



16th International Congress of Phonetic Sciences

Book of Abstracts

www.icphs2007.de

Edited by Jürgen Trouvain and William J. Barry

Previous Congresses

1st	Amsterdam	(1932)
2nd	London	(1935)
3rd	Ghent	(1938)
4th	Helsinki	(1961)
5th	Münster	(1964)
6th	Prague	(1967)
7th	Montréal	(1971)
8th	Leeds	(1975)
9th	Copenhagen	(1979)
10th	Utrecht	(1983)
11th	Tallinn	(1987)
12th	Aix-en-Provence	(1991)
13th	Stockholm	(1995)
14th	San Francisco	(1999)
15th	Barcelona	(2003)

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Message from the General Chair

Dear Colleagues,

On behalf of the Phonetic Sciences in Germany, I welcome you to Saarbrücken and the Saarland. Though Saarbrücken is the venue, it was a Consortium of Phoneticians from the whole country that was accorded the honour of hosting the XVIth ICPhS, 43 years and 11 congresses after the last meeting in Germany, in Münster, Westphalia.

For us, one of the important things about such a Congress is the signal it sends to the emerging generation of speech scientists. As far as Germany is concerned, many have come here from their universities to act as student helpers in the minute-to-minute running of the Congress. Being part of the events here and experiencing the intellectual excitement of discussions and of the exchange of results and ideas will, we hope, serve to strengthen their interest and inspire their own future work in speech research.

But equally important is what such a Congress demonstrates to the “Powers That Be”. It shows the breadth and depth of activity in an area of scientific endeavour that focuses on what is, and always has been, central to human communal life – speech communication. It is the breadth of the activity which constitutes the special nature of the Phonetic Sciences. But it is also what makes them vulnerable to the fast-changing and increasingly commercially-driven fashions that attract the attention of potential funding bodies. They can lead to a neglect of the fundamental question that drives all the disparate branches of the Speech Sciences: How does speech work?

The political and financial pressures for “reform” that keep our educational systems and the contents of our university curricula in flux also make it a challenge to maintain an awareness of what the Phonetic Sciences are and what they contribute to our understanding of so many organizationally separated aspects of science. Without this awareness, there is a real danger that phonetics teaching will be fragmented into the parts that all the participating sciences contribute to the whole, which is, I claim, much more than the sum of the parts.

We therefore rely on the International Congress of Phonetic Sciences as the public declaration of a common core interest in all aspects of spoken language, and it is as such that we are proud to offer our hospitality – intellectual and corporeal – to you all.

You will have noticed that the venue we have provided is a long way from the luxury conference centres to which many of you may have become accustomed over the past decade or so. We trust, however, that the functionalities we offer are efficient, and the more Spartan conditions will help to concentrate the mind on all the exciting scientific issues being presented here this week. But we also secretly hope that the proverbial friendliness of the Saarland people will help create an atmosphere that will transcend any lack of environmental luxury.

On behalf of the Programme Committee I wish you all a stimulating congress.

William J. Barry

General Chair

Welcome from the President of the Permanent Council of the ICPhS

Dear Phonetic Scientists,

It gives me great pleasure to welcome you to the XVIth International Congress of Phonetic Sciences. You are attending the Jubilee Congress, marking 75 years of interdisciplinary exchange among the international phonetic community since the first meeting of phonetic scientists in Amsterdam in July 1932. I am also very pleased that the Congress has returned to Germany, where it was held in 1964, thus paying tribute to the country's rich tradition in phonetics. In this linguistically diverse area of Europe, where West-Germanic, Romance, Scandinavian, and Slavonic languages share frontiers, now open, the choice of Saarbrücken as the Congress site offers the additional attraction of a quick hop into France, Luxemburg, Belgium or Holland, all in close proximity.

The international and interdisciplinary orientation, which shaped the very first gathering in our Congress series and which found its expression in its name, has not only been kept but has been expanded. Whereas the Amsterdam meeting was mainly European, with few participants from outside, and those only from the United States and Japan, the Congress has since then increasingly spanned the world. And the number of fields represented under its phonetic roof has grown, with new techniques of speech analysis, synthesis and application becoming absorbed. The numbers of participants and presentations then – 136 and 45 – are dwarfed by their many-fold increases in Saarbrücken. The local committee of the 2007 event deserves our gratitude for having taken on such a massive commitment as the organization of a congress of these huge dimensions.

Two changes have taken place of late in the way the International Congresses of Phonetic Sciences are administered by the community of phonetic scientists. In Amsterdam, an international and interdisciplinary committee was elected, which came to be known as the Permanent Council for the Organization of ICPhS. It was to decide on future Congresses, elect their Presidents, select the Congress sites, and oversee the scientific standard of the meetings. This Permanent Council became the foundation on which the Congresses were built; it continued to exist, albeit dormant, during World War II, and it is due to its members that the Congress could be revived in Helsinki in 1961. It was exceptional among scientific congresses in that it did not have the backing of a learned society. To adjust this, the Executives of the Permanent Council and of the International Phonetic Association negotiated a union between them. This resulted in the International Congress of Phonetic Sciences being held under the auspices of the IPA as from 2003. It also meant that the Permanent Council became a committee of the IPA, but keeping its original functions and a semi-autonomous status, with its own Executive as before, but 14 of its 25 members now elected by the IPA instead of by the Permanent Council. This new composition has just been finalized. So, the XVIth International Congress of Phonetic Sciences in Saarbrücken is the first to be run under the IPA and a new Permanent Council. On their behalf, I wish the Congress organizers a very successful and rewarding completion of their dedicated efforts and their hard work, and all of us lots of exciting and fruitful discussions of current research in the Phonetic Sciences.

Klaus J. Kohler

President of the Permanent Council for the Organization of ICPhS

Welcome Note of the Patronesse – Grußwort der Schirmherrin

Das Wissenschaftsjahr 2007, das den Geisteswissenschaften in ihrer ganzen Vielfalt gewidmet ist, versammelt unter dem Thema „Sprache“ eine breite Palette menschlicher Artikulationsformen: In Kunst und Kultur, in Wissenschaft und Politik spielt Sprache die zentrale Rolle bei der Erschließung der Wirklichkeit. Auch wenn mit dem Thema „Das ABC der Menschheit“ die Sprachen der Kunst, der Musik und sogar Symbolsprachen der Mathematik oder der Naturwissenschaften mit gemeint sind, kommt doch der Sprache im engeren Sinne eine besondere Bedeutung zu.

Der XVI. Internationale Phonetik-Kongress findet in diesem Jahr in Deutschland statt und dokumentiert auf diese Weise eindrücklich, welches Gewicht die deutsche Sprachforschung auch international hat. Das Themenspektrum des Kongresses ist beeindruckend und lässt erahnen, wie bedeutungsvoll die Phonetik für die Sprachforschung aber auch für die Lern- und Bildungsforschung, die Soziologie, die Psychologie oder der Rechtswissenschaft ist. Im Dialog mit der Neurobiologie wird das enge Verhältnis von Geistes- und Naturwissenschaften deutlich.

Im Mittelpunkt der Phonetik steht die gesprochene Sprache in all ihren Facetten – und damit die Grundlage der alltäglichen Kommunikation, aber auch die Grundlage jedes wissenschaftlichen Arbeitens. Wissenschaft und Forschung leben von Sprache, die ihre Gegenstände erschließt und diskutabel macht. Sie sind für die intersubjektive Kommunikation ihrer Ergebnisse auf Sprache angewiesen – auch da noch, wo auf den ersten Blick nur die Messergebnisse sprechen.

Die Phonetiker leisten einen wichtigen Beitrag zur Klärung der komplexen Bedingungen dieser Grund-Verständigung und tragen dazu bei, sie weltweit zu sichern. Für diese Aufgabe wünsche ich dem XVI. Internationalen Phonetik-Kongress viel Erfolg und einen guten und ertragreichen Verlauf.

Dr. Annette Schavan, MdB

Bundesministerin für Bildung und Forschung

Note from the Editors

Dear Colleagues,

As usual for the Phonetics Congresses, the programme of the XVIth ICPhS offers an extraordinary diversity of topics. They come to you in three different types of presentation.

The two *keynote* addresses in the opening plenary session provide insight into two less mainstream areas of speech research and illustrate two different methodologies, one representing an extension and new developments of more traditional phonetic analysis, the other firmly rooted in modern technology. But they address two of perhaps the most central aspects of speech communication, namely that we talk with one another, and that we normally talk face to face.

Twelve *Special Sessions* with their 66 papers deal with themes that are currently subject to lively discussion or which have not generally been focused on previously. The sessions have been initiated and organized by scientists with the enthusiasm and commitment to undertake the onerous task of bringing experts together and coordinating their contributions.

For the *Regular Sessions* 467 oral and poster presentations were selected from 708 papers submitted to more than twenty thematic areas. “Speech Prosody” received by far the most submissions — a clear indication of the increased interest in “higher level” structuring in speech, but also of the need for thematic and terminological differentiation in that area.

The Programme Committee decided to introduce two novel aspects to the procedure of paper submission. Instead of the traditional short abstracts, an *anonymised* four-page *full paper* was subjected to review. The review process was therefore more demanding than usual, calling for an extended number of reviewers: 351 reviewers proposed by the Programme Committee and supplemented by the International Advisory Committee reported on between 1 and 10 papers within their fields of expertise. In cases of diverging or unclear opinion, a third review was sought from the appropriate person on the International Advisory Committee. From the papers submitted for presentation in regular sessions, 66% were accepted. Although the reviewing process needs improvement, in particular with regard to the specificity and usefulness of the comments provided for the authors, a questionnaire sent to the reviewers showed that the majority of them believes that full-paper submission and anonymous submission are, in principle, to be preferred. It is the conviction of the editors that the exercise of presenting research results clearly and succinctly on only four pages in a peer-reviewed conference paper is a valuable exercise for the presentation of more extensive studies in journals.

We thank all reviewers, the organisers of Special Sessions and all invited speakers for their contribution to the Congress Proceedings, which will also be available on the Web.

Jürgen Trouvain and William J. Barry

Number of papers per country

(According to first author)

Australia	12
Austria	1
Belgium	7
Brazil	3
Canada	14
China	6
Croatia	3
Czech Republic	4
Denmark	3
Estonia	4
Finland	10
France	49
Germany	74
Greece	3
Hong Kong	8
Hungary	1
Iran	2
Ireland	3
Israel	4
Italy	10
Japan	24
Jordan	1
Korea	2
Malta	1
Morocco	2
Netherlands	30
New Caledonia	1
New Zealand	1
Norway	5
Poland	4
Portugal	2
Russia	3
Singapore	1
Spain	15
Sweden	11
Switzerland	4
Taiwan	8
United Kingdom	74
United States	125
Total	535

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- Christoph Clodo
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Satellite Events

ICPhS satellite workshops:

- *Phonetics and Phonology in Third Language Acquisition*
(August 3-4, 2007, in Freiburg)
<http://www.phonetik.uni-freiburg.de/L3phonology>
- *Paralinguistic Speech - between Models and Data*
(August 3, 2007, in Saarbrücken)
<http://dfki.de/paraling07>
- *The Phonetics of Laughter*
(August 4-5, 2007, in Saarbrücken)
<http://www.coli.uni-saarland.de/conf/laughter-07/>
- *Intonational Phonology: Understudied or Fieldwork Languages*
(August 5, 2007, in Saarbrücken)
<http://www.linguistics.ucla.edu/people/jun/Workshop2007ICPhS/intonation.htm>
- *EMA (Electromagnetic Articulography)*
(August 11, 2007, in Saarbrücken)
http://www.articulograph.de/Workshop_on_EMA.htm
- *6th ISCA Speech Synthesis Research Workshop – SSW-6*
(August 22-24, 2007, in Bonn)
<http://www.isca-speech.org/ssw6/>
- *Temporal Dynamics in Speech and Hearing*
(August 26, 2007, in Antwerp, Belgium)
<http://www.silicon-speech.com/workshop>

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Monday, 9:20**Keynote Talks**

Monday, 9:20, Room: 1 (Red)

Chair: Bill Barry

PHONETIC DETAIL AND THE ORGANISATION OF TALK-IN-INTERACTION*John Local*

University of York

ID 1785

[full paper]

This paper examines some methodological and empirical issues concerning phonetic detail and phonetic variability and the work they accomplish in everyday talk-in-interaction. By considering the phonetic and sequential design of a variety of conversational practices I show that phonetic aspects of language should in the first instance be understood as shaped by interactional considerations. I argue that in order to provide a robust account for the organisation and functioning of phonetic detail in everyday conversation we need to: i) enrich our understanding of 'context' and 'communicative function'; ii) develop a theory of phonetic exponency which derives from a sequential, action-based analysis of talk-in-interaction, and iii) treat all phonetic resources equally and not give analytic privilege to one kind of phonetic parameter over another. If we adopt this approach, it becomes possible to document systematically the ways in which speakers and listeners use fine phonetic detail and phonetic variability in producing and interpreting the moment-to-moment flow of everyday talk.

INSIDE OUT – ACOUSTIC AND VISUAL ASPECTS OF VERBAL AND NON-VERBAL COMMUNICATION*Björn Granström & David House*

Centre for Speech Technology, KTH, Stockholm

ID 1786

[full paper]

In face-to-face communication both visual and auditory information play an obvious and significant role. In this presentation we will discuss work done, primarily at KTH, that aims at analyzing and modelling verbal and non-verbal communication from a multi-modal perspective. In our studies, it appears that both segmental and prosodic phenomena are strongly affected by the communicative context of speech interaction. One platform for modelling audiovisual speech communication is the ECA, embodied conversational agent. We will describe how ECAs have been used in our research, including examples of applications and a series of experiments for studying multimodal aspects of speech communication.

Monday, 11:00**Prosody I: Dialect Intonation**

Monday, 11:00, Room: 1 (Red)

Chair: Gösta Bruce

INTONATIONAL AND TEMPORAL FEATURES OF SWISS GERMAN*Adrian Leemann & Beat Siebenhaar*

Institut für Sprachwissenschaft, Universität Bern

ID 1468

[full paper]

The study examines the timing of 10 speakers and the intonation of 6 speakers of two Swiss German dialects. Results show that the relative mean duration of segments and final lengthening are only similar in the two dialects observed. A crucial difference is that Valais speakers generally speak at a faster rate. In terms of intonation, the Valais produce more accent commands than the Bernese; largely due to stressing more lexical words than the Valais. Phrase accents are fairly weak as opposed to standard German. The study shows phonetically motivated differences in Swiss German dialectal prosody.

EFFECTS OF DIALECT AND CONTEXT IN THE REALISATION OF GERMAN PRENUCLEAR ACCENTS*Bettina Braun*

Max-Planck-Institute for Psycholinguistics, Nijmegen

ID 1683

[full paper]

We investigated whether alignment differences reported for Southern and Northern German speakers (Southerners align peaks in pre-nuclear accents later than Northerners) are carried over to the production of pragmatic contrast. Therefore, the realization of non-contrastive theme accents is compared with those in contrastive theme-rheme pairs such as 'Sam rented a truck and Johanna rented a car.' We found that when producing this 'double-contrast', speakers mark contrast both phonetically by delaying and rising the peak of the theme accent ('Johanna') and/or phonologically by a change in rheme accent type. The effect of dialect is complex: Only in non-contrastive contexts produced with a high rheme accent Southerners align peaks later than Northerners. Further, peak delay as a means to signal contrast is not used uniformly by the two varieties. Dialect clearly affects the realization of pre-nuclear accents but its effect is conditioned by pragmatic and intonational context.

NUCLEAR ACCENTS IN FOUR IRISH (GAELIC) DIALECTS*Martha Dalton & Ailbhe Ní Chasaide*

Trinity College Dublin

ID 1640

[full paper]

In this paper the distribution of nuclear accents in declaratives of four major dialects of Irish is described. The findings show considerable variation, particular be-

tween northern and southern dialects. Speakers of the northern dialect of Donegal show a propensity for rising nuclear accents (L*+H) in declaratives, while speakers of the other, more southern, dialects of Mayo, South Connaught and Kerry Irish show a preference for falling nuclear (H*+L) accents. The findings are compared with results for varieties of English.

Acoustics I: Speaker-Specific Aspects

Monday, 11:00, Room: 2 (Orange)

Chair: Henning Reetz

SPEAKER NORMALIZATION OF FRICATIVE NOISE: CONSIDERATIONS ON LANGUAGE-SPECIFIC CONTRAST*Martine Toda*

ENST/LTCI UMR 5141, CNRS

ID 1550

[full paper]

Both frication noise and vowel formants cue the place of articulation of sibilant fricatives (e.g., /s/ and /sh/ in English). However, only few studies have examined the effect of speaker-specific factors. This acoustic study of sibilant fricatives examines how speaker-specific formant information can improve the distinctness of two phonemic categories of sibilants: /s/ vs. /sh/ in French and /s/ vs. /sj/ in Japanese. The results show that the center of gravity of the frication noise, normalized with respect to the subject-specific coefficient of vowel onset or vowel center formants, in overall provide an appreciable improvement in the sibilant distinctness. While the distinctness score of the subject-normalized noise is generally higher in French than in Japanese, the F2 onset patterns (/s/ < /sj/) are throughout consistent only in Japanese. These language-specific behaviors are discussed in relation with the respective phonological system.

ENGLISH LEXICAL STRESS CUES IN NATIVE ENGLISH AND NON-NATIVE ARABIC SPEAKERS*Wael Zuraig¹ & Joan Sereno²*¹Hashemite University; ²University of Kansas

ID 1653

[full paper]

Individuals who speak English as a second language vary in their ability to produce appropriate stress, which often impedes their intelligibility. The present study investigated the production of lexical stress by native speakers of English as well as learners of English. Minimal pairs were recorded by 8 native speakers of English and 8 Arabic learners of English. A second experiment examined use of acoustic cues to indicate stressed syllables in Arabic (8 speakers). In both experiments, four acoustic cues were examined: duration, fundamental frequency, amplitude, and second formant frequency. Differences in the use of these cues were observed across speaker groups (native and non-

native speakers) for fundamental frequency and second formant frequency. These differences in use of cues to signal stress were only partially related to use of these acoustic cues in the speakers' first language.

ACCENT MORPHING AS A TECHNIQUE TO IMPROVE THE INTELLIGIBILITY OF FOREIGN-ACCENTED SPEECH

Kayoko Yanagisawa & Mark Huckvale

UCL

ID 1486

[extra files] [full paper]

Accent morphing aims to modify the accent of a speaker whilst maintaining speaker identity. A text-independent approach could be based on voice conversion systems which manipulate speaker identity through spectral mapping. However, it is not clear to what extent accent changes can be captured with spectral mapping alone. In this paper we implement and evaluate a text-dependent accent morphing system capable of manipulating both spectral and prosodic features. We show how accent morphing can significantly improve the intelligibility of English-accented Japanese sentences to native Japanese listeners (from 57% to 84% words correct). Analysis of the different processing conditions shows that much of the benefit of morphing comes from integrated changes to both spectrum and prosody. This suggests that text-independent morphing is unlikely to provide anything but a small increase in intelligibility.

Production I: Imitation and Learning

Monday, 11:00, Room: 3 (Yellow)

Chair: Valerie Hazan

PERCEPTION AND IMITATION OF FINNISH OPEN VOWELS AMONG CHILDREN, NAÏVE ADULTS, AND TRAINED PHONETICIANS

Lotta Alivuotila¹, Jussi Hakokari², Janne Savela², Risto-Pekka Happonen¹ & Olli Aaltonen³

¹Department of Oral and Maxillofacial Surgery, University of Turku; ²Department of Information Technology, University of Turku; ³Department of Phonetics, University of Turku

ID 1532

[full paper]

We have compared identification and imitation of a synthetic vowel continuum varying from [æ] to [ɑ] among Finnish speakers. Results indicate that special practice is needed for listeners to monitor only the sensory information in imitation and to bypass what is learned and stored in long-term memory. We had three kinds of participants: preschool children, naïve adults, and phoneticians. All the groups were able to identify the vowels systematically in the listening experiments, although individual differences were found in the location of the category boundary. Adults performed better than children in goodness rating. The experts rated goodness accurately. After the listening tests, the partic-

ipants imitated the same stimuli. In this condition imitation proved to be categorical among children and naïve adults as the previous studies have suggested. Phoneticians could imitate gradually changing vowel qualities without any abrupt changes reflecting the way how the continuum was categorized into phonemes.

CHILDREN'S CLEAR SPEECH SUGGESTS WORD-LEVEL TARGETS: PRELIMINARY EVIDENCE

Melissa A. Redford¹ & Christina E. Gildersleeve-Neumann²

¹University of Oregon; ²Portland State University

ID 1544

[full paper]

The development of clear speech was examined in a cross-sectional study of three-, four-, and five-year-old children. Thirty children produced target monosyllabic words with monophthongal vowels in clear and casual speech conditions. Vowel acoustics were measured and adults were asked to provide clear speech ratings on either the vowel or the whole word. The results provided little evidence that young children hyperarticulate vowels in clear speech. Rather, the results suggest that children aim for more adult-like word targets in clear compared to casual speech.

INDUCING IMITATIVE PHONETIC VARIATION IN THE LABORATORY

Véronique Delvaux¹ & Alain Soquet²

¹FNRS/Université de Mons-Hainaut; ²Université de Mons-Hainaut

ID 1318

[full paper]

Vocal imitation governs speech acquisition. But the role of imitation in the routine phonetic behavior of adult speakers still needs to be investigated. The experiment reported here is an attempt to induce imitative phonetic variation in the laboratory. The experimental setting aims at giving rise to modifications in the phonetic realizations of speakers who are exposed to a recorded speaker from another French dialect. Results show that the speakers' productions get closer to the productions they are exposed to, although the instructions are not to imitate or even to listen to the recorded speaker. We discuss the implications of this finding for the study of the emergence and the propagation of sound changes within a speech community.

Perception I: Incomplete Neutralisation

Monday, 11:00, Room: 4 (Green)

Chair: Michel Scheffers

EVIDENCE OF /l/-/r/ CONTRAST IN KOREAN

Joe Eun Kim

University College London

ID 1257

[full paper]

This paper reports an investigation of the nature of

allophonic variation in the single liquid phoneme of standard Korean. Alveolar tap and alveolar lateral allophones are in strict complementation, and an intervocalic length contrast of singleton tap vs. geminate lateral also arises on the surface. These are sometimes cited as reasons Koreans do better at the English /l/-r/ distinction than other learners who similarly lack an underlying L1 contrast. To investigate native perception of the two intervocalic possibilities, waveform editing was used to eliminate the duration difference between geminate laterals and singleton taps in recordings of natural speech. In a forced-choice test, all listeners identify the edited stimuli as containing the lateral (90.5% identification rate), suggesting that duration is not a deciding factor in identification. Instead, Korean L1 speakers appear sensitive to non-durational differences, and thus effectively have a latent /l/-r/ contrast.

ON THE PERCEPTION OF INCOMPLETE NEUTRALIZATION

Cynthia Kilpatrick¹, Ryan K. Shosted² & Amalia Arvaniti¹

¹University of California, San Diego; ²University of Illinois at Urbana-Champaign

ID 1255

[full paper]

The perception of American English epenthetic and underlying stops (as in prin[t]ce~prints) was examined in a forced-choice identification experiment that controlled for word frequency and familiarity, closure duration and presence of burst. Previous production data have shown durational differences between epenthetic and underlying [t]. The present results support this generalization, but only for familiar words: listeners appear more sensitive to distinctions between short and long closure durations, tending to categorize those with short duration as “nce” words.

ORDER EFFECTS AND VOWEL DECAY IN SHORT-TERM MEMORY: THE NEUTRALIZATION HYPOTHESIS

Charalampos Karypidis

LPP - UMR 7018, CNRS / Université de la Sorbonne Nouvelle - Paris 3

ID 1517

[full paper]

In this paper, we examine the presentation order effect in the light of the neutralization hypothesis, according to which the first vowel in a pair decays, during its storing in memory, toward [er]. 12 French listeners participated in three AB discrimination sessions. For each phonetic category, a prototype and four satellite tokens were synthesized, each paired with the prototype. Results revealed minor or major order effects in the interior of every phonetic category. Nonetheless, the neutralization hypothesis could not account for at least half of these asymmetries. An explanation justifying nearly all order effects is proposed, sustaining that the periphery of the vowel space serves as a reference area triggering a contrast effect.

Universals and Typology

Monday, 11:00, Room: 5 (Blue)

Chair: Eric Zee

A PERCEPTUAL SIMILARITY SPACE FOR LANGUAGES

Ann Bradlow¹, Cynthia G. Clopper² & Rajka Smiljanic¹

¹Northwestern University; ²The Ohio State University

ID 1041

[full paper]

The goal of the present study was to devise a means of representing languages in a perceptual similarity space based on their overall sound structures. In Experiment 1, native English listeners performed a free classification task in which they grouped 17 diverse languages based on their sound similarity. A similarity matrix of the grouping patterns was then submitted to clustering and multidimensional scaling analyses. In Experiment 2, an independent group of native English listeners sorted the group of 17 languages in terms of their distance from English. Taken together, the results of the two experiments provide the basis for developing predictions regarding foreign-accented speech intelligibility.

THE ORGANIZATION OF PHONOLOGICAL INVENTORIES - AN ARTICULATORY APPROACH

Michael Ian Proctor

Yale University

ID 1668

[full paper]

The phonological inventories of the world's languages vary remarkably in their size and constituency, when modeled as sets of phonemes or systems of distinctive features. An alternative approach to the analysis of inventories can be made, based on the premise that the phonological primitives represented in the inventory, the lexicon and the speech signal are one and the same – coordinated actions of the vocal tract. Described in articulatory terms, the differences between inventories of different languages may not be as significant as feature and segment-based characterizations suggest. Comparative estimates of the entropy of different inventory structures suggest that an articulatory model may provide a more parsimonious account of the salient contrasts than a feature-based approach. Under an articulatory account, both consonantal and vocalic inventories can be explained using the same theoretical apparatus, and ‘complex’ segments can be explained in temporal terms.

AREAL DISTRIBUTION OF NASALIZED VOWELS

Ian Maddieson

University of New Mexico

ID 1676

[full paper]

This paper reviews the typology and distribution of vowel systems which include nasalized vowels. It is well-known that languages with distinctively nasal-

ized vowels have an equal or lower number of nasalized vowel qualities than of oral vowel qualities. However, there are interesting areal differences in the distribution of systems with equal and fewer numbers of nasalized vowels. Languages in Africa usually have fewer nasalized than oral vowels; languages in the southern part of the Americas more often have equal numbers of oral and nasalized vowel qualities. The latter pattern is sometimes associated with a morphological function for vowel nasalization.

Phonetic Neurolinguistics

Monday, 11:00, Room: 6 (Black)

Chair: Ingo Hertrich

NEUROPHYSIOLOGICAL MEASURES OF SPEECH PERCEPTION AS PRECURSORS OF DYSLEXIA

Ben Maassen¹, Jaco Pasman² & Marieke van Herten²

¹Medical Psychology; Radboud University Nijmegen Medical Center; ²Neurology; Radboud University Nijmegen Medical Center

ID 1225

[full paper]

Developmental dyslexia is a language disorder which affects the phonological domain. This prospective longitudinal study aims to determine whether early markers in auditory processing can be found that contribute in the prediction of later reading problems. Over 200 children, genetically at risk of dyslexia, and a control group of over 100 children are followed from age 2 months to age 10 years. The research protocol consists of neurophysiological and behavioral measurements twice a year. This presentation reports on two studies to assess auditory information processing, by means of neurophysiological registrations, in particular auditory event-related potentials (AERPs), at age 2 and 17 months. Results showed, first a consistent pattern of responses across ages, and second quantitative AERP differences between at risk and control children. These results can be interpreted in terms of the underlying auditory processing deficits in developmental dyslexia, and can be used as clinical precursors for early intervention.

CEREBRAL CORRELATES OF MULTIMODAL POINTING: AN FMRI STUDY OF PROSODIC FOCUS, SYNTACTIC EXTRACTION, DIGITAL- AND OCULAR- POINTING

Hélène Loevenbruck¹, Coriandre Vilain¹, Francesca Carota², Monica Baciur³, Christian Abry¹, Cédric Pichat³, Laurent Lamalle⁴ & Christoph Segebarth⁵

¹ICP, Speech and Cognition Department, GIPSA-lab; ²Institut des Sciences Cognitives; ³Laboratoire de Psychologie et Neurocognition; ⁴INSERM IFR 1; ⁵INSERM U594

ID 1658

[full paper]

Deixis or pointing plays a crucial role in language acquisition and speech communication and can be conveyed in several modalities. The aim of this paper is to explore the cerebral substrate of multimodal pointing. We present an fMRI study of pointing including: 1) index finger pointing, 2) eye pointing, 3) prosodic focus, 4) syntactic extraction. Fifteen subjects were examined while they gave digital, ocular and oral responses inside the 3T imager. Results of a random effect group analysis show that digital and prosodic pointings recruit the parietal lobe bilaterally, while ocular and syntactic pointings do not. A grammaticalization process is suggested to explain the lack of parietal activation in the syntactic condition. Further analyses are carried out on the link between digital and prosodic parietal activations.

BALANCED BILINGUALS HAVE ONE INTER-TWINED PHONOLOGICAL SYSTEM

Maija S. Peltola, Henna Tamminen, Heidi Lehtola & Olli Aaltonen

Department of Phonetics and the Centre for Cognitive Neuroscience

ID 1184

[extra files] [full paper]

Speech sound perception is based on automatically responding neural memory traces. In order to see, whether balanced bilinguals have two separate phonological systems, which can be activated in accordance with the linguistic context, we performed discrimination tasks and recorded the mismatch negativity (MMN) response from 12 Finnish-Swedish bilinguals in both linguistic contexts. Our results suggest that vowels are perceived by an intertwined phonological system, which includes the representations for the phonological categories of both languages. This system is triggered equally efficiently by both languages.

Monday, 13:20**Prosody II: Intonational Phonology**

Monday, 13:20, Room: 1 (Red)

Chair: Anton Batliner

THE FOOT AS THE DOMAIN OF TONAL ALIGNMENT OF INTONATIONAL PITCH ACCENTS*Sam Hellmuth*

University of Potsdam

ID 1615

[full paper]

This paper presents evidence from an experimental investigation of the alignment properties of pre-nuclear rising pitch accents in Egyptian Arabic, across different syllable types (CV, CVV and CVC). In both CVC and CVV syllables, the H peak is aligned within the second mora of the syllable, but in CV syllables the H peak appears in the following (light) syllable. We argue that these generalizations support adoption of the (metrical) foot as the domain of tonal alignment of intonational pitch accents in Egyptian Arabic, and discuss this finding in the context of current debate regarding tonal alignment in intonation languages.

LEVELS OF THE PROSODIC HIERARCHY IN ENGLISH*Molly Shilman*

UCLA Linguistics Department

ID 1302

[full paper]

Many theories of the internal structure of prosodic systems—and of the mapping between syntax and phonology—predict that there can be no prosodic head without a corresponding prosodic phrase. The English post-lexical pitch accent has the characteristics of a prosodic head but is not associated with any known prosodic phrase. Based on our knowledge of the prosodic hierarchy of English, a phrase headed by pitch accent would be larger than a word and smaller than an Intermediate phrase. This paper reports evidence of such a phrase, i.e., accent domain.

EVIDENCE FOR TONAL IDENTITY FROM PEAK SCALING UNDER PITCH SPAN VARIATION*Martine Grice, Stefan Baumann & Nils Jagdfeld*

IfL Phonetik, University of Cologne

ID 1214

[full paper]

In a reading task we investigate the scaling of pitch accents in neutral and lively speech in German. We first show that lively speech tends to increase the pitch span, raising the F0 targets for H tones but little affecting those for L tones. We then investigate the scaling of a tone whose identity is controversial: the second tone, X, of an early peak accent (H+X*). This pitch accent is employed on inferentially accessible referents and has been analysed as H+!H* as well as H+L*. Our finding that the F0 target for X is clearly raised in lively speech favours

its analysis as a downstepped high tone in a H+!H* pitch accent.

Clinical Phonetics I

Monday, 13:20, Room: 2 (Orange)

Chair: William Hardcastle

PROSODIC BOUNDARY IN THE SPEECH OF CHILDREN WITH AUTISM*Susan Jean Evadne Peppe*

Queen Margaret University

ID 1253

[full paper]

Expressive prosody is thought to be disordered in autism, and this study sets out to evaluate one aspect (prosodic boundary) to investigate how naïve judges rate utterances for atypicality; whether pitch and duration measurements in those utterances differ from those of typically-developing children; and whether children with autism can use prosodic boundary in speech for linguistic distinctions. Samples were drawn from children with language-delayed high-functioning autism (LD-HFA), with Asperger's syndrome (AS), and with typical development (TD). Results showed that naïve judges perceived children with LD-HFA as sounding more atypical than those with AS, who were marginally more atypical than those with TD. Measurements suggested those with LD-HFA had wider pitch-span than those with TD. The groups did not differ on linguistic functionality, and it is possible that factors other than prosody contributed to the perception of atypicality.

AN ACOUSTIC ANALYSIS OF VOWELS PRODUCED BY GREEK SPEAKERS WITH HEARING IMPAIRMENT*Katerina Nicolaidis & Anna Sfakianaki*

Aristotle University of Thessaloniki

ID 1358

[full paper]

The study examines F1, F2 formant frequencies and duration of all five Greek vowels produced by six Greek speakers with profound hearing impairment and six speakers with normal hearing (three male and three female in each group). The speech material analysed was of the form /'pVCV/ where V= /i, e, a, o, u /, C=/p, t, k, s/. The study discusses differences in the above acoustic parameters as a function of hearing level, gender, stress and context. The results show longer vowel durations and a reduction of the vowel space for the speakers with hearing impairment. Significant variability due to stress and context was evident between the two groups. The paper discusses findings with reference to perceptual constraints affecting the speech of individuals with hearing impairment.

ACOUSTIC ANALYSIS OF OCCLUSIVE WEAKENING IN PARKINSONIAN FRENCH SPEECH

Danielle Duez

CNRS

ID 1417

[full paper]

The current study was aimed at investigating some acoustic characteristics of Occlusive (O)-weakening in French Parkinsonian Speech (PS). Compared to Control Speech (CS), PS exhibit an increase in the reduction and assimilation of O's to context. At the acoustic level this is reflected by a larger number of absent bursts, a decrease in energy, a change of O's into their sonorant and fricative counterparts and omissions of speech sounds. In PS, the rigidity of muscles and the difficulty in initiating movements result in a decrease in the amplitude of speech gestures. O-weakning which is the consequence of PD production deficits appears to be influenced by the inherent-articulatory characteristics of consonants and is highly variable.

Production II: Vocal Tract Modelling

Monday, 13:20, Room: 3 (Yellow)

Chair: Louis Goldstein

3D AUDITORY-ARTICULATORY MODELING OF THE LARYNGEAL CONSTRICTOR MECHANISM

Scott Moisk & John H. Esling

University of Victoria

ID 1559

[extra files] [full paper]

The vocal tract is reinterpreted in the context of the laryngeal articulator model, which integrates the functions of the laryngeal and oral components of the vocal tract. To account for the action of pharyngeal-resonator reduction, for constricted phonation types, and for the interaction of glottal pitch with the laryngeal constrictor mechanism, a three-dimensional model has been developed on the basis of auditory parameters and extrapolation from articulatory data sources. A critical aspect of the proposed model is the functioning of the aryepiglottic sphincter, formed by the aryepiglottic folds at the upper border of the larynx articulating towards the epiglottis. The novel feature of this model is the inclusion of a separate and 'reversed' action of the laryngeal component.

SIMULATION OF VOCAL TRACT GROWTH FOR ARTICULATORY SPEECH SYNTHESIS

Peter Birkholz¹ & Bernd J. Kröger²

¹Institute for Computer Science, University of Rostock;

²Department of Phoniatrics, Pedaudiology, and Communication Disorders, University Hospital Aachen

ID 1153

[full paper]

We present a three-dimensional articulatory model of the vocal tract with the capability to simulate growth from infancy to adulthood. This model is intended to

be applied for the articulatory synthesis of children's speech and the study of speech acquisition. To generate the vocal tract shape for a given age and sex, we resize and translate the anatomic structures of an adult reference vocal tract according to natural growth patterns. Furthermore, we discuss the transformation of the articulatory state of the reference vocal tract to the articulation for a vocal tract with a changed anatomy. The articulatory transformation was examined for the vocal tract of an 11-year-old boy by means of six vowels. To reproduce the formant frequencies measured for children of that age, it is not enough to scale the articulation (especially the tongue shape) analogous to the changes of the palatal and pharyngeal length.

PREDICTION OF THE ABILITY OF RECONSTITUTED VOCAL TRACTS OF FOSSILS TO PRODUCE SPEECH

Jean Granat¹, Louis-Jean Boë², Pierre Badin³, David Pochic⁴, Jean-Louis Heim¹, Evelyne Peyre¹ & Roland Benoit⁵

¹Museum National d'Histoire Naturelle, Paris; ²GIPSA - ICP Université Stendhal, Grenoble; ³GIPSA - ICP INPG, Grenoble; ⁴ENSERG, Grenoble; ⁵Université de Paris V, Paris

ID 1707

[full paper]

This work is part of a project in the quest of the origin of speech. From classical bony landmarks of the head and jaw used in anthropology, and using a generic model of the vocal tract, we applied the prediction of geometric limits of the vocal tract for modern man to fossils covering a period from 10 ka until 2 Ma (Paleolithic period). We conclude that all the reconstituted vocal tracts could produce the same variety of speech sounds that can produced by modern humans. However, we do not know to what extent ancient humans mastered the control skills needed to produce speech.

Phonetic Psycholinguistics I: Segmental Effects

Monday, 13:20, Room: 4 (Green)

Chair: Holger Mitterer

IF SYLLABLES WERE CLASSIFICATION UNITS IN SPEECH PERCEPTION, AUDITORY PRIMING WOULD SHOW IT

Nicolas Dumay¹, Alain Content² & Monique Radeau³

¹University of Bristol; ²Université libre de Bruxelles;

³National Fund for Scientific Research

ID 1158

[full paper]

Two auditory priming experiments tested whether the final overlap effect relies on syllabic representations. Amount of shared phonetic information and syllabic correspondence between prime and target non-words were varied orthogonally. In the related conditions, CV.CVC primes and targets shared the last syllable.

ble (e.g. pinclude-viclude) or the last syllable minus one phoneme (e.g. pinclude-viflud); conversely, CVC.CVC primes and targets shared the last syllable (e.g. goltibe-purtibe) or the last syllable plus one phoneme (e.g. goltibe-pultibe). Both experiments required to repeat back the targets, with Experiment 2 including foils. The facilitation induced by related primes increased with the number of shared phonemes, and was by and large independent of syllabic correspondence. There is thus little evidence for pre-lexical syllabic classification.

THE EFFECT OF MISMATCHING SEGMENTAL INFORMATION ON THE MASKED ONSET PRIMING EFFECT (MOPE)

Niels Olaf Schiller¹ & Sachiko Kinoshita²

¹Leiden Institute for Brain and Cognition; ²Macquarie Centre for Cognitive Science

ID 1185

[full paper]

We report two experiments investigating the masked onset priming effect (MOPE) in reading aloud. More specifically, we tried to answer the question of whether or not mismatching segments in the prime have an inhibitory effect on the MOPE. Dutch native speakers saw four-letter target words preceded by visually masked primes that either consisted of whole words or letters, and either matched or did not match the onset segment of the target. Prime exposure duration was varied between 33 ms and 66 ms to investigate the time course of the obtained effects. Whole-word primes behaved the same as letter primes at the short (33 ms) prime exposure duration, whereas at longer prime exposure (66 ms) effects of mismatching segments present in the whole-word but not in the letter primes led to slower overall naming latencies, suggesting that inhibition from segments beyond the onset needs time to build up.

ACOUSTICS VS. PHONEMES IN LEXICAL ACCESS

William J. Barry & Bistra Andreeva

Institute of Phonetics, Saarland University, Saarbrücken
ID 1692

[extra files] [full paper]

Phonetic perception and lexical access is sensitive to acoustic traces of co-articulatory processes in overlapping neighbouring segments. Longer distance coarticulatory effects, though well documented in production studies, have not been examined with regard to their contribution to lexical access. Using an eye-tracking paradigm, we examine whether the acoustic reflex of anticipatory lip-rounding and lip-spreading in initial /S/ in German CC and CCC word onset clusters is used to decide between lexical candidates with phonemically identical onsets prior to the contrasting vowel. The results show a clear effect of the pre-vocalic consonant information, but the effect is not symmetrical for rounded and unrounded /S/. Results are discussed in relation to a phonemic vs. a (demi-)syllabic basis of lexical decisions and markedness theory.

Speaking Styles and Expressive Speech

Monday, 13:20, Room: 5 (Blue)

Chair: Cédric Gendrot

CHANGES IN VOICE QUALITY DUE TO SOCIAL CONDITIONS

Nick Campbell

NiCT

ID 1183

[full paper]

This paper describes how acoustic features of the voice vary according to social relationships between speakers, and proposes that voice quality is an important aspect of prosodic information which serves to carry this separate strand of affect-related information, in parallel with variation according to the linguistic information in a spoken discourse.

CROSS-LISTENING OF JAPANESE, ENGLISH AND FRENCH SOCIAL AFFECT : ABOUT UNIVERSALS, FALSE FRIENDS AND UNKNOWN ATTITUDES

Takaaki Shochi¹, Véronique Aubergé² & Albert Rilliard³

¹Institut de la Communication Parlée, GIPSA-lab, CNRS UMR 5009; ²Institut de la Communication Parlée, GIPSA-lab, CNRS UMR 5009, UMAN-lab - Usages Marchés Attitudes Nanotech; ³LIMSI CNRS, BP 133, 91403 Orsay Cedex, France

ID 1435

[full paper]

Seven affectively-neutral Japanese sentences as uttered with 12 different attitudes are investigated. The listeners were 15 Japanese listeners, 15 French listeners and 20 American listeners. Both non-native listeners had no Japanese language skill. They were asked to choose the speaker's intended attitudes among the 12 attitudes. Results showed that Japanese listeners recognized all attitudes above chance, but there were some confusion, especially for the expressions of politeness (i.e. sincerity-politeness vs. kyoshuku). However, these two cultural politeness expressions are not recognized by French and American listeners. Especially kyoshuku, a type of politeness that does not occur as conventional expression in occidental society, was incorrectly decoded by French and American listeners, they recognized this politeness as arrogance or irritation.

EFFECTS OF RANDOM SPLICING ON LISTENERS' PERCEPTIONS

Mihoko Teshigawara¹, Noam Amir², Ofer Amir², Edna Milano Wlosko² & Meital Avivi²

¹The University of Tokushima; ²Tel Aviv University

ID 1303

[full paper]

Twenty-one Hebrew speakers listened to speech excerpts of 27 Japanese cartoon voices in the random-spliced and non-manipulated conditions and rated their impressions of physical and personality traits, emotional states, and vocal characteristics on 7-point scales. The correspondence of ratings between the two manipula-

tion conditions was examined by calculating Pearson's correlations for individual participants, and for the mean ratings across participants. Cronbach's alpha was also calculated to assess inter-rater reliability. Possibilities of systematic biases introduced by the random-splicing technique are discussed.

Foreign Language Acquisition I: New Teaching Methodology

Monday, 13:20, Room: 6 (Black)

Chair: David Deterding

THE EFFECT OF VISUAL TRAINING ON THE PERCEPTION OF NON-NATIVE PHONETIC CONTRASTS

Valerie Hazan¹ & Anke Sennema²

¹Department of Phonetics and Linguistics, UCL;

²Institut für Linguistik, Universität Potsdam

ID 1194

[full paper]

Auditory and audiovisual training have been shown to be successful in increasing the discriminability of non-native phonetic contrasts in second-language learners. The purpose of this study, which trained the English /l-/r/ contrast with Japanese learners of English, was to investigate training effectiveness using visual stimuli alone. The study evaluated whether training with visual cues leads to (a) increased discriminability of the phonetic contrast, (b) an increase in visual influence in phonetic labelling, and (c) cross-modal effects in audiovisual or auditory speech perception. Visual-alone training was successful in increasing the discriminability of the /l-/r/ contrast in visual and audiovisual test conditions but there was no carry-over to the auditory condition. There was also evidence of an increase in audiovisual advantage (AV>A) in the training group and of good generalisation to unknown words by the same speakers and to nonsense words by unknown speakers.

DIFFERENTIAL EFFECTS OF STIMULUS VARIABILITY AND LEARNERS' PRE-EXISTING PITCH PERCEPTION ABILITY IN LEXICAL TONE LEARNING BY NATIVE ENGLISH SPEAKERS

Jiyeon Lee¹, Tyler K. Perrachione², Tasha Dees³ & Patrick C.M. Wong⁴

¹Department of Communication Sciences and Disorders, Northwestern University; ²Department of Linguistics & Program in Cognitive Science, Northwestern University; ³Department of Communication Sciences and Disorders, Northwestern University; ⁴Department of Communication Sciences and Disorders & Northwestern University Institute for Neuroscience, Northwestern University

ID 1558

[full paper]

This study examined the role of stimulus variability in learning non-native phonetic contrasts (supraseg-

mentals) for word identification by adults, considering whether all learners benefit from high-variability training. We trained native English-speaking adults to use Mandarin lexical tones to identify 18 English pseudowords. Subjects were randomly assigned to two experimental conditions: a multi-talker group in which learners trained on stimuli produced by four talkers, and a single-talker group, in which each learner trained on only one of the four talkers. Before training, all subjects were tested on their ability to identify these pitch patterns in a non-lexical context. Subjects with high pitch identification ability learned more successfully than those with lower pitch identification ability. Further, multi-talker training was beneficial only for learners with high pitch identification ability, whereas learners with low pitch identification ability benefited more from single-talker training.

TOOLS DEVOTED TO THE ACQUISITION OF THE PROSODY OF A FOREIGN LANGUAGE

Guillaume Henry¹, Anne Bonneau² & Vincent Colotte³

¹LORIA; ²CNRS-LORIA; ³UHP - LORIA

ID 1548

[extra files] [full paper]

The work presented here is developed within a project devoted to the acquisition of English prosody by French learners. Our goal is to improve both production and perception of English prosody by French learners thanks to speech signal transformations and the knowledge about the prosody of the mother language (L1) and the target language (L2). We present the tools provided to learners and a simple example.

Monday, 14:20

Poster I

Monday, 14:20

Chairs: Inger Moen, Allard Jongman

COARTICULATORY RESISTANCE IN A MENTAL SYLLABARY*Uta Benner, Ines Flechsig, Grzegorz Dogil & Bernd Möbius*

Institut für Maschinelle Sprachverarbeitung, Universität Stuttgart

ID 1017; Poster No. 2

[full paper]

In a speech production model proposed by Levelt a distinction is made between two routes of phonetic implementation in speech. A syllabary route is used to retrieve the stored motor programs for the most frequent syllables of a language, and segment-by-segment assembly is used for the implementation of low-frequency syllables. One of the predictions of the model is that there should be a difference in coarticulation between motor programs retrieved from the syllabary and programs that are computed online. In this paper we present two laboratory experiments and a corpus study on German which were designed to verify this prediction. Our results support the hypothesis that articulatory programs for high-frequency syllables are implemented differently than those for rare syllables.

VELAR MOVEMENTS FOR TWO FRENCH SPEAKERS*Angélique Amelot & Solange Rossato*

Institut de la Communication Parlée Université Stendhal - 1180, Avenue Centrale, BP 25, 38040 GRENOBLE CEDEX 9 Tél. +33 (0)4 76 82 43 37

ID 1331; Poster No. 4

[full paper]

The contrast between oral and nasal vowels in French is known to involve secondary cues in addition to nasality; it is an open issue to what extent differences of velum height between the two sets of vowels are preserved in rapid speech. This study compares the velar movements for nasal vowels and consonants; it investigates contextual nasalisation; and it provides new data on how nasalisation is affected by speech rate. Velar position is measured with an electromagnetic articulograph (EMA) for two French speakers. Our results confirm that (i) nasal vowels are produced with a lower velum height than nasal consonants; (ii) the contrast between nasal and oral vowels is maintained in nasal context; (iii) velum height targets for nasal and oral segments show some overlap, especially sequences of nasal consonant + oral vowels or liquids; and (iv) nasal vowels have a relatively longer duration which is preserved under rapid speech rate.

VOICING ASSIMILATION IN JOURNALISTIC SPEECH*Pierre André Hallé¹ & Martine Adda-Decker²*¹LPP/CNRS 19 rue des Bernardins, 75005 Paris;²LIMSI/CNRS, bat. 508 F-91403 Orsay cedex

ID 1385; Poster No. 6

[full paper]

We used a corpus of radio and television speech to run a quantitative study of voicing assimilation in French. The results suggest that, although voicing may be gradient rather than all-or-none, voicing assimilation is essentially categorical. The amount of voicing assimilation little depends on underlying voicing but clearly varies with speech rate and also with consonant manner of articulation. The results also suggest that voicing assimilation, though largely regressive, is not purely unidirectional.

ARTICULATORY OPTIMISATION IN PERTURBED VOWEL ARTICULATION*Jana Brunner¹, Phil Hoole² & Pascal Perrier³*¹Humboldt-Universität zu Berlin, ICP-Gipsa-lab, INP Grenoble and ZAS Berlin; ²Institut für Phonetik und Sprachliche Kommunikation der Ludwig-Maximilians-Universität München; ³ICP, Gipsa-lab, CNRS, INP Grenoble & Université Stendhal

ID 1408; Poster No. 8

[full paper]

A two-week perturbation EMA-experiment was carried out with palatal prostheses. Articulatory effort for five speakers was assessed by means of peak acceleration and jerk during the tongue tip gestures from /t/ towards /i, e, o, y, u/. After a period of no change speakers showed an increase in these values. Towards the end of the experiment the values decreased. The results are interpreted as three phases of carrying out changes in the internal model. At first, the complete production system is shifted in relation to the palatal change, afterwards speakers explore different production mechanisms which involves more articulatory effort. This second phase can be seen as a training of the internal model during which input-output pairs are tested with respect to their articulatory effort. In the third phase speakers start to select an optimal movement strategy to produce the sounds so that the values decrease.

PERCEPTUAL BOUNDARY BETWEEN A SINGLE AND A GEMINATE STOP IN JAPANESE*Shigeaki Amano, Ryoko Mugitani & Tessei Kobayashi*

NTT Communication Science Laboratories, NTT Corporation

ID 1007; Poster No. 10

[full paper]

Hirata and Whiton [2005] revealed that the production boundary between a single and a geminate stop in Japanese is invariant over speaking rates in terms of the ratio of stop closure duration to word duration (closure-word ratio). This study addressed the question of whether the ratio is also invariant for the perceptual boundary. An experiment was conducted to obtain the perceptual boundary between a single and a geminate stop at slow, normal and fast speaking rates. The re-

sults showed that the closure-word ratio at the perceptual boundary did not coincide with that at its production boundary. However, the closure-word ratio was consistent within each stimulus item for all speaking rates, although it was different among the stimulus items. The results suggest that the closure-word ratio at the perceptual boundary is invariant over speaking rates within an item, but some item-related factors affect it.

DISTINGUISHING SPECTRAL AND TEMPORAL PROPERTIES OF SPEECH USING AN INFORMATION-THEORETIC APPROACH

Thomas Ulrich Christiansen¹ & Steven Greenberg²

¹Ørsted*DTU, Technical University of Denmark;

²Silicon Speech

ID 1192; Poster No. 12

[full paper]

The spectro-temporal coding of Danish consonants was investigated using an information-theoretic approach. Listeners were asked to identify eleven different consonants spoken in a CV[l] syllable context. Each syllable was processed so that only a portion of the original audio spectrum was present. Narrow speechbands, with center frequencies of 750 Hz, 1500 Hz and 3000 Hz, were presented individually and in combination with each other. The modulation spectrum of each band was low-pass filtered at 24, 12, 6 and 3 Hz. Confusion matrices of the consonant-identification data were computed. From these the amount of information transmitted for each of three phonetic features (voicing, manner and place) was calculated for each condition. Such analyses indicate that: (1) Accurate, robust decoding of place-of-articulation information requires broadband cross-spectral integration (2) Place-of-articulation information is most closely associated with the modulation spectrum above 12 Hz.

PROSODIC CONDITIONING OF PORTUGUESE SUBJECTS' PERCEPTION OF VOWEL NASALITY

John Hajek¹ & Ian Watson²

¹School of Languages and Linguistics, University of Melbourne; ²Phonetics Laboratory and Christ Church, University of Oxford, Great Britain

ID 1238; Poster No. 14

[full paper]

We examine the sensitivity of Portuguese subjects to a series of prosodic parameters previously shown to condition perception of vowel nasality, hypothesizing that the presence in Portuguese of long, strongly nasal vowels would (i) provoke lower nasality ratings than observed in English and French subjects and (ii) make these insensitive to prosodic parameters under investigation. The results confirm (i) but not (ii). Although there was some language-specificity in their responses, the subjects were sensitive to all the parameters in question, confirming their robustness.

COMPARING HUMAN AND MACHINE VOWEL CLASSIFICATION

Uwe D. Reichel & Katalin Mády

Department of Phonetics and Speech Processing, University of Munich

ID 1485; Poster No. 16

[full paper]

In this study we compare human ability to identify vowels with a machine learning approach. A perception experiment for 14 Hungarian vowels in isolation and embedded in a carrier word was accomplished, and a C4.5 decision tree was trained on the same material. A comparison between the identification results of the subjects and the classifier showed that in three of four conditions (isolated vowel quantity and identity, embedded vowel identity) the performance of the classifier was superior and in one condition (embedded vowel quantity) equal to the subjects' performance. This outcome can be explained by perceptual limits of the subjects and by stimulus properties. The classifier's performance was significantly weakened by replacing the continuous spectral information by binary 3-Bark thresholds as proposed in phonetic literature. Parts of the resulting decision trees can be interpreted phonetically, which could qualify this classifier as a tool for phonetic research.

LEXICAL CHARACTERISTIC MEDIATE THE INFLUENCE OF SEX AND SEX TYPICALITY ON VOWEL-SPACE SIZE

Benjamin Munson

University of Minnesota

ID 1012; Poster No. 18

[full paper]

Sex differences in vowel acoustics were found to be mediated by words' frequency of use and phonological neighborhood density. Larger sex differences in vowel-space expansion were found for words with high-frequency of use and words with small phonological neighborhoods than for words than for low-frequency and high density words. Results suggest that talkers' production of social-indexical variants is constrained by the influence these might have on word recognition.

RELATIONSHIP BETWEEN HARMONIC AMPLITUDES AND SPECTRAL ZEROS AND GLOTTAL OPEN QUOTIENT

Peter J. Murphy

University of Limerick

ID 1076; Poster No. 20

[full paper]

An analysis of spectral details relating to the glottal flow waveform and its first derivative can be used to inform both formant and parametric synthesis strategies. Specifically, the current study presents a conceptual basis for the empirically known relationship between the difference in amplitude between the first and second harmonics (H1-H2) and open quotient (OQ). The position of the first spectral null and the pattern of spectral zeros are shown to contain information relevant to the duration of the open period. The analysis suggests conditions for optimum power output for specific pulse characteristics. These conditions may be important for improved

naturalness of the resulting synthesized waveforms and may also be relevant to vocal performance issues.

DISCOURSE COHESION AND ITS PROSODIC MARKING IN FRENCH: INTERACTIONS BETWEEN INTONATION UNIT ONSETS AND ANAPHORIC PRONOUNS IN SPEECH PERCEPTION.

Cyril Auran

Laboratoire Savoirs, Textes, Langage, UMR 8163 CNRS, Université Lille 3 - Charles de Gaulle

ID 1161; Poster No. 22

[full paper]

This study is part of a wider project analyzing the roles of prosody and anaphora in discourse organization in English and French, and linking production and perception. More specifically, the aim of this paper is twofold: it explores the interactions of prosody and anaphora in French discourse and their consequences in terms of cognitive processing cost for the hearer; these results are based on an indirect methodology which constitutes the second aspect of this work. More specifically, this study explores the interplay hypothesis between pronominal anaphora and the phonetic realization of intonation unit onsets using cross-modal semantic priming in French.

VISUALIZING LEVELS OF RHYTHMIC ORGANIZATION

Petra Wagner

Universität Bonn

ID 1163; Poster No. 24

[full paper]

The paper presents a method to visualize the timing related levels of prosodic organization that have an influence on the rhythmic shape of an utterance. Timing relations can be characteristic of a language or a speaking style. The method is illustrated on various languages classified as stress timed or syllable timed, on a rhythmically unclassified language and L2 speech. The visualization method can be used to detect rhythmically relevant levels of organization within the prosodic hierarchy, e.g. whether rhythm manifests itself primarily on the level of prosodic feet, phrasal organization or reduction. Our method helps to identify language and speaking style related rhythmical preferences and can classify languages rhythmically. It is able to visualize subtle and large differences between stress timed and syllable timed languages and timing related performance problems of L2 speech.

COMPARING METHODS FOR LOCATING PITCH "ELBOWS"

Alex del Giudice¹, Ryan K. Shosted², Katherine Davidson¹, Mohammad Salihie¹ & Amalia Arvaniti¹

¹University of California, San Diego; ²University of Illinois at Urbana-Champaign

ID 1283; Poster No. 26

[full paper]

The labeling of "elbows" in an F0 contour is considered an enterprise beset with difficulty due to the inability of humans to locate pitch elbows with accuracy,

consistency and in a manner devoid of theoretical bias. This paper investigates the extent to which human labelers can agree with one another in locating elbows and how they fare by comparison to four algorithms. The results show that humans are more consistent than has been suggested and that the algorithm that best approximates their intuition is the least-squares fitting algorithm. The success of algorithmic elbow location, however, depends on the selection of the contour stretch in which the elbow is to be located; This selection is most consistent if performed by a theoretically informed human annotator, strongly suggesting that a completely a-theoretical annotation of F0 contours may be impossible to achieve, and ultimately undesirable.

PERCEPTUAL EVIDENCE FOR DIRECT ACOUSTIC CORRELATES OF STRESS IN SPANISH

Marta Ortega-Llebaria¹, Pilar Prieto² & Maria del Mar Vanrell³

¹University of Texas at Austin; ²Universitat Autònoma de Barcelona and ICREA; ³Universitat Autònoma de Barcelona

ID 1604; Poster No. 28

[full paper]

This article provides evidence for the perception of the stress contrast in deaccented contexts in Spanish. Twenty participants were asked to identify oxytone words which varied orthogonally in two bi-dimensional paroxytone-oxytone continua: one of duration and spectral tilt, and the other of duration and overall intensity. Results indicate that duration and overall intensity were cues to stress, while spectral tilt was not. Moreover, stress detection depended on vowel type: the stress contrast was perceived more consistently in [a] than in [i]. Thus, in spite of lacking vowel reduction, stress in Spanish has its own phonetic material in the absence of pitch accents. However, we cannot speak of cues to stress in general since they depend on the characteristics of the vowel.

CONSONANTAL PERTURBATION OF F0 CONTOURS OF CANTONESE TONES

Ying Wai Wong¹ & Yi Xu²

¹The Chinese University of Hong Kong; ²University College London

ID 1460; Poster No. 30

[full paper]

A systematic study of F0 perturbation by voiceless consonants in Cantonese is carried out. Apart from a voiceless interval introduced, a production asymmetry is found: F0 contours are raised by prevocalic consonants but lowered by postvocalic consonants at the C-V and V-C transitions. Moreover, initial consonants are found to differ in the duration of the voiceless intervals they introduce. Based on the recent finding that F0 production is synchronized with the syllable, we demonstrate that such durational differences need to be taken into consideration before accurate measurement of F0 perturbations can be made.

VOWEL FORMANTS AND ANGLE MEASUREMENTS IN DIACHRONIC SOCIOPHONETIC STUDIES: FOOT-FRONTING IN RP

Anne H. Fabricius

Roskilde University

ID 1087; Poster No. 32

[extra files] [full paper]

This paper examines formant data from a corpus of male speakers of RP born during the twentieth century. It compares average formant positions in the F1/F2 plane for the short vowels LOT and FOOT. The relative positions of the two vowels are represented by a single numerical value, the calculated angle from LOT to FOOT relative to the vertical. Changing angle values between the early and the later part of the twentieth century can be clearly seen in the data, reflecting a diachronic process of FOOT-fronting well documented in varieties of British English, (Torgersen and Kerswill [9]), including RP, (Hawkins and Midgley [5]). One aim of the paper is methodological, in that it demonstrates the versatility of an angle calculation method developed by Anon [1], used in combination with F1/F2 plots, in producing replicable quantified measures which demonstrate changing vowel juxtapositions in real time.

DUTCH DIPHTHONG AND LONG VOWEL REALIZATIONS AS CHANGING SOCIOECONOMIC MARKERS

Irene Jacobi, Louis Pols & Jan Stroop

Amsterdam Center for Language and Communication,
University of Amsterdam

ID 1196; Poster No. 34

[full paper]

To judge the influence of speaker background on the quality of five Standard Dutch long vowels and diphthongs, the spectra of these vowel realizations in the spontaneous speech of 70 subjects were measured and analyzed with regard to the subjects' age, sex, regions of education and residence, and their level of education and occupation. Besides the level of education /occupation, the factor 'age group' had a major effect on the variations in speech production. The vowel attributes 'onset' and 'degree of diphthongization' were affected differently. Highly educated speakers of the younger and middle-aged generation displayed systematic age patterns; lowly educated speakers and the older generation did not. A slight effect of region of residence was found for some females. An effect of sex was found for the higher educated speakers of the youngest age group. The vowel variations that were related to age reflected several pronunciation changes in progress.

LANGUAGE-SPECIFIC PRODUCTION PATTERNS IN THE FIRST YEAR OF LIFE

Izabelle Grenon, Allison Benner & John H. Esling

University of Victoria

ID 1250; Poster No. 36

[full paper]

The production of sounds by infants from 1 to 12 months is evaluated according to place of articulation to verify the hypothesis that infants' production becomes language-specific towards the end of the first year. This

study is based on an analysis of 4,499 sounds produced by 19 infants raised in one of 3 linguistic contexts: Canadian English, Moroccan Arabic, and Bai (a Tibeto-Burman language spoken in China). Our results reveal that towards the end of the first year (10-12 months), infants show a preference for producing sounds at places of articulation that reflect their linguistic background, a finding that parallels results obtained in perceptual studies. Contrary to our expectations, however, the infants' production at the end of the first year, albeit language-specific, does not directly correspond to the adult model.

FROM TONE TO ACCENT: THE TONAL TRANSFER STRATEGY FOR CHINESE L2 LEARNERS

Chen Yudong

University of Illinois at Urbana Champaign

ID 1043; Poster No. 38

[full paper]

This paper investigates the acquisition of Spanish prosodic patterns by Chinese learners. Pitch plays different linguistic roles in Mandarin Chinese and in Spanish. In Chinese the tonal contour of individual syllables is lexically contrastive. In Spanish the tonal contours characterize utterances and convey pragmatic functions. Conversely, Spanish has lexically contrastive stress which serves as anchoring points for local pitch excursions. In this paper we find strong evidence for the hypothesis that Mandarin learners of Spanish interpret the contours of Spanish words in citation form as a lexical property of individual syllables. This interpretation leads these learners to employ contours with a tonal rise in the stressed syllable and a fall on the post-tonic syllable. For instance, a word with stress on the penultimate syllable is produced as having a rising tone on the penultimate syllable (=tone 2 in Chinese) and a falling tone on the final syllable (=tone 4).

ACOUSTIC REALIZATION OF LEXICAL ACCENT AND ITS EFFECTS ON PHRASE INTONATION IN ENGLISH SPEAKERS' JAPANESE

Mariko Kondo

School of International Liberal Studies, Waseda University

ID 1306; Poster No. 40

[full paper]

Acoustic manipulation of Japanese prosody by English speakers was investigated. The study examined how fluent Japanese speakers of English realize Japanese lexical accent in terms of mora duration and the fundamental frequency, and also whether they transfer acoustic features associated with English word stress to Japanese lexical accent. The experimental results found that 'more fluent' speakers of Japanese used F0 to indicate lexical accent without increasing mora duration, whereas 'less fluent' speakers did not, and instead increased the duration of accented vowels at the same time suppressing the F0 increase. The results also found that the English speakers were unable to produce non-accented words and place an accent in a word, which triggers downstep. Moreover, they tended to place an accent in each word rather than using a phrase accent,

which caused an overall impression of foreign accent despite a good control of speech rhythm.

THE RELATIVE CONTRIBUTIONS OF INTONATION AND DURATION TO INTELLIGIBILITY IN NORWEGIAN AS A SECOND LANGUAGE

Snefrid Holm

Norwegian University of Science and Technology

ID 1445; Poster No. 42

[full paper]

This paper describes an experiment designed to investigate the relative contributions of intonation and duration to the intelligibility of Norwegian as a second language (N2). Recordings of Norwegian sentences read by speakers of 7 different native languages (L1s) were used. The global intonation and the phoneme durations of each N2 utterance were manipulated so as to match a native Norwegian speaker's productions of the same sentences. A perception experiment was carried out in which native Norwegian listeners wrote down what they perceived of each N2 sentence. Intonation manipulation is shown to enhance the N2 intelligibility for the English and German L1 groups. Duration manipulation is shown to enhance the N2 intelligibility for the French, Tamil and Persian L1 groups. For the English, German, Tamil and Russian L1 groups intonation contributes more to N2 intelligibility than duration. For the French speakers duration contributes more to N2 intelligibility than intonation.

PITCHING IT DIFFERENTLY: A COMPARISON OF THE PITCH RANGES OF GERMAN AND ENGLISH SPEAKERS

Ineke Mennen¹, Felix Schaeffler¹ & Gerard Docherty²

¹Queen Margaret University Edinburgh; ²Newcastle University

ID 1079; Poster No. 44

[full paper]

This paper presents preliminary findings of a systematic comparison of various measures of pitch range for speakers of Southern Standard British English and Northern Standard German. The purpose of the study as a whole is to develop the methodology to allow comparisons of pitch range across languages and regional accents, and to determine how they correlate with listeners' perceptual sensitivity to cross-language/accents differences. In this paper we report on how four measures of pitch range in read speech (text, sentences) compare across the languages. The results show that the measures of the difference between the 90th and 10th percentile, and ± 2 standard deviations around the mean differentiate the groups of speakers in the direction predicted by the stereotypical beliefs described in the literature about German and English. These differences are most obvious in the read text and longer sentences and the effect disappears in sentences of short duration.

CONSONANT-LABIOVELAR GLIDE COMBINATIONS IN SPANISH AND KOREAN

Yunju Suh

SUNY at Stony Brook

ID 1246; Poster No. 46

[full paper]

This paper investigates the acoustic properties of the combinations of a consonant and a labiovelar glide (Cw combinations), and shows that the universally favored and disfavored consonant places for Cw combinations exhibit the most and the least acoustic cues for C-Cw contrast, respectively. Spanish and Korean, different in how they phonetically implement the Cw combinations (one a consonant cluster and the other a labialized consonant), are used as subject languages.

MOTOR SPEECH DISORDERS IN THREE PARKINSONIAN SYNDROMES: A COMPARATIVE STUDY

Heike Penner¹, Maria Wolters² & Nicholas Miller³

¹Geriatrisches Zentrum Heidelberg; ²Centre for Speech Technology Research, University of Edinburgh; ³School of Education Communication and Language Sciences

ID 1061; Poster No. 48

[full paper]

This paper presents results of an acoustic investigation of speech in progressive supranuclear palsy (PSP), multiple system atrophy (MSA) and idiopathic Parkinson's disease (IPD). The study had two aims: (a) to provide a first acoustic description of the speech of people with PSP and MSA, (b) to compare acoustic characteristics of the dysarthria associated with PSP and MSA with classic hypokinetic dysarthria. Four acoustic parameters (voice quality, pitch range, vowel space and rate in syllable repetition) were investigated in 17 patients with PSP and 9 patients with MSA and compared with data from a large-scale study of IPD patients. Participants with PSP and MSA performed significantly worse than the PD group on Alternating Motion Rate tasks. In addition, the pitch range of PSP participants was restricted. We discuss the potential of these speech tasks for early differential diagnosis.

CHARACTERIZATION OF THE PATHOLOGICAL VOICES (DYSPHONIA) IN THE FREQUENCY SPACE

Gilles Pouchoulin¹, Corinne Fredouille¹, Jean-François Bonastre¹, Alain Ghio² & Joana Revis³

¹Laboratoire Informatique d'Avignon (LIA);

²Laboratoire Parole et Langage (CNRS-LPL); ³Lab.

Audio-Phonologie Expérimentale et Clinique (LAPEC)

ID 1095; Poster No. 50

[full paper]

This paper is related to dysphonic voice assessment. It aims at characterizing dysphonia in the frequency domain. In this context, a GMM-based automatic classification system is coupled with a frequency subband architecture in order to investigate which frequency bands are relevant for dysphonia characterization. Through various experiments, the low frequencies [0-3000]Hz tend to be more interesting for dysphonia discrimination compared with higher frequencies.

VOICE QUALITY AND VARIATION IN ENGLISH*Marion Coadou & Abderrazak Rougab*

Laboratoire Parole et Langage, Université de Provence

ID 1215; Poster No. 52

[full paper]

This study is, to our knowledge, the first to compare the voice quality of several accents of the British Isles. Our hypothesis is that voice quality can vary according to the regional accent of the speaker. The Long Term Average Spectrum (LTAS) was measured for each of the 50 speakers. Then, in order to test our hypothesis, a Principal Component Analysis (PCA) was carried out to compare the spectra. The results showed that at least two accent groups could be isolated from the others. The spectra of the Belfast accent were particularly concentrated around the negative part of the first component. This can be explained by the fact that the Belfast accent is still strongly influenced by the Celtic languages spoken in the region.

DISCRIMINATING EXPRESSIVE SPEECH STYLES BY VOICE QUALITY PARAMETERIZATION*Carlos Monzo, Francesc Alías, Ignasi Iriondo, Xavier Gonzalvo & Santiago Planet*

Department of Communications and Signal Theory, Enginyeria i Arquitectura La Salle, Ramon Llull University, Barcelona, Spain

ID 1351; Poster No. 54

[full paper]

In this work, the capability of voice quality parameters to discriminate among different expressive speech styles is analyzed. To that effect, the data distribution of these parameters, directly measured from the acoustic speech signal, is used to train a Linear Discriminant Analysis that conducts an automatic classification. As a result, the most relevant voice quality patterns for discriminating expressive speech styles are obtained for a diphone and triphone Spanish speech corpus with five expressive speaking styles: neutral, happy, sad, sensual and aggressive.

PERCEIVING ANGER AND JOY IN SPEECH THROUGH THE SIZE CODE*Yi Xu¹ & Suthathip Chuenwattanapranithi²*¹University College London, London; ²King Mongkut's University of Technology Thonburi

ID 1105; Poster No. 56

[full paper]

Human speech conveys emotions not only by words, but also by nonverbal acoustic cues. The hypothesis was tested that anger and joy can be conveyed in speech by displaying effort to sound larger or smaller, just as expressing dominance and submission in animal communication. Human listeners perceived vowels synthesized with a statically lengthened vocal tract and lowered pitch as from a large person, but from an angry person when the lengthening and lowering were dynamic. The opposite was true for perceiving small body size and joy. These results point to a "size code" shared by human and nonhuman communications.

MOTHERS ARE LESS EFFICIENT IN EMPLOYING PROSODIC DISAMBIGUATION IN CHILD-DIRECTED SPEECH THAN NON-MOTHERS: IS THERE A TRADE-OFF BETWEEN AFFECTIVE AND LINGUISTIC PROSODY?*Sonja Schaeffler¹ & Vera Kempe²*¹Queen Margaret University, Edinburgh; ²Stirling University

ID 1269; Poster No. 58

[full paper]

This study examines prosodic disambiguation in child-directed (CD) speech. Twenty-four mothers addressed syntactically ambiguous sentences to their 2;0 to 3;8 year old child and to an adult confederate. Twenty-four non-mothers addressed an imaginary toddler and an imaginary adult. We found that only mothers increased pitch and produced the CD-typical pitch excursions when addressing their children. In contrast, non-mothers, but not mothers, used prosodic disambiguation in CD speech, which was corroborated by a forced choice test in which 48 listeners judged the intended meaning of each sentence. The results suggest that if speakers express genuine positive affect, they tend to emphasise affective prosody at the expense of linguistic prosody. In the case of CD speech, this communication strategy may be more effective as it serves to elicit the child's attention.

SPEECH AND SIGN - IT'S ALL IN THE MOTION*Stina Ojala¹ & Olli Aaltonen²*¹Department of Information Technology, University of Turku; ²Department of Phonetics, University of Turku

ID 1464; Poster No. 60

[full paper]

Speech research has shown that vowels are less categorical than consonants, but a similar correlation in sign, i.e. between handshapes and place of articulation, is not yet known. The handshapes seem similar to vowels: they are continuum-like and follow coarticulatory principles. Here categorization and discrimination of handshapes were studied from the perspective of vowel perception. According to the results handshapes from the Finnish Sign Language handshape continuum transcribed as /G/-/X/ are perceived similarly than vowels varying systematically along a phonetic continuum. As in vowels, a phoneme boundary between signs can be found. In addition, there is a tendency for enhanced discrimination at the boundary zone. However, these results are typical to native signers only.

INVESTIGATING HMMs AS A PARAMETRIC MODEL FOR EXPRESSIVE SPEECH SYNTHESIS IN GERMAN*Sacha Krstulovic, Anna Hunecke & Marc Schröder*

DFKI GmbH

ID 1058; Poster No. 62

[extra files] [full paper]

The paper investigates the potential of HMM based synthesis to support the parameterisation of expressive speech in German. First, we review the assets of HMMs in the perspective of previous works in speech modelling and speech transformation. It is shown that

HMMs define a flexible parametric model of the speech acoustics. HMM-based synthesis has also supported cross-speaker and cross-speaking style transformations with a good level of perceptual quality, albeit in other languages than German and over a limited range of styles. To try these considerations in our research framework, we have therefore performed a preliminary application of HMM technology to the synthesis of excited football announcements in German. It is shown that a highly intelligible voice can be obtained, but that the rendering of the prosodic and voice quality correlates of excitement could benefit from some improvement in well identified areas.

AUTOMATIC DETECTION OF FOREIGN ACCENT FOR AUTOMATIC SPEECH RECOGNITION

Katarina Bartkova & Denis Jouviet
R&D France Telecom

ID 1126; Poster No. 64

[full paper]

Recognition of foreign accented speech remains among the most difficult tasks in automatic speech recognition. It was observed that using models trained on foreign data together with native models improves the recognition for speakers with foreign accent. However such an approach degrades the recognition performances on native speakers. In order to avoid such performance degradation the degree of accent should be detected prior to the recognition process. In this paper an automatic method of detection of the degree of foreign accent is proposed and results are compared with accent labeling carried out by an expert phonetician. This made possible a better targeting of speakers having a heavy foreign accent which allowed using the foreign accent dedicated model when necessary and thus improving recognition performances on non-native speech without major performance degradation on native speakers.

CONSTRUCTION OF PERCEPTION STIMULI WITH COPY SYNTHESIS

Yves Laprie & Anne Bonneau
LORIA

ID 1360; Poster No. 66

[extra files] [full paper]

A number of experiments in perception requires the construction of speech-like stimuli whose acoustic content needs to be manipulated easily. Formant synthesis offers the possibility of editing all the parameters of speech. However, the construction of stimuli by hand is a very laborious task and therefore automatic tools are necessary. This paper describes two main extensions of a copy synthesis algorithm previously proposed. The first concerns formant tracking which relies on a concurrent curve strategy. The second is a pitch synchronous amplitude adjustment algorithm that enables the capture of fast varying amplitude transitions in consonants. In addition, the automatic determination of the source parameters through the computation of F0 and of the friction to voicing ratio enables the speech signals to be copied automatically. This copy synthesis is evaluated

on sentences and V-Stop-V stimuli.

OUISPER: CORPUS BASED SYNTHESIS DRIVEN BY ARTICULATORY DATA

Thomas Hueber¹, Gerard Chollet², Bruce Denby³, Maureen Stone⁴ & Leila Zouari²

¹LABORATOIRE D'ELECTRONIQUE, ESPCI / CNRS-LTCI, ENST; ²CNRS-LTCI, ENST; ³LABORATOIRE D'ELECTRONIQUE, ESPCI / UPMC-PARIS VI; ⁴Dept of Biomedical Sciences and Orthodontics, University of Maryland Dental School, Baltimore, MD, USA

ID 1513; Poster No. 68

[full paper]

Many applications require the production of intelligible speech from articulatory data. This paper outlines a research program (Ouisper : Oral Ultrasound synthetic SPEech souRce) to synthesize speech from ultrasound acquisition of the tongue movement and video sequences of the lips. Video data is used to search in a multistream corpus associating images of the vocal tract and lips with the audio signal. The search is driven by the recognition of phone units using Hidden Markov Models trained on video sequences. Preliminary results support the feasibility of this approach.

AN UPDATE ON PHONETIC SYMBOLS IN UNICODE

John Wells

Phonetics & Linguistics, UCL

ID 1357; Poster No. 70

[full paper]

The problem of including phonetic symbols in popular computer applications such as word-processing, email, presentation graphics, and web pages has by now been largely, though not entirely, solved through the implementation of the Unicode standard. This paper traces the advances made in this field since the last ICPhS and assesses the current position. With the general availability of Unicode, the various unstandardized custom fonts that phoneticians previously used must now be treated as 'legacy fonts'. A remaining issue is that of the input of special characters: but in this area, too, satisfactory solutions are now readily available.

Monday, 16:00**Prosody III: Alignment and Articulation**

Monday, 16:00, Room: 1 (Red)

Chair: Bob Ladd

ON THE ARTICULATORY BASES OF PROMINENCE IN ITALIAN*Cinzia Avesani¹, Mario Vayra² & Claudio Zmarich¹*¹Institute of Cognitive Sciences and Technologies-CNR; ²University of Bologna

ID 1596

[full paper]

This study reports the first results of a research aimed to investigate how segmental variation is conditioned by prosody in Italian, by examining the acoustic and articulatory properties of syllables that are prominent at different levels of the prosodic hierarchy. We examined lip movement kinematics of unstressed, stressed and nuclearly accented syllables in order to understand the kinematic characteristics of accent-induced articulatory strengthening. The kinematic results are then interpreted within a Task Dynamics model to evaluate how prosodically-driven variation can be accounted for by a particular dynamical parameter setting in a mass-spring gestural model.

STRESS AND BOUNDARY EFFECTS ON ANTICIPATORY AND PRESERVATORY NASAL AIRFLOW*Christopher S. Doty & Melissa A. Redford*

University of Oregon

ID 1115

[full paper]

The present study examined the effects of boundary strength and stress on nasal coarticulation with neighboring segments. Acoustic and nasal airflow data were recorded from four speakers as they produced intervocalic fricative-nasal and nasal-fricative sequences that spanned a word-internal boundary or a word boundary under two different stress conditions. Although neither stress nor boundary affected preservatory nasal airflow, tautosyllabic stress was associated with increased anticipatory nasal airflow within a word, but not at the edge of a word where coarticulation decreased or stayed the same. The interaction between boundary strength and stress was attributed to condition-dependent differences in the relative durations of individual segments. Overall, the study suggests that stress-induced lengthening of a velar gesture results in the leftward spread of nasality if adjacent segments are not also substantially lengthened by prosodic factors.

COORDINATION PATTERNS BETWEEN PITCH MOVEMENTS AND ORAL GESTURES IN CATALAN*Pilar Prieto¹, Doris Mücke², Johannes Becker² & Martine Grice²*¹ICREA-Universitat Autònoma de Barcelona; ²IfL Phonetik-University of Cologne

ID 1384

[full paper]

In this paper, we investigate the coordination relations between F0 turning points in bitonal pitch accents and landmarks of dynamically defined articulatory gestures in Catalan, using kinematic and acoustic data on three pitch accent types. Electro-magnetic articulography data (EMMA) reveals that the end of pitch movements for two rising and one falling accent are tightly synchronized with the peak velocity of the oral closing gestures (such as tongue tip raising) during the production of vowel-consonant sequences.

DISTRIBUTION AND ALIGNMENT OF F0 CONTOURS IN TAMIL*Elinor Keane*

Oxford University Phonetics Laboratory

ID 1451

[full paper]

Previous work on Tamil intonation suggests that each word in a phrase except the final verb typically bears a fall-rise-fall f0 contour. The distribution of these contours was investigated in more detail by recording eighteen speakers reading sentences containing nouns of varying length in phrase-medial and phrase-final positions. This established that phrase-final nouns can bear fall-rise-fall contours but are not required to do so, and revealed the possibility of longer words bearing a double fall-rise-fall pattern. The alignment of the f0 turning-points was measured to investigate whether the peak is better characterized phonologically as the trailing tone of an L*H accent or a boundary tone. The balance of evidence pointed to the high tone being associated with the boundary of a low-level constituent, maximally the prosodic word.

PHRASE BOUNDARIES AND PEAK ALIGNMENT: AN ACOUSTIC AND ARTICULATORY STUDY*Doris Mücke & Anne Hermes*

IfL Phonetik, University of Cologne

ID 1187

[full paper]

The present study investigates the effect of an upcoming phrase boundary on peak alignment in rising pitch accents in a variety of German (Vienna). We measured the synchronization of F0 peaks with acoustic segments and articulatory movements. As expected, the closer the tone bearing unit is to the phrase boundary, the earlier the F0 peak is aligned. Although this alignment is not systematic in relation to syllable or segment boundaries, it is in relation to articulatory movements. Specifically, the F0 peak is aligned with the oral closing gesture. Without time pressure, the F0 peak was placed at the target of the closing gesture and with time

pressure before the target. The differences in the articulatory alignment patterns were not discrete but gradient. They correspond to articulatory adjustments at the phrase boundary (final lengthening of the oral gesture).

Contrastive Phonetics and Phonology

Monday, 16:00, Room: 2 (Orange)

Chair: Beat Siebenhaar

TONAL PHONETIC ANALOGY

Alan C. L. Yu

Phonology Laboratory, University of Chicago

ID 1572

[full paper]

Paradigmatic uniformity effects are commonplace in linguistic change. Recent work has extended this idea to the synchronic domain. At issue here is whether paradigm uniformity holds at the phonetic level. This study offers experimental evidence for phonetic analogy from Cantonese, demonstrating that the phonetic realization of a derived tone may vary in the direction of its paradigmatic neighbor.

LARYNGOSCOPIC (ARTICULATORY) AND ACOUSTIC EVIDENCE OF A PREVAILING EMPHATIC FEATURE OVER THE WORD IN ARABIC

Zeki Majeed Hassan¹ & John H. Esling²

¹University of Göteborg; ²University of Victoria

ID 1280

[extra files] [full paper]

The secondary place of articulation for Arabic 'emphatic' consonants varies across dialects. This study examines two speakers of Iraqi Arabic, using acoustic evidence, and one speaker of Iraqi Arabic, using direct visual laryngoscopic (articulatory) evidence, to determine the phonetic nature of the secondary feature and the prosodic effect of an emphatic consonant over multisyllabic words. The acoustic and laryngoscopic evidence indicates that the prevailing nature of emphatics in Iraqi Arabic is pharyngealization. Furthermore, the effect of an emphatic spreads to all syllables, forwards or backwards, regardless of its position in the word, although the effect is modified or blocked in certain phonotactic conditions.

PHONETIC VS. PHONOLOGICAL LENGTHENING IN AFFRICATES

Anne Pycha

University of California, Berkeley

ID 1267

[full paper]

Affricate consonants consist of two portions: stop closure and frication. Can these portions play different roles in phonetic and phonological processes? In this study, I address the question by probing the behavior of Hungarian affricates under lengthening. I measure the duration changes that affricates undergo in two types of lengthening processes: first, a phonetic process of final

lengthening and second, a phonological process of gemination. I show that these two processes alter the internal structure of affricates in very different ways. The results suggest that the difference between phonetic and phonological processes is in fact deeper than a mere difference between "gradient" and "categorical" effects.

THE /r/-REALISATION IN SWISS GERMAN AND AUSTRIAN GERMAN

Christiane Ulbrich¹ & Horst Ulbrich²

¹University of Ulster School of Communication; ²no affiliation

ID 1535

[extra files] [full paper]

Rhotics are generally believed to be phonetically heterogeneous. They are usually classified as rhotics due to their similar phonological behaviour and their diachronic and synchronic alternation. There are generalizations regarding phonotactic properties, synchronic and diachronic alternations. The realisation of /r/ produced by German speakers has previously been analysed in comprehensive corpora and /r/ was found to have undergone dramatic changes. The paper addresses two issues regarding the /r/-realisation using cross-varietal data from two standard varieties of German spoken in Switzerland and Austria. The process of /r/ vocalisation is independent of regional variation and spreads from the north to the south in the German speaking countries in central Europe. The second issue addressed is the allophonic alternation between trills and taps and their interaction with prosodic structure.

INCOMPLETE NEUTRALIZATION IN EASTERN ANDALUSIAN SPANISH: PERCEPTUAL CONSEQUENCES OF DURATIONAL DIFFERENCES INVOLVED IN S-ASPIRATION

Jason Bishop

University of Leipzig

ID 1066

[full paper]

The present paper describes an experiment designed to assess the perceptual consequences of two attested phonetic differences, both durational in nature, said to represent incomplete neutralization in Eastern Andalusian Spanish cases of s-aspiration: aspiration duration and the phonetic length of a following consonant. For word-medial cases of s-aspiration, it is found that the length of a stop consonant following aspiration, but not the length of aspiration itself, can serve as a strong, disambiguating cue to listeners in making phonemic decisions as to an underlying coda. These results complement evidence from production that s-aspiration represents incomplete neutralization in this variety of Spanish and, further, that incomplete neutralization is a phenomenon which can and should be studied beyond the cases of final devoicing to which most previous investigation has been limited.

Production III: Consonants Across Languages

Monday, 16:00, Room: 3 (Yellow)
Chair: Ian Maddieson

ASPIRATION AND VOICING OF CHINESE AND ENGLISH PLOSIVES

David Deterding¹ & Francis Nolan²

¹Nanyang Technological University; ²University of Cambridge

ID 1049

[full paper]

The six plosives of Standard Chinese are compared with those of RP British English, to see if there is a difference in their aspiration and/or voicing. Recordings of 7 speakers from China reading words beginning with each of the 6 plosives are compared to similar recordings of 7 speakers of RP British English, and it is found that there is little difference in the aspiration of the plosives in the two languages, though there is a difference in the voicing during the closure when the plosive occurs between two vowels.

FLAPPING IN UNCONSTRAINED ALVEOLARS

Daniel Recasens

Universitat Autònoma de Barcelona and Institut d'Estudis Catalans

ID 1015

[full paper]

Electropalatographic data for the alveolar nasal, the alveolar tap and clear /l/ in two Catalan dialects reveal that all three consonants undergo continuous closure fronting after low and back rounded vowels in VCV sequences, next to these same vowels in postpausal and prepausal position, and next to labial and velar consonants in consonant clusters. It is argued that this flapping mechanism is associated with the low degree of tongue constraint involved in the production of the three alveolars.

UNDERSTANDING FLAPPING IN XIANGXIANG CHINESE: ACOUSTIC AND AERODYNAMIC EVIDENCE

Ting Zeng

Department of Chinese, Translation and Linguistics, City University of Hong Kong, Hong Kong

ID 1326

[full paper]

This paper investigates the phonetic nature of flapping for /d/ and /th/ in intervocalic pre-unstressed and pre-stressed positions at a normal speech rate in Xiangxiang Chinese. The resulting data were approached in two perspectives: acoustic and aerodynamic. It was found that the acoustic and aerodynamic patterns were significantly correlated with each other, and both show that /d/ and /th/ exhibit considerable intra-speaker variation which constitutes a continuum from typical [d]s and [th]s to typical flaps in intervocalic position, indicating an articulatory continuum from long and complete oral closure for typical [d]s and [th]s to short and incom-

plete oral closure for typical flaps. This mirrors a gradient process which springs from a single mechanism common to each speaker. A model of consonant-vowel co-articulation is proposed and other related problems raised by these results are also discussed.

EMA STUDY OF THE CORONAL EMPHATIC AND NON-EMPHATIC PLOSIVE CONSONANTS OF MOROCCAN ARABIC

Chakir Zeroual¹, Phil Hoole², Susanne Fuchs³ & John H. Esling⁴

¹Faculté Polydisciplinaire de Taza, BP. 1223 Taza, Morocco & Laboratoire de Phonétique et Phonologie, CNRS-UMR7018, Paris, France.; ²Institut für Phonetik, Munich, Germany.; ³ZAS/Phonetik, Jaegerstr. 10-11. 10117, Berlin, Germany.; ⁴Department of Linguistics, University of Victoria, Victoria-Canada.

ID 1637

[full paper]

Abstract Our EMA data show that the longer VOT duration of the coronal non-emphatic /t/ compared to its emphatic cognate /T/ is due to: (i) the laminal articulatory contact during /t/ vs., contact apical during /T/, (ii) the jaw position which reaches its target at the release of /t/, and before it during /T/. We propose that this apical contact during the emphatics, and their unexpectedly high jaw position, are bound to the biomechanics constraints of emphasis (pharyngealization).

ARTICULATORY CHARACTERISTICS OF ANTERIOR CLICK CLOSURES IN N|UU

Bonny Sands¹, Johanna Brugman², Mats Exter³, Levi Namaseb⁴ & Amanda Miller²

¹Northern Arizona University; ²Cornell University; ³University of Cologne; ⁴University of Namibia

ID 1540

[full paper]

We document the anterior places of articulation in the N|uu click types [ɽ, ɽ̥, ɽ̥̥, ɽ̥̥̥] using palatography and linguography. We discuss the variability seen across speakers and compare these articulations with the cross-linguistic variation reported for comparable clicks. We show that inter-speaker variability found for anterior click place of articulation is comparable to that found for coronal pulmonic consonants.

Sociophonetics I

Monday, 16:00, Room: 4 (Green)
Chair: Gerry Docherty

FRICATION OF AUSTRALIAN ENGLISH /p t k/: GROUP TENDENCIES AND INDIVIDUAL DIFFERENCES

Deborah Loakes¹ & Kirsty McDougall²

¹University of Melbourne; ²University of Cambridge

ID 1583

[full paper]

This paper presents an analysis of frication of Australian English voiceless plosives in spontaneous

speech. Group and individual patterns in the rate of frication of /p t k/ in the speech of eight male twins from Melbourne are analysed. /k/ was fricated most often (17.2%), then /p/ (11.6%), while /t/ was rarely fricated (0.9%). /p/ and /k/ exhibited extensive individual variation in frication behaviour even within twin pairs and proportions of fricated tokens were relatively consistent within-speaker across sessions. By contrast, since /t/ was very rarely fricated it showed little variation among speakers. Sociolinguistic patterning in the frication of voiceless plosives in Australian English is considered. Implications of these findings for the characterisation of individual speakers are discussed.

THE EFFECT OF PHONETIC DETAIL ON PERCEIVED SPEAKER AGE AND SOCIAL CLASS

Abby Walker

University of Canterbury

ID 1374

[full paper]

It is well documented that the phonetic realization of a sociolinguistic variable can systematically differ according to the social attributes of a speaker, such as their age, class or ethnicity. What is less understood is the degree to which listeners routinely exploit this systematicity in order to make social judgments about speakers. This study uses speech synthesis to examine whether subtle changes to the phonetic realization of sociolinguistic variables in a sentence can alter the perceived age and social class of a speaker.

PREDICTING MUTUAL INTELLIGIBILITY IN CHINESE DIALECTS

Chaoju Tang¹ & Vincent J. van Heuven²

¹Chongqing Jiaotong University, PR China; ²Phonetics Laboratory, Leiden University Centre for Linguistics

ID 1266

[extra files] [full paper]

We determined subjective mutual intelligibility and linguistic similarity by presenting recordings of the same fable spoken in 15 Chinese dialects to naive listeners of the same set of dialects and asking them to rate the dialects along both subjective dimensions. We then regressed the ratings against objective structural measures (lexical similarity, phonological correspondence) for the same set of dialects. Our results show that subjective similarity is better predicted than subjective mutual intelligibility and that the relationship between objective and subjective measures is logarithmic. Best predicted was log-transformed subjective similarity with $R^2 = .64$.

SOCIAL EFFECTS ON THE PERCEPTION OF VIETNAMESE TONES

Marc Brunelle¹ & Stefanie Jannedy²

¹University of Ottawa; ²Humboldt University

ID 1231

[extra files] [full paper]

The rate of correct identification of tones in Vietnamese is influenced by the dialect of the stimuli to which the hearer is exposed (northern vs. southern). However, sociophonetic factors such as the dialect of the person administering the experiment (northern vs.

southern) and, by extension, accommodation via length of exposure to the experimenter also play a role. Our results indicate that listeners adjust their interpretation of some tone-stimuli in accordance with the dialect of the person administering the experiment, strongly suggesting that both perceptual cues contained in the signal and inferred social factors play a role in the categorization of tones in Vietnamese.

A SOCIOPHONETIC INVESTIGATION OF POSTVOCALIC /r/ IN GLASWEGIAN ADOLESCENTS

Jane Stuart-Smith

Department of English Language, University of Glasgow

ID 1307

[full paper]

This paper presents an auditory and acoustic study of postvocalic /r/ in 12 working-class Glaswegian male speakers, young and old. The results support the view that a process of derhoticisation is underway in Scottish English, but in such a way that the contrast between words with and without /r/ is still generally maintained, albeit differently for individual speakers.

Forensic Phonetics

Monday, 16:00, Room: 5 (Blue)

Chair: Hermann Künzel

SPEAKER IDENTIFICATION USING SELECTIVE COMPARISON OF PITCH CONTOUR PARAMETERS

Natalia Smirnova¹, Alexey Starshinov¹, Ilya Oparin¹ & Tatiana Goloshchapova²

¹Speech Technology Center; ²Federal Service of Drug Control of the Russian Federation

ID 1138

[full paper]

A method of selective pitch data comparison for speaker identification is presented. Pitch parameters of rising and falling nuclear monosyllables and filled hesitation pauses are evaluated for their discriminating ability using F-ratio and EER measures obtained on a 10-male 3-session speech database. "Physical" F0 parameters providing 20%-30% EER in isolation proved more effective than linguistically conditioned ones. Using all parameters in combination produced an EER of 13%. Directions of future research are outlined and the scope of possible method application in forensic tasks is discussed.

IMITATED OR AUTHENTIC? LISTENERS' JUDGEMENTS OF FOREIGN ACCENTS

Sara Neuhauser & Adrian P. Simpson

Friedrich-Schiller-Universität Jena

ID 1335

[full paper]

This paper presents a perception experiment which investigates (1) whether listeners are able to distinguish

between authentic non-native accents and non-authentic (imitated) accents and (2) whether they are able to identify the accents being produced. The results show that native-German-speaking listeners are able to identify (to name) imitated accents better than authentic non-native accents, probably due to the presence or absence of stereotypical patterns being used by the speakers. However, listeners were less able to judge the authenticity of the presented accents which probably can be related to the wide variation in the speakers' ability to imitate an accent.

F0 STATISTICS FOR 100 YOUNG MALE SPEAKERS OF STANDARD SOUTHERN BRITISH ENGLISH

Toby Hudson¹, Gea de Jong¹, Kirsty McDougall¹, Philip Harrison² & Francis Nolan¹

¹University of Cambridge; ²JP French Associates & Department of Language & Linguistic Science, University of York

ID 1570

[full paper]

This paper presents statistical data for the fundamental frequency of 100 young male speakers of Standard Southern British English producing spontaneous speech under cognitive stress. The material comes from the new X database, for which subjects underwent a simulated police interview. The distribution of F0 in a large homogenous group of speakers is of forensic significance since it provides a framework for understanding the significance of F0 measurements in casework. Long-term F0 for the 100 speakers yielded a mode of 102.2 Hz, a mean of 106 Hz and a median of 105 Hz, and had a near-normal distribution. We demonstrate the limitations of F0 as a discriminatory feature for the majority (60%) of our speech group, which fell within a narrow window of 20 Hz. Conversely, we see the forensic implications for recordings where F0 falls outside this window.

THE SPEAKER DISCRIMINATING POWER OF SOUNDS UNDERGOING HISTORICAL CHANGE: A FORMANT-BASED STUDY

Gea de Jong, Kirsty McDougall, Toby Hudson & Francis Nolan

University of Cambridge

ID 1542

[extra files] [full paper]

Can patterns of diachronic sound change within a language variety predict phonetic variability useful for distinguishing speakers? Standard Southern British English monophthongs are analysed to test whether individuals differ more widely in their realisation of sounds undergoing change than stable sounds. Read speech of 50 male speakers aged 18-25 is analysed. The 'changing' vowels /æ,ʊu:/ are compared with the stable /i:,ɑ:,ɔ:/. The data confirm the stability of /i:,ɑ:,ɔ:/, the fact that /ʊ,u:/ indeed have fronted and that the articulation of /æ/ has become more open. Results from discriminant analysis based on F1 and F2 frequencies, however, do not show a straightforward pattern: no discrete difference is observed between 'changing' and 'stable' vowels.

els. It is suggested that high variability in some speakers obscures the effect of large between-speaker variability in changing vowels.

FORENSIC SPEAKER DISCRIMINATION WITH AUSTRALIAN ENGLISH VOWEL ACOUSTICS

Philip John Rose

Australian National University

ID 1339

[full paper]

A large-scale forensic discrimination experiment is described which investigates how well same-speaker speech samples can be discriminated from different-speaker speech samples using acoustic parameters (F-pattern and duration) from Australian English vowels. A multivariate likelihood ratio is used, under both optimum and realistic conditions, as a discriminant function on the five tense and six lax vowels phonemes of 171 male speakers. In 171 target trials and 54,140 non-target trials, comparing samples with just one token per vowel each gave EERs of between 17% and 40%, which dropped to 10% (optimum) and 14% (realistic) when fused. It is also demonstrated that kernel density modelling outperforms normal, and that performance degrades under realistic conditions.

Phonology

Monday, 16:00, Room: 6 (Black)

Chair: Aditi Lahiri

REGRESSIVE VOICE ASSIMILATION IN SWEDISH

Petur Helgason¹ & Catherine Ringen²

¹Uppsala University; ²University of Iowa

ID 1132

[full paper]

This paper examines the occurrence of regressive voice assimilation in Swedish. Six speakers of Central Standard Swedish were recorded and the voicing conditions in stop-fricative and stop-stop clusters were analyzed. The findings indicate that regressive devoicing of lenis stops (/b d g/) occurs only when followed by /t/, but not /s/. This contradicts claims in the literature regarding the nature of regressive voice assimilation in Swedish. These findings also demonstrate the necessity of doing detailed acoustic analysis of stop production in order to ascertain the details of the phonological distribution of stop variants.

CROSS-LANGUAGE DIFFERENCES IN OVERLAP AND ASSIMILATION PATTERNS IN KOREAN AND RUSSIAN

Alexei Kochetov¹, Marianne Pouplier² & Minjung Son³

¹Simon Fraser University, Haskins Laboratories;

²University of Edinburgh, Haskins Laboratories; ³Yale University, Haskins Laboratories

ID 1298

[full paper]

This paper investigates cross-linguistic differences

in gestural overlap in consonant clusters and discusses how different patterns of overlap may interact with language-specific place assimilation patterns. We examine Russian and Korean stop-stop sequences within and across words, produced at two speaking rates. Significant differences in degrees of overlap emerge between the two languages for both prosodic conditions. We discuss to what extent language-specific differences in overlap can be linked to the language-specific propensity for articulatory place assimilation.

TI~CHI CONTRAST PRESERVATION IN JAPANESE LOANS PARASTIC ON SEGMENTAL CUES TO PROSODIC STRUCTURE

Jason Shaw

New York University

ID 1175

[full paper]

Acoustic analysis of /ti/ tokens produced in native words across a range of phonetic environments by two generations of Japanese speakers reveals a systematic influence of prosodic structure on the duration of frication following the release of consonant closure. The range of frication durations conditioned by prosodic structure in native words is partitioned into lexically contrastive sequences, ti~chi, in loanwords. Within speaker comparisons of words borrowed at different time periods suggests that this new contrast emerged, for some speakers, during adulthood. Implications of the data for a phonological theory of loanword adaptation are discussed.

A NOTE ON THE INFLUENCE OF LOUIS HJELMSLEV'S SUPRASEGMENTAL PHONOLOGY

Stefano Canalis

University of Padova

ID 1608

[full paper]

Louis Hjelmslev's presence in the history of phonology, usually deemed very marginal, can at least in part be re-evaluated under the light of little known references to the Dane linguist, which suggest that his early concern for suprasegmental units did not pass unnoticed by other phonologists. Among the phonologists in a way or another likely influenced by Hjelmslev, figure Firth who probably took from Hjelmslev the term 'prosody' and showed other similarities with his ideas, and several classic works on the nature and status of the syllable (Kurylowicz, Hockett, Fudge); one of Greenberg's phonological universals is derived from Hjelmslev. John Anderson's 'structural analogy' owes much to Hjelmslev's thinking, and Malmberg was influenced by Hjelmslev in several respects too. Moreover, Hjelmslev anticipated some much recent proposals, in particular with regard to the suprasegmental domain.

COMPENSATORY LENGTHENING IN PERSIAN

Vahid Sadeghi¹ & Mahmoud Bijankhan²

¹Iran Telecommunication Research Center & Takestan Islamic Azad University; ²Tehran University

ID 1159

[full paper]

It is commonly held that Persian glottal consonants in syllable coda undergo vowel lengthening [12], [13]. Some questions have been arised, however, concerning the phonological operations involved in CL. One view suggests that glottal allophonic weakening is compensated by vowel lengthening. Another view holds that CL involves the deletion of a coda glottal consonant followed by the lengthening of the adjacent nucleus vowel. There is a third view which suggests that CL is a gradient process in which different magnitude of glottal gesture is realized in speech from a weak through complete deletion of glottals. Using spectral tilt values, as defined by two measurements H1-H2 and H1-F1, I suggest that CL involves allophonic reduction of glottal gesture, which causes more length for the preceding vowel on the ground that glottals attain a gesture much similar to a vowel.

Tuesday, 9:00**Prosody IV: Stress and Rhythm**

Tuesday, 9:00, Room: 1 (Red)
Chair: Stefanie Shattuck-Hufnagel

PHONETIC CUES IDENTIFYING ENGLISH COMPOUNDS*Tuuli Adams*

New York University

ID 1323

[extra files] [full paper]

This study investigates the acoustic correlates of stress in English compounds by measuring the interaction of stress cues with different intonational environments. Effects on vowel duration, intensity, and pitch changes are compared in contrasting compounds and phrases. The results of an experiment in which participants pronounced compounds and phrases in controlled prosodic and intonational environments provide new evidence that the phonetic indicators of stress interact with these environments in a systematic way.

WHAT IS COMPOUND STRESS?*Gero Kunter & Ingo Plag*

Universität Siegen

ID 1383

[full paper]

This paper investigates the implementation of stress in English noun-noun compounds. First, a perception experiment examines how listeners perceive prominence in compounds. After that, significant acoustic correlates of prominence are established. Finally, a cluster analysis is described that classifies compounds on the basis of their phonetic features and which is capable of separating different stress categories. The results demonstrate how gradient acoustic measurements and discrete phonological contrasts can be mapped onto each other.

RHYTHM METRICS PREDICT RHYTHMIC DISCRIMINATION*Laurence White¹, Sven L. Mattys², Lucy Series² & Suzi Gage²*¹University of Reading; ²University of Bristol

ID 1412

[full paper]

Metrics such as VarcoV and %V provide empirical support for long-held notions about rhythmic distinctions between languages. Furthermore, listeners can discriminate languages with distinct rhythm metric scores purely on the basis of the durational information available in resynthesized monotone sasasa speech. However, some factors contributing to this durational variation, such as stress distribution and prosodic timing, are not directly reflected in rhythm scores. To test more precisely the predictive power of rhythm metrics, we used tightly controlled sasasa stimuli, eliminating stress distribution and prosodic timing cues to focus on the information directly quantified by rhythm metrics. We show that VarcoV and %V scores are predictive of listeners'

discrimination within and between languages, even with these highly constrained stimuli.

Clinical Phonetics II

Tuesday, 9:00, Room: 2 (Orange)

Chair: Katerina Nicolaidis

PITCH RANGE AND VOWEL DURATION IN CHILDREN WITH WILLIAMS SYNDROME*Jane Elizabeth Setter, Vesna Stojanovik, Lizet van Ewijk & Matt Moreland*

University of Reading

ID 1030

[full paper]

This paper reports the pitch range and vowel duration data from a group of children with Williams syndrome (WS) in comparison with a group of typically developing children matched for chronological age (CA) and a group matched for receptive language abilities (LA). It is found that the speech of the WS group has a greater pitch range than the typically developing children, and that that vowel duration in the WS groups tends to be more similar to the LA group. These findings are in line with the impressionistic results reported by Reilly, Klima and Bellugi [16], indicating that children with WS use affective prosody differently to typically developing children.

VARIABILITY IN FRICATIVE PRODUCTION OF YOUNG PEOPLE WITH DOWN'S SYNDROME: AN EPG ANALYSIS*Claire Timmins¹, William Hardcastle¹, Sara Wood¹, Joanne McCann¹ & Jennifer Wishart²*¹Queen Margaret University; ²University of Edinburgh

ID 1206

[full paper]

Speech production in Down's syndrome is highly variable, with particular problems arising from complex articulations such as fricatives. In this paper, EPG analysis is used to study the variation in the production of the fricatives /s/ and /sh/ in 6 young people with Down's syndrome. The variability of these productions is compared with information from the Robbins and Klee Oral/Speech Motor Control Protocol.

A NEW EPG PROTOCOL FOR ASSESSING DDK ACCURACY: A DOWN'S SYNDROME STUDY*Joanne McCann¹ & Alan Wrench²*¹Speech Science Research Centre, Queen Margaret University; ²Articulate Instruments Ltd.

ID 1359

[extra files] [full paper]

Recent research has suggested that eliciting diadochokinetic (DDK) rate and accuracy in young children is difficult, with analysis being time-consuming. This paper details a new protocol for assessing DDK in young children or children with intellectual impairment (Down's syndrome) and a method for calculating accuracy scores automatically. Accuracy scores were calcu-

lated from auditory and electropalatographic analyses and found to correlate in some instances. The children with Down's syndrome presented with similar DDK rates to typically-developing children but reduced accuracy.

Production IV: Gestures and Timing

Tuesday, 9:00, Room: 3 (Yellow)

Chair: Daniel Recasens

ON GESTURES TIMING IN EUROPEAN PORTUGUESE NASALS

Catarina Oliveira¹ & António Teixeira²

¹Universidade de Aveiro; ²Dep. Electrónica Telec & Informática/IEETA, Universidade de Aveiro

ID 1629

[full paper]

In this paper a first study of gestures timing in European Portuguese nasals is presented. Velum, lips and tongue tip gestures were automatically annotated in an existent EMMA corpus. Analyses concentrated in the characterization of the different gesture landmarks in terms of average duration values, investigation of factors influencing such durations, and characterization of inter-gestural coordination.

INFLUENCE OF ARTICULATOR AND MANNER ON STIFFNESS

Kevin Roon¹, Adamantios I. Gafos¹, Phil Hoole² & Chakir Zeroual³

¹New York University; Haskins Laboratories; ²Institut für Phonetik und Sprachliche Kommunikation, Ludwig-Maximilians-Universität München; ³University Sidi Mohamed Ben-Abdellah-Morocco; Laboratoire de Phonétique et Phonologie (UMR 7018 CNRS / Sorbonne -Nouvelle, Paris)

ID 1308

[full paper]

Comparatively little is known about the role that the velocity profiles of different articulatory movements play in speech production. Using 3D Electromagnetic Articulography, the present experiment analyzes articulatory data from Moroccan Arabic for independent influences of oral articulator and manner on stiffness, which is an important aspect of the velocity profile of articulator movement. Tongue back movements were found to have lower stiffness than those of the tongue tip or lower lip. No differences based on manner were found. Relevance to phonetics and phonology is discussed.

SERIAL-ORDER CONTROL AND GROUPING IN SPEECH: FINDINGS FOR A FRAME/CONTENT THEORY

Victor J. Boucher

Université de Montréal

ID 1300

[full paper]

Frame/content (F/C) theory [1] offers a working ra-

tionale of the rise of serial-order control and forms without assuming a priori units. A synthesis of our recent work is presented with the purpose of refining this rationale on two points. First, observations of contraction activity and passive elasticity suggest that basic frames of serial-order control correspond to contraction-relaxation cycles not present in non-speech motions such as mastication. Second, on explaining prosodic grouping, results show a relationship between "size effects" on such patterns and grouping effects on recall. Converging evidence suggests that grouping may arise from capacity limits on attention processes of short-term memory.

Perception II: Cross-Language

Tuesday, 9:00, Room: 4 (Green)

Chair: Carsten Eulitz

CLEAR SPEECH INTELLIGIBILITY: LISTENER AND TALKER EFFECTS

Rajka Smiljanic & Ann Bradlow

Linguistics, Northwestern University

ID 1020

[full paper]

In this study, we investigated whether the intelligibility-enhancing mode of speech production, known as "clear speech" produced by native and non-native talkers influenced speech intelligibility equally for native and non-native listeners. We explored the effect of clear speech for various talker and listener pairs in three experiments. In experiment 1, non-native listeners listened to their second language produced by native talkers. In experiment 2, native listeners listened to their native language produced by non-native talkers. In experiment 3, non-native listeners listened to their second language produced by non-native talkers. Combined, the results showed that "native" speech is overall more intelligible than "foreign" accented speech for both native and non-native listeners. Importantly, the proportional intelligibility gain for clear speech produced by both native and non-native talkers was similar across listener groups suggesting common speech processing strategies across all talker-listener groups.

NATIVE AND NON-NATIVE PERCEPTUAL DIALECT SIMILARITY SPACES

Cynthia G. Clopper¹ & Ann Bradlow²

¹Ohio State University; ²Northwestern University

ID 1019

[full paper]

The current study examined the role of native language on the perceptual similarity space of regional dialect variation. Native and non-native speakers of American English were asked to group a set of talkers by regional dialect in a free classification task. The two listener groups exhibited similar dialect classification strategies and perceptual similarity structures. However, the non-native listeners were less accurate overall than the native listeners and relied heavily on a few salient

acoustic cues to make their classifications. These results suggest that non-native listeners can use lawful variation in the acoustic signal to make dialect classification judgments, but that cultural and linguistic familiarity also play a role in shaping perceptual dialect categories.

PAIRWISE PERCEPTUAL MAGNET EFFECTS

Kathleen Currie Hall

The Ohio State University

ID 1602

[full paper]

This paper explores the role of familiarity in speech perception. It is argued that “perceptual magnet effects” (the warping of the perceptual space by prototypical exemplars of a category) can be extended to the perception of pairs of sounds. Specifically, a prototypical exemplar of a contrast (that is, an instantiation of a contrast involving prototypical members of the pair) will be more perceptually distinct than a non-prototypical exemplar of the same phonological contrast. Conversely, a prototypical exemplar of an allophonically related pair will be perceptually less distinct than a non-prototypical exemplar of the same pair.

First Language Acquisition I

Tuesday, 9:00, Room: 5 (Blue)

Chair: Marianne Pouplier

SPEECH CLARITY IN INFANT-DIRECTED SINGING: AN ANALYSIS OF GERMAN VOWELS

Simone Falk

Ludwig-Maximilians-Universität München

ID 1195

[full paper]

The findings discussed in this paper are part of a broader fieldwork study where the characteristics of infant-directed singing in natural interaction are analyzed. The aim of this part of the study was to determine whether vowels in infant-directed singing were of a clearer speech quality compared to adult-directed speech as it has been shown several times for ID speech. Six German speaking mothers sang for their children aged between 2 and 10 months. Stressed long vowels /a:/, /i:/, /u:/ of these songs were analyzed and compared to vowels in samples of AD speech. Results show that mothers use acoustically more extreme vowels when singing for their infants than in AD speech. This indicates that singing forms a subpart of the infant-directed register which is well-adapted to assist the child at an early stage in acquiring the linguistically relevant characteristics of his/her mother tongue.

THE DEVELOPMENT OF LANGUAGE SPECIFIC PROSODIC PREFERENCES DURING THE FIRST HALF YEAR OF LIFE AND ITS RELATION TO LATER LEXICAL DEVELOPMENT: EVIDENCE FROM GERMAN AND FRENCH

Barbara Höhle¹, Ranka Bijeljic-Babic², Thierry Nazzi², Birgit Herold¹ & Jürgen Weissenborn³

¹Universität Potsdam Institut für Linguistik; ²CNRS - Université Paris 5; ³Humboldt-Universität zu Berlin

ID 1201

[full paper]

We report the results of four experiments conducted with German and French infants addressing the question of when infants determine the predominant pattern for bisyllabic words in their surrounding language. We presented German 6- and 4-month-olds and French 6-month-olds with trochaic or iambic bisyllables. The German 6-month-olds showed a preference for the trochaic pattern, but not the German 4-month-olds nor the French 6-month-olds. However, French 6-month-olds were able to discriminate trochaic from iambic bisyllables. This suggests that the preference for the language predominant pattern of word stress arises between the ages of 4 and 6 months in German. In French, in which there is little if any accentuation at the lexical level, 6-month-olds do not show a preference for any stress pattern, but are sensitive to acoustic differences between trochaic and iambic bisyllables.

SIMULTANEOUS BILINGUALS AND FLEGE'S SPEECH LEARNING MODEL

Ian Watson

University of Oxford

ID 1239

[full paper]

The applicability of Flege's Speech Learning Model (SLM) to simultaneous bilinguals is examined in two related experiments on the acquisition of the production and perception of the voicing contrast in simultaneous French-English bilinguals. The results show that the SLM can account for the data providing account is taken of the degree of bilinguals' exposure to each language.

Sociophonetics II

Tuesday, 9:00, Room: 6 (Black)

Chair: Stefanie Jannedy

VOWEL SPACE AREAS ACROSS DIALECTS AND GENDER

Ewa Jacewicz¹, Robert Allen Fox¹ & Joseph Salmons²

¹Speech Perception and Acoustics Labs, Ohio State;

²University of Wisconsin-Madison

ID 1252

[full paper]

This study compares vowel spaces in three regional varieties of American English spoken in central Ohio, south-central Wisconsin, and western North Carolina to determine whether the significant variation in the vowel

systems of these dialects also affects the dialect-specific vowel space area. The gender-related differences are assessed by comparing the unnormalized (in Hz) and normalized formant frequency values. Significant effects of speaker dialect were found for the vowel space area defined by four “corner” vowels. However, there were no differences between dialects in the area of an extended 5-vowel space. The results indicate that, despite large cross-dialectal differences in the positions of the vowels in the acoustic space, the extended vowel space area encompassing a complete vowel system is unaffected by dialectal variation. The differences in the size of the vowel space due to speaker gender were eliminated by normalizing formant frequency values.

ACOUSTIC CHARACTERISTICS OF STANDARD DUTCH /ɣ/

Sander van der Harst¹, Hans Van de Velde² & Bert Schouten²

¹UiL-OTS/CLS; ²UiL-OTS

ID 1479

[full paper]

In this paper an acoustic analysis of Standard Dutch /ɣ/ is presented. 160 speakers, stratified for nationality, region, gender and age, performed a reading task in which (ɣ) was embedded in a carrier sentence. The analysis is based on measurements of the resonance frequencies, the intensity, the periodicity and the duration of the realizations of (ɣ). The results show that regional variation is high. Furthermore, the existence of the voiced fricative phoneme /ɣ/ in Dutch will be questioned.

/u/-FRONTING IN RP: A LINK BETWEEN SOUND CHANGE AND DIMINISHED PERCEPTUAL COMPENSATION FOR COARTICULATION?

Jonathan Harrington, Felicitas Kleber & Ulrich Reubold

IPS, Munich

ID 1314

[full paper]

The present study is concerned with a perceptual analysis of /u/-fronting in Southern British English, Received Pronunciation and with whether there is an age-dependent difference in perceptual judgments to synthetic /i-u/ continua. A second aim was to test the hypothesis that younger listeners would be less likely to attribute a fronted /u/ perceptually to the coarticulatory fronting effects of the left context. We synthesized /i-u/ continua and embedded them in two contexts: firstly, ‘yeast-used’, in which the initial /j/ exerts a marked effect on /u/-fronting; and secondly ‘sweep-swoop’ in which the preceding /w/ is likely to induce /u/-backing. Taken together, the results of responses to these continua so far suggest that young and old listeners respond differently to a sound change in progress and also that /u/-fronting in RP may be related to a perceptual reinterpretation of coarticulatory-induced /u/-fronting.

Tuesday, 10:00**Poster II**

Tuesday, 10:00

Chairs: Nicolas Dumay, Mark Jones

A PRELIMINARY EPG STUDY OF STOP CONSONANTS IN ARRERENTE*Marija Tabain & Kristine Rickard*

La Trobe University, Melbourne

ID 1005; Poster No. 1

[full paper]

The Australian Aboriginal language Arrernte has four coronal consonants in the stop, nasal and lateral series. This paper presents EPG data for the four coronal stops of Arrernte in inter-vocalic context for one female speaker of the language. Results show comparatively little variability in the laminal articulations, and comparatively greater variability in the apical articulations. An interesting finding suggests that a retroflex harmony may exist in the language, whereby a retroflex consonant later in the word may cause a previous alveolar consonant to harmonize.

SCHWA VOCALIZATION IN THE REALIZATION OF /r/*Robert Vago¹ & Mária Gósy²*

¹Queens College and The Graduate Center, City University of New York; ²Research Institute for Linguistics, Hungarian Academy of Sciences

ID 1080; Poster No. 3

[full paper]

The realization of the phoneme /r/ is commonly identified in terms of trills, taps, approximants, fricatives, vowels, and devoicing. An experimental investigation in Hungarian revealed a heretofore not discussed variant: [r] with a schwa on-vocalization ([^ər]) or off-vocalization ([r^ə]). In Cr clusters the occurrence of schwa was more frequent in homorganic than in heterorganic clusters, while in the case of rC clusters the occurrence of schwa was more frequent in heterorganic than in homorganic clusters. The [^ər] realization was found before vowels (onset position), [r^ə] before consonants or word finally (coda position). These facts are explained on the basis of articulatory / aerodynamic principles.

THE ROLE OF VOWEL CONTRAST IN LANGUAGE-SPECIFIC PATTERNS OF VOWEL-TO-VOWEL COARTICULATION: EVIDENCE FROM KOREAN AND JAPANESE*Jeong-Im Han*

Konkuk University

ID 1097; Poster No. 5

[full paper]

The purpose of this paper is to test the role of vowel contrast in V-to-V coarticulation. Specifically, V-to-V anticipatory and carryover coarticulations in Korean and Japanese were examined in terms of F1 and F2 in crowded vs. non-crowded regions of the vowel space. The results showed that the vowel contrast does not directly contribute to the language-specific coarticulation

pattern between these two languages, which is at odds with Manuel & Krakow (1984), and Manuel (1987), but in good agreement with Bradlow (1995).

DETAIL IN VOWEL AREA FUNCTIONS*Christine Ericsdotter*

Stockholm University

ID 1337; Poster No. 7

[full paper]

This paper presents some results from an MRI study of vowels [3], in which classical distance-to-area equations [5] were evaluated for implementation in sagittal view articulatory modelling. It was shown that an articulatorily more detailed application of the conversion rules improved the accuracy of the predicted areas, but that this increased realism failed to improve acoustic performance, if midline derivation and vocal tract termination points were kept the same. It was also shown that a more general application of the conversion rules produced significant area errors, but did not impair acoustic performance considerably. A small follow-up investigation on the general approach is presented, which confirms modest acoustic effects of less area detail. This is interpreted as the acoustic impact of mid-sagittal information being greater than that of detail in area size.

STOP-VOWEL COARTICULATION IN CYPRIOT GREEK*Eftychia Eftychiou*

University of Cambridge

ID 1409; Poster No. 9

[full paper]

The present paper presents the results of an experimental investigation of the connected speech process of close-vowel lenition in Cypriot Greek (henceforth CG). The process appears to be gradient, with stops whose adjacent vowels have been elided being acoustically different from canonical word-final stops, indicating residual stop-vowel coarticulation. Finally, the study reveals two routes to lenition in CG; one involves a full consonant with a lenited vowel, and the other a lenited consonant with a full vowel, potentially signifying that the laryngeal setting is the same in both cases and that the different acoustic patterns are the result of supralaryngeal imprecision.

GESTURAL PHASING IN /KT/ SEQUENCES CONTRASTING WITHIN AND CROSS WORD CONTEXTS

Mark Tiede¹, Stefanie Shattuck-Hufnagel², Beth Johnson³, Satrajit Ghosh², Melanie Matthies⁴, Madjid Zandipour² & Joseph Perkell²

¹MIT R.L.E. & Haskins Laboratories; ²MIT R.L.E.;³Yale University; ⁴Boston University & MIT R.L.E.

ID 1666; Poster No. 11

[full paper]

This work presents results of an EMMA study of the articulatory phasing between successive /k/ and /t/ gestures in English tautosyllabic ("pact op") and heterosyllabic ("pack top") contexts, varied by speaking rate and stress. Although subjects responded idiosyncratically, in general coda clusters are shown to be significantly less

variable in timing than heterosyllabic sequences relative to the labial gestures of the carrier context.

CROSS-LINGUISTIC DIFFERENCES IN THE PERCEPTION OF PALATALIZATION

Molly Babel & Keith Johnson

University of California, Berkeley

ID 1287; Poster No. 13

[full paper]

This paper investigates the difference between basic psycho-acoustic auditory perception and language-specific perception of speech sounds. This was examined in two experiments with American English and Russian listeners. Results suggest that listeners' language does not influence auditory perception, but does affect the rated perceptual similarity of speech sounds.

CONSONANTAL COARTICULATION RESISTANCE IN VOWEL-CONSONANT-VOWEL SEQUENCES

Simone Graetzer

University of Melbourne

ID 1315; Poster No. 15

[full paper]

Formant two distribution for Arrernte and Burarra, two Australian languages, at V1-offset and V2-onset in V1CV2 sequences, reveals that phonemic voiceless plosive consonants differ in coarticulation resistance. While the two languages display slightly dissimilar patterns of resistance, they share a strong tendency towards greater variation in V1-offset, suggesting that the effects of coarticulation resistance are strongest immediately after intervocalic consonants in these languages.

ANATOMICAL PLAUSIBILITY OF AREA FUNCTIONS INFERRED BY ANALYTIC FORMANT-TO-AREA MAPPING

Abdellah Kacha¹, Francis Grenez¹ & Jean Schoentgen²

¹Université Libre de Bruxelles; ²Fonds National de la Recherche Scientifique

ID 1415; Poster No. 17

[full paper]

The presentation concerns the evaluation of the anatomical plausibility of vocal tract shapes calculated by means of an analytical formant-to-area map. A constraint that requests that the jerk of the evolving model parameters is minimal is used to select a single solution among the infinitely many area functions that are compatible with the observed formant frequencies. A similarity measure between observed and inferred cross-sections has been computed to express the plausibility of the recovered shapes quantitatively. The test corpus has comprised observed area functions and formant frequencies of ten French vowels sustained by two male and two female speakers. Results show that vowel qualities involving double articulations have been the most likely to give rise to large dissimilarities between acoustically inferred and measured vocal tract cross-sections.

ACOUSTIC DESCRIPTION OF A SOPRANO'S VOWELS BASED ON PERCEPTUAL LINEAR PREDICTION

Thomas John Millhouse¹ & Frantz Clermont²

¹Sydney Conservatorium, University of Sydney; ²JP French Associates, Forensic Speech and Acoustics Laboratory York

ID 1458; Poster No. 19

[full paper]

A perceptually-motivated model (Hermansky, 1990) known as Perceptual Linear Prediction (PLP) is employed to parameterise and to interpret the cardinal vowels sung by a professional soprano at pitches ranging from 220 to 880 Hz. The PLP model yields perceptual formants (F1' and F2'), which encode the low and high-spectral regions, respectively. These formants are found to be tractable and robust, thereby facilitating a more complete description of the sung-vowel space.

PROSODIC PHRASING IN ELLIPTIC AND NON-ELLIPTIC COORDINATIONS

Gerrit Kentner

Universität Potsdam

ID 1088; Poster No. 21

[full paper]

This paper reports a prosodic difference between elliptic and non-elliptic coordinations in German. Findings of a speech production experiment indicate that elipsis has an effect on prosodic phrasing and that speakers avoid phrase boundaries between an elliptic gap and its filler. The data is incompatible with accounts stating that phonetically empty material resurfaces in the form of increased segment duration and greater pitch excursion at the gap. The results are evaluated against the Sense Unit Condition on intonational phrasing.

RHYTHMICAL CLASSIFICATION OF LANGUAGES BASED ON VOICE PARAMETERS

Volker Dellwo, Adrian Fourcin & Evelyn Abberton

University College London

ID 1169; Poster No. 23

[full paper]

It has been demonstrated that speech rhythm classes (e.g. stress-timed, syllable-timed) can be distinguished acoustically and perceptually on the basis of the variability of consonantal and vocalic interval durations. It has moreover been shown that even infants are able to use these cues to distinguish between languages from different rhythm classes. Here we demonstrate that the same classification is possible in the acoustic domain based simply on the durational variability of voiced and voiceless intervals in speech. The advantages of such a procedure will be discussed and we will argue that 'voice' possibly offers a more plausible cue for infants to distinguish between languages of different rhythmic class.

TONAL TARGETS AND THEIR ALIGNMENT IN DAEGU KOREAN

Akira Utsugi¹, Hyejin Jang² & Minyoung Seol²

¹JSPS Postdoctoral Fellow for Research Abroad / University of Edinburgh; ²Korea University

ID 1260; Poster No. 25

[full paper]

This study investigates tonal targets in Daegu Korean. Through our analysis of F0 and alignment, especially focusing on the turning point, we identified the different features between the rise before the accent and the fall after the accent. In the contour before the accent, we identified the turning point from the low plateau to the rise, anchored to the end of the syllable immediately preceding the accented syllable. On the other hand, in the contour after the accent, the turning point was not clear and, even if it exists, it was delayed. These results are against the theory in previous literature that the accented syllable is associated with H*+L in this dialect.

AN INITIAL ACCOUNT OF THE INTONATION OF EMIRATI ARABIC

Allison Blodgett, Jonathan Owens & Trent Rockwood

University of Maryland Center for Advanced Study of Language

ID 1272; Poster No. 27

[extra files] [full paper]

We conducted auditory and visual analyses of recordings of colloquial Emirati Arabic in order to develop an autosegmental-metrical account of the intonation. Based on our analyses, we propose an initial tonal inventory of two main pitch accents (i.e., H*, (LH)*), one downstepped variant (i.e., !H*), and four bitonal phrase accents (i.e., LL%, LH%, HL%, HH%), which mark the right edges of intonation phrases. The data suggest that speakers produce a pitch accent on every content word and can use pitch range compression to vary the position of the perceptually most prominent pitch accent within a prosodic phrase. The data further suggest that speakers can initiate and complete compression within a prosodic phrase and that they can extend that compression across silent durations to subsequent phrases.

ACOUSTIC EFFECTS OF PROSODIC PHRASING ON DOMAIN-INITIAL VOWELS IN KOREAN

Eun-Kyung Lee

University of Illinois at Urbana-Champaign

ID 1304; Poster No. 29

[full paper]

This paper investigates acoustic evidence of strengthening and lengthening on domain-initial vowels in Korean, by comparing measures of F1, F2, and duration across vowels /a, e, i, o, u/ in three different prosodic domains; Intonational Phrase, Accentual Phrase, and Phonological Word. In contrary to previous findings on domain-initial vowels in the CV syllable where no prosodic strengthening effects were observed, the results of the current study confirms the presence of acoustic correlates of prosodic phrasing in the spectral and temporal dimensions of onsetless domain-initial

vowels: place features are enhanced and duration is reduced in higher level domains relative to lower levels. This indicates that prosodic phrasing is manifested in vowel features as well as in those of consonants if vowels are immediately adjacent to prosodic boundaries. The findings also suggest that strengthening and lengthening are independent effects on domain-initial vowels in Korean, rejecting the undershoot hypothesis.

FOR A DEPENDENCY THEORY OF INTONATION

David Le Gac¹ & Hi-Yon Yoo²

¹Université de Rouen; ²Université de Paris 7

ID 1438; Poster No. 31

[extra files] [full paper]

This paper accounts for a theory of intonation for French. We discuss morphological approaches where tones or contours are derived by meaning. We claim for an intonative structure independent from other components of the grammar, where the phonological units are interrelated by dependency rules.

DISFLUENCY SURFACE MARKERS AND COGNITIVE PROCESSING; THE CASE OF SIMULTANEOUS INTERPRETING

Myriam Piccaluga¹, Jean-Luc Nespoulous² & Bernard Harmegnies³

¹Laboratoire des Sciences de la Parole, Académie Universitaire Wallonie-Bruxelles; ²Laboratoire Jacques Lordat, Université de Toulouse-Le Mirail et Institut Universitaire de France; ³Laboratoire des sciences de la Parole, Académie Universitaire Wallonie-Bruxelles

ID 1713; Poster No. 33

[full paper]

This paper focuses on a new speech signal based index ("Inter syllabic Interval": ISI), intended to improve the study of disfluencies produced by the chunking process in subjects performing a SI task (Simultaneous Interpreting, i.e., on line oral translation). The variable is introduced on the basis of a discussion of the main methodological trends in the field, with the aim of improving the quality of the numerical treatments applied to the study of SI. It is argued that because the technical and epistemological limitations of the study of pauses, an index based upon the amplitude peaks in the speech signal should provide more reliable and valid information. An exploratory experiment is carried out on a prototypical sample of 4 subjects, performing SI under several conditions. Results show ISI usefulness in detecting events related to high-level cognitive processes, on the basis of the speech signal.

SLIPS OF THE EAR DEMONSTRATE PHONOLOGY IN ACTION

Linda Shockey¹ & Z. S. Bond²

¹University of Reading; ²Ohio University

ID 1045; Poster No. 35

[full paper]

In casual conversation, listeners occasionally report hearing something which differs from what the talker has intended. A large proportion of such 'slips of the ear' involves casual speech phonological alternations.

The error patterns suggest that listeners employ knowledge of casual speech phonology to map phonetic forms into lexical entries.

LEXICAL AND PHONOTACTIC EFFECTS ON WORDLIKENESS JUDGMENTS IN CANTONESE

James Kirby¹ & Alan C. L. Yu²

¹Phonology Laboratory, University of Chicago;

²Phonology Laboratory, University of Chicago

ID 1125; Poster No. 37

[full paper]

This paper reports the results of a wordlikeness task designed to investigate Cantonese speakers' gradient phonotactic knowledge of systematic versus accidental phonotactic gaps. Regression analyses found that wordlikeness judgments correlate with token frequency-weighted neighborhood density and transitional (bigram) probability. This is suggested to be an effect of the relative phonological densities of the Cantonese and English lexica.

VOWEL DISPERSION AS A DETERMINANT OF WHICH SEX LEADS A VOWEL CHANGE

Kevin Heffernan

University of Toronto

ID 1120; Poster No. 39

[full paper]

Women typically produce more dispersed vowels than men. This sex difference makes predictions about the role of each sex in vowel changes. Specifically, women lead changes that maintain the distance between vowels, such as chain shifts, while men lead changes that reduce the distance between vowels, such as vowel mergers. That women lead chain shifts is well-established. That men lead mergers has not been established. An investigation of vowel mergers among the Atlas of North American English speakers reveals that men do lead mergers, and that speakers with a less dispersed vowel system show more instances of mergers, regardless of sex. I conclude by positing vowel dispersion as an internal explanation of which sex leads a vowel change.

ACQUISITION OF WORD STRESS IN GERMAN: VOWEL DURATION AND INCOMPLETENESS OF CLOSURE

Katrin Schneider

Institute of Natural Language Processing, Experimental Phonetics Group, University of Stuttgart

ID 1334; Poster No. 41

[full paper]

This paper presents the results of a study concerning the acoustic correlates of contrastive word stress in bisyllabic and trisyllabic German words, produced by four children aged 2;3 to 7;3 and their mothers. We found that German children of that age are certainly able to produce contrastive word stress and that vowel duration is the most reliable correlate of word stress in the utterances produced by all four children and their mothers, independent of the position of the vowel within the produced word. Furthermore, we found the voice quality parameter incompleteness of closure most uniformly

used by the mothers to mark word stress while the children are on different acquisition stages for this parameter.

THE INFLUENCE OF FREQUENCY ON WORD-INITIAL OBSTRUENT ACQUISITION IN HEXAGONAL FRENCH

Julia Monnin¹, Hélène Loevenbruck² & Mary Beckman³

¹EA Transcultures & ICP, Speech and Cognition Department, GIPSA-lab; ²ICP, Speech and Cognition Department, GIPSA-lab; ³Department of Linguistics, Ohio State University

ID 1660; Poster No. 43

[full paper]

The present study is part of a larger cross-linguistic comparison of phonological development. The aim is to compare production of word-initial obstruents across pairs of languages which have comparable consonants that differ either in overall frequency or in the frequency with which they occur in analogous sound sequences. By comparing across languages, the influence of language-specific distributional patterns on consonant mastery can be disentangled from the effects of more general phonetic constraints on development. The present study aims at extending the comparison to Hexagonal French. We report frequency measures obtained on French databases and results of a preliminary experiment with French-acquiring two-year-old children.

PHONETICS EAR-TRAINING - DESIGN AND DURATION

Patricia D S Ashby

University of Westminster

ID 1281; Poster No. 45

[full paper]

A recent study of the product of traditional phonetics ear-training revealed a number of interesting (sometimes unexpected) effects. Mastery of the sounds of the IPA (including Cardinal Vowels) was taken as the goal/benchmark. 125 ab initio students of phonetics at a UK university were followed through a typical year-long phonetics ear-training programme; their ability to recognise sounds was tested at two points during the year. With respect to vowel identification, the findings confirmed the expectation that contextualised vowels would be harder to identify than vowels in isolation, but they also raised questions about the contribution made by length of training to the level of achievement.

PROPER NAMES: FEATURES OF AMBIGUITY IN A MULTICULTURAL CONTEXT

Marie Dohalska¹, Radka Skardova¹ & Jana Kralova²

¹Phonetics - Institute of Phonetics in Prague; ²Phonetics - Institute of Translation Studies

ID 1404; Poster No. 47

[full paper]

The aim of the experiment was to prove, via production and perception tests, the comprehensibility of proper names. We were interested not only in their recognition in fluent speech, but also in the relationship that may exist between these significant bearers

of information, and furthermore in their interpretation in different languages. This work focuses on the most obvious distortions and degrees of understanding the significant facts when talking about prominent sportsmen/sportswomen in authentic English, Spanish, French and Czech TV announcements.

EFFECTS OF PHONETIC SPEECH TRAINING ON THE PRONUNCIATION OF VOWELS IN A FOREIGN LANGUAGE

Vesna Mildner & Diana Tomic

University of Zagreb, Faculty of Humanities and Social Sciences, Dept. of Phonetics

ID 1444; Poster No. 49

[full paper]

The paper presents the results of speech training exercises on a sample of American English and Spanish native speakers learning Croatian as a foreign language. The success of training was assessed by a panel of trained phoneticians, who evaluated examples of speech before and after a series of individual training sessions. Two different evaluation tests revealed significant improvement in the quality of pronunciation of the five Croatian vowels, which was also reflected in the shape of their vowel space expressed in terms of F1 and F2 frequencies.

EXAMINATION OF SIMILARITY BETWEEN ENGLISH /r/, /l/, AND JAPANESE FLAP: AN INVESTIGATION OF BEST EXEMPLARS BY ENGLISH AND JAPANESE SPEAKERS

Kota Hattori & Paul Iverson

University College London

ID 1107; Poster No. 51

[full paper]

Japanese adults have difficulty learning the English /r/-/l/ contrast, and it has been suggested that this occurs because /r/ and /l/ are similar to the Japanese flap category. The present experiment evaluated this similarity by finding best exemplars of these three consonants in a 5-dimensional acoustic space (F1, F2, F3, closure duration, transition duration) for native speakers of Japanese and English. The results demonstrated that Japanese flap was similar to /l/, but not /r/, for Japanese listeners. However, the flap and /l/ best exemplars of Japanese speakers were still significantly different (e.g., flap having a shorter closer than /l/), indicating that Japanese speakers maintained separate mental representations for these categories rather than using their L1 flap for both consonants.

CROSS-LANGUAGE PERCEPTION OF WORD-FINAL STOPS: COMPARISON OF CANTONESE, JAPANESE, KOREAN AND VIETNAMESE LISTENERS

Kimiko Tsukada¹, Thu, T. A. Nguyen², Rungpat Roengpitya³ & Shunichi Ishihara⁴

¹University of Oregon; ²The University of Queensland;

³Mahidol University; ⁴The Australian National University

ID 1131; Poster No. 53

[extra files] [full paper]

This study examined the discrimination of word-final stop contrasts (/p/-/t/, /p/-/k/, /t/-/k/) in English and Thai by native speakers of Cantonese (C), Japanese (J), Korean (K) and Vietnamese (V). The listeners' first languages (L1) differ substantially in how word-final stops are phonetically realized. Although Japanese does not permit word-final stops, the J listeners were able to discriminate English (but not Thai) contrasts accurately, demonstrating that non-native contrasts are learnable beyond early childhood. The C, K and V listeners have experience with unreleased final stops in their L1s, but differed in their discrimination accuracy especially for Thai stop contrasts. This research highlights the value of systematically comparing listener groups from diverse L1 backgrounds in gaining a better understanding of the role of L1 experience in cross-language speech perception.

THE MAPPING OF PHONETIC INFORMATION TO LEXICAL REPRESENTATIONS IN SPANISH: EVIDENCE FROM EYE MOVEMENTS

Andrea Weber¹, Alissa Melinger² & Lourdes Lara Tapia¹

¹Saarland University; ²Dundee University

ID 1016; Poster No. 55

[full paper]

In a visual-world study, we examined spoken-word recognition in Spanish. Spanish listeners followed spoken instructions to click on pictures while their eye movements were monitored. When instructed to click on the picture of a door (puerta), they experienced interference from the picture of a pig (puerco). The same interference was observed when the displays contained a printed name or a combination of a picture with its name printed underneath. The results confirm for Spanish the simultaneous activation of multiple lexical candidates that match the unfolding speech signal. Implications of the finding that the effect can be induced with standard pictorial displays as well as with orthographic displays will be discussed.

STRATEGIES FOR EDITING OUT SPEECH ERRORS IN INNER SPEECH

Sieb G. Nooteboom & Hugo Quené

Utrecht institute of Linguistics OTS

ID 1119; Poster No. 57

[full paper]

In a classical SLIP task spoonerisms are elicited with either a lexical or a nonlexical outcome. We argue that if the frequency of a particular class of responses is affected by the lexicality of the expected spoonerisms, this indicates that many such responses have replaced elicited spoonerisms in inner speech. Such effects are shown in early interrupted speech errors, speech errors that are form-related to the spoonerisms, and form-unrelated speech errors. Keywords: Speech errors, lexical bias, feedback, self-monitoring, inner speech.

INCREASED LEFT-HEMISPHERE CONTRIBUTION TO NATIVE- VERSUS FOREIGN-LANGUAGE TALKER IDENTIFICATION REVEALED BY DICHOTIC LISTENING.

Tyler K. Perrachione¹ & Patrick C.M. Wong²

¹Department of Linguistics and Cognitive Science Program, Northwestern University, Evanston, IL;

²Department of Communication Sciences and Disorders and Northwestern University Interdepartmental Neuroscience Program, Northwestern University, Evanston, IL

ID 1249; Poster No. 59

[full paper]

Previous studies of human listeners' ability to identify speakers by voice have revealed a reliable language-familiarity effect: Listeners are better at identifying voices when they can understand the language being spoken. It has been claimed that talker identification is facilitated in a familiar language because of functional integration between the cognitive systems underlying speech and voice perception. However, prior studies have not provided specific evidence demonstrating neural integration between these two systems. Using dichotic listening as a means to assess the role of each hemisphere in talker identification, we show that listeners' right-, but not left-, ear (left-hemisphere) performance better predicts overall accuracy in their native than non-native language. By demonstrating functional integration of speech perception regions (classical left-hemisphere language areas) in a talker identification task, we provide evidence for a neurologic basis underlying the language-familiarity effect.

ACOUSTIC CORRELATES OF THE VOICED-VOICELESS DISTINCTION IN DUTCH NORMAL AND TRACHEOESOPHAGEAL SPEAKERS

Petra Jongmans¹, Ton Wempe², Frans Hilgers³, Louis Pols² & Corina van As-Brooks⁴

¹University of Amsterdam/Netherlands Cancer Institute; ²University of Amsterdam; ³Netherlands Cancer Institute/University of Amsterdam; ⁴Netherlands Cancer Institute

ID 1140; Poster No. 61

[extra files] [full paper]

Confusions between voiced and voiceless plosives and fricatives are the most common confusions in Dutch tracheoesophageal (TE) speech. The problem is attributed to the working of the new voice source: the pharyngo-esophageal segment, or neoglottis. In order to learn how these speakers convey the voiced-voiceless distinction, detailed analyses are necessary. 15 acoustic correlates (and a subset of 6 for the fricatives) were selected and analyzed. Statistical analyses were then used to determine which correlates are used to distinguish between voiced and voiceless sounds. The data show that TE speakers do not differ much from normal laryngeal speakers, except where voicing is concerned.

AERODYNAMIC VALIDATION OF PERCEPTUALLY-BASED BREATH GROUP DETERMINATION AND TEMPORAL BREATH GROUP STRUCTURE ANALYSIS IN TAIWANESE ADOLESCENTS WITH PRELINGUAL SEVERE TO PROFOUND HEARING IMPAIRMENT

Wei-Chun Che¹, Yu-Tsai Wang² & Hsiu-Jung Lu²

¹Department of Physical and Medical Rehabilitation, National Taiwan University, Taipei, Taiwan; ²School of Dentistry, National Yang-Ming University, Taipei, Taiwan

ID 1328; Poster No. 63

[extra files] [full paper]

This study reported the reliability and validity of perceptually determined inspiratory loci and temporal breath group structure between 20 young Taiwanese adults with prelingual severe to profound hearing impairment (HI) and 20 age-gender-education-matched controls (HC) with normal hearing. The reliability and validity of perceptual judgment of inspiratory loci were considered satisfactory for both groups, although the HI group exhibited more error rate than the HC group. Furthermore, compared to the HC group, the HI group had more inappropriate inspiratory loci and speech breathing frequencies, longer inter-breath-group pause, but comparable breath group duration.

SEGMENTAL ASPECTS IN SPEAKERS WITH PARKINSON'S DISEASE

Maria Francisca de Paula Soares

UNICAMP - BRAZIL

ID 1654; Poster No. 65

[full paper]

In this study, we explored the segmental aspects of the speech production of a Brazilian parkinsonian group. Three spectral moments and vocalic space area were measured. A total of 8 subjects participated in this study, including 5 parkinsonians with dysarthria and 3 healthy subjects. The experimental task was read given sentences. For acoustic analysis, we selected the words containing the voiceless stop at word onset, followed by /a/, and the lexically stressed vowels. The results suggested that the values for all three spectral moments were higher as compared to the healthy subjects. The spectral moment distribution analysis showed that three parkinsonians were able to distinct places of articulations; two parkinsonian did not present the distinctions for place of articulation; and all the participants of the control did it. For vowel production, our results pointed to great intersubject vocalic space variability expressed by higher values for variance, in the parkinsonian group.

COMMON FACTORS IN EMOTION PERCEPTION AMONG DIFFERENT CULTURES

Kanae Sawamura¹, Jianwu Dang¹, Masato Akagi¹, Donna Erickson², Aijun Li³, Kyoko Sakuraba⁴, Nobuaki Minematsu⁵ & Keikichi Hirose⁵

¹Japan Advanced Institute of Science and Technology, Japan; ²Showa Academia Musicale; ³Institute of Linguistics Chinese Academy of Social Science, China; ⁴Kiyose-shi Welfare Center for the Handicapped; ⁵The University of Tokyo

ID 1065; Poster No. 67

[full paper]

It is believed that there are some common factors independent of languages and cultures in human perception of emotion via speech sounds. This study investigated the factors using 3 country people. An emotional speech evaluated using 3- and 6-emotional dimensions. It was found that most speech materials were perceived to have multiple emotional components, even though a single emotion had been intended to be expressed by the speaker. This phenomenon is common across the three cultures. The principle component analysis showed that the loading pattern of the explanatory variables was consistent with one another for the three different cultures at about 67% cover rate. This suggested that people of different language/cultural backgrounds can perceive emotion from speech sounds sans linguistic information to about the same extent. Extending the evaluation dimension from three emotions to six emotions, it was found that "anger" "joy" and "sad" constitute three basic emotions.

VISUALIZATION OF INTERNAL ARTICULATOR DYNAMICS AND ITS INTELLIGIBILITY IN SYNTHETIC AUDIOVISUAL SPEECH

Katja Grauwinckel, Britta Dewitt & Sascha Fagel

Institute for Speech and Communication, Berlin University of Technology, Germany

ID 1023; Poster No. 69

[full paper]

This paper presents the result of a study investigating the influence of visualization of internal articulator movements on the intelligibility of synthesized audiovisual speech. A talking head was supplemented by internal passive and active articulators. A comparative perception test before and after two different training lessons was carried out, where one type of display included all internal articulator movements and the other displayed dynamics without tongue dorsum height, velum opening/closing and tongue forward/backward movements. Results show that recognition scores were significantly higher in audiovisual compared to auditory alone presentation with non-significantly different recognition scores for both kinds of display. But only in case of additional motion information of internal articulators the training lesson was able to significantly increase the visual and audiovisual intelligibility.

A PHONETICALLY BALANCED MODIFIED RHYME TEST FOR EVALUATING CATALAN SPEECH INTELLIGIBILITY

Francesc Alías & Manuel Pablo Triviño

Enginyeria i Arquitectura La Salle. Ramon Llull University

ID 1210; Poster No. 71

[full paper]

This work introduces a phonetically balanced modified rhyme test (MRT) for evaluating Catalan speech intelligibility. The proposal contents fulfill the standard MRT restrictions, besides yielding phonetic balanced word ensembles so as to avoid biasing the test to scarcely representative phonemes. Hence, it allows testing the intelligibility of any communication system delivering Catalan speech by means of a unique phonetic meaningful comparison framework.

Tuesday, 13:20**Prosody V: Phrasing**

Tuesday, 13:20, Room: 1 (Red)

Chair: Martine Grice

PROSODIC DISAMBIGUATION FROM DEEP SYNTACTIC STRUCTURES*Philipp von Böselager¹ & Berthold Crysman²*¹IfL Phonetik, University of Cologne; ²DFKI & Saarland University

ID 1429

[full paper]

In this paper, we report on an experiment showing how the introduction of detailed prosodic information into synthetic speech leads to better disambiguation of structurally ambiguous sentences. Using modifier attachment (MA) ambiguities and subject/object fronting (OF) in German as test cases, we show that prosody which is automatically generated from deep syntactic information can lead to considerable disambiguation effects, and can even override a strong semantics-driven bias. The architecture used in the experiment, consisting of a large-scale generator for German, a prosody module, and the speech synthesis system MARY is shown to be a valuable platform for testing hypotheses in intonation studies.

ON THE EDGE: ACOUSTIC CUES TO LAYERED PROSODIC DOMAINS*Tae-Jin Yoon, Jennifer Cole & Mark Hasegawa-Johnson*
University of Illinois at Urbana-Champaign

ID 1264

[full paper]

Prosodic structure encodes grouping of words into hierarchically layered prosodic constituents, including the prosodic word, intermediate phrase (ip) and intonational phrase (IP). This paper investigates the phonetic encoding of prosodic structure from a corpus of scripted broadcast news speech through analysis of the acoustic correlates of prosodic boundary and their interaction with phrasal stress (pitch-accent) at three levels of prosodic structure: Word, ip, and IP. Evidence for acoustic effects of prosodic boundary is shown in measures of duration local to the domain-final rhyme. These findings provide strong evidence for prosodic theory, showing acoustic correlates of a 3-way distinction in boundary level.

MINIMUM SIZE CONSTRAINTS ON INTERMEDIATE PHRASES*Gorka Elordieta*

University of the Basque Country

ID 1682

[extra files] [full paper]

In Northern Bizkaian Basque (NBB), Intermediate Phrases (ips) align by default with the left edge of syntactic phrases. The main intonational cue of ips is partial pitch reset at their left edges. A minimal size constraint applies on ips occurring at the left edge of an Intonational Phrase (IP), requiring that they consist of at least

two Accentual Phrases (APs). Following [9]'s idea that certain prominent positions demand augmentation, the NBB facts show that the left edge of an IP can also be a phonologically prominent position.

Acoustics II: Vowels

Tuesday, 13:20, Room: 2 (Orange)

Chair: Hartmut Traunmüller

WHISTLED TURKISH: STATISTICAL ANALYSIS OF VOWEL DISTRIBUTION AND CONSONANT MODULATIONS*Julien Meyer*

LAB, Universitat Politecnica de Catalunya (UPC)

ID 1286

[full paper]

Whistled Turkish is one of the best-preserved whistled forms of languages. The frequency distribution of whistled vowels and the modulations that characterize the whistled consonants are here analyzed. Their articulatory origin is also explained. Moreover, this study provides a detailed insight of the phenomenon of adaptation of whistled speech to the phonology of a given language.

AN ACOUSTICAL ANALYSIS OF THE VOWELS, DIPHTHONGS AND TRIPHTHONGS IN HAKKA CHINESE*Yuk Man Cheung*

City University of Hong Kong

ID 1614

[extra files] [full paper]

The study is a phonetic analysis of the vowels, diphthongs and triphthongs in Meixian Hakka. The formant measurements as well as the temporal organization are presented. Results show that (1) the relative distance between the mid vowels and the high vowels differ in male and female speech in Meixian Hakka; (2) diphthongs in Meixian Hakka may be separated into two categories according to the difference in formant structure relative to the monophthongal vowels and this was supported by the temporal structure of the diphthongs; and (3) the formant frequency data and the temporal organization provide a basis for the transcription of the Meixian Hakka vowel system.

ACOUSTIC PROPERTIES OF THE KAGAYANEN VOWEL SPACE*Kenneth S Olson¹ & Jeff Mielke²*¹SIL International and University of North Dakota;²University of Ottawa

ID 1618

[full paper]

We present a preliminary study of the acoustic properties of the Kagayanen vowel space. We find that /ə/ has an F1 value similar to /i/ and /u/ and hence should be classified as a high vowel. The vowel /i/ has a reduced F2 value in closed syllables. For /u/, both F1 and F2 increase in word-final open syllables.

Production V: Coarticulation

Tuesday, 13:20, Room: 3 (Yellow)

Chair: John Ohala

COARTICULATION IN CONTRASTIVE RUSSIAN STOP SEQUENCES*Lisa Davidson*

New York University

ID 1085

[extra files] [full paper]

The articulation of stop-stop #CC, C#C, and #C₀C by native Russian speakers is examined using ultrasound imaging. Three main issues are addressed: whether syllable structure affects coordination of consonant sequences, whether coarticulatory resistance interacts with syllable structure, and whether second language learners could transfer their ability to produce C#C sequences to #CC sequences. The tongue shape trajectories suggest that C#C and #CC coarticulation and timing are not interchangeable, and that syllable structure does interact with coarticulatory resistance. In some cases, native Russian #CC articulation is more similar to #C₀C than to C#C, suggesting that learning the timing and coarticulation of these sequences may be a challenge for L2 acquisition.

EFFECTS OF SYLLABLE STRUCTURES ON V-TO-V COARTICULATION (THAI VS ENGLISH)*Pik Ki Peggy Mok*

Department of Linguistics and Modern Languages, The Chinese University of Hong Kong

ID 1301

[full paper]

This paper investigates the effects of syllable structures on v-to-v coarticulation. It was hypothesized that open syllables (V#CV) would allow less v-to-v coarticulation than closed syllables (VC#V). Languages with simple syllable structure (Thai) would allow less v-to-v coarticulation than languages with complex syllable structure (English). /C1V1#C2V2/ and /C1V1C2#V2/ sequences were recorded from six native speakers in Thai and English. F1 and F2 frequencies were measured. Results show that English consistently allows more v-to-v coarticulation than Thai, but open and closed syllables do not affect v-to-v coarticulation differently. The results on open and closed syllables are compatible with Öhman's model of coarticulation.

STROBOSCOPIC-CINE MRI AND ACOUSTIC DATA ON GRADUAL TONGUE MOVEMENTS IN KOREAN PALATALIZATION: IMPLICATIONS FOR ITS COARTICULATORY EFFECT*Hyunsoo Kim*

Hongik University, Seoul Korea

ID 1148

[full paper]

The present study addresses the question of whether the tongue rises as high as in the vowel /i/ in two types of Korean palatalization: a) when consonants take place before /i/ within a morpheme and b) when the conso-

nants /t, th/ occur before /i/ across a morpheme boundary, changing into their affricate counterparts. For this purpose, we looked into stroboscopic-cine magnetic resonance imaging (MRI) data on tongue movements taken from two native speakers of the Seoul dialect. The MRI results that the tongue gradually rises and moves front throughout the target consonants are further confirmed by our acoustic data taken from ten Seoulites including the subjects in the MRI experiment. From this, we propose that Korean palatalization is a phonetic coarticulatory effect in the sense of Öhman (1966) and Keating (1985, 1988).

Phonetic Psycholinguistics II: Perceptual Contrasts

Tuesday, 13:20, Room: 4 (Green)

Chair: Niels Schiller

SUPERVISION HAMPERS DISTRIBUTIONAL LEARNING OF VOWEL CONTRASTS*Margarita Gulian, Paola Escudero & Paul Boersma*

University of Amsterdam

ID 1605

[full paper]

We investigate how supervision (in the form of explicit instruction) interacts with distributional learning in the acquisition of the perception of a novel vowel contrast in a second language. An experiment with non-Dutch-speaking Bulgarians reveals that listeners who receive bimodal distributional training without explicit instruction can acquire new Dutch vowel contrasts, and that listeners who receive the same training with explicit instruction do not acquire the new contrasts nearly as well. We conclude that explicit instruction hampers distributional learning.

NO LEXICALLY-DRIVEN PERCEPTUAL ADJUSTMENTS OF THE [x]-[h] BOUNDARY*Michael A. Stevens¹, James M. McQueen² & Robert J. Hartsuiker¹*¹Ghent University; ²Max Planck Institute for Psycholinguistics

ID 1391

[full paper]

Listeners can make perceptual adjustments to phoneme categories in response to a talker who consistently produces a specific phoneme ambiguously. We investigate here whether this type of perceptual learning is also used to adapt to regional accent differences. Listeners were exposed to words produced by a Flemish talker whose realization of [x] or [h] was ambiguous (producing [x] like [h] is a property of the West-Flanders regional accent). Before and after exposure they categorized a [x]-[h] continuum. For both Dutch and Flemish listeners there was no shift of the categorization boundary after exposure to ambiguous sounds in [x] or [h]-biasing contexts. The absence of a lexically-driven learning effect for this contrast may be because [h] is

strongly influenced by coarticulation. As [h] is not stable across contexts, it may be futile to adapt its representation when new realizations are heard.

LARYNGEAL FEATURE STRUCTURE IN 1ST AND 2ND LANGUAGE SPEECH PERCEPTION

Noah Silbert & Kenneth de Jong

Indiana University, Department of Linguistics, Department of Cognitive Science

ID 1149

[full paper]

This study reports an analysis of confusion data in Cutler, et al. [2] designed to probe interactions between distinctive features in English consonant identification by English and Dutch native listeners. While both listener groups exhibit extensive interaction between features, the Dutch listeners' interactions deviate systematically from the English listeners'. In the original analysis, coda voicing neutralization in Dutch was invoked to account for the lower identification accuracy and information transmission rates for coda voicing contrasts in Dutch listeners [2]. The present study augments these findings, analyzing consonant pair similarity measures, finding evidence for different laryngeal feature structure in both language groups in both onset and coda positions. This is not accounted for by a general neutralization rule.

Voice Quality I

Tuesday, 13:20, Room: 5 (Blue)

Chair: John Esling

DETECTION OF IRREGULAR PHONATION IN SPEECH

Srikanth Vishnubhotla & Carol Y. Espy-Wilson

Institute for Systems Research, University of Maryland

ID 1659

[full paper]

The problem addressed here is that of detecting irregular phonation during conversational speech. While most published work tackles this problem only by focusing on the voiced regions of speech, we focus on detecting irregular phonation without assuming prior knowledge of voiced regions. In addition, we improve the pitch estimation accuracy of a current pitch tracking algorithm in regions of irregular phonation, where most pitch trackers fail to perform well. The algorithm has been tested on the TIMIT and NIST 98 databases. The detection rate for the TIMIT database is 91.8% (17.42% false detections). The detection rate for the NIST 98 database is 91.5% (12.8% false detections). The pitch detection accuracy increased from 95.4% to 98.3% for the TIMIT database, and from 94.8% to 97.4% for the NIST 98 database.

ACOUSTIC AND EGG ANALYSIS OF PRESSED PHONATION

Carlos Toshinori Ishi, Hiroshi Ishiguro & Norihiro Hagita

ATR - IRC Labs.

ID 1057

[full paper]

Pressed phonation ("rikimi" in Japanese) is a voice quality that carries important paralinguistic information of expressivity in the emotional or attitudinal states of the speaker. Analysis of pressed voice samples extracted from natural conversational speech firstly shows that irregularity in periodicity (such as in vocal fry and harsh voices) is a common but not a strictly determinant feature of pressed voices. Spectral analysis shows that parameters related with spectral slope are effective to identify part of the pressed voice samples, but fail when vowels are nasalized or double-beating occurs within a glottal cycle. Temporal analyses of speech and EGG waveforms indicate that information about the completely closed period can potentially be used for pressed voice identification.

USE OF SPEECH RECOGNITION AND VOICE FATIGUE: MEASURES OF F0 AND SPECTRAL SLOPE

Christel De Bruijn¹ & Sandra Whiteside²

¹University of Central England, Birmingham, UK;

²University of Sheffield, UK

ID 1490

[full paper]

This study investigates the effect of a speech recognition task on acoustic measures of voice quality. Type of speech recognition (discrete and continuous) and vocal load of a speaker receive particular attention. A rise in F0, a common finding in voice fatigue studies, appears as the most consistent finding. It is interpreted as part of hyperfunctional mechanism countering early signs of voice fatigue.

Foreign Language Acquisition II: Foreign Accent

Tuesday, 13:20, Room: 6 (Black)

Chair: Wim v. Dommelen

FACTORS ACCOUNTING FOR ATTAINMENT IN FOREIGN LANGUAGE PHONOLOGICAL COMPETENCE

Chris Sheppard¹, Chiyo Hayashi² & Ai Ohmori³

¹Waseda University; ²Kunitachi College of Music;

³International Christian University

ID 1499

[full paper]

This paper reports research which first examines the limits in attaining phonological competence of foreign language learners who have not resided in a target language community, and second, attempts to identify factors which explain variance in this competence. After rating fifty-two samples from 67 participants, the re-

sults showed that EFL learners were able to attain a near-native like pronunciation for all but sentences. The factors which explained individual difference in pronunciation attainment were self rated musical ability, attitudes toward learning pronunciation, length of time spent learning the language and strategy use.

PERCEPTION OF ACCENT BY L2 STUDENTS OF ENGLISH: SUBJECTIVE PREFERENCE VS. OBJECTIVE INTELLIGIBILITY

Teresa Lopez-Soto & Dario Barrera-Pardo

University of Seville

ID 1625

[full paper]

This experimental study deals with the perception of regionally coloured accents of English in Ireland, Great Britain, and the United States. The 3 standards were chosen after a preliminary survey had taken place where students showed a higher knowledge of the culture of these 3 different groups over the Australasian variety. 14 different recordings were selected from the International Dialects of English Archives and played to students of English as a Foreign language (EFL) at the University level. To pursuit this goal, a questionnaire was devised on-line so that a mixed groups of students could express their opinion on a three-layer approach towards the perception of the audio files: personality identification and preference, perceived linguistic divergence, and geographic identifiability. The study is done in the context of EFL in Spain.

GLOBAL FOREIGN ACCENT IN NATIVE GERMAN SPEECH

Esther de Leeuw¹, Monika Schmid² & Ineke Mennen¹

¹Speech Science Research Centre, Queen Margaret University, Edinburgh; ²Vrije Universiteit Amsterdam

ID 1056

[full paper]

The primary aim of this study was to determine whether German native speakers who immigrated abroad are perceived to have a global foreign accent in their native speech. German monolingual listeners assessed global foreign accent of German immigrants living in either Anglophone Canada or the Dutch Netherlands, and five German monolingual controls. A highly significant difference was revealed between the foreign accent rating (FAR) of the consecutive bilinguals and the German monolingual control group as well as a significant difference between the two groups of second language learners. Multiple regression analyses indicated that for English L2 speakers, age of arrival (AOA) was the only significant predictor variable; whereas for Dutch L2 speakers, the averaged variable of contact with German (CONTACT) was the only significant predictor variable. Further research is necessary in order to illuminate cross-linguistic differences, particularly with regard to amount and type of contact to the native language.

Tuesday, 14:20

Poster III

Tuesday, 14:20

Chairs: Linda Shockey, Petur Helgason

ANTICIPATORY LARYNGEAL MOVEMENTS. AN X-RAY INVESTIGATION*Béatrice Vaxelaire¹, Rudolph Sock¹, Fabrice Hirsch¹ & Johanna-Pascale Roy²*¹Phonetics Institute of Strasbourg - Speech and Cognition Group; ²Département de linguistique et de didactique des langues

ID 1099; Poster No. 2

[full paper]

This investigation deals with the production of VCV sequences produced by French speakers, with particular focus on larynx position and trajectory. X-ray data are extracted from a database for four speakers, uttering sentences or VCV sequences at two speaking rates: normal-conversational and fast. Results obtained from a frame-by-frame analysis of midsagittal profiles reveal: (1) a high positive correlation between the larynx and the hyoid bone in their vertical displacements; (2) a confirmation of previous findings that the position of the larynx is lower for high vowels than for low vowels; (3) anticipatory laryngeal gestures in both /aCu/ and /uCa/ sequences; (4) that these anticipatory gestures are resistant to the behaviour of supraglottal structures, and also to speech rate conditions.

SPEECH SYNCHRONIZATION: INVESTIGATING THE LINKS BETWEEN PERCEPTION AND ACTION IN SPEECH PRODUCTION*Fred Cummins*

University College Dublin

ID 1156; Poster No. 4

[full paper]

Speakers can achieve a high degree of synchrony when reading a prepared text together. Under these constraints, there is necessarily a very tight coupling of production and perception. In a first experiment, we demonstrate that speakers can successfully synchronize with selected recordings of others obtained in a synchronous speaking condition. We then have speakers attempt to synchronize with modified recordings, in which the original recording is replaced with altered speech. The goal is to find out the physical properties of the speech signal which permit the coupling required for synchronization. It is demonstrated that the energy envelope itself is not sufficient to support coupling, while pitch information is essentially unimportant.

SKULL AND VOCAL TRACT GROWTH: FROM NEWBORN TO ADULT*Louis-Jean Boë¹, Jean Granat², Pierre Badin³, Denis Autesserre¹, David Pochic⁴, Nassim Zga⁴, Nathalie Henrich⁵ & Lucie Ménard⁶*¹ICP – Depart Speech and Cognition, GIPSA, CNRS, Université Stendhal, Grenoble; ²Muséum National Histoire Naturelle, CNRS, Paris, France; ³ICP – Depart Speech and Cognition, GIPSA, CNRS, INPG, Grenoble; ⁴École Nationale Supérieure d'Électronique, Grenoble, France; ⁵ICP – Depart Speech and Cognition, GIPSA, CNRS, Université Stendhal, Grenoble, France; ⁶Départ. Linguistique et Didactique des Langues, Univ. du Québec, Montréal, Canada

ID 1426; Poster No. 6

[full paper]

The objective of this work is twofold. First, a model of the vocal tract is positioned into the bony architecture of the male and female skulls from birth to adulthood. Second, vowel spaces are determined and vowel prototypes, for the cardinal vowels, are synthesized using a simulation of the laryngeal source. Results of this modeling study during ontogeny allow for a better understanding of speech acquisition processes in infants and vocal tract reconstruction of fossils' Hominids.

TEMPORAL COMPENSATION IN CZECH?*Pavel Machač & Radek Skarnitzl*

Institute of Phonetics, Charles University in Prague

ID 1434; Poster No. 8

[full paper]

Temporal compensation on the segmental level refers to the tendency towards temporal equalization of CV (and possibly VC) sequences: a shorter duration of one segment leads to a longer duration of the neighbouring segment, and vice versa. Any comprehensive description of sound properties of a language must take the possible existence of this tendency into account. The objective of this research, which constitutes a pilot study into this area for the Czech language, is the question of a possible temporal effect of a consonant on a vowel ('vocalic compensation'), and of a vowel on a consonant ('consonantal compensation'). The result suggest that there indeed is a tendency towards bilateral temporal effects between a consonant and vowel (C \rightleftharpoons V).

RELATIONAL TIMING OR ABSOLUTE DURATION? CUE WEIGHTING IN THE PERCEPTION JAPANESE SINGLETON - GEMINATE STOPS*Kaori Idemaru & Lori Holt*

Carnegie Mellon University

ID 1178; Poster No. 10

[full paper]

Relational timing has been proposed as a solution to the problem of variability across durational properties of speech arising with changes in speaking rate. The current study investigates the role of absolute and relational timing cues in perception of Japanese stop length (singleton/ geminate) categorization. Absolute (stop duration) and relational (ratio of stop duration to preceding mora duration) duration cues were independently varied in a categorization test. Although Ratio was shown

previously to classify speakers' productions more accurately (Idemaru, 2005), listeners' category responses showed strong individual differences in cue use. These results demonstrate that a highly reliable acoustic cue in the distribution of cue available in speech production does not necessarily predict its primacy in speech perception.

THE INFLUENCE OF DYNAMIC F0 ON THE PERCEPTION OF VOWEL DURATION: CROSS-LINGUISTIC EVIDENCE

Heike Lehnert-LeHouillier

University at Buffalo & Haskins Laboratories

ID 1213; Poster No. 12

[full paper]

This paper investigates the influence of a dynamic fundamental frequency (F0) on the perception of vowel duration. The perception of vowel duration of the vowels [a], [e], and [i] with a falling versus a level F0 was investigated. Native speakers of Thai, Japanese, German, and Latin American Spanish were presented with monosyllabic CV non-sense words, and their perception of the duration of vowels with a level F0 was compared to that of vowels with a falling F0 from 160 Hz to 80Hz. The results show that only Japanese listeners perceived the vowels with a falling F0 as longer. Hence the cross-linguistic investigation shows that the influence of F0 on the perceived duration of vowels is language specific rather than universally present in speech perception.

THE PERCEPTION OF CYPRIOT GREEK 'SUPER-GEminATES'

Spyros Armosti

University of Cambridge

ID 1551; Poster No. 14

[full paper]

In Cypriot Greek, word-final /n/ assimilates to word-initial fricative and sonorant geminates producing 'super-geminates'. This study examines whether these super-geminates are perceptually distinct from other types of word-initial and post-lexical geminates. The results of the study indicate that super-geminates were not readily identified by the subjects, while the contrast between word-initial geminates and singletons was more marked.

VOWEL NASALIZATION IN AMERICAN ENGLISH: ACOUSTIC VARIABILITY DUE TO PHONETIC CONTEXT

Nancy F. Chen¹, Janet Slifka² & Kenneth N. Stevens³

¹Speech & Hearing Bioscience & Technology, Harvard-MIT Health Sciences and Technology; Speech Communication Group, Research Laboratory of Electronics, Massachusetts Institute of Technology; ²Speech Communication Group, Research Laboratory of Electronics, Massachusetts Institute of Technology; ³ Speech & Hearing Bioscience & Technology, Harvard-MIT Health Sciences and Technology; Speech Communication Group, Research Laboratory of Electronics, Massachusetts Institute of Technology

ID 1171; Poster No. 16

[full paper]

This study quantifies acoustic variation of vowel nasalization arising from phonetic context in American English with an emphasis on carryover contexts. While qualitative articulatory trajectories and phonetic descriptions suggest that a vowel is nasalized in carryover contexts, few acoustic studies have examined this issue. Our acoustic analyses investigate the vowel /i/ and show that: (1) a vowel can be nasalized with at least one adjacent nasal consonant, even if the nasal consonant is pre-vocalic; (2) vowels with nasal consonants on both sides (NVN) do not guarantee more vowel nasalization.

AN ACOUSTIC STUDY OF DEVOICING OF THE VOICED GEMINATE OBSTRUENTS IN JAPANESE

Aki Hirose¹ & Michael Ashby²

¹Institute of International Education in London;

²University College London

ID 1425; Poster No. 18

[extra files] [full paper]

Historically, the phonological system of Japanese did not allow voiced geminate obstruents, and they can be found only in recent loanwords such as /baggu/ "bag" and /kiddo/ "kid". However, the voicing of geminates in such loanwords is problematic, and seemingly voiceless pronunciations are often to be heard. In a nonsense word study, three speakers read words exemplifying all potential voiced geminate obstruents, together with their voiceless and singleton counterparts, and measures were made of four possible voicing cues. The duration of closure voicing, and to a lesser extent F0 perturbation, suggest unvoicing of the geminates; but F1 transition resembles that for voiced sounds, while preceding vowels are actually longer before geminates than before singletons. Overall, it seems that laryngeal activity in geminates results from a pattern of deliberate control rather than the aerodynamic challenge of maintaining voicing during a long obstruent articulation.

INTER-SUBJECT AGREEMENT IN RHYTHM EVALUATION FOR FOUR LANGUAGES (ENGLISH, FRENCH, GERMAN, ITALIAN)

Paolo Mairano¹ & Antonio Romano²

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ID 1110; Poster No. 20

[full paper]

This paper deals with the acoustic correlates of stress-timed and syllable-timed languages proposed by Ramus et alii (1999). An experiment has been conducted in order to verify the validity of the three correlates using data of 4 languages (and some of their varieties). The novelty of this study consists in the fact that the segmentation of the acoustic data (based on "The North Wind and the Sun" of the IPA) was carried out independently by both authors. The results show significant differences if compared between them and with those of other studies. However, the general tendency seems to confirm, at least partially, the validity of the three correlates even though they have been obtained from narrative texts.

PITCH RANGE VARIATION IN ENGLISH TONAL CONTRASTS: CONTINUOUS OR CATEGORICAL?

Laura Dilley

Department of Communication Disorders and Department of Psychology, Bowling Green State University

ID 1122; Poster No. 22

[extra files] [full paper]

The importance of pitch range variation for theories of intonation is well-known, but whether pitch range variation gives rise to distinctive linguistic categories in English is unclear. To test this possibility, three intonation continua were constructed for use in an imitation experiment; all had endpoints with distinct tonal representations under autosegmental-metrical (AM) theory [1]. Responses to all three stimulus sets showed continuous variation in pitch range. The results suggest that pitch range is a dimension which is gradient in English.

LEXICAL PITCH ACCENT IN GOSHOGAWARA JAPANESE: RISING OR FALLING?

Yosuke Igarashi

Japan Society for the Promotion of Science, National Institute for Japanese Language

ID 1179; Poster No. 24

[full paper]

This study analyzes Goshogawara Japanese (GJ) which has rising lexical pitch accent. Accented words in this dialect are known to show a pitch lowering in the final syllable only when the word is followed by a juncture. The results of this experiment contradict earlier reports revealing that this lowering is always present. They indicate that pitch accent in GJ is not simply rising (LH) but it contains falling (HL) elements in its representation.

MORAIC ANCHORING OF F0 IN WASHO

Justin Murphy & Alan C. L. Yu

Phonology Laboratory, The University of Chicago

ID 1268; Poster No. 26

[full paper]

Recent research shows that the minima and maxima of pitch accent and tonal contours are often aligned with segmental anchors. This study examines f0 alignment in Washo, an endangered American language. Washo is interesting because, unlike other languages which have been studied, it not only has a vowel length distinction, but also what is known as 'stress-sensitive quantity alternations' [1]: long stressed vowels are followed by a short consonant (V:C), while short stressed vowels are followed by a geminate (VC:). This paper reports the results of an acoustic experiment demonstrating that the anchoring of f0 landmarks in Washo makes reference to anchors at the moraic rather than the segmental level. It is found that H anchors consistently with the second mora of the stressed vowel. L, meanwhile, cannot be anchored to the onset of the stressed vowel without reference to the sonority of segments preceding the tonic vowel.

EFFECT OF UTTERANCE LENGTH ON F0 SCALING

Maria del Mar Vanrell

Universitat Autònoma de Barcelona

ID 1273; Poster No. 28

[full paper]

This study examines the effect of utterance length on utterance-initial F0 values and H and L scaling of nuclear accent in Majorcan Catalan. Research on the correlation between utterance length and initial F0 values has thus far yielded contradictory answers to the question of whether utterance length is a determining factor for initial pitch height. Regarding the impact of utterance length on scaling of nuclear accents (known as downstep), it has been shown that downstep may be under the conscious control of the speaker and be governed by a clearly communicative function. Firstly, the results reveal that there exists a correlation between sentence length and initial pitch height, but this correlation is not constant across speakers and sentence-types, suggesting that this is an instance of soft preplanning. Secondly, our results show that downstep or, more precisely, the failure of downstep may be grammaticalized in a particular phonological context.

PRODUCTION AND PERCEPTION OF WORD PROSODY IN THREE DIALECTS OF KOREAN

Kenji Yoshida, Junghyoe Yoon & Hyun-jin Kim

Indiana University

ID 1305; Poster No. 30

[extra files] [full paper]

This paper examines the relationship between production and perception of prosodically marked lexical contrast, comparing 16 native speakers from three dialects of Korean known to exhibit variation in the use of prosodic features for lexical marking. A set of synthesized stimuli was constructed, where both F0 contour and syllable duration were manipulated. South Kyungsang speakers have F0 distinction in their productions and are sensitive to F0 variations in perception. Cholla speakers are sensitive to F0 information but in the opposite direction to Kyungsang speakers, suggesting that their 'interpretation' of the F0 is the critical factor of perceptual judgment. Some of the Seoul speakers show a duration contrast and are sensitive only to duration change. The results reveal general though incomplete correlation between production and perception of word prosody, suggestive of the different typological status of the three dialects.

EFFECTS OF SYLLABLE STRUCTURE AND NUCLEAR PITCH ACCENTS ON PEAK ALIGNMENT: A CORPUS-BASED ANALYSIS

Bernd Möbius & Matthias Jilka

University of Stuttgart

ID 1389; Poster No. 32

[full paper]

This paper describes the use of a unit selection corpus in carrying out an investigation of factors influencing specific aspects of the phonetic realization of tonal categories, concentrating on the alignment of peaks in H*L pitch accents in German. Three major linguistic

parameters potentially influencing peak alignment are investigated. Two of them (syllable structure, nuclear pitch accents) are established influences while vowel quality is usually not considered relevant. Results from other studies are confirmed (peaks occur earlier in nuclear pitch accents, coda type influences peak position) and new findings are offered (in interaction onset type is more important than coda type). The presented procedure both describes the characteristics of the voice providing the corpus (allowing a more detailed phonetic realization of tonal categories, e.g., for speech synthesis) and offers general insights into which factors are relevant to the alignment of H*L peaks in German.

ENGLISH PHRASAL STRESS TARGETS MULTIPLE, OPTIONAL LENGTHENING SITES

Alice Turk¹ & Snezhina Dimitrova²

¹University of Edinburgh; ²Sofia University

ID 1394; Poster No. 34

[full paper]

Durations of syllables in phrasally stressed English 4-syllable words like *democratic*, with primary stress on the penultimate syllable and secondary stress on the first syllable, were compared with their counterparts in words without phrasal stress. These comparisons showed considerable variation in lengthening patterns across subjects, where two subjects showed reliable lengthening on only a single syllable in the phrasally-stressed words (primary stressed syllable for one subject, final syllable for the other). The other two subjects reliably lengthened the first syllable, the primary stressed syllable, and final syllable, with the greatest magnitude of lengthening on the primary stressed syllable. Taken together, these results suggest that the initial, secondary stressed syllable, the primary stressed syllable, and the final syllable are all distinct but optional lengthening sites in English.

EFFECTS OF FOCUS UPON DURATIONAL PATTERNS OF FIVE-SYLLABLE WORDS IN STANDARD CHINESE

Yuan Jia¹, Aijun Li², Ziyu Xiong² & Yiya Chen³

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ID 1399; Poster No. 36

[extra files] [full paper]

ABSTRACT This paper explicitly examines the influence of focus on durational patterns of five-syllable words with various positions and different tones in Standard Chinese. Target sentences were constructed that focus elicited on the constituents which were located at the beginning of the sentences. For the within-word syllables of the focused constituents, they were designed in various positions in the words and associated with the tones of tone1, tone2 and tone4. Results of the experiments show that although focus induces significant lengthening of the focused constituents, the internal durational adjustment of each focused syllable is by no means symmetric and the magnitude of such

lengthening is determined by the metrical structure of the focused constituents. **Keywords:** focus; five-syllable words; durational pattern

LINGUISTIC RESOURCES FOR COMPLAINTS IN CONVERSATION

Richard Ogden

Dept. of Language & Linguistic Science, University of York

ID 1197; Poster No. 38

[extra files] [full paper]

Complaints might be thought a priori to be a good place to find paralinguistic features in their natural setting. Using conversation analytic methodology, I argue that an account of the phonetics of complaints needs to take into consideration other sequential features of the turn in which the complaint is delivered. In particular, a turn delivering a complaint can either be marked as designed to receive an affiliative response (and thus a continuation of the activity of complaining), or marked as closing down the complaint sequence.

THE EFFECT OF ONSET AND POSITION IN THE REALIZATION OF TONE 1 IN TWO DIALECTS OF TAIWAN MANDARIN

Janice Fon¹, Huiju Hsu², Yi-Hsuan Huang¹ & Sally Chen¹

¹Graduate Institute of Linguistics, National Taiwan University;

²Department of Applied Linguistics and Language Studies, Chung Yuan Christian University

ID 1364; Poster No. 40

[full paper]

This study investigates how onset and sentence positioning affect the realization of Tone 1 in two dialects of Taiwan Mandarin. Results showed that the central dialect was higher in register when placed in isolation, but lower when placed in a sentential context. When there was a tonal mismatch, coarticulatory effects were more robust in the northern dialect. This implies that speakers of the central dialect (nonstandard) might be more self-conscious about the standard-vernacular distinction than those of the northern dialect (standard), and overcorrection tended to occur. The effect of onset type was also significant but fairly localized. Obstruent-initial syllables had higher initial pitch than sonorant ones. The declination effect was also significant, the rate of which being higher in the central variety. In addition, sentential stress tended to raise the sentence-final H targets in both varieties. However, the PENTA model was not fully supported.

SOUND CHANGE AND FUNCTIONALISM

Matt Bauer¹ & Frank Parker²

¹Illinois Institute of Technology; ²Parlay Press

ID 1078; Poster No. 42

[full paper]

Functional (speaker-based) and non-functional (listener-based) accounts are often equally satisfactory in explaining internally motivated diachronic sound change. Here we report a case clearly favoring the non-functional account: In some dialects of English, /æ/ is raised before /g/ but not /k/. The raising may be an at-

tempt to reduce the conflict between producing the low front vowel before the voiced velar, or it may be due to listener misapprehension. Using acoustic and articulatory data from General American English to simulate the conditions prior to /æ/-raising, we show the precipitating stimulus for /æ/-raising had to have been listener misapprehension. Specifically, even though both /g/ and /k/ exert a coarticulatory effect on /æ/, acoustic evidence for the coarticulatory effect is found only before /g/.

PHONETIC FACTORS IN /r/-LIAISON USAGE: A FIRST REPORT

Pilar Mompean-Guillamon & Jose Antonio Mompean-Gonzalez

University of Murcia

ID 1090; Poster No. 44

[full paper]

Variability in /r/-liaison usage in non-rhotic accents of English has been explained by reference to linguistic, sociolinguistic and phonetic factors. This paper looks at two phonetic factors that might condition such variability: a) the type of vowel phoneme at the end of the syllable likely to make the link; and b) the presence/absence of /r/ at the beginning of that syllable. A corpus of Received Pronunciation (RP) English newscasts from the years 2004 and 2005 available from the BBC Learning English website [16] was investigated. Potential contexts were detected and analysed auditorily. The results show that intrusive /r/ is more frequent after back vowels than after central vowels and that the presence of /r/ in the syllable that would make the /r/-link does not seem to have a great effect on the presence of /r/-link.

HOW UNIVERSAL IS THE SONORITY HIERARCHY?: A CROSS-LINGUISTIC ACOUSTIC STUDY

Carmen Jany, Matthew Gordon, Carlos M Nash & Nobutaka Takara

University of California, Santa Barbara

ID 1096; Poster No. 46

[full paper]

Parker (2002) explores the hypothesis that segmental sonority in the phonological sense has concrete measurable physical correlates. In a study of English and Spanish, Parker concludes that intensity is the most reliable correlate of sonority. This paper extends Parker's study to four more genetically diverse languages: Egyptian Arabic, Hindi, Mongolian, and Malayalam, thereby examining the universality of the acoustic basis for the sonority hierarchy: glides > liquids > nasals > obstruents. It is shown that disputed sonority contrasts, such as a) laterals vs. rhotics, b) voiceless fricatives vs. voiced stops, c) affricates vs. stops, and d) sibilants vs. other fricatives, follow language-specific patterns, while undisputed contrasts, such as sonorants > obstruents, are cross-linguistically consistent in their acoustic patterns. Differences in sonority as a result of prosodic position and interspeaker variation are not observed in the present study.

ACCENT VARIATION IN ADOLESCENTS IN ABERDEEN: FIRST RESULTS FOR (HW) AND (TH)

Thorsten Brato

Department of English, University of Giessen

ID 1420; Poster No. 48

[full paper]

This paper presents preliminary results of a major study into accent variation in a socially-stratified sample of urban adolescents in Aberdeen. The variables (hw) and (th) were analysed in word list style and reading style. The results indicate changes in progress for the first variable. The status of the second variable is yet unclear. TH-fronting was found only infrequently and seems to be restricted to some speakers.

LONG-TERM PHONOLOGICAL BENEFITS OF CHILDHOOD L2 EXPERIENCE IN A JAPANESE IMMERSION PROGRAM

Tetsuo Harada

Waseda University

ID 1230; Poster No. 50

[full paper]

This study examines to what extent English-speaking adults who have attended a Japanese immersion program in childhood, in which many content subjects are taught in Japanese, can retain their L2 pronunciation ability even if L2 input dramatically decreases after they exit the program. The results show that the immersion graduates still retained their ability to control segmental timing (i.e., voice onset time (VOT), contrast between single and geminate stops in Japanese), although their L2 sounds were not exactly the same as monolingual speakers'.

SPATIAL CONFIGURATIONS OF ENGLISH FRICATIVES FOR JAPANESE LEARNERS

Won Tokuma

Seijo University

ID 1388; Poster No. 52

[full paper]

This study investigates how spatial configurations of English fricatives change for Japanese learners in advanced, intermediate and pre-intermediate levels, in comparison to that of native speakers. The perceptual representations obtained from Multidimensional Scaling analysis on similarity judgements showed clear sibilance/nonsibilance division for advanced and intermediate learners, but place of articulation feature was not observed. The perceptual configuration of pre-intermediate level students showed strong L1 phonological influence. The results show that the spatial modelling of similarity data can provide an alternative to the conventional approaches to cross language perception.

A PRELIMINARY STUDY ON THE INFLUENCE OF SOUND DATA COMPRESSION UPON FORMANT FREQUENCY DISTRIBUTIONS IN VOWELS AND THEIR MEASUREMENT

Bogdan Rozborski

Polish-Japanese Institute of Information Technology

ID 1624; Poster No. 54

[full paper]

The aim of this paper is to demonstrate the appear-

ance of spectral differences of formant structures of a chosen vowel that occurred after compressing PCM sound data using a given compression method. The experiments carried out by the author show that sound data compression does not affect the significantly stability of formant frequency distributions in terms of statistics, as long as it does not introduce random, stochastic component into the original speech signal.

INFLUENCE OF BRAIN REGIONS INVOLVED WITH ARTICULATORY PROCESSING ON PHONEME IDENTIFICATION PERFORMANCE

Daniel Callan & Mitsuo Kawato

ATR Computational Neuroscience Laboratories

ID 1361; Poster No. 56

[full paper]

This study investigates neural processes related to phoneme identification in the presence of noise. Differential brain activity for difficult consonant identification task (/b/-/d/) relative to an easier vowel identification task (/a/-/o/) was present in brain regions involved with articulatory planning control (Broca's area, anterior insula, premotor cortex), instantiation of internal models (cerebellum), and auditory processing regions (STG/S). The results of a correlation analysis of behavioral performance with brain activity, as well as analysis of incorrect versus correct responses suggests that activity in brain regions involved with articulatory planning control is related with poorer performance. These results are inconsistent with hypotheses that articulatory planning areas are utilized to facilitate speech perception. Considerable activity in the cerebellum for correct relative to incorrect responses is consistent with the hypothesis that articulatory-auditory internal models instantiated in the cerebellum are utilized to facilitate phoneme perceptual identification performance.

SPEECH RHYTHM OF A WOMAN WITH FOREIGN ACCENT SYNDROME (FAS)

Beate Wendt¹, Ines Bose², Henning Scheich¹, Michael Sailer³ & Hermann Ackermann⁴

¹Leibniz-Institute for Neurobiology; ²Martin-Luther-University of Halle/S.; Department of Speech Communication and Phonetics; ³MEDIAN Klinik NRZ Magdeburg; ⁴Eberhard-Karls-Universitätsklinikum Tübingen; Clinic for Neurology

ID 1348; Poster No. 58

[extra files] [full paper]

This paper deals with a case of FAS (a German speaking woman with a Russian accent), a rare form of speech disorder. We focused on the patient's prosody while reading aloud, especially on temporal structures (speech rate and speech rhythm) in comparison to features of a Russian and a German native speaker. The aim of the auditory and acoustic analysis was to identify potential key features of pronunciation which could be characteristic of Russian German speech and which might lead listeners to judge the patient's speech as sounding Russian. There are similarities between the patient and the Russian native speaker with regard to some phonetic features (structuring of prosodic phrases). But

the patient's speech often shows a lack of some of the most typical features of true Russian foreign accent, and there are more similarities between the Russian and the German native Speaker.

MULTIMODAL ANALYSIS OF ANGER IN NATURAL SPEECH DATA

Catherine Mathon

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ID 1123; Poster No. 60

[full paper]

This paper reports a study on detection and expression of anger in French, conducted on natural speech data. Perceptual tests showed that both linguistic and prosodic cues could convey information about the affective state of the speaker. Pragmatic, segmental and supra-segmental analyses of the corpus were conducted in order to reveal the real cues that permit the detection of emotion and the classification of anger in degrees.

EXPRESSING THE INEXPRESSIBLE: A PHONETIC STUDY OF NONSTANDARD USE OF A DIACRITIC FOR VOICED OBSTRUENTS IN JAPANESE

Keiko Masuda

Chuo University

ID 1182; Poster No. 62

[full paper]

This paper investigates phonetic features of vowels with a diacritic for voiced obstruents (dakuten) in Japanese, which are phonologically and orthographically nonstandard but often observed recently in informal linguistic media. Recorded data of the vowels were analysed in terms of auditory impression, visual inspection, formant frequencies, phonation type, F0 and acoustic intensity. It was revealed that the productions of /a/ with a dakuten exhibited positive spectral tilt in the low frequency range and lowering of F0, both of which are indicative of creaky voice. On the other hand, increase in acoustic intensity, which has been claimed by some previous work, was not clearly observed in this analysis.

EXPRESSIVE SPEECH CORPUS VALIDATION BY MAPPING SUBJECTIVE PERCEPTION TO AUTOMATIC CLASSIFICATION BASED ON PROSODY AND VOICE QUALITY

Ignasi Iriondo, Santiago Planet, Joan Claudi Socoró, Francesc Alías, Carlos Monzo & Elisa Martínez

Enginyeria i Arquitectura La Salle. Ramon Llull University

ID 1501; Poster No. 64

[full paper]

This paper presents the validation of the expressive content of an acted corpus produced to be used in speech synthesis, due to this kind of emotional speech can be rather lacking in authenticity. The goal is to obtain an automatic classifier able to prune the bad utterances - from an expressiveness point of view-. The results of a previous subjective test are used for training a multistage emotional identification system based on statis-

tical features computed from the speech prosody and voice quality. Finally, the system provides a set of utterances to be checked and definitely eliminated if appropriate.

THE IMPACT OF F0 EXTRACTION ERRORS ON THE CLASSIFICATION OF PROMINENCE AND EMOTION

Anton Batliner¹, Stefan Steidl¹, Björn Schuller², Dino Seppi³, Thuriid Vogt⁴, Laurence Devillers⁵, Laurence Vidrascu⁵, Noam Amir⁶, Loic Kessous⁶ & Vered Aharonson⁷

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ID 1168; Poster No. 66

[full paper]

Traditionally, it has been assumed that pitch is the most important prosodic feature for the marking of prominence, and of other phenomena such as the marking of boundaries or emotions. This role has been put into question by recent studies. As nowadays larger databases are always being processed automatically, it is not clear up to what extent the possibly lower relevance of pitch can be attributed to extraction errors or to other factors. We present some ideas as for a phenomenological difference between pitch and duration, and compare the performance of automatically extracted F0 values and of manually corrected F0 values for the automatic recognition of prominence and emotion in spontaneous speech (children giving commands to a pet robot). The difference in classification performance between corrected and automatically extracted pitch features turns out to be consistent but not very pronounced.

Tuesday, 16:00**Second Language Acquisition and Exemplar Theory**

Tuesday, 16:00, Room: 1 (Red)

Chairs: Valerie Hazan, Wim v. Dommelen

SECOND LANGUAGE ACQUISITION AND EXEMPLAR THEORY*Valerie Hazan*

Department of Phonetics and Linguistics, UCL

ID 1782

[full paper]

In the last decade or so, there has been a revived interest in studying the phonetic aspects of second language (L2) acquisition. In spite of increased research efforts, the representation and processing of L2 speech is still unclear. The aim of this session is to discuss the construction of a mental lexicon for L2 and the use of L1-specific speech processing strategies by L2 learners. A central issue is the extent to which words are stored as episodic traces or as abstract representations. This introductory paper summarises the two target papers by Cutler & Weber and Goldinger, and the views of the four commentators: Bradlow, Davidson, Maye and McLennan.

LISTENING EXPERIENCE AND PHONETIC-TO-LEXICAL MAPPING IN L2*Anne Cutler¹ & Andrea Weber²*¹Max Planck Institute for Psycholinguistics, Nijmegen;²Saarland University, Saarbrücken

ID 1779

[full paper]

In contrast to initial L1 vocabularies, which of necessity depend largely on heard exemplars, L2 vocabulary construction can draw on a variety of knowledge sources. This can lead to richer stored knowledge about the phonology of the L2 than the listener's prelexical phonetic processing capacity can support, and thus to mismatch between the level of detail required for accurate lexical mapping and the level of detail delivered by the prelexical processor. Experiments on spoken word recognition in L2 have shown that phonetic contrasts which are not reliably perceived are represented in the lexicon nonetheless. This lexical representation of contrast must be based on abstract knowledge, not on veridical representation of heard exemplars. New experiments confirm that provision of abstract knowledge (in the form of spelling) can induce lexical representation of a contrast which is not reliably perceived; but also that experience (in the form of frequency of occurrence) modulates the mismatch of phonetic and lexical processing. We conclude that a correct account of word recognition in L2 (as indeed in L1) requires consideration of both abstract and episodic information.

A COMPLEMENTARY-SYSTEMS APPROACH TO ABSTRACT AND EPISODIC SPEECH PERCEPTION*Stephen D. Goldinger*

Arizona State University

ID 1781

[full paper]

Over the past two decades, numerous experiments have shown that spoken word perception creates detailed memory traces, containing not only word meanings, but also extraneous, perceptual or contextual details. This is shown, for example, by voice-specific priming effects. Based on such results, exemplar theories suggest the mental lexicon may consist of accumulated episodic traces. Although an episodic approach is well-suited to explain priming, ample evidence suggests that language also entails abstract representations. Certainly at the segmental level, there are logical constraints that require unitization. An optimal theory may include stable abstract representations, combined with context-sensitive episodic traces. This paper summarizes new tests examining word perception from a complementary-systems perspective, wherein reciprocal neural networks represent hippocampal and cortical memory systems. In this approach, detailed episodic traces and holographic, abstract traces combine to create behavior in real-time, allowing perceptual or memorial data to appear more or less "episodic," depending on myriad factors. I summarize new results and simulations on perceptual priming, and discuss the model with respect to perceptual learning in speech.

INFORMATION FLOW AND PLASTICITY ACROSS LEVELS OF LINGUISTIC SOUND STRUCTURE: RESPONSES TO THE TARGET PAPERS BY CUTLER & WEBER AND BY GOLDINGER*Ann Bradlow*

Northwestern University

ID 1778

[full paper]

The two target papers in this session present different approaches to substantiating the consensus position that both abstract and episodic levels of representation underlie speech processing. Cutler and Weber's paper provides an interesting illustration of the non-direct phonetic-to-lexical mapping in second language speech processing. Their contribution presents a series of studies in which meta-knowledge of a second language contrast facilitated representation of the contrast at a lower level. As a complement to this contribution, I discuss cases in which the lack of access to abstract category representations effectively blocks the passage of information across the episodic-to-abstract hierarchy. Second, picking up on the challenge of specifying the nature of exemplars as discussed in Goldinger's target article, I discuss recent data regarding experience-dependent shaping of the basic sensory circuitry. These data are particularly relevant to the case of second language speech learning as they help specify the levels of plasticity required for successful non-native language acquisition.

THE INFLUENCE OF NON-PHONETIC FACTORS ON THE FORM OF L2 LEXICAL ENTRIES: RESPONSE TO CUTLER AND WEBER

Lisa Davidson

Department of Linguistics, New York University, New York

ID 1780

[full paper]

Cutler and Weber argue that L2 lexical representations must incorporate both abstract and episodic information. In this paper, the nature of non-phonetic information that is useful to L2 learners is further explored, with a focus on orthographic and minimal pair data. It is argued this type of information is useful to L2 listeners because it provides them with an overt incentive to distinguish non-native phonemic or phonotactic categories. However, it is noted that not all phonemic categories may be equally learnable in L2 acquisition, which is a challenge for episodic models of lexical storage.

LEARNING TO OVERCOME L1 PHONOLOGICAL BIASES

Jessica Maye

Northwestern University and the Northwestern Institute on Complex Systems

ID 1783

[full paper]

This paper expands upon the complementary-systems model of speech perception by proposing that exemplar encoding is filtered by native language phonology through differential attentional weighting of particular acoustic cues. Phonetic processing in a second language is presumed to rely on an L2 phonological system that is not native-like due to the persistent effects of this attentional filtering. In learning to either re-weight attention or work around this filtering effect, individuals may vary with respect to their ability to exploit the exemplar store in L2 processing, leading to differences in long-term ability to develop native-like L2 phonologies.

CHALLENGES FACING A COMPLEMENTARY-SYSTEMS APPROACH TO ABSTRACT AND EPISODIC SPEECH PERCEPTION

Conor McLennan

Cleveland State University

ID 1784

[full paper]

It has been nearly a decade since the publication of Goldinger's 1998 Psychological Review paper in which he presented his episodic theory of lexical access. Moreover, Goldinger's (and others') empirical work providing evidence for episodic representations predates the formal presentation of his episodic theory. This is an appropriate time to note how the field has progressed in the past decade with respect to the debate over the nature of lexical representations. As evidenced by the two main papers, the emphasis is no longer on whether there are abstract and/or episodic representations. Instead, the focus is now on the ideal framework that can account for their coexistence. Goldinger's presentation of a complementary systems (hereafter CS) approach offers a glimpse into the direction that many future in-

vestigations of lexical representation may be headed. I discuss some of the challenges facing a CS approach in an effort to stimulate further discussion, and to help provide an impetus for future empirical, theoretical, and modeling studies.

Between Meaning and Speech: On the Role of Communicative Functions, Representations and Articulations

Tuesday, 16:00, Room: 2 (Orange)

Chair: Carlos Gussenhoven

ON THE RELATIONSHIP BETWEEN PHONOLOGY AND PHONETICS (OR WHY PHONETICS IS NOT PHONOLOGY)

Amalia Arvaniti

University of California, San Diego

ID 1740

[full paper]

In this presentation, I argue that unifying phonetics and phonology in the grammar has undesirable consequences. Evidence for this position is provided from various sources, but focuses on intonation, an area of linguistic structure that has often been viewed as not requiring an abstract phonological representation.

SPEECH AS ARTICULATORY ENCODING OF COMMUNICATIVE FUNCTIONS

Yi Xu

University College London; Haskins Laboratories, New Haven, USA

ID 1743

[full paper]

Speech conveys communicative meanings by encoding functional contrasts. The contrasts are realised through articulation, a biomechanical process with specific constraints. Phonology, phonetics or any other theories of speech therefore cannot be autonomous from either communicative functions or biophysical mechanisms. Successful speech modeling can be achieved only if communicative functions and biophysical mechanisms are treated as the core rather than the margins of speech.

NON-EQUIVALENCE BETWEEN PHONOLOGY AND PHONETICS

Aditi Lahiri

University of Konstanz

ID 1741

[full paper]

In her paper, Arvaniti supports a production and perception model which distinguishes phonological representations from their phonetic surface form. She draws on intonational data as evidence that an abstract phonological representation is necessary to capture native speakers' competence to extract unique significance when faced with multiple phonetic variations. This view is in direct contrast to models which advocate that contours are holistic and all variation must be coded in de-

tail. My commentary professes sympathy with Arvaniti's approach and adds further evidence from segmental variation in support of abstract representations.

THE MISSING LINK BETWEEN ARTICULATORY GESTURES AND SENTENCE PLANNING

Chilin Shih¹, Greg Kochanski² & Su-Youn Yoon¹

¹University of Illinois at Urbana-Champaign; ²Oxford University

ID 1742

[full paper]

The motivation of this paper is to build a bridge between phonology and phonetics with implementation models. The challenge is to explain a wide range of phonetic forms in diverse speaking styles, including laboratory speech, spontaneous speech, fluent and non-fluent speech and model them as orderly variations of one coherent communication system. In the paper, we will focus on the effect of sentence planning on articulatory gestures. Data from spontaneous speech provides strong evidence for anticipatory effects and partial reduction effects. How and when they occur reflect the speaker's sentence planning strategies. It is hypothesized that much of the discrepancy between laboratory speech and spontaneous speech can be accounted for with a model that can represent these effects, such as the weights used in the Stem-ML model.

Of Mouths, Ears, Eyes and Brains – The Sensory Motor Foundations of Spoken Language

Tuesday, 16:00, Room: 3 (Yellow)

Chair: Steven Greenberg

WHAT MAKES SPEECH STICK?

Steven Greenberg

Silicon Speech

ID 1760

[full paper]

Robustness and reliability is the essence of speech communication. The senses collaborate with memory and other brain mechanisms to decode spoken language in the harsh and often unpredictable environments of the real world. How the brain makes speech "stick" is the focus of this special session, which examines how the senses and motor system coordinate during speech perception and production.

USING AUDITORY FEEDBACK AND RHYTHMICITY FOR DIPHONE DISCRIMINATION OF DEGRADED SPEECH

Oded Ghitza

Sensimetrics Corporation

ID 1762

[full paper]

We describe a computational model of diphone perception based on salient properties of peripheral and central auditory processing. The model comprises an efferent-inspired closed-loop model of the auditory per-

iphery connected to a template-matching neuronal circuit with a gamma rhythm at its core. We show that by exploiting auditory feedback a place/rate model of central processing is sufficient for the prediction of human performance in diphone discrimination of minimal pairs embedded in background noise – in contrast to the need for additional, temporal information when open-loop models of the periphery are used. We also demonstrate that the template-matching circuit exhibits properties, such as time-scaling insensitivity, consistent with (and desirable for) perception of spoken language.

SENSORY GOALS AND CONTROL MECHANISMS FOR PHONEMIC ARTICULATIONS

Joseph Perkell

Massachusetts Institute of Technology

ID 1761

[full paper]

An overview of speech production is described in which the goals of phonemic speech movements are implemented in auditory and somatosensory domains and the movements are controlled by a combination of feedback and feedforward mechanisms. Findings of motor-equivalent trading relations in producing /u/ and /r/, cross-speaker relations between vowel and consonant production and perception, and speakers' use of a "saturation effect" in producing /s/ support the idea that the goals are in sensory domains. Results of production experiments in which auditory feedback was modified and interrupted provide insight into the nature of feedback and feedforward control mechanisms. The findings are all compatible with the DIVA model of speech motor planning, which makes it possible to quantify relations among phonemic specifications of utterances, brain activity, articulatory movements and the speech sound output.

ANALYSIS-BY-SYNTHESIS IN AUDITORY-VISUAL SPEECH PERCEPTION: MULTI-SENSORY MOTOR INTERFACING

Virginie van Wassenhove

California Institute of Technology

ID 1763

[full paper]

In conversation, one sees as much as one hears the interlocutor. Compelling demonstrations of auditory-visual (AV) integration in speech perception are the classic McGurk effects: in McGurk "fusion," an auditory [p] dubbed onto a face articulating [k] is perceived as a single fused percept [t], but in McGurk "combination," an auditory [k] dubbed onto a visual [p] is heard as combinations of [k] and [p]. The spatiotemporal co-occurrence of AV speech signals is likely used by the brain. AV integration offers interesting challenges for neuroscience and speech science alike. How, when, where, and in what format do auditory and visual speech signals integrate? Several studies are described, suggesting that multisensory speech integration relies on a dynamic set of predictive computations involving large-scale cortical, sensorimotor networks. Within an 'analysis-by-synthesis' framework, it is suggested that speech per-

ception entails a predictive brain network operating on abstract speech units.

Do Phonological Features have any Reality for the Brain?

Tuesday, 16:00, Room: 4 (Green)
Chairs: Ingo Hertrich, Carsten Eulitz

SOME MEG CORRELATES FOR DISTINCTIVE FEATURES

William J. Idsardi

Department of Linguistics and Program in Neuroscience and Cognitive Science, University of Maryland

ID 1745 [full paper]

This presentation reviews the use of distinctive features for the mental representation of speech sounds, briefly considering three bases for feature definition: articulatory, auditory and translational. We then review several recent neuroimaging studies examining distinctive features using magnetoencephalography (MEG). Although this area of research is still relatively new, we already have interesting findings regarding vowel place, nasality and consonant voicing. Although this research is not yet definitive, some refinements of these experiments can be expected to yield important results for feature theory, and more generally for our understanding of the neural computations that underlie the transformations between articulatory and auditory space necessary to produce and perceive speech.

REPRESENTATION OF PHONOLOGICAL FEATURES IN THE BRAIN: EVIDENCE FROM MISMATCH NEGATIVITY

Carsten Eulitz

Department of Linguistics, University of Konstanz

ID 1744 [full paper]

The representation of phonological features in the mental lexicon has been examined using event-related brain responses, such as mismatch negativity (MMN; an automatic auditory change detection response in the brain) or the P350 component (a correlate of lexical activation). This presentation will summarize some MMN studies that demonstrate support for (i) models proposing abstract underspecified representations in the mental lexicon, i.e. not all phonological features are stored; and (ii) top-down influence of the language-specific phonological system on the fine structure of the phonological representations. Constraints in using the MMN for investigations concerning phonological representations will also be discussed.

PHONOLOGICAL ASPECTS OF AUDIOVISUAL SPEECH PERCEPTION

Ingo Hertrich¹, Werner Lutzenberger² & Hermann Ackermann¹

¹Department of General Neurology, University of Tuebingen; ²MEG Center, University of Tuebingen

ID 1747 [full paper]

Based on magnetoencephalographic measurements, this contribution delineates a sequence of processing stages engaged in audiovisual speech perception, giving rise, finally, to the fusion of phonological features derived from auditory and visual input. Although the two channels interact even within early time windows, the definite percept appears to emerge relatively late (> 250 ms after speech onset). Most noteworthy, our data indicate visual motion to be encoded as categorical information even prior to audiovisual fusion, as demonstrated by a non-linear visual /ta/ - /pa/ effect. Our findings indicate, first, modality-specific sensory input to be transformed into phonetic features prior to the generation of a definite phonological percept and, second, cross-modal interactions to extend across a relatively large time window. Conceivably, these integration processes during speech perception are not only susceptible to visual input, but also to other supramodal influences such as top-down expectations and interactions with lexical data structures.

SPEECH SOUND PERCEPTION AND NEURAL REPRESENTATIONS

Maija S. Peltola

Department of Phonetics and the Centre for Cognitive Neuroscience, University of Turku

ID 1746 [full paper]

This commentary reviews some of the main findings in speech sound perception using the brain imaging techniques and comments briefly on the recent findings by the session contributors. The main emphasis is on the experimental settings used in these studies. The aim is to demonstrate how the search for the neural correlates for abstract linguistic units has resulted in various types of experimental designs and how the stimulus selection may play a crucial role in the findings. It seems that the experimental settings are becoming more and more elaborate thus offering an access to the abstract levels of representation.

BEHAVIOR REFLECTS THE (DEGREE OF) REALITY OF PHONOLOGICAL FEATURES IN THE BRAIN AS WELL

Holger Mitterer

Max Planck Institute for Psycholinguistics

ID 1759 [full paper]

To assess the reality of phonological features in language processing (vs. language description), one needs to specify the distinctive claims of distinctive-feature theory. Two of the more far-reaching claims are compositionality and generalizability. I will argue that there is some evidence for the first and evidence against the

second claim from a recent behavioral paradigm. Highlighting the contribution of a behavioral paradigm also counterpoints the use of brain measures as the only way to elucidate what is “real for the brain”. The contributions of the speakers exemplify how brain measures can help us to understand the reality of phonological features in language processing. The evidence is, however, not convincing for a) the claim for underspecification of phonological features—which has to deal with counterevidence from behavioral as well as brain measures—, and b) the claim of position independence of phonological features.

Arabic Phonetics at the Beginning of the 3rd Millennium

Tuesday, 16:00, Room: 5 (Blue)
Chair: Judith Rosenhouse

ARABIC PHONETICS AT THE BEGINNING OF THE THIRD MILLENNIUM

Judith Rosenhouse

Swantech Ltd. Haifa, Israel

ID 1735

[full paper]

Arabic phonetics has been part of the study of Arabic language at least since the 7th century CE. The great works by Al-Khali:l and Si:bawayh are the two cornerstones of this field. The early Arab grammarians knew phonetics and phonology quite well at that time, but interest in phonetics has remained relatively marginal until the middle of the 20th century. Modern Western phonetics, computerized innovations and other factors enhanced Arabic phonetics especially in the last two decades. This Introduction reviews five major schools which developed Arabic phonetics in the (Classical) past: dictionary, grammar, Koran reading, philosophy, and rhetoric. These are followed by modern trends in Arabic phonetic studies: dialect descriptions, sociolinguistic studies, pure phonetic features, language acquisition and teaching, and new phonetic areas: prosody and suprasegmentals. The basic differences between the two periods lie in research motivation and methodology.

PRE-PAUSAL DEVOICING AND GLOTTALISATION IN VARIETIES OF THE SOUTH WESTERN ARABIAN PENINSULA

Janet C.E. Watson & Yahya Asiri

University of Salford

ID 1738

[full paper]

This paper discusses and compares pre-pausal devoicing, glottalisation and aspiration in Arabic dialects in Yemen, Asir (south-west Saudi Arabia) and Mehri, also referring to the general background of this process. The findings reveal gradation in pre-pausal processes. For San'ani Arabic the findings include: (1) Pre-pausal glottal closure in environments -VV]/-VVC]/-VVS]. In final -VC] glottal closure follows/coincides with oral

closure. In -VS], no glottal closure or devoicing is evident, the sonorant is audible. (2) Glottalic release of oral stops. /b/ pre-glottalised, but may be released with some aspiration. (3) Non-realisation of nasals in -VCS]. (4) Pre-glottalisation and devoicing or non-realisation of final sonorant consonants in -VVS], of which relative probability of non-realisation among sonorants is /n/ > /m/ > /l/ > /r/. (5) C. 200% longer pre-pausal vowels, fricatives and affricates. (6) Weakened intensity in lower frequencies of final fricatives.

AN ACOUSTIC STUDY OF COARTICULATION IN MODERN STANDARD ARABIC AND DIALECTAL ARABIC: PHARYNGEALIZED VS. NON-PHARYNGEALIZED ARTICULATION

Mohamed Embarki¹, Mohamed Yeou², Christian Guilleminot³ & Sallal Al Maqtari⁴

¹Praxiling UMR 5267 CNRS-Montpellier III; ²Universite Chouaib Doukkali, El Jadida; ³Centre Tesniere, EA 2283 Universite Franche-Comte, Besancon; ⁴Universitee de Sanaa

ID 1739

[full paper]

The present study carries out an acoustic investigation of coarticulation in the context of pharyngealized /t', d', s', d'/ vs non-pharyngealized consonants /t, d, s, d/ both in MSA and in four Arabic dialects (Yemeni, Kuwaiti, Jordanian and Moroccan). The speech material, produced by four males per country, consisted of 24 words in symmetrical VCV contexts [iCi, uCu, aCa] where C is either pharyngealized or non-pharyngealized in both MSA and Dialectal Arabic. The results from 4608 CV sequences showed a substantial regularity in coarticulation. Comparison of the two contexts - pharyngealized vs. non-pharyngealized - indicated quite different acoustic cues. Speakers presented comparable cues, allowing an effective classification by geographical area. Intraspeaker variation showed that the transition from MSA to the native dialect was realized by different strategies of programming and production.

VARIATION IN PHONETIC REALISATION OR IN PHONOLOGICAL CATEGORIES? INTONATIONAL PITCH ACCENTS IN EGYPTIAN COLLOQUIAL ARABIC AND EGYPTIAN FORMAL ARABIC

Sam Hellmuth¹ & Dina El Zarka²

¹Universität Potsdam; ²Universität Graz

ID 1737

[full paper]

This paper uses qualitative and quantitative methods to compare the intonation of formal and colloquial varieties of Egyptian Arabic in a corpus of elicited read speech, to explore the widely held assumption that spoken formal Arabic will have the intonational characteristics of the speakers' colloquial variety. Speakers are found to use broadly parallel phonological systems in each register, reflected in parallel distribution and type of pitch accents. A quantitative analysis of the pitch target alignment to the segmental string reveals only minor differences in the phonetic realisations of pitch accents

across registers.

A PHONETIC STUDY OF GEMINATION IN LEBANESE ARABIC

Ghada Khattab

University of Newcastle, UK

ID 1734

[full paper]

This paper reports on phonological and phonetic patterns of gemination in Lebanese Arabic (LA) and temporal relations between geminate consonants and vowel length. The study investigates the effect of style on absolute and proportional durations by eliciting data from word lists and near-naturalistic conversations. Five Lebanese females were recorded reading target word lists containing medial long and short consonants preceded by long and short vowels and engaging in near-naturalistic conversations. Acoustic and auditory analyses of medial consonants and of preceding and following vowel durations were made. Results suggest that vowels and consonants show proportional rather than absolute temporal compensation in singleton and geminate targets. In spontaneous speech, target long vowels and consonants overlap in duration with singleton targets in word list style and the percept of phonological length is mainly achieved through the proportional durations for each of the short or long targets and their surrounding sounds.

Natural Phonology: Universal Principles for the Study of Language

Tuesday, 16:00, Room: 6 (Black)

Chair: Katarzyna Dziubalska-Kołaczyk

NATURAL PHONOLOGY: UNIVERSAL PRINCIPLES FOR THE STUDY OF LANGUAGE

Katarzyna Dziubalska-Kołaczyk

Adam Mickiewicz University

ID 1751

[full paper]

Ever since Jakobson (or, shall we say, Plato?) linguists have been searching for universals. Their views on the role of universals in language and linguistics have varied widely, though. In this session we want to concentrate on the question of the existence of universal principles for the study of language. Natural Phonology has always advocated the holistic view on language, both in the sense of analyzing language structures as well as in the sense of seeing language as part of the universe. The latter means that the same principles of explanation apply to language and to other aspects of life, and thus they are derivable from the most general laws of human interaction with nature. In Natural Phonology the principles are cognitive, phonetic, psychological, sociological, etc. They lead to the establishment of linguistic preferences which guide the explanation of language-specific structures.

PHONOLOGY, NATURALNESS AND UNIVERSALS

Ian Maddieson

University of California, Berkeley and University of New Mexico

ID 1755

[full paper]

This paper briefly surveys several conceptions of naturalness in phonology, touching primarily on typological frequency and the notion of 'phonetic motivation'. It is argued that typological frequency is not a reliable indicator of what is 'phonetically motivated' as relative frequency patterns are the outcomes of more complex interactions including non-phonetic factors. Phonetic motivations are diverse and include random variations, not only deterministic results, as is often desired. Models that view phonological patterns as emerging from complex interactions of a variety of natural factors are the most satisfying.

FORMAL IS NATURAL: TOWARD AN ECOLOGICAL PHONOLOGY

Dafydd Gibbon

University of Bielefeld

ID 1750

[full paper]

Naturalism in linguistics has a history of opposition: to abstractness, to generative linguistics, to formalist approaches. The present approach concentrates on a key feature of Natural Linguistics and Natural Phonology in particular, namely the empirical centrality of external evidence. A step further than traditional naturalism is taken, in replacing the Viennese schools of philosophy of science, specifically Logical Empiricism and Critical Rationalism, which typically underlie the metatheory of Natural Phonology, by an ecological view that science is evaluated - intellectually and by the taxpayer - in terms of its operational functionality in personal, social, political and economic environments. The ecological perspective on science is related to applications of linguistics in speech technology.

PHONETIC DIMENSIONS OF SEGMENTAL STRENGTH

Grzegorz Dogil

University of Stuttgart

ID 1754

[full paper]

Natural Phonology (NatPhon) has been the first explanatory model of sound structure which assigned the central role to functional phonetic principles such as articulatory effort and perceptual distinctiveness. These conflicting principles have been operationalised in a procedural model consisting of weakening processes (minimizing articulatory effort) and strengthening processes (maximizing perceptual distinctiveness). Whereas the weakening processes have been mostly categorical in nature, the formalization of the phonological strengthening has been a perennial problem for the procedural models of phonology. In this contribution I will argue that all dimensions of segmental strengthening are controlled by phonetics, and that articulatory, acoustic

and auditory constraints on speech should be carefully studied to provide a detailed account of strengthening.

WHERE IS THE NATURAL PHONOLOGY PHONEME IN 2007?

Geoffrey S. Nathan

Wayne State University

ID 1752

[full paper]

This paper reviews the status of the phoneme, the basic linguistic unit of phonology as it is understood within Natural Phonology, and the ways in which it contrasts with current mainstream theories – particularly most versions of Generative Phonology on the one hand, and various usage-based view on the other. It concludes by pointing out a number of aspects of phonological acquisition, storage and processing which indicate that there is still a role for the traditional Baudouin/Sapir/Stampe-Donagan view of fully-specified acoustic/articulatory idealized targets.

CLARIFICATIONS ABOUT NATURAL PHONOLOGY

Anna Bogacka

Adam Mickiewicz University

ID 1756

[full paper]

This contribution argues that crucial as formalism is in computational linguistics and speech technology, Natural Phonology, with less rigid and less formalized claims, has important applications in the areas where language and not totally predictable human factors are involved. The paper discusses approaches to autonomy in language, explanation in Natural Phonology and applications of Natural Phonology.

COMPARING AND CONTRASTING NATURAL PHONOLOGY WITH THE THEORY OF PHONOLOGY AS HUMAN BEHAVIOR

Yishai Tobin

Ben-Gurion University of the Negev

ID 1753

[full paper]

This paper compares and contrasts the theories of Natural Phonology and Phonology as Human Behavior in general and shows how each theory views the notion of language universals in particular. The concepts of combinatory phonology, phonotactics, and diachronic, developmental, clinical and evolutionary phonology will be discussed as measures of defining and determining the concept of language universals. The author maintains that biological, physiological, cognitive, psychological, sociological and other universals of human behavior are merely reflected in language rather than being specific “language universals” per se.

Wednesday, 9:00**Prosody VI: Information Structure**

Wednesday, 9:00, Room: 1 (Red)

Chair: Janet Fletcher

ON THE UNIVERSALITY OF PROSODIC REFLEXES OF CONTRAST: THE CASE OF YUCATEC MAYA*Frank Kügler & Stavros Skopeteas*

Institut für Linguistik, Universität Potsdam

ID 1188

[full paper]

This paper is about the prosodic realization of contrastive focus in Yucatec Maya. Examining sentences with in situ focused adjectives (postverbally) we observe neither durational differences as compared to non-contrastive sentences nor any differences in F0. Yucatec Maya being a tone language seems use prosodic means exclusively to express tonal contrasts, thus belonging to a language type without marking contrast prosodically.

TONAL AND ARTICULATORY MARKING OF FOCUS IN GERMAN*Stefan Baumann, Johannes Becker, Martine Grice & Doris Mücke*

IfL Phonetik, University of Cologne

ID 1378

[full paper]

A production study on read German speech shows an increase in prominence-lending parameters as the focus domain is narrowed, or when contrast is expressed over non-contrast. Prominence-lending parameters included tonal and durational cues (e.g. nuclear pitch accent type and scaling, duration of segments and syllables) as well as those generally considered to be in the segmental domain (e.g. formant values of vowels in nuclear syllables). These cues are exploited by different speakers to different degrees and in different combinations, but are all used for signalling aspects of focus.

EFFECTS OF TONAL CONTEXT AND FOCUS ON CANTONESE F0*Wentao Gu & Tan Lee*

Dept. of Electronic Engineering, the Chinese University of Hong Kong

ID 1689

[full paper]

F0 variations of tone languages are not only constrained by individual lexical tones but also affected by various contextual factors. In this work the effects of two factors, i.e. tonal context and focal emphasis, on F0 contours of Cantonese are investigated by a controlled experiment. All the four combinations of carry-over/anticipatory and assimilatory/dissimilatory effects by adjacent tones are observed, with different magnitudes and domains. The effect of focus is not local but shows a similar nature in pre-focus, on-focus, and post-focus domains, with both raised F0 values and expanded F0 ranges. The interactions between the two factors are also analyzed.

Acoustics III: Lenition, Reduction, Undershoot

Wednesday, 9:00, Room: 2 (Orange)

Chair: Jonathan Harrington

NOVEL MEASURES FOR VOWEL REDUCTION*Noam Amir & Ofer Amir*

Dept. of Communication Disorders, Tel-Aviv University

ID 1035

[full paper]

Novel measures for vowel reduction are presented, for examining vowel space as a whole, and for quantifying reduction of individual vowels. These were used to evaluate the degree of vowel reduction in continuous speech, manifested in the F1-F2 plane. The measures were applied to a set of 1500 tokens, extracted from a database of spontaneous Hebrew speech. Using a similarity measure, we found that vowels were reduced by a factor of 2.09 for men and by 2.93 for women. The reduced vowel space for men was more distorted than for women. Error measure estimations were larger for men in comparison to women (0.0714 versus 0.0525, respectively). While vowel reduction in women exhibited a relatively symmetric pattern across vowels, it showed a skewed pattern in men. This was attributed to a more pronounced reduction in the back vowels /o/ and /u/.

VOWEL TARGETS AND CONSONANT LOCI FROM SCALING PROPERTIES OF FORMANT TRANSITIONS*David J. Broad¹ & Frantz Clermont²*¹2638 State St., Unit 12, Santa Barbara CA 93105, USA; ²JPFrench Forensic Speech & Acoustics Lab., York

ID 1054

[extra files] [full paper]

From the assumptions that vowel-to-consonant formant transitions in any given VC context are (1) similar in shape and (2) scaled in proportion to the difference between the vowel target and consonant locus, we show that the implied set of scaling relationships leads to a method for estimating the loci and targets from formant data.

STATISTICAL METHODS FOR QUANTITATIVE ANALYSIS OF MULTIPLE LENITION COMPONENTS*Christina Villafañá Dalcher*

City University

ID 1199

[full paper]

Lenition has been described in various ways but broadly involves multiple acoustic parameters. These include closure duration, VOT duration, periodicity, intensity, and absence of release burst. Because these concrete acoustic characteristics are variable and sometimes independent of one another, it is difficult to quantify the more abstract construct of lenition by referring to its separate components. This paper introduces a method of producing a quantitative measure of lenition, using a

latent variable score derived via Principal Components Analysis on five individual parameters having a recognised relationship to consonant weakening.

Production VI: Laryngeal Activity

Wednesday, 9:00, Room: 3 (Yellow)

Chair: Bernd Kröger

TOWARDS A PHONETIC CONSPECTUS OF PREASPIRATION: ACOUSTIC EVIDENCE FROM SIENESE ITALIAN

Mary Stevens & John Hajek

School of Languages & Linguistics, University of Melbourne

ID 1319

[full paper]

Preaspiration, i.e. [hC], is a rare feature of stop production in the world's languages that has been recently found to occur in Sienese Italian. We present a qualitative acoustic-phonetic description of voiceless geminate stops /p: t: k:/ with preaspiration that occurred in a corpus of spontaneous Sienese Italian speech (6 ss). We outline the different fine-grained realizations of preaspiration and discuss the findings in the context of our general knowledge of the phenomenon across languages

LEARNABILITY OF LARYNGEAL ABDUCTION IN VOICELESS FRICATIVES: CROSS-LINGUISTIC EVIDENCE

Olga B. Gordeeva

(1) Acapela Group, Mons, Belgium; (2) Speech Science research Centre, Queen Margaret University College, Edinburgh, UK

ID 1356

[full paper]

Previous research of laryngeal-oral gestural coordination in vowel-voiceless fricative sequences (Vf) shows that earlier timing of glottal opening relative to oral constriction is a language-independent aerodynamic property. In this paper, we provide evidence that the extent of this gestural dissociation is nonetheless learnable in a variety-specific way, and is, thus, actively controlled. This study shows that in some British English varieties, large temporal laryngeal-oral dissociation in Vf transitions is a correlate of the fricative /voice/ contrast, while the dissociation is much tighter in a language neutralising /voice/ such as Russian. The learnability of Vf-gestures is important in the context of theories on gestural phonology and acoustic multidimensionality of the /voice/ contrast.

INTRAGLOTTAL CONTACT PRESSURES IN HUMAN VOICE PRODUCTION

Christiane Mantay¹, Frank Müller¹, Arne Dippel¹, James Kobler² & Markus Hess¹

¹University Medical Center Hamburg-Eppendorf, Department of Phoniatics and Pedaudiology; ²Harvard Medical School, Massachusetts General Hospital Boston, USA

ID 1704

[extra files] [full paper]

Some fundamental questions concerning voice production remain unanswered despite numerous research approaches in various fields of voice science. It is widely believed that high intraglottal pressures may cause organic voice disorders – like vocal fold nodules or contact granulomas. This hypothesis seems reasonable but is difficult to prove given the challenges of pressure measurement and of establishing a causative link to disease. In this study we present a method for intraglottal contact pressure measurement in humans with a specially designed subminiature sensor. While implementing the measurement of the contact pressures, videolaryngoscopy is simultaneously used for online-monitoring. The new generation of subminiature sensors now allows us to make pressure measurements along the membranous vocal fold. We demonstrate contact pressure values for 10 healthy female and 10 healthy male subjects as well as for 10 patients with organic voice disorder. A video with endoscopic pictures illustrates the investigation procedure and data collection.

Perception III: Fast/Synthetic Speech

Wednesday, 9:00, Room: 4 (Green)

Chair: Pat Beddor

THE EFFECT OF HEARING LOSS ON THE INTELLIGIBILITY OF SYNTHETIC SPEECH

Maria Wolters¹, Pauline Campbell², Christine DePlacido², Amy Liddell³ & David Owens³

¹University of Edinburgh; ²Queen Margaret University;

³Queen Margaret University / University of Edinburgh

ID 1151

[extra files] [full paper]

Many factors affect the intelligibility of synthetic speech. One aspect that has been severely neglected in past work is hearing loss. In this study, we investigate whether pure-tone audiometry thresholds across a wide range of frequencies (0.25–20kHz) are correlated with participants' performance on a simple task that involves accurately recalling and processing reminders. Participants' scores correlate not only with thresholds in the frequency ranges commonly associated with speech, but also with extended high-frequency thresholds.

COMPREHENSION OF ULTRA-FAST SPEECH – BLIND VS. “NORMALLY HEARING” PERSONS

Anja Moos & Jürgen Trouvain

Saarland University, Institute of Phonetics

ID 1186

[extra files] [full paper]

This study explores how much speech can be temporally compressed and still understood by blind people who have daily practice with speech synthesis vs. sighted persons without such training. Texts with formant-synthesized speech, and compressed natural speech with and without pauses were generated at rates between 9 and 14 syll/sec (sighted persons) and 17 and 22 syll/sec (blind). The removal of pauses in compressed natural speech shows significant benefits at only few speaking rates. Results also show that synthesis is understood worst by sighted but best by blind. The fact that some of the blind still understood speech at 22 s/s reveals the flexibility of speech perception during the processing of ultra-fast speech.

LISTENING TO FAST SPEECH: AGING AND SENTENCE CONTEXT

Esther Janse¹, Majoke van der Werff² & Hugo Quené²

¹Utrecht institute of Linguistics UiL OTS & Max Planck institute for Psycholinguistics; ²Utrecht institute of Linguistics OTS

ID 1258

[full paper]

In this study we investigated to what extent a meaningful sentence context facilitates spoken word processing in young and older listeners if listening is made taxing by time-compressing the speech. Even though elderly listeners have been shown to benefit more from sentence context in difficult listening conditions than young listeners, time compression of speech may interfere with semantic comprehension, particularly in older listeners because of cognitive slowing. The results of a target detection experiment showed that, unlike young listeners who showed facilitation by context at both rates, elderly listeners showed context facilitation at the intermediate, but not at the fastest rate. This suggests that semantic interpretation lags behind target identification.

Speaker Characteristics

Wednesday, 9:00, Room: 5 (Blue)

Chair: Angelika Braun

HIERARCHICAL CLUSTERING OF SPEAKERS INTO ACCENTS WITH THE ACCDIST METRIC

Mark Huckvale

University College London

ID 1204

[full paper]

Hierarchical clustering of speakers by their pronunciation patterns could be a useful technique for the discovery of accents and the relationships between accents and sociological variables. However it is first nec-

essary to ensure that the clustering is not influenced by the physical characteristics of the speakers. In this study a number of approaches to agglomerative hierarchical clustering of 275 speakers from 14 regional accent groups of the British Isles are formally evaluated. The ACCDIST metric is shown to have superior performance both in terms of accent purity in the cluster tree and in terms of the interpretability of the higher-levels of the tree. Although operating from robust spectral envelope features, the ACCDIST measure also showed the least sensitivity to speaker gender. The conclusion is that, if performed with care, hierarchical clustering could be a useful technique for discovery of accent groups from the bottom up.

DISCRIMINATION OF SPEAKERS USING THE FORMANT DYNAMICS OF /u:/ IN BRITISH ENGLISH

Kirsty McDougall & Francis Nolan

University of Cambridge

ID 1567

[full paper]

Formant dynamics are an interesting source of speaker-discriminating information, reflecting both differences in speakers' vocal tract morphology and individual differences in the articulatory trajectories chosen to produce each sound. A study of speaker-distinguishing properties of the formant dynamics of /u:/ in Standard Southern British English is presented. Measurements at equidistant intervals along the F1 and F2 contours are compared with polynomial characterisations of the contours. Approximating the contours with quadratic and cubic polynomials allows more speaker-discriminating information to be conveyed with fewer parameters. The best value per predictor is provided by the cubic approximation of F2.

PHONETIC CONTENT INFLUENCES VOICE DISCRIMINABILITY

Attila Andics¹, James M. McQueen¹ & Miranda van Turenhout²

¹Max Planck Institute for Psycholinguistics; ²FC Donders Centre for Cognitive Neuroimaging

ID 1217

[full paper]

We present results from an experiment which shows that voice perception is influenced by the phonetic content of speech. Dutch listeners were presented with thirteen speakers pronouncing CVC words with systematically varying segmental content, and they had to discriminate the speakers' voices. Results show that certain segments help listeners discriminate voices more than other segments do. Voice information can be extracted from every segmental position of a monosyllabic word and is processed rapidly, and vowel changes seem to make a greater difference than consonant changes do. We also show that although relative discriminability within a closed set of voices appears to be a stable property of a voice, it is also influenced by segmental cues – that is, perceived uniqueness of a voice depends on what that voice says.

Phonetic Psycholinguistics III: Speech Variability

Wednesday, 9:00, Room: 6 (Black)
Chair: Joan Sereno

SPEAKERS DIFFERENTIATE ENGLISH INTRUSIVE AND ONSET /r/, BUT L2 LISTENERS DO NOT

Annelie Tuinman, Holger Mitterer & Anne Cutler
Max Planck Institute for Psycholinguistics

ID 1407

[full paper]

We investigated whether non-native listeners can exploit phonetic detail in recognizing potentially ambiguous utterances, as native listeners can [6, 7, 8, 9, 10]. Due to the phenomenon of intrusive /r/, the phrase extra ice may sound like extra rice. A production study indicates that the intrusive /r/ can be distinguished from the onset /r/ in rice, as it is phonetically weaker. In two cross-modal identity priming studies, however, we found no conclusive evidence that Dutch learners of English are able to make use of this difference. Instead, auditory primes such as extra rice and extra ice with onset and intrusive /r/s activate both types of targets such as ice and rice. This supports the notion of spurious lexical activation in L2 perception.

WHY THE 'PRESIDENT' DOES NOT EXCITE THE 'PRESS': THE LIMITS OF SPURIOUS LEXICAL ACTIVATION IN L2 LISTENING

Mirjam Broersma

Radboud University Nijmegen

ID 1525

[full paper]

Two Cross-Modal Priming experiments assessed lexical activation of unintended words for nonnative (Dutch) and English native listeners. Stimuli mismatched words in final voicing, which in earlier studies caused spurious lexical activation for Dutch listeners. The stimuli were embedded in or cut out of a carrier (PRESident). The presence of a longer lexical competitor in the signal or as a possible continuation of it prevented spurious lexical activation of mismatching words (press).

DUTCH LISTENERS' USE OF SUPRASEGMENTAL CUES TO ENGLISH STRESS

Anne Cutler¹, Roger Wales², Nicole Cooper¹ & Joris Janssen¹

¹Max Planck Institute for Psycholinguistics; ²LaTrobe University

ID 1108

[full paper]

Dutch listeners outperform native listeners in identifying syllable stress in English. This is because lexical stress is more useful in recognition of spoken words of Dutch than of English, so that Dutch listeners pay greater attention to stress in general. We examined Dutch listeners' use of the acoustic correlates of English stress. Primary- and secondary-stressed syllables

differ significantly on acoustic measures, and some differences, in F0 especially, correlate with data of earlier listening experiments. The correlations found in the Dutch responses were not paralleled in data from native listeners. Thus the acoustic cues which distinguish English primary versus secondary stress are better exploited by Dutch than by native listeners.

Wednesday, 10:00

Poster IV

Wednesday, 10:00

Chairs: Helene Loevenbruck, Elina Savino

STATIC AND DYNAMIC CUES IN VOWEL PRODUCTION: A CROSS DIALECTAL STUDY IN JORDANIAN AND MOROCCAN ARABIC.*Jalaleddin Al-Tamimi*

Laboratoire dynamique du Langage – CNRS – Université Lyon 2 (UMR 5596), 14, Avenue Berthelot – 69007 Lyon – France

ID 1259; Poster No. 1

[extra files] [full paper]

The aim of this paper is to examine the role of dynamic cues (i.e. formant slopes obtained from a linear regression analysis) in comparison with static one (i.e. vowel targets) in the classification of Jordanian and Moroccan vowels, using Discriminant Analysis. 10 speakers per dialect produced a list of vowels in C1VC2, C1VC2V, or C1VC2VC words, where C1 and C2 were either /b/, /d/, /d/(pharyngealized) or /k/, and V, each vowel. Results show the possibility of vowel separation between both dialects for a specific consonantal environment. Using dynamic cues improves the correct classification rates of about 5% for Moroccan Arabic and 13% for Jordanian Arabic.

TONE DISTRIBUTION AND ITS EFFECT ON SUBGLOTTAL PRESSURE DURING SPEECH*Helen M. Hanson¹, Janet Slifka¹, Stefanie Shattuck-Hufnagel¹ & James Kobler²*¹MIT; ²Massachusetts General Hospital

ID 1291; Poster No. 3

[full paper]

The current work is part of a project to characterize the subglottal pressure (Ps) contour in terms of the distribution of pitch accents and of phrase and boundary tones. Declination of the working phase, and the transition from the working phase to the termination phase are studied. It is found that the nuclear pitch accent does not define the start of the termination phase; the utterance offset is a better marker. Declination rate of the working phase and its relation to the phrase and boundary tones at utterance offset are found to vary among speakers. These differences could result in variations in SPL and F0 that contribute to a speaker's individuality. The results have implications for models of speech production, and for applications such as computer speech synthesis and recognition.

A FIBERSCOPIC ANALYSIS OF NASAL VOWELS IN BRAZILIAN PORTUGUESE*Liane Lovatto¹, Angélique Amelot², Lise Crevier-Buchman³, Patricia Basset¹ & Jacqueline Vaissière¹*

¹Laboratoire de Phonétique et de Phonologie, UMR 7018 CNRS/ Sorbonne Nouvelle, 19 rue des Bernardins, 75005 Paris; ²Institut de la Communication Parlée, Université Stendhal - 1180, Avenue Centrale, BP 25, 38040 CEDEX 9 Tél. +33 (0)4 76 82 43 37; Laboratoire de Phonétique et de Phonologie, UMR 7018 CNRS/ Sorbonne Nouvelle, 19 rue des Bernardins, 75005 Paris; ³Unité Voix-Parole-Déglutition Hôpital Européen G. Pompidou, 20 rue Leblanc, 75015, Paris, Chargée de Recherche CNRS, LPP/UMR 7018, Université Paris 3

ID 1469; Poster No. 5

[extra files] [full paper]

This paper examines velar movements during the production of the nasal vowels /ẽ, ã, õ/ in Brazilian Portuguese (BP). Velum movements were measured for a female Brazilian speaker using fiberoptic video-recording synchronized with acoustic recording. The nasal vowel (Vn) was placed in initial, medial and final positions in nonwords with the following structure: VnCoVo, CoVnCoVo, and CoVoCoVn. The oral vowel Vo was /a, i, u/ and the oral consonant Co= /p/, /b/ or /f/. Our results based on fibroscopy confirm that (i) a nasal "tail" (N/) is clearly observed in 85% of nasal vowel productions, (ii) the nasal tail is about the same length as the previous part of the vowel. This suggests that (iii) when Vn is in medial or final position, the maximum lowering of the velum is free to occur either before the nasal tail or during it.

IMPLICIT RATE AND SPEAKER NORMALIZATION IN A CONTEXT-RICH PHONETIC EXEMPLAR MODEL*Travis Wade*

Institute for Natural Language Processing, University of Stuttgart

ID 1345; Poster No. 7

[full paper]

In this study we present a model of speech perception in which (1) memory includes a single, ordered collection of acoustic cues extracted in real time at salient landmark locations from previously heard signals, and (2) identification of newly encountered sounds involves comparing the sounds and their surrounding contexts with similar sequences occurring in memory. Under these assumptions, perceptual speaker and rate normalization and context dependence in general follow implicitly from the statistics of the language environment and do not require traditionally assumed processes or levels of representation. We verify this by means of a simulation in which the model simultaneously acquires VOT and F1 cues to consonant voicing and vowel height, and their dependence on speaking rate and speaker gender, based on exposure to productions from the TIMIT database.

ACOUSTIC AND AUDITORY ANALYSES OF N|UU LINGUAL AND PULMONIC STOP BURSTS

Amanda Miller¹, Johanna Brugman¹ & Bonny Sands²

¹Cornell University; ²Northern Arizona University

ID 1664; Poster No. 9

[full paper]

We provide auditory data for the center of gravity (COG) and the resonances of two spectral peaks for the lingual stop bursts of all five N|uu click types that differ in the location of the anterior and posterior constrictions. The COG and the resonance of two spectral peaks for lingual bursts in lingual and linguo-pulmonic (LP) stops do not differ between the two sets of clicks. We provide auditory spectra and the COG in the pulmonic posterior bursts of LP stops and [k] and [q]. Results support the claim that place of articulation for the pulmonic portion of LP stops is contrastive, uvular in the case of uvular clicks and upper pharyngeal for dental and palatal clicks, as with lingual stops. LP stops differ from lingual stops in that they are contour segments on the airstream dimension: a new type of segment.

ACOUSTIC CORRELATES OF EMPHASIS IN ARABIC

Allard Jongman¹, Wendy Herd¹ & Mohammad Al-Masri²

¹University of Kansas; ²Hashemite University

ID 1235; Poster No. 11

[full paper]

The effects of emphasis, a secondary articulation in the posterior vocal tract, were investigated in the speech of 8 speakers of Jordanian Arabic. A number of acoustic parameters were measured in the consonants and vowels of mono- and bisyllabic minimal pairs containing plain or emphatic consonants in initial, medial, or final position. In general, the acoustic correlates of emphasis include a raised F1, lowered F2, and raised F3 in the vowel adjacent to the emphatic consonant. This pattern across the three formants suggests that emphasis involves a constriction near the epiglottis. In addition, the present results indicate that the spectral mean of the consonant itself is also a reliable acoustic correlate of emphasis. However, while the spread of emphasis can be detected throughout both vowels of bisyllabic words, only the target consonants themselves show an effect of emphasis.

SPECTRAL MEASURES FOR SIBILANT FRICATIVES OF ENGLISH, JAPANESE, AND MANDARIN CHINESE

Fangfang Li¹, Jan Edwards² & Mary Beckman¹

¹Department of Linguistics, the Ohio State University;

²Department of Communicative Disorders, University of Wisconsin-Madison

ID 1446; Poster No. 13

[full paper]

Most acoustic studies of sibilant fricatives focus on languages that have a place distinction like the English distinction between coronal alveolar /s/ and coronal post-alveolar /ʃ/. Much less attention has been paid to languages such as Japanese, where the contrast involves tongue posture as much as position. That is, the

Japanese sibilant that contrasts with /s/ is /ç/, an alveolopalatal fricative that has a “palatalized” tongue shape (a bunched predorsum). This paper describes measures that can be calculated from the fricative interval alone, which we applied both to the place distinction of English and the “palatalization” or posture distinction of Japanese. The measures were further tested on Mandarin Chinese, a language that has a three-way contrast in sibilant fricatives contrasting in both tongue position and posture.

LOANWORD ACCENT IN SOUTH KYUNGSANG KOREAN: A MORAIC ACCOUNT

Haruo Kubozono

Department of Linguistics, Kobe University

ID 1051; Poster No. 15

[full paper]

The primary goal of this paper to propose a new mora-based analysis of loanword accent in the South Kyungsang dialect of Korean (SKK) on the basis of data from original fieldwork. This paper first points out some critical errors in previous studies concerning the description of loanword accent in SKK. It will then propose a new, much simpler generalization based on the notion ‘mora’. Specifically, several seemingly different accent patterns can be generalized as a rule assigning an accent on the penultimate mora. This rule as well as some other pitch features of SKK is strikingly similar to the loanword accent of (Tokyo) Japanese. These cross-linguistic similarities can be uncovered if and only if the mora is recognized as a relevant unit of description in Korean just as it is in Japanese.

QUESTION INTONATION AS AFFECTED BY WORD STRESS AND FOCUS IN ENGLISH

Fang Liu¹ & Yi Xu²

¹Department of Linguistics, The University of Chicago;

²Department of Phonetics and Linguistics, University College London

ID 1130; Poster No. 17

[full paper]

The intonational realizations of statements and declarative questions in American English are studied by examining their interaction with focus and word stress. Five native speakers read 24 sentences eight times. Results of F0 analyses indicate that focus has no effect on the pre-focus region of either statements or questions. In the on-focus region, the pitch range of the stressed syllable is expanded in both statements and questions. The post-focus pitch range is compressed and lowered in statements, but compressed and raised in questions. Furthermore, the pitch target of the stressed syllable in a content word is high or falling in statements but rising in questions, depending on the focus condition and the stress pattern of the word. These results suggest that a particular combination of word stress, focus, and sentence type in an English utterance largely determines its local and global pitch contours.

THE STORY OF /r/ IN TWO VOCAL TRACTS*Thomas Judd Magnuson*

University of Victoria

ID 1172; Poster No. 19

[full paper]

Since even before Lindau's Story of /r/, the search for a single phonetic (acoustic or articulatory) characteristic which defines rhotics as a class has met with little success [13]. In light of an alternative way of conceptualizing the vocal tract [6, 7], however, this paper proposes that there is indeed an articulatory basis for classifying at least some phonologically rhotic speech sounds as phonetically rhotic insofar as they necessarily involve some degree of constriction or expansion of the pharynx. This paper further proposes a model (Fig. 1) of rhotic association parameters which builds on Lindau's 1985 [13] model by providing for the contribution of the laryngeal vocal tract to the production of r-like sounds.

PROSODIC STRUCTURE REPRESENTATION FOR BOUNDARY DETECTION IN SPONTANEOUS FRENCH*Natalia Segal & Katarina Bartkova*

France Telecom R&D Lannion

ID 1241; Poster No. 21

[full paper]

Automatic speech processing has recently turned to the treatment of continuous spontaneous speech, which demands, among many other issues, a representation of its prosodic organization. This paper presents a new approach to automatic prosodic boundary detection and prosodic unit structuring, based, with certain changes, on a descriptive theory of the French prosodic system initially proposed for prepared speech. This theory had been transformed into a set of rules so as to create a hierarchical representation of a phrase in spontaneous French in the form of a prosodic tree. The method had been manually verified and then applied to a spontaneous speech database in order to obtain a statistical description of prosodic structures.

LOOKING FOR RHYTHMS IN CONVERSATIONAL SPEECH*Michael O'Dell¹, Mietta Lennes², Stefan Werner³ & Tommi Nieminen⁴*¹University of Tampere; ²University of Helsinki;³University of Joensuu; ⁴University of Jyväskylä

ID 1382; Poster No. 23

[full paper]

Our exploratory study looks for units of temporal structure in conversational Finnish speech. The relative significance of different hierarchical levels of rhythm was evaluated using Bayesian inference on a linear regression model of coupled oscillators. Results suggest that mora, stress and foot timing as rhythmic factors in Finnish are more relevant than traditionally assumed.

ANALYSIS BY SYNTHESIS OF ENGLISH INTONATION PATTERNS: GENERALISING FROM FORM TO FUNCTION*Saandia Ali & Daniel Hirst*

CNRS, Parole et Langage Université de Provence

ID 1403; Poster No. 25

[full paper]

This paper presents a general model for the relation between representations of form and function for speech prosody on a multi-lingual basis. It outlines a procedure for analysing prosody by synthesis generating formal representations from a minimal representation of prosodic functions and comparing the output with the observed data. This then allows the functional representation to be enriched and to test whether it provides a closer fit to the data. This is specifically applied to the intonation patterns of British English. Five successively more complex models are presented and applied to fifteen continuous passages from the Eurom1 corpus. The quality of fit of the models is finally measured by linear correlation with hand corrected modelled fundamental frequency curves. It is argued that such a process will provide a starting point for an analysis which eventually could provide fully automatic functional annotation of prosody on a multilingual basis.

PRODUCING PHRASAL PROMINENCE IN GERMAN*Bistra Andreeva, William J. Barry & Ingmar Steiner*

Institute of Phonetics, Saarland University, Saarbrücken

ID 1699; Poster No. 27

[extra files] [full paper]

This study examines the relative change in a number of acoustic parameters usually associated with the production of prominences. The production of six German sentences under different question answer conditions provide de-accented and accented versions of the same words in broad and narrow focus. Normalised energy, F0, duration and spectral measures were found to form a stable hierarchy in their exponency of the three degrees of accentuation.

SOME FEATURES OF FILLED HESITATION PAUSES IN SPONTANEOUS RUSSIAN*Svetlana Stepanova*

St. Petersburg State University

ID 1261; Poster No. 29

[full paper]

This article examines the results of research conducted on different varieties of hesitation phenomena. The research, based on the spontaneous speech recordings of 10 Russian speakers, compares the spectral characteristics of these speakers' vocalizations from hesitation pauses and the vowels /a/ and /e/ within words from spontaneous monologues.

AN EXPERIMENTAL INVESTIGATION OF THE INTER-RELATIONSHIP BETWEEN THE DIPHTHONG AND THE TONE IN FUZHOU CHINESE

Gongguan Peng

Department of Chinese, Translation and Linguistics,
City University of Hong Kong

ID 1297; Poster No. 31

[full paper]

An interesting phenomenon in Fuzhou Chinese is the co-variation of the rhyme and the tone. The alternating rhymes will assume different forms when associated with different sets of tones. Several suggestions have been put forward to explain the relation between the intrinsic pitch of the vowel and the tongue height of the vowel. However, these suggestions rely on different sources which differ somewhat in their descriptions of the number of the diphthongs which show alternations depending on the tone. The considerable variation in the use of symbols suggests the desirability of more acoustic data. Results show that there is no significant differences between those finals with /e, o, a/ as the nucleus occurring in different sets of tones. Duration result of the diphthongs shows that the distribution of time of each component in the falling diphthongs will change when associated with different sets of tones.

POST-ORALIZED NASAL CONSONANTS IN CHINESE DIALECTS - AERODYNAMIC AND ACOUSTIC DATA

Fang Hu

Phonetics Lab, Institute of Linguistics, Chinese Academy
of Social Sciences

ID 1127; Poster No. 33

[extra files] [full paper]

Denasalization is a widely detected but not well documented and thus poorly understood phonetic or phonological process in Chinese dialects. The plain nasal consonants in Middle Chinese may remain as plain nasals such as in Wu dialects, have conditionally changed into plain fricatives or approximants such as in Mandarin dialects, or become post-oralized. This paper discusses acoustic and aerodynamic data of the post-oralized nasal consonants from four major Chinese dialect groups—Shanxi Jin dialects, Cantonese dialects around the Zhongshan area, southern Min dialects (Xiamen and Chao-Shan areas), and the Qingxin Hakka. The presented phonetic data reveal details of the denasalization process in Chinese dialects in particular and shed light on the understanding of historical sound change in general.

A ROLE FOR PHONOTACTIC CONSTRAINTS IN SPEECH PERCEPTION

Keren Shatzman & René Kager

Utrecht Institute of Linguistics OTS, University of
Utrecht

ID 1245; Poster No. 35

[full paper]

This study investigated whether abstract phonotactic constraints play a role in speech processing. Dutch listeners performed an auditory lexical decision task, in which the nonword stimuli either did or did not violate

a phonotactic constraint. Listeners were faster to reject nonwords that violated a phonotactic constraint. This effect remained significant even after partialling out the effects of lexical factors, such as the similarity of the nonwords to existing words in the lexicon. This finding constitutes, to our knowledge, the first demonstration of the involvement of pure abstract phonotactic constraints in on-line speech perception.

F0 ALIGNMENT PATTERNS IN ARABIC DIALECTS

Mohamed Yeou¹, Mohamed Embarki², Sallal Al Maqtari³ & Christelle Dodane⁴

¹Université Chouaib Doukkali, El jadida; ²Praxiling UMR 5267 CNRS-Montpellier III; ³Université de Sanaa; ⁴Université Franche-Comté, Besançon

ID 1173; Poster No. 37

[full paper]

A comparison of F0 alignment values was carried out for three Arabic dialects (Moroccan Arabic, Kuwaiti Arabic and Yemeni Arabic) using five speakers from each variety. Clear differences found in peak and valley alignments enable separation of Moroccan Arabic from the two other dialects: (1) values of the F0 valley differed significantly, with Moroccan Arabic showing a later synchronisation than Kuwaiti Arabic and Yemeni Arabic; (2) there was variation as to the effect of syllable structure on F0 peaks. The effect is not significant in Yemeni Arabic and Kuwaiti Arabic as the F0 peak is aligned within the stressed vowel in both CV: and CV:C. In Moroccan Arabic, however, the effect of syllable structure is significant: the F0 peak is earlier in closed syllables than open syllables.

LENITION OF VOICELESS FRICATIVES IN TWO VARIETIES OF SOUTHERN ITALIAN

Nadia Nocchi¹ & Stephan Schmid²

¹Phonogrammarchiv der Universität Zürich;

²Phonetisches Laboratorium der Universität Zürich

ID 1234; Poster No. 39

[full paper]

The purpose of this study is to verify if the traditionally acknowledged lenition of intervocalic plosives in the varieties of Southern Italy also applies to voiceless fricatives. Data from a recent corpus of semi-spontaneous speech collected in Naples and Palermo are analysed according to the parameters of duration, intensity, and voicing. It is demonstrated that, in the intervocalic position, the realisations of /s/ and /f/ are significantly shorter, whereas intensity does not prove to be affected by the phonotactic position; sonorization does occur, to some extent, in the Neapolitan data, being marginal among the Sicilian speakers.

VARIABILITY OF RHOTICS IN PUNJABI-ENGLISH BILINGUALS

Allen Hirson & Sohail Nabiah

City University London

ID 1623; Poster No. 41

[full paper]

This paper examines variation of /r/-pronunciation as a function of social identification in Punjabi-English

bilinguals. This is clearly different from previous studies of linguistic stratification based upon geography, gender age or social network [1], [2]. The study presented here examines group affiliation of second generation speakers of Punjabi in south east Britain. Specifically, the subject selection for the study partitions British-Asian speakers of English (from the Indian Subcontinent) on the basis of self-identification as either 'British' or as 'Asian'. The main research question addressed was whether 'British Asian' speakers of English with particular social affiliations acquire the local (south east British) pattern of /r/-pronunciation, or retain features of Punjabi rhotic pronunciation.

AN ACOUSTIC COMPARISON OF VOWEL SYSTEMS IN ADULT-DIRECTED-SPEECH AND CHILD-DIRECTED SPEECH: EVIDENCE FROM FRENCH, ENGLISH & JAPANESE

Christelle Dodane¹ & Jaleddin Al-Tamimi²

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ID 1588; Poster No. 43

[extra files] [full paper]

This research investigated the role of child-directed speech in the acquisition of vowel systems in a cross-linguistic perspective. In order to determine if vocalic systems are extended in child-directed speech and if this extension varies cross-linguistically, child-directed speech was compared to adult-directed speech in three different languages, French, English and Japanese. The same short story was successively read by mothers to their infant and to an adult (5 mother-infant dyads per language). The acoustic analyses reveal a downward shift of the vowel triangle on the high-low dimension of vowel space (F1). In the three languages, mothers tend to produce more opened vowels in CDS than in ADS.

AN AUTOMATIC PHONETIC TRANSCRIPTION MARKER AS A PHONETICS TEACHING TOOL

Laurence Paris-Delrue & Jean-Claude Desruque

Université de Lille 3

ID 1036; Poster No. 45

[full paper]

This paper is a report on an experiment carried out with French students of English as a second language. It aims to test the validity of combining a multimedia tool with a constructivist approach to phonetics teaching at university level.

LINGUISTIC FACTORS IN L2 WORD STRESS ACQUISITION: A COMPARISON OF CHINESE AND VIETNAMESE EFL LEARNERS' DEVELOPMENT

Shu-chen Ou

National University of Kaohsiung

ID 1104; Poster No. 47

[full paper]

This paper disambiguates two linguistic factors in L2 English word stress acquisition. Chinese EFL learners have been found to prefer a syllable to be stressed when it is closed by a sonorant [5]. This non-English-

like pattern is open to at least two interpretations: (a) an effect of L1 transfer, and (b) an effect of universal sonority-weight mapping. In order to evaluate the analyses, data was collected from L1 Vietnamese speakers whose native language allows both sonorant and obstruent codas. If the Vietnamese speakers do not show a preference for sonorant codas, then the L1 transfer interpretation is supported. If both groups acquire L2 English stress in a similar way, then an effect of phonological universal might be possible. These predictions are tested in a perceptual experiment. The results support the hypothesis that the L2 English stress pattern shown by L1 Chinese speakers is due to phonological universals.

PERCEPTION OF ENGLISH LEXICAL STRESS: EFFECT OF F0 PEAK LOCATION ON ENGLISH AND JAPANESE SPEAKERS

Shinichi Tokuma

Chuo University

ID 1349; Poster No. 49

[full paper]

This study investigated the perceptual effect of duration and F0 peak location on L1/L2 perception of English lexical stress. A nonsense bisyllabic English word embedded in a frame sentence, whose F0 was set to reach its peak after the word, was used as the stimuli of the perceptual experiment. Native English and Japanese speakers were asked to determine lexical stress locations. The results showed that in the perception of English lexical stress, F0 peaks that immediately followed the stimulus words perceptually affected the subjects in an opposite manner: Japanese speakers perceived these F0 peaks as a cue to lexical stress in the preceding syllable, while English speakers perceived them as an independent prominence peak and showed perceptual stress shift. The findings also confirmed the claim by previous studies that, while the perception of Japanese subjects is scarcely affected by duration, English subjects show great sensitivity to it.

PHONETIC CRITERIA OF ATTRACTIVE MALE VOICES

Vivien Zuta

Institute of Phonetics Frankfurt

ID 1021; Poster No. 51

[full paper]

In German voice and language science we act on the assumption that a male's voice has to be deep in order to leave an attractive impression on the female listener. This study shows that this is not the fact and that even voices with a middle or high fundamental frequency can be judged as attractive. Furthermore, the analysis shows that there is a combination of various parameters, which are responsible for leaving an impression of any kind (positive or negative) to the listener.

DEVELOPMENTAL CHANGES IN CEREBRAL RESPONSES TO NATIVE AND NON-NATIVE VOWELS: A NIRS STUDY

Yasuyo Minagawa-Kawai¹, Nahoko Nishijima², Nozomi Naoi², Emmanuel Dupoux¹ & Shozo Kojima²

¹LSCP, EHESS-ENS-CNRS; ²Keio University

ID 1487; Poster No. 53

[full paper]

While newborn infants discriminate speech sounds from languages that they have never heard, 6-month-olds demonstrate the beginnings of vowel classification specific to their native-language. The neuronal correlates involved in such a dramatic perceptual reorganization process, however, are not well understood. Using near-infrared spectroscopy (NIRS), this study compares the neural responses of Japanese infants at 3-4 months and 7-8 months of age as well as of adults to native ([i] vs. [uu]) and non-native vowel contrasts ([uu] vs. [u]) within pseudo-word contexts. The findings demonstrated longitudinal developmental changes of functional temporal cortex asymmetries associated with the exposure of the native language.

INHIBITION OF PROCESSING DUE TO REDUCTION OF THE AMERICAN ENGLISH FLAP

Benjamin V. Tucker & Natasha Warner

University of Arizona

ID 1493; Poster No. 55

[full paper]

The speech we encounter in daily life casual conversation often contains impoverished or reduced acoustic information, in comparison to careful speech, and yet listeners can understand such speech with ease. This study explores differences in processing between reduced/ conversational speech and unreduced/careful speech. In a cross-modal identity priming experiment, listeners heard reduced vs. careful pronunciations of real words and then saw visual stimuli and decided whether the visual stimulus was a real word. This experiment investigates processing differences between reduced and unreduced speech using the American English flapped /d/ and word-medial /g/. American English listeners are shown to process unreduced (clear) targets more quickly than reduced targets.

PERCEPTUAL AND ACOUSTIC ANALYSIS OF VOWEL PRODUCTIONS IN WORDS AND PSEUDO WORDS IN CHILDREN WITH SUSPECTED CHILDHOOD APRAXIA OF SPEECH

Anke Blech¹, Luise Springer² & Bernd J. Kröger¹

¹Departement of Phoniatrics, Pedaudiology and Communication Disorders, UKAachen and Aachen University; ²School of Logopedics, University Hospital, Aachen

ID 1142; Poster No. 57

[full paper]

Purpose: Childhood Apraxia of Speech (CAS) is a developmental disorder affecting the speech motor programming and planning. This study aims to investigate deviant vowel and diphthong articulations of German children with suspected CAS. Methods and Data: A corpus of 115 isolated stimulus words were evoked by pic-

ture naming, 33 pseudo words were evoked by repetition and collected for three German children with suspected CAS aged 5;9 to 6;3 years and for 21 controls. Perceptual and acoustic analysis were done in order to judge the vowels and diphthong realisations of suspected CAS-children vs. control speakers. Results: The perceptual evaluation shows vowel and diphthong errors in the suspected CAS-children in contrast to the controls. Discussion: This study shows that incorrect vowel and diphthong productions can be detected in children with suspected CAS by perceptual and acoustic evaluation.

AN ACOUSTIC INVESTIGATION OF PITCH ACCENT CONTRASTS IN THE SPEECH OF A NORWEGIAN PATIENT WITH THE FOREIGN ACCENT SYNDROME

Inger Moen¹, Frank Becker², Live Günther² & Mari Berntsen²

¹Department of Linguistics and Scandinavian Studies, University of Oslo; ²Sunnaas Hospital

ID 1205; Poster No. 59

[full paper]

In 2005 a middle aged Norwegian man became aphasic as a result of a left hemisphere stroke. After a few months his aphasic condition had improved. He was mildly agrammatic with word finding problems and what sounded like a foreign accent. Deviant prosody was an important feature of his foreign sounding speech, in particular the lack of a clear distinction between the two Norwegian word tones (pitch accents). Acoustic analysis of his speech revealed limited F0 variation at word and utterance level and a similar F0 pattern on the two word tones. His deviant prosody is assumed to be the result of reduced ability to produce appropriate F0 variation, a dysarthric condition. There was no indication of apraxia of speech.

ANALYSIS OF ORAL AND NASAL VOWEL REALISATION IN NORTHERN AND SOUTHERN FRENCH VARIETIES

Philippe Boula de Mareüil, Martine Adda-Decker & Cécile Woehrling

LIMSI-CNRS

ID 1240; Poster No. 61

[extra files] [full paper]

We present data on the pronunciation of oral and nasal vowels in northern and southern French varieties. In particular a sharp contrast exists in the fronting of the open /O/ towards [œ] in the North and the denasalisation of nasal vowels in the South. We examine how linguistic changes in progress may affect these vowels, which are governed by the left/right context and bring to light differences between reading and spontaneous speech. This study was made possible by automatic phoneme alignment on a large corpus of over 100 speakers.

PROSODIC MODELLING OF SYNTHESISED GERMAN WORDS

Ursula Hirschfeld¹, Rüdiger Hoffmann² & Friderike Lange¹

¹Martin-Luther-Universität Halle-Wittenberg;

²Technische Universität Dresden

ID 1265; Poster No. 63

[full paper]

During the development of an “exemplary” synthesis of words and phonetic words for a “speaking pronunciation dictionary”, considerable deviations from German pronunciation norms are being found, particularly in the prosodic field. On the basis of listening experiments new possibilities of modelling accent patterns arranged specifically for the German vocabulary are being tested.

speech production process.

MORPHOLOGICAL AND SYNTACTIC FACTORS IN PREDICTING SEGMENTAL DURATIONS FOR ESTONIAN TEXT-TO-SPEECH SYNTHESIS

Meelis Mihkla

Institute of Estonian Language

ID 1414; Poster No. 65

[full paper]

Traditionally, durational models of speech units have been developed without paying much heed to morphology and part-of-speech information while predicting speech temporal structure. The aim of the present study was to find out whether the rich morphology of the Estonian language could possibly provide some additional (beside the syntactic and part-of-speech) information that could be used in predicting durations. The project is a continuation of prosody studies for Estonian TTS synthesis. Sound durations in the speech of radio newsreaders were modelled by means of different statistical methods (linear regression and neural networks). Model input consisted not only of descriptors of sound context and position, but also of information on part of speech, part of sentence and morphological features. The results indicated a decrease of error in the prediction of segmental durations. Such results were in good harmony with our expectations concerning a morphologically rich language.

INVESTIGATING LARYNX HEIGHT WITH AN ARTICULATORY SYNTHESIZER

Eva B. Lasarczyk

Saarland University, Germany

ID 1543; Poster No. 67

[extra files] [full paper]

In this paper, we present a comparative study of natural and synthetic speech samples which vary in larynx height. The acoustics of isolated vowels was analyzed with respect to formant frequency changes and changes in voice quality. The synthetic stimuli show the same characteristics as the natural stimuli when special attention is paid to the synthetic excitation quality. One issue addressed behind this study is how the naturalness of speech synthesis can be improved by manipulating voice quality. Another issue is to find out how well the articulatory speech synthesizer used matches the real

Thursday, 9:00**Prosody VII: Pragmatics**

Thursday, 9:00, Room: 1 (Red)

Chair: Daniel Hirst

THE ROLE OF PITCH RANGE IN REALISING PRAGMATIC CONTRASTS - THE CASE OF TWO QUESTION TYPES IN ITALIAN*Micheline Savino¹ & Martine Grice²*¹Dept. of Psychology, University of Bari; ²IfL - Phonetik, University of Cologne

ID 1093

[full paper]

In Bari Italian, the same pitch accent is used in two different types of question – those seeking information and those challenging what has been said (echo questions). However, they differ in their pitch range. A perception study was carried out, consisting of a semantically motivated identification task. Results provide preliminary evidence for the categorical perception of pitch range variation.

IMPERATIVES, ORDERS AND REQUESTS IN EUROPEAN PORTUGUESE INTONATION*Isabel Falé¹ & Isabel Hub Faria²*¹Onset-Centro de Estudos da Linguagem; Universidade Aberta; ²Onset-Centro de Estudos da Linguagem; Departamento de Linguística Geral e Românica, Faculdade de Letras da Universidade de Lisboa

ID 1452

[full paper]

The main aim of this study is to identify the phonetic features of European Portuguese imperative intonation. Recognition and categorization of intonation contours associated to imperative sentences and to illocutionary directive speech acts (order and request) were studied through two perception experiments. Acoustic and phonetic analyses of perception results revealed the F0 contour features of the European Portuguese imperative prototype. Imperative Order and request specific intonation characteristics were also described and analyzed. Intonation global parameters were enhanced on these analyses: pitch span and pitch register play an important role on grammatical and pragmatic distinctions.

INTONATION IN TURKISH KABARDIAN*Ayla Applebaum & Matthew Gordon*

UC Santa Barbara

ID 1279

[extra files] [full paper]

This paper reports on intonational characteristics of the Northwest Caucasian language Kabardian as spoken by the diaspora community of Turkey. As the first instrumental study of intonation in a Northwest Caucasian language, the current research expands our typological database on intonation systems. Drawing on a combination of conversational and elicited data, several findings emerged. Both statements and most question types, including yes/no and wh-questions, are associated with falling intonation. Terminal rises are found in certain

questions and non-final items in a list. H* pitch accents occur in both statements and questions, while H* on an NP in questions is followed by a HL fall.

Acoustics IV: Oral and Nasal Stops

Thursday, 9:00, Room: 2 (Orange)

Chair: Mark Huckvale

POST-NASAL DEVOICING IN TSWANA*Andries W. Coetzee¹, Susan Lin¹ & Rigardt Pretorius²*¹University of Michigan; ²Nort-West University

ID 1062

[extra files] [full paper]

Tswana is traditionally described as having a process of post-nasal devoicing (/mba/ > [mpa]). If this is accurate, then Tswana poses a challenge to views that neutralization processes should be articulatorily grounded. Airflow leakage through the nasal cavity should promote, not inhibit, voicing post-nasally. Zsiga et al. performed acoustic analysis of the speech of 6 Tswana speakers, and found no evidence of post-nasal devoicing. They conclude that, counter to traditional descriptions, Tswana does not have post-nasal devoicing. In an independent study, we collected speech from 12 Tswana speakers. Four of our speakers showed clear and consistent post-nasal devoicing. In this paper, we present the data for these 4 speakers to show that at least some speakers of Tswana do have an active process of post-nasal devoicing. We also consider possible explanations for this process, arguing that it is motivated by perceptual rather than articulatory considerations.

FINE-GRAINED PHONETICS AND ACQUISITION OF GREEK VOICED STOPS*Eunjong Kong¹, Mary Beckman¹ & Jan Edwards²*¹Ohio State University, Department of Linguistics;²University of Wisconsin at Madison, Department of Communicative Disorders

ID 1366

[full paper]

We explore the acoustics of Greek voiced stops produced by 2~3 year-old Greek-acquiring children and compare them with adult patterns, in order to understand developmental universals in the mastery of phonation-type contrast. A truly voiced stop (with negative VOT) is a difficult sound due to aerodynamic requirements of glottal gesture. Prior studies show that French or Thai-acquiring children are hindered by this fact, not mastering them until age 5. To assess the effects of such physical constraints on acquisition, we examine the acoustics of Greek voiced stops and investigate how Greek learners deal with articulatory difficulties of producing them. Greek data were recorded in two experiments and were analyzed in terms of amplitude change during the closure and around the burst. Results suggest the very detailed phonetic descriptions of phonetic categories must be taken into account to provide properly nuanced prediction about developmental universals.

AN ACOUSTIC AND ARTICULATORY STUDY OF BININJ GUN WOK STOP CONSONANTS

Hywel Stoakes¹, Janet Fletcher¹ & Andrew Butcher²

¹The University of Melbourne; ²Flinders University

ID 1413

[full paper]

It has previously shown that there is a clear duration difference between the long and short stop series in Bininj Gun Wok, a language spoken in Northern Australia. The stops are phonologically categorized as fortis and lenis. This investigation looks at some non-durational phonetic correlates of the contrast between lenis and fortis consonants. H1-H2, H1-A2 and H1-A3 measurements were made using acoustic recordings and the closed quotient CQ was measured using an electroglottograph. Although there were differences in H1-H2, voice quality was not found to be a consistent cue to a contrast across all measures.

Production VII: Assimilation and Sandhi

Thursday, 9:00, Room: 3 (Yellow)

Chair: Francis Nolan

CONDITIONING FACTORS IN EXTERNAL SANDHI: AN EPG STUDY OF ENGLISH /l/ VOCALISATION

James M. Scobbie¹, Marianne Pouplier² & Alan Wrench³

¹Queen Margaret University, Edinburgh; ²University of Edinburgh; ³Articulate Instruments Ltd

ID 1275

[full paper]

We investigate l-sandhi in English, specifically the changes that occur in alveolar contact when word-final /l/ appears in a range of connected speech contexts. Analysis of EPG data for Scottish Standard English and Southern Standard British English speakers shows that there is wide variation in the rate of vocalisation and in the extent of alveolar contact, and that whether the following word is lexically onsetless or not is not enough to predict how /l/ behaves. We conclude that resyllabification is not sufficient as a mechanism for conditioning this alternation.

TEMPORAL, SPECTRAL EVIDENCE OF DEVOICED VOWELS IN KOREAN

Yoonsook Mo

University of Illinois at Urbana-Champaign

ID 1597

[full paper]

Vowel devoicing is a phenomenon that is reported to occur in many languages such as Japanese, Parisian and Montreal French, Turkish and English. This paper investigates vowel devoicing in Korean. A devoiced vowel does not exhibit characteristic vocal tract resonances, and instead is realized as a long interval of aspiration or frication following consonant release, resulting in non-distinct segment boundaries between devoiced vowels and adjacent voiceless consonants. This paper examines

temporal and spectral evidence of devoiced vowels and, among other findings, reveals that in Korean devoiced high vowels are not segmentally deleted but phonetically masked, suggesting that vowel devoicing results from the overlap of glottal gestures. This paper also examines the effect of the preceding consonant place and manner, and the height and front/backness of vowels on devoicing.

WEAK CLICKS IN GERMAN?

Susanne Fuchs¹, Laura Koenig² & Ralf Winkler³

¹ZAS Berlin; ²Haskins Laboratories New Haven; ³TU Berlin

ID 1678

[full paper]

We investigated alveolar-velar stop sequences in connected speech processes in order to understand the potential articulatory and aerodynamic causes for the alveolar weakening, often discussed with respect to assimilation. We will also shed light on the potential click-nature of these sequences as suggested in the literature. By means of a new experimental set-up which allowed us to monitor tongue-palatal contact patterns simultaneously with intraoral pressure variations 8 German native speakers were recorded. Temporal results and relative burst intensities were obtained from acoustic data, the potential overlap of alveolar and velar movements was obtained by tongue palatal contact patterns in the anterior and posterior regions, and a brief period of pressure rarefaction at alveolar release (negative pressure) was taken as evidence for clicks. On the basis of these data speaker specific evidence is provided for weak clicks in German.

Perception IV: Vowels

Thursday, 9:00, Room: 4 (Green)

Chair: Bernd Pompino-Marschall

AN EXEMPLAR-BASED MODEL OF CHAIN SHIFTS

Marc Ettlinger

University of California, Berkeley

ID 1282

[full paper]

Explanations for historical chain shifts tend towards the teleological using abstract ideas like balance and equilibrium as the organizing principles of a language's sounds. This paper investigates whether there are more basic phonetic principles governing the behavior of sound categories with respect to one another. Using a computational simulation of agents communicating with each other, I show that vowel chain shifts fall out naturally from an exemplar-based model of sounds. This suggests that no overarching teleological mechanisms are required to account for chain shifts and that the self-organizing behavior of exemplar-based categories provides an adequate explanation.

VOWEL PERCEPTION WITH VIRTUAL FORMANTS

Robert Allen Fox, Ewa Jacewicz & Chiung-Yun Chang
Speech Perception and Acoustics Labs, Ohio State

ID 1024

[full paper]

This study examines the potential role of the auditory spectral integration in phonetic vowel quality decisions. Synthetic stimuli included a “virtual formant (F2)” which was produced by inserting two pairs of sine waves below and above a “perceptual target frequency” (the spectral center-of-gravity, COG). Intensity weighting across the pairs of sine waves created a virtual F2, i.e., an F2 percept which listeners formed although the formant was not physically present in the signal. Two different vowel series containing a virtual F2 were created by varying the intensity weightings of the sine wave pairs. The patterns of vowel identification decisions were similar with either the actual or virtual F2. The results are interpreted as evidence that the auditory system performs spectral integration across spectral components and can extract formant frequency information which in fact is not present in vowel spectrum

PERCEPTION OF VOWEL LENGTH: TONALITY CUES CATEGORIZATION EVEN IN A QUANTITY LANGUAGE

Juhani Järviö¹, Daniel Aalto², Reijo Aulanko³ & Martti Vainio³

¹University of Turku; ²Helsinki University of Technology; ³University of Helsinki

ID 1509

[full paper]

A two-alternative forced-choice categorization experiment (2AFC) tested whether the type of tone (static high vs. dynamic fall) affected the perception of the length of a stressed initial syllable in Finnish, when the participants had to categorize it as “short” or “long”. In addition to the main effects of the duration of the first and second syllables, the results showed a significant main effect of tone that was qualified by an interaction with the duration of the first syllable nuclei. More precisely, the participants were *ceteris paribus* more likely to categorize the vowel of the first syllable as “long” in the dynamic fall condition than the high tone condition. The results showed that, alongside with duration, also the tonal structure is used as a strong perceptual cue for the quantity opposition in Finnish.

First Language Acquisition II

Thursday, 9:00, Room: 5 (Blue)

Chair: Thorsten Piske

THE ROLE OF PROSODY ON THE PERCEPTION OF WORD-ORDER DIFFERENCES BY 14-MONTH-OLD GERMAN INFANTS

Ricardo Augusto Hoffmann Bion, Barbara Höhle & Michaela Schmitz

University of Potsdam

ID 1311

[full paper]

Fourteen-month-old German infants can distinguish between isolated non-finite verb-noun and noun-verb verb-phrases [1]. This study investigated whether prosody is the cause of this differential attention. The prosodic content of 144 verb-phrases was manipulated, and the impact of this manipulation on infants' perception was examined. Our results show that, even though prosody does influence infants' perception, the segmental content of phrases (i.e., morphological markers) is also crucial for German infants' early sensitivity to word-order differences within verb-phrases.

INFANTS' RECOGNITION OF FUNCTION WORDS IN CONTINUOUS SPEECH

Rushen Shi

Université du Québec à Montréal

ID 1296

[full paper]

This study tests the hypothesis that function words are among the earliest word forms segmented by pre-verbal infants. In a visual fixation procedure, French-learning 8-month-old infants were familiarized to a function word, *mes* or *ta*. All infants were then tested with passages containing *mes* vs. *ta*. Looking times during the presentation of the two passage types were expected to differ if infants segmented the target functor. The results showed a significant interaction of passage type and sex. Although the direction of the looking preference is different for the two sexes, both groups showed a significant difference in listening times to the passage containing the target versus that containing the non-target. This suggests that both groups segmented the function words. The implications of functional elements for early lexical and syntactic acquisition are discussed.

ACQUIRING RHYTHMICALLY DIFFERENT LANGUAGES IN A BILINGUAL CONTEXT

Conxita Lleó¹, Martin Rakow² & Margaret Kehoe Winkler²

¹Department of Romance Languages, University of Hamburg; ²Research Center on Multilingualism, University of Hamburg

ID 1144

[full paper]

Using the Pairwise Variability Index (Grabe & Low, 2002), the rhythmic patterns of 3;0 year old German and Spanish monolingual and bilingual children are exam-

ined. Whereas the PVIs of monolingual Spanish data are low and those of monolingual German data are high, the data of the bilinguals do not greatly differ across languages. The PVIs of the bilinguals in German do not differ from those of the monolinguals, but the consonantal intervals of the bilinguals in Spanish are characterized by higher variability than those of the Spanish monolinguals. Several explanatory hypotheses are discussed, and an interpretation, which posits that consonantal intervals reflect properties of the language-specific phonology, is proposed. This implies that only the vocalic PVIs correlate with rhythmic class.

Phonetic Psycholinguistics IV: Talker Familiarity

Thursday, 9:00, Room: 6 (Black)
Chair: Lisa Davidson

THE EFFECT OF TALKER FAMILIARITY ON WORD SEGMENTATION IN NOISE

Rachel Smith

University of Glasgow

ID 1611

[full paper]

Perceptual learning about voices is known to facilitate speech perception, but it is unclear exactly which phonetic representations are altered to cause this facilitation. This study examines perceptual learning for a non-segmental phonetic property, talker-specific cues to word boundaries. An experiment tested intelligibility in noise of sentences that contained hard-to-segment sequences (e.g. /patsɔ:d/, which can correspond to Pat sawed or Pat's awed). Testing occurred before and after training with a voice; improvement in performance after training was measured. Subjects who heard the same voice during training as during testing showed more improvement than those who heard a different voice. Implications for exemplar theories of speech perception are discussed.

THE LOCUS OF TALKER-SPECIFIC EFFECTS IN SPOKEN-WORD RECOGNITION

Alexandra Jesse¹, James M. McQueen¹ & Mike Page²

¹Max Planck Institute for Psycholinguistics; ²University of Hertfordshire

ID 1212

[full paper]

Words repeated in the same voice are better recognized than when they are repeated in a different voice. Such findings have been taken as evidence for the storage of talker-specific lexical episodes. But results on perceptual learning suggest that talker-specific adjustments concern sublexical representations. This study thus investigates whether voice-specific repetition effects in auditory lexical decision are lexical or sublexical. The same critical set of items in Block 2 were, depending on materials in Block 1, either same-voice or different-voice word repetitions, new words com-

prising re-orderings of phonemes used in the same voice in Block 1, or new words with previously unused phonemes. Results show a benefit for words repeated by the same talker, and a smaller benefit for words consisting of phonemes repeated by the same talker. Talker-specific information thus appears to influence word recognition at multiple representational levels.

THE EFFECT OF AN UNFAMILIAR REGIONAL ACCENT ON SPOKEN WORD COMPREHENSION

Patti Adank¹ & James M. McQueen²

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²Max Planck Institute for Psycholinguistics, PO Box 310, 6500 AH, Nijmegen, The Netherlands

ID 1387

[full paper]

This study aimed first to determine whether there is a delay associated with processing words in an unfamiliar regional accent compared to words in a familiar regional accent, and second to establish whether short-term exposure to an unfamiliar accent affects the speed and accuracy of comprehension of words spoken in that accent. Listeners performed an animacy decision task for words spoken in their own and an unfamiliar accent. Next, they were exposed to approximately 20 minutes of speech in one of these two accents. After exposure, they repeated the animacy decision task. Results showed a considerable delay in word processing for the unfamiliar accent, but no effect of short-term exposure.

Thursday, 10:00**Poster V**

Thursday, 10:00

Chairs: Petra Wagner, Esther Janse

WHEN DOES LIP PROTRUSION START IN STANDARD AUSTRIAN GERMAN? AN ACOUSTIC INVESTIGATION*Sylvia Moosmüller*

Acoustics Research Institute of the Austrian Academy of Sciences

ID 1437; Poster No. 1

[full paper]

CV, V1CV2- and V1#CV2-sequences of reading material of six speakers of Standard Austrian German have been analysed. V1 was a pre-palatal, constricted vowel /i/ in unstressed position, C an alveolar consonant, and V2 either a pre-palatal, constricted vowel /i/ or a back, rounded vowel /u, o/ in a stressed position. F1, F2, F3, and VOT measurements were performed. Lip protrusion starts at consonant release and may affect the transconsonantal vowel, as long as V1 and C are not separated by a word boundary.

A COMPARISON OF VOWEL ACOUSTICS BETWEEN OLDER AND YOUNGER ADULTS*Peter Watson & Benjamin Munson*

University of Minnesota - Twin Cities

ID 1453; Poster No. 3

[full paper]

Previous research has shown a difference in vowel acoustics between older and younger adults, possibly related to age-related changes in vocal tract morphology. Other data suggest that vowel acoustics may vary as a function of neighborhood density and word frequency in older adults, possibly due to the mediating influence of lexical access. This investigation examined whether these two factors interact. Results show that older adults had overall lower-frequency formants, and qualitatively different-shaped vowel spaces, than the younger adults, but the influences of word frequency and neighborhood density on the acoustic characteristics of vowels were statistically equivalent in both groups.

LINGUAL CONTACT IN SELECTED ENGLISH VOWELS AND ITS ACOUSTIC CONSEQUENCE*Ivan Yuen¹, Alice Lee² & Fiona Gibbon³*

¹Department of Psychology, Royal Holloway, University of London; ²Department of Speech and Hearing Sciences, University College Cork; ³Department of Speech and Hearing Sciences, Queen Margaret University College

ID 1466; Poster No. 5

[full paper]

This paper provides preliminary data about EPG contact for 3 different vowels in Southern British English and Scottish English across eleven speakers. The EPG data were compared with vowel formants to test the hypothesis that the amount of EPG contact as an indicator of tongue height or anteriority will result in

a corresponding change in F1 and F2. The results suggest that Percent Contact varies with the three monophthongs. F1, F2 and F2-F1 difference varies with the amount of Percent Contact.

SPEECH DYNAMICS: EPISTEMOLOGICAL ASPECTS*René Carré¹, François Pellegrino¹ & Pierre Divenyi²*

¹Laboratoire Dynamique Du Langage (DDL), CNRS-Université de Lyon 2; ²VA Medical Center and EBIRE, Martinez, California, USA

ID 1560; Poster No. 7

[full paper]

Speech is generally looked upon as a succession of events in the time domain and analyzed frame by frame, while ignoring the fact that speech is dynamic. In the present paper, evidence in support of the dynamic nature of speech and dynamic invariance, as well as their consequences on speech research, are discussed.

THE COMPREHENSION OF ACOUSTICALLY REDUCED MORPHOLOGICALLY COMPLEX WORDS: THE ROLES OF DELETION, DURATION, AND FREQUENCY OF OCCURRENCE*Mirjam Ernestus & Harald Baayen*

Radboud University Nijmegen & Max Planck Institute for Psycholinguistics

ID 1091; Poster No. 9

[full paper]

This study addresses the roles of segment deletion, durational reduction, and frequency of use in the comprehension of morphologically complex words. We report two auditory lexical decision experiments with reduced and unreduced prefixed Dutch words. We found that at the macro level, segment deletions lead to delayed comprehension. At the micro level, however, longer durations appear to increase lexical competition, either from the word's stem (Experiment 1) or from the word's morphological continuation forms (Experiment 2). Increased lexical competition slows down especially the comprehension of low frequency words, which shows that speakers do not try to meet listeners' needs when they reduce especially high frequency words.

INTERLINGUAL NEAR HOMOPHONIC WORDS AND PHRASES IN L2 LISTENING: EVIDENCE FROM MISHEARD SONG LYRICS*Takashi Otake*

E-Listening Laboratory

ID 1329; Poster No. 11

[full paper]

Recent studies on bilingual spoken-word recognition have shown that bilinguals cannot deactivate the lexicon of the native language in a monolingual non-native situation due to the fact that language nonselective access is applied. This study attempted to examine whether this phenomenon could be observed in a unique Japanese word play called *soramimi awaa* in which Japanese misheard song lyrics were extracted from foreign songs. The analysis showed that both interlingual near homophones and phrases were observed, suggesting that at

least Japanese bilinguals may experience the deactivation of the lexicon in their linguistic activity.

L2 PERCEPTION OF ENGLISH FRICATIVES IN CLEAR AND CONVERSATIONAL SPEECH: THE ROLE OF PHONEMIC, PHONETIC, AND ACOUSTIC FACTORS

Baris Kabak & Kazumi Maniwa

University of Konstanz

ID 1380; Poster No. 13

[full paper]

This study investigated perception by non-native listeners of English fricatives produced in clear and conversational speaking styles. We measured babble thresholds for fricative voicing and place of articulation contrasts by Standard German and Swabian German and native American English speakers. Overall, Swabian German speakers performed worse than both native English and Standard German speakers, and Standard German speakers worse than native English speakers. German speakers in general had more difficulty with non-sibilant distinctions, and Swabian speakers also had difficulty with sibilant voicing distinctions. A robust clear speech benefit was observed across groups and contrasts. Overall, the results indicate that difficulty in perceiving foreign-language contrasts stems from the interaction of phonological, phonetic, and psychophysical issues.

PERCEPTUAL EFFECT OF VOWEL DEVOICING AND ITS WORKING RANGE

Makiko Aoyagi

Dokkyo University

ID 1411; Poster No. 15

[full paper]

This study reports a perceptual effect of a devoiced vowel in Japanese as an assimilative outcome of connected speech. A focus is placed on how such an effect changes its magnitude as the source and the recipient of the effect are separated. A devoiced syllable *ki-* has a strong effect of causing voiceless judgment in the following *da-ta* VOT variations with natural closure durations. However, such an effect is weakened as the closure interval is expanded beyond the original one for a voiceless stop. In this case, the original voicing judgment of the *da-ta* variations in isolation gradually returns. Also, the more voiced the *da-ta* variation itself, the earlier and farther it deviates from the influence of the devoiced vowel. Phonetic variation resulting from connected speech serves to aid segmental perception, but in turn the effect obtains in a 'connected' speech event.

THE ACOUSTIC ANALYSIS OF PERSIAN FRICATIVE-AFFRICATE CONTRAST

Zahra Mahmoodzadeh & Mahmoud Bijankhan

Department of Linguistics, University of Tehran

ID 1470; Poster No. 17

[full paper]

Acoustic analysis suggests that each of the following variables can cue the post-alveolar fricative-affricate contrast in isolated word forms in Persian: silence duration, frication duration, rise time and amplitude rise

slope. The acoustic values of each cue differ with the position of the test item in the word. Silence and frication duration of Persian affricates was longest in the final position. The rise time of Persian voiceless affricate was also longest finally but the amplitude rise slope was longest initially. It is confirmed that there is a positive relation between frication duration and silence duration, frication duration and rise time and also silence duration and rise time. The trading relation between frication duration and amplitude rise slope was negative.

ROBUSTNESS OF ACOUSTIC LANDMARKS IN SPONTANEOUSLY-SPOKEN AMERICAN ENGLISH

Stefanie Shattuck-Hufnagel¹ & Nanette Veilleux²

¹Speech Group, RLE, Massachusetts Institute of Technology; ²Speech Group, RLE, Massachusetts Institute of Technology, and Simmons College

ID 1584; Poster No. 19

[full paper]

Acoustic landmarks (abrupt changes associated with consonant closures and releases, vowels and glides) play an important role in some models of lexical access (e.g. Stevens 1998, 2002), so it is important to determine how often they survive articulatory overlap and weakening in spontaneous speech production. A corpus of spontaneous American English speech collected from 8 adult female speakers is hand labeled for the occurrence of landmarks. Preliminary results for one conversation (240 secs., 610 words, analysis completed for 1003 of 2750 predicted landmarks) show that 86% of landmarks were realized overall, with a sharply lower rate for coronal stops /t/ and /d/. These results suggest that the majority of landmarks are available for detection both by human listeners and automatic recognition algorithms. Ongoing analyses are comparing the rate of automatic detection of these acoustic events with the hand labels, and tabulating the contexts in which landmarks are lost or changed.

DURATION AND PITCH ANCHORING AS CUES TO WORD BOUNDARIES IN GREEK

Argyro Katsika

YALE UNIVERSITY

ID 1631; Poster No. 21

[full paper]

This investigation is part of a larger study of the role of fine phonetic details in word segmentation in Greek connected speech. The present paper investigates whether and how Greek speakers use durational and pitch alignment acoustic cues to mark word boundaries in identical segmental strings differing only in the word boundary affiliation. Duration modification mechanisms are evident in cuing words, while different F0 alignment is not detected.

THE PHONETICS-PHONOLOGY INTERFACE OF ERZYA STRESS: MORPHOLOGICAL CONDITIONING OF VOWEL REDUCTION

Niina Aasmäe & Jaan Ross

University of Tartu

ID 1200; Poster No. 23

[full paper]

Analyses provided in this paper test the possibility of morphological conditioning for vowel durations in Erzya. The duration of stressed first-syllable and unstressed second-syllable vowels in disyllabic 'root' and 'inflectional form' tokens was compared. Material consisted of one-word utterances produced in spontaneous speech by speakers of different dialects. The inter-dialect vowel durations tended to equalize within the root. At the boundary of the root and a suffix vowels were shorter than in the stressed first syllable. The manifestations of the tendency varied across four dialect groups representing the main language varieties. The results suggest that there is a causal relationship between unstressed vowel reduction and the domain of morphology. Dialects revealing variability in the manifestation of the general tendency towards vowel duration asymmetry in the root and inflectional forms also display differences in the mobility of stress, as suggested in previous research.

PROSODIC PHRASING OF BIMORAIC ACCENTED PARTICLES IN SPONTANEOUS JAPANESE

Kikuo Maekawa & Yosuke Igarashi

National Institute for Japanese Language

ID 1433; Poster No. 25

[full paper]

Lexical pitch accents in bimoraic particles of Tokyo Japanese are believed to be deleted when the particles are combined with accented words. Analysis of the Corpus of Spontaneous Japanese revealed, however, there are many cases where particles retain their accent, thereby forming an accentual phrase of their own. Factors that favor accent preservation include semantic properties of particles, inter-accent distance, boundary pitch movements, and, formality of speech. Particles having emphatic and/or limitative meanings, like /sa'e/, /ko'so/ and /no'mi/, are the most probable to retain their accents.

INVESTIGATING THE RELATIONSHIP BETWEEN HIGH, LOW AND LEVEL CONTOUR ENDINGS AND PUNCTUATION SYMBOLS IN DUTCH

Johanneke Caspers

Dept. of Dutch Studies / Leiden University Centre for Linguistics, Leiden University

ID 1456; Poster No. 27

[extra files] [full paper]

A distinction can be made between three different final boundary tone types in Dutch: high (H%), low (L%) and 'level' (%). As yet it is not completely clear what these tones signify to the listener; the present perception test aims to find out more about the interpretation of these tones. In a listening experiment declarative sen-

tences with different intonation contours were presented to native listeners, who had to indicate whether they thought the stimulus ended in a comma, a full stop or a question mark. Results are clear for L% tones (full stop) and for level tones (mainly commas, no question marks). Within the category of H% tones the higher ending rises lead to more question responses, while the lower ending rises prompt more comma responses.

PROSODIC BOUNDARY EFFECTS ON DURATIONS AND VOWEL HIATUS IN MODERN GREEK

Evia Kainada

University of Edinburgh

ID 1484; Poster No. 29

[full paper]

Research on the identification of the prosodic structure of languages has been based on phonetic processes, such as durational patterns and sandhi phenomena. One of the main assumptions is that such processes all signal, and are thus regulated by, the same structure. The experiment reported here tests the validity of this assumption by investigating whether prosodic boundary strength has the same effect on various segmental processes. The application of pre- and post-boundary duration and of vowel hiatus is investigated under different prosodic conditions in Modern Greek. Preliminary results suggest that there is a tendency for a similar effect of boundary strength on both processes, with vowel hiatus showing potentially a different application in one of the conditions.

MAP TASK DIALOGS IN NOISE - A PARADIGM FOR EXAMINING LOMBARD SPEECH

Hansjörg Mixdorff¹, Ulrich Pech¹, Chris Davis² & Jeesun Kim²

¹Department of Computer Sciences and Media, Berlin University of Applied Sciences; ²MARCS Auditory Laboratories, University of Western Sydney

ID 1533; Poster No. 31

[full paper]

This paper presents a paradigm for comparing auditory-visual map task dialogs produced in silence and in noise, also known as Lombard speech. A previously developed temporal filtering algorithm which removes the ambient noise from recordings of Lombard speech was modified to accommodate longer recordings. On a small production dataset of two levels of vehicle and babble noise we examined the effect on fundamental frequency and intensity contours. We found that Lombard characteristics of speech, that is, an increase in mean F0 as well as intensity, are stronger for babble than for vehicle noise. There are indications that talkers become habituated to the noisy environment during a dialog. Participants appeared to solve the task more leisurely in silence than in noise. By performing eye-tracking on one of the talkers' data we found that the frequency of gaze was more than double in babble noise than in silence.

SINGLE H AND DOUBLY-LINKED H IN SOUTH KYUNGSANG KOREAN

Seung-Eun Chang

University of Texas at Austin

ID 1512; Poster No. 33

[full paper]

This experiment examines the distinction between single H and doubly-linked H of monomorphemic words (HL, HH) and bimorphemic words (H+L, H+H) in South Kyungsang Korean. The results showed that F0 fall comes later in double H than in single H, and thus peak plateau is longer in double H than in single H. However, F0 timing difference was also found within double H, depending on the morpheme type, i.e., the peak plateau is longer in monomorphemic HH than in bimorphemic H+H. This suggests that the morphological structure may influence the phonetic realization such as F0 timing. In addition, this instrumental data do not confirm the H tone spreading analysis in suffixed words, not as suggested in earlier transcription based studies.

PROSODIC PHRASING IN TONAL AND NON-TONAL DIALECTS OF KAMMU

Anastasia Mukhanova Karlsson¹, David House², Jan-Olof Svantesson¹ & Damrong Tayanin¹

¹Lund University; ²Kungliga Tekniska Högskolan

ID 1537; Poster No. 35

[full paper]

Kammu is a language that has developed lexical tones rather recently. One dialect is a tone language with (high or low) tone on each syllable, while the other main dialect lacks lexical tones. The dialects differ only marginally in other respects. This allows us to investigate how the existence of lexical tones in a given language influences the use of intonation. We performed a study of tonal means of phrasing in tonal vs. non-tonal dialects. We did find differences in boundary signaling. In both types of dialects the differentiation between marked and unmarked boundaries is relevant. At marked phrase boundaries we find signaling of focus and of some expressive meanings. The difference between the dialects is in the functional load of the intonational gestures. In the tone dialects pragmatically marked boundaries are assigned high pitch, while in non-tonal dialect the falling tone has a high pragmatic load.

MODELING VOWEL NORMALIZATION AND SOUND PERCEPTION AS SEQUENTIAL PROCESSES

Paola Escudero & Ricardo Augusto Hoffmann Bion

University of Amsterdam

ID 1313; Poster No. 37

[full paper]

This study constitutes the first attempt at combining vowel normalization procedures with the linguistic perception framework of Stochastic Optimality Theory [1] and the Gradual Learning Algorithm [2]. Virtual learners possessing different normalization procedures, and a control learner with no normalization, were trained to perceive Brazilian Portuguese and American English vowels. Our results show that learners equipped with normalization algorithms outperformed the control

learners, obtaining accuracy scores up to 46% higher. Thus, this model in which normalization and sound perception are implemented as two sequential processes delivers the expected results. That is, it improves the performance of a perception grammar when the training and testing sets have speakers with different ages and gender.

DIRECTIONALITY OF TONE CHANGE

Pittayawat Pittayaporn

Department of Linguistics, Cornell University

ID 1516; Poster No. 39

[full paper]

In this paper, I present a theory of tonal change focusing on the directionality of tone change. Drawing on studies on phonetic variation of tones, I propose three main mechanisms that govern the directions in which tones change: 1) segment-tone interaction, 2) contextual variation, and 4) perceptual maximization. The predictions made by a model that includes these mechanisms are borne out by the tonal development of Bangkok Thai.

IMPACT OF DURATION AND VOWEL INVENTORY SIZE ON FORMANT VALUES OF ORAL VOWELS: AN AUTOMATED FORMANT ANALYSIS FROM EIGHT LANGUAGES

Cédric Gendrot¹ & Martine Adda-Decker²

¹L.P.P.; ²L.I.M.S.I.

ID 1481; Poster No. 41

[extra files] [full paper]

Eight languages (Arabic, English, French, German, Italian, Mandarin Chinese, Portuguese, Spanish) with 6 differently sized vowel inventories were analysed in terms of vowel formants. A tendency to phonetic reduction for vowels of short duration clearly emerges for all languages. The data did not provide evidence for an effect of inventory size on the global acoustic space and only the acoustic stability of quantal vowel /i/ is greater than other vowels' in many cases.

A CROSS-DIALECT COMPARISON OF PENINSULA- AND PERUVIAN-SPANISH VOWELS

Geoffrey Stewart Morrison¹ & Paola Escudero²

¹Department of Cognitive & Neural Systems, Boston University; ²Institute of Phonetic Sciences, University of Amsterdam

ID 1006; Poster No. 43

[full paper]

A comparison was made of the acoustic properties of Spanish vowels produced by monolingual Spanish speakers from Spain and Peru. Monophthongs were produced in sentence final position. Peninsula speakers' vowels were shorter, had lower fundamental frequency, and were more likely to be produced with creaky voice. A multivariate test on the whole vowel system did not find a significant cross-dialect difference in formant values. Implications for second-language speech perception and production research are discussed.

INVESTIGATING BRITISH ASIAN ACCENTS: STUDIES FROM GLASGOW

Kirsten Lambert¹, Farhana Alam² & Jane Stuart-Smith³

¹Speech and Hearing Sciences, Queen Margaret University; ²Department of English Language, University of Glasgow; ³Department of English Language

ID 1312; Poster No. 45

[full paper]

Despite the substantial Asian community in the UK, there has been very little phonetic work on British Asian accents. The complementary results from two small-scale studies of Glasgow Asian accent, confirm the identification of Glasgow Asian as an recognizable accent, identify accent features particular to Glasgow Asian and not found in Glaswegian more generally, and confirm their use – with specific social-indexical functions – in everyday speech.

THE EFFECT OF ACQUISITION ORDER AND WORD RELATEDNESS ON CODE-SWITCHING COSTS IN BALANCED BILINGUAL SPEAKERS

Yi-Hsuan Huang & Janice Fon

Graduate Institute of Linguistics, National Taiwan University

ID 1381; Poster No. 47

[full paper]

This paper aims to explore the effect of acquisition order and word-relatedness on code-switching costs in bilingual speakers. 38 Mandarin-Min bilinguals performed a picture-naming task, in which hand-drawn pictures were color-coded for the two languages, Mandarin and Min, and switching points were pre-determined but variable. Results showed that naming latencies of cognates were in general shorter than non-cognates, and Mandarin stimuli were also shorter than Min. Min non-cognates were especially difficult for subjects. Code-switched trials incurred longer latencies in subjects, but only in those who acquired both languages at the same time, contrary to what was predicted by the Inhibitory Control Model.

JAPANESE LEARNERS' ENGLISH INTONATION: DISCREPANCY BETWEEN INTONATION INTENDED AND INTONATION PERFORMED

Masaki Taniguchi & Yusuke Shibata

Kochi University

ID 1010; Poster No. 49

[extra files] [full paper]

This research attempts to clarify the difference between Japanese learners' intended tonicity and performed tonicity, i.e., between their knowledge and practice. The results were as follows: (1) The subjects tended to put a nucleus on the stressed syllable of the last word in each intonation phrase. They typically used high level pitch to highlight the word that they thought they had to put a nucleus on. (2) Their intended tonicity was strikingly better than their performed tonicity. (3) There was greater discrepancy between intended tonicity and performed tonicity when they had to find correct tonicity on their own than when they were provided with it. (4) We need to consider two kinds of errors: (a) error in intended tonicity (error in knowledge) and (b) error

in performed tonicity (error in putting knowledge into practice). (5) Teaching tonicity requires providing with knowledge plus exercise to put knowledge into practice.

SWEDISH ACCENT – DURATION OF POST-VOCALIC CONSONANTS IN NATIVE SWEDES SPEAKING ENGLISH AND GERMAN

Bo Thorén

Dept of Linguistics, Stockholm University

ID 1167; Poster No. 51

[full paper]

In order to test the persistency of the Swedish complementary durational pattern of VC-sequences in stressed syllables, a number of native Swedish speakers were recorded when pronouncing words in English and German. The words were of a kind that were expected to be perceived by Swedes as having "short vowel". Swedish speakers pronounced the test words with significantly longer post-vocalic stop consonant /k/ and /t/, than did native English and German speakers, but not when the test word contained a post-vocalic nasal /m/. This asymmetry was not found when native Swedish speakers pronounced Swedish words with the same segments in the VC-sequence. Keywords: foreign accent, temporal patterns, complementary consonant duration.

EFFECTS OF PHONETIC SIMILARITY AND L2 EXPERIENCE: PRODUCTION OF ENGLISH /s-sh/ BY ADULT KOREAN ESL LEARNERS

Sang Yee Cheon

University of Hawaii at Manoa

ID 1274; Poster No. 53

[full paper]

This study examined the effects of phonetic similarity between L1 and L2 sounds and L2 experience on the production improvement of L2 English /s/ and /ʃ/ by adult Korean ESL learners. Two production judgment methods were employed. The result shows that a dissimilar L2 sound /s-sh/ was better produced than a similar L2 sound /s/ in terms of listener judgment. Adult L2 learners did not produce similar L2 sounds accurately, even with extensive L2 experience. However, in terms of acoustic-based judgment, ESL learners produced L2 sounds accurately regardless of proficiency level, resulting in a disparity in production performance between two production judgment methods. In assessing the production ability of L2 learners, more than one phonetic-based judgment in addition to listener judgment need to be taken into consideration.

COMPARISON OF PITCH RANGE IN FINNISH (L1) AND RUSSIAN (L2)

Riikka Ullakonaja

University of Jyväskylä

ID 1498; Poster No. 55

[full paper]

The aim of the present study is to investigate, whether the pitch range of a speaker can vary according to the language he speaks. The hypothesis is tested on Finnish university students studying Russian as a second language before and after their stay in Russia. The global pitch range (max – min) is determined as well as

the pitch range in different types of utterances (declarative, question, exclamation) also by superimposing pitch contours. It was discovered that the L2 learners have a narrower pitch range in L1 and L2 and less variable pitch. However, the results suggest that L2 experience seems to help most students to produce more native like pitch range, especially in questions.

ANALYSIS AND SYNTHESIS OF SPEAKER AGE

Susanne Schötz

Linguistics and Phonetics, Centre for Languages and Literature, Lund University

ID 1162; Poster No. 57

[full paper]

Speaker age is an important speaker-specific quality, which was investigated in the two studies presented here. The first study automatically extracted 161 acoustic features from six words produced by 527 speakers, and used normalised mean values to compare the features. Segment duration and sound pressure level (SPL) range were identified as two important acoustic correlates of age. The second study developed a research tool for analysis of speaker age by data-driven formant synthesis and age-weighted linear interpolation to simulate an age between the ages of any two of four female differently-aged reference speakers. Evaluation of the tool revealed that speaker age may in fact be simulated using formant synthesis. Both studies will be used in further attempts to model and simulate speaker age.

INTERSEGMENTAL COHESION AND SYLLABLE DIVISION IN POLISH

Pier Marco Bertinetto¹, Sylwia Scheuer², Katarzyna Dziubalska-Kolaczyk² & Maddalena Agonigi¹

¹Scuola Normale Superiore, Pisa; ²Adam Mickiewicz University, Poznań

ID 1494; Poster No. 59

[full paper]

An experiment with Polish participants was devised in order to shed light on 'intersegmental cohesion hierarchy', with special regard to CC sequences. This hierarchy regulates the strength of the segments' mutual attraction, obeying both universal and language-specific tendencies. The results show that Polish speakers, as contrasted to Italian ones, exhibit a finer cohesion scale due to the richer phonotactics to which they are attuned. In the approach advocated by the authors, syllabic structure is assumed to epiphenomenically emerge from the given hierarchy.

AUTISM AND LEXICAL CONTEXT EFFECTS ON SPEECH PERCEPTION

Mitsuhiko Ota¹ & Mary Stewart²

¹University of Edinburgh; ²Heriot-Watt University

ID 1427; Poster No. 61

[full paper]

The view that weak central coherence in processing causes autism implies that autistic individuals should exhibit attenuated lexical context effects on speech perception. To test this hypothesis, we examined the degree to which phonetic categorization shifts to make the percept a known word (i.e., the 'Ganong effect') in a

neurotypical population with varying degrees of autistic traits. Fifty-eight university students were given the Autism-Spectrum Quotient (AQ) and a segment identification test using two word-to-nonword VOT continua (kiss-giss and gift-kift). A significant negative correlation was found between the total AQ score and the identification shift that occurred between the continua. The AQ score did not correlate with scores on separately administered VOT discrimination, auditory lexical decision, or verbal IQ, ruling out enhanced auditory sensitivity, slower lexical access or higher intelligence as explanations of the AQ-related shift in phonetic categorization.

EFFECTS OF LOUDNESS AND COMPLEX SPEECH ON SPATIAL AND TEMPORAL PRECISION IN PARKINSON'S DISEASE

Mariam Hartinger¹, William Hardcastle¹ & Fiona Gardiner²

¹Queen Margaret University, Edinburgh; ²NHS Highlands

ID 1491; Poster No. 63

[full paper]

The paper presents preliminary results of a speech motor control study in hypokinetic dysarthria in Parkinson's disease (PD). By means of EPG, the tongue contacts of two speakers with PD and two control speakers during the production of target words containing the initial and final stops /t/ were analysed in normal and loud condition as well as in complex sentences. The preliminary results showed no effects of increasing loudness on duration and on the number of tongue contacts in speakers with PD. Furthermore, frication of the stop /p/ to [f] was found for one speaker in the acoustic analysis.

SONORANT SEGMENT QUALITY IN RUSSIAN EMOTIONAL SPEECH

Veronika Makarova¹ & Valery Petrushin²

¹University of Saskatchewan; ²4i Consulting Group, Inc

ID 1316; Poster No. 65

[full paper]

The paper reports characteristics of sonorant segments (vowels and sonorant consonants) in Russian emotional speech. The authors describe the effects of segmental duration, energy, formants and dynamic ranges on the expression of emotion in Russian. The data come from RUSLANA, a database containing samples of neutral utterances and utterances with simulated emotions of surprise, happiness, anger, sadness and fear.

CROSS-MODAL PERCEPTION OF EMOTIONAL SPEECH

Pashiera Barkhuysen, Emiel Krahmer & Marc Swerts

University of Tilburg

ID 1482; Poster No. 67

[full paper]

We report on a perception experiment in which Czech participants rate the perceived emotional state of Dutch speakers. These speakers could either display a positive or a negative emotion, which was either real or acted. The Czech participants were confronted with these utterances, which they could not understand, in

a bimodal (audiovisual) or a unimodal (audio or vision only) condition. It was found that acted emotional speech leads to significantly more extreme perceived emotion scores than non-acted emotional speech, where the difference between acted and real emotional speech is stronger for the negative than for the positive conditions. Interestingly, the biggest overall differences between acted and non-acted emotions were found for the audio-only condition, which suggests that acting has a particularly strong effect on the spoken realization of emotions.

CHARACTERIZING NON-NATIVE FRENCH ACCENTS USING AUTOMATIC ALIGNMENT

Bianca Vieru-Dimulescu, Philippe Boula de Mareüil & Martine Adda-Decker

LIMSI-CNRS

ID 1242; Poster No. 69

[full paper]

The goal of this study is to investigate the most relevant cues that differentiate foreign accents in French (Arabic, English, German, Italian, Spanish and Portuguese). We took advantage of automatic alignment into phonemes of non-native French recordings. Starting from standard acoustic models, we introduced pronunciation variants which were reminiscent of foreign-accented speech: first allowing alternations between French phonemes (e.g. [s]~[z]), then combining them with foreign acoustic units (e.g. a rolled r). Results reveal discriminating accent-specific pronunciations which, to a large extent, confirm both linguistic predictions and human listeners' judgments.

Thursday, 13:20**Prosody VIII: Quantity and Duration**

Thursday, 13:20, Room: 1 (Red)

Chair: Hansjörg Mixdorff

THE TONAL COMPONENT IN PERCEPTION OF THE ESTONIAN QUANTITY*Pärtel Lippus¹, Karl Pajusalu¹ & Jüri Allik²*¹Department of Estonian and Finno-Ugric Linguistics, University of Tartu; ²Department of Psychology, University of Tartu

ID 1029

[full paper]

This paper studies the role of the pitch cue for perceiving the Estonian quantities. In addition to the importance of the tonal component we investigate the differences in native vs. learned discrimination of the quantities. Perception tests were carried out with manipulated natural speech stimuli on a group of Estonian native speakers and a group of non-native Estonian speakers. The test results show that for Estonian listeners F0 is a vital cue to the perception of Q3. This indicates that the Estonian quantity system is a binary distinction on two levels, where the distinction between short and long is perceived on the basis of durational ratios, but for the distinction of long and overlong, the pitch cue is needed. The results of the non-native group show that they have learned to focus on the duration of the stressed syllable whereas F0 does not affect their perception of quantities.

QUANTITY DISTINCTION IN THE HUNGARIAN VOWEL SYSTEM – JUST THEORY OR ALSO REALITY?*Katalin Mády & Uwe D. Reichel*

Institute of Phonetics and Speech Processing, LMU Munich

ID 1524

[extra files] [full paper]

Hungarian vowel system involves 14 vowels that correspond to seven vowel pairs each differentiated by quantity. However, there are phenomena that suggest that for low, middle and high vowels a separate evaluation of the quantity opposition is necessary. In order to test this, we conducted a perception test, in which vowels were to be identified by native listeners. Outcomes: Low vowels, for which short and long realisations differ in quality, i.e. in openness, were seldom identified incorrectly. For high vowels, duration was not obviously regarded as a crucial cue for identification by the subjects, while they were not clearly differentiated by the speaker. Middle vowels showed a mixed behaviour. The fact that vowel quantity distinction in Hungarian is only maintained where there is a perceivable quality difference shows that the role of quantity is not as dominant as it has been regarded for long.

VOWEL DURATION, COMPRESSION AND LENGTHENING IN STRESSED SYLLABLES IN ITALIAN*John Hajek, Mary Stevens & Georgia Webster*

School of Languages and Linguistics, University of Melbourne

ID 1685

[full paper]

The focus of this study is on temporal organization, specifically of vowel duration, in stressed syllables in (standard) Italian. We investigate possible compression effects on the duration of stressed vowels according to wordposition (final, penult and antepenult) and syllable type (open vs. closed) in this language. Our results show predicted shortening in some contexts, e.g. closed syllables, and antepenultimate position, but not in all tested contexts. Compression effects do not surface in a fully linear fashion, with complications arising in word-final position where competing tendencies towards lengthening and shortening are found to co-occur.

Foreign Language Acquisition III: Miscellaneous

Thursday, 13:20, Room: 2 (Orange)

Chair: Jane Setter

A REPORT ON OUR SUMMER INTENSIVE PROGRAM IN DEVELOPING ENGLISH COMMUNICATIVE SKILLS*Yuichi Todaka*

Miyazaki Municipal University

ID 1174

[full paper]

English Phonetics Seminar members at Miyazaki Municipal University in Japan have been conducting a summer intensive program each year since the year 2000. Various activities to improve the members' English listening, pronunciation, and reading skills have been adopted from various sources, and we have been making modifications to our program each year. This report makes some practical suggestions to improving Japanese EFL learners' English skills based on our 7-year experience.

PRODUCTION AND PERCEPTION OF ENGLISH /i:/-/ɪ/ AND /æ:/-/ʌ/ IN A FORMAL SETTING: INVESTIGATING THE EFFECTS OF EXPERIENCE AND STARTING AGE*Joan C. Mora & Natalia Fullana*

Universitat de Barcelona

ID 1594

[full paper]

This study looked at the perception and production of English /i:/-/ɪ/ and /æ:/-/ʌ/ by Catalan/Spanish learners of English varying in starting age of FL learning and experience in the FL in a formal learning context. Results showed that neither starting age nor experience had a significant effect on how accurately participants perceived and produced the two vowel contrasts, although

a late starting age advantage was observed as suggested by previous research conducted in formal instruction settings.

ENGLISH SOUNDS IN GERMAN: LISTENERS' CHOICES

Julia Abresch

Institute of Communication Sciences, University of Bonn

ID 1621

[full paper]

To figure out, whether native German speakers tend to prefer English xenophones or their nativised German counterparts in the pronunciation of Anglicisms and English proper names, a preference test was carried out. Listeners had to rank the different varieties in a web-based test. The results show clearly that two groups of sounds can be made out: sounds which listeners like to hear in their original English pronunciation and those which are expected to be substituted by native equivalents.

main initial /k/ clusters in German by means of Electropalatography (EPG). Recordings of 7 subjects were analyzed using temporal and spatial parameters derived from the EPG data. Temporal and spatial parameters show that boundary effects are stronger for the first consonant while in the temporal domain stress affects the second consonant rather than the first. Overlap was found to be greater in unstressed position and at lower prosodic boundaries. Furthermore, /k/ appears to be more susceptible to stress effects when not preceded by a boundary.

PROSODIC CONDITIONING OF PHONETIC DETAIL OF GERMAN PLOSIVES

Claudia Kuzla¹ & Mirjam Ernestus²

¹Max Planck Institute for Psycholinguistics, Nijmegen;

²Radboud University Nijmegen and Max Planck Institute for Psycholinguistics, Nijmegen

ID 1428

[full paper]

Prosodic structure influences the fine-grained phonetic detail of German plosives. Phonetic characteristics that also cue the phonological fortis-lenis contrast are affected in different ways. Closure durations were longer at higher prosodic boundaries. There was also more glottal vibration in lenis plosives at smaller prosodic boundaries, which can be explained as an aerodynamic consequence of shorter closure duration. Voice onset time in lenis plosives was not affected by prosody. In contrast, VOT decreased at higher boundaries for fortis plosives, as did the maximal intensity of the release. These results demonstrate that effects of prosody on different phonetic cues can go into opposite directions, but are overall constrained by the need to maintain phonological contrasts. While prosodic effects on some cues are compatible with a 'fortition' account of prosodic strengthening or with a general feature enhancement explanation, the effects on others enhance paradigmatic contrasts only within a given prosodic position.

Production VIII: Prosodic Factors of Consonants

Thursday, 13:20, Room: 3 (Yellow)

Chair: Michael Jessen

AN ARTICULATORY MODELING OF ROMANIAN DIPHTHONG ALTERNATIONS

Stefania Marin

Yale University

ID 1285

[full paper]

This paper presents an articulatory modeling of the alternation between Romanian diphthong [ea] and unstressed vowel [e], starting from the hypothesis that the representation of Romanian diphthongs is that of two vowels synchronously coordinated. Stimuli are created to examine the effect of this synchronous coordination in the absence of stress, and two perceptual experiments show that synchronously coordinated vowels [e] and [a] result in the percept of an [e]-like blended vowel – the same outcome as reported in Romanian phonological alternations.

Prosody IX: Discourse

Thursday, 13:20, Room: 4 (Green)

Chair: Richard Ogden

ARTICULATORY STRENGTHENING IN INITIAL GERMAN /k/ CLUSTERS UNDER PROSODIC VARIATION

Lasse Bombien¹, Christine Mooshammer², Phil Hoole¹, Tamara Rathcke¹ & Barbara Kühnert³

¹Institut für Phonetik & Sprachverarbeitung München;

²Institut für Phonetik & digitale Sprachverarbeitung Kiel;

³Institut du Monde Anglophone & Laboratoire de Phonétique et Phonologie, UMR 7018, CNRS/Sorbonne-Nouvelle

ID 1106

[full paper]

This study investigates the effects of varying prosodic boundary strength and lexical stress on do-

ON PITCH AND PERCEPTUAL PROMINENCE IN CONVERSATIONAL FINNISH SPEECH

Mietta Lennes

Department of Speech Sciences, University of Helsinki

ID 1575

[full paper]

In this preliminary study, the relationship between pitch patterns and perceived prominence of word-initial syllables are investigated in conversational Finnish for one female and one male speaker. Possibilities for comparing pitch distributions for different speakers are also addressed. Prominent syllables were marked for two speakers, and the pitch levels and pitch changes were analyzed around these syllables. It was found that the

level of pitch at prominent syllables tends to be slightly higher than the pitch level in non-prominent syllables. Prominent syllables are also more often associated with a pitch rise with respect to the preceding syllable. However, the most significant correlation was found between perceptual prominence and decrease in pitch from the prominent (word-initial) syllable towards the next syllable. Thus, both the pitch level and the pitch movement around perceptually prominent syllables may represent cues for prominence in conversational Finnish.

THE PROSODY OF BACKCHANNELS IN AMERICAN ENGLISH

Stefan Benus¹, Agustin Gravano² & Julia Hirschberg²

¹Brown University; ²Columbia University

ID 1276

[full paper]

We examine prosodic and contextual factors characterizing the backchannel function of single affirmative words. Data is drawn from collaborative task-oriented dialogues between speakers of Standard American English. Despite high lexical variability, backchannels are prosodically well defined: they have higher pitch and intensity and greater pitch slope than affirmative words expressing other pragmatic functions. Additionally, we identify phrase-final rising pitch as a salient trigger for backchanneling.

CLICKS AS MARKERS OF NEW SEQUENCES IN ENGLISH CONVERSATION

Melissa Wright

University of Central England

ID 1155

[extra files] [full paper]

This paper analyses the use of clicks in naturally-occurring English conversation. It demonstrates that regardless of any paralinguistic functions that clicks may undertake, their occurrence is orderly and systematic, and intimately tied to the interactional structure of talk. Specifically, clicks are shown to function alongside various phonetic parameters, such as pitch, glottalisation and loudness (and the sequential and lexical organisation of talk), to demarcate the onset of new and disjunctive sequences. These findings challenge the traditional view that clicks function only paralinguistically in English. They also highlight the fruitfulness of implementing context-bound phonetic investigations alongside interactional analyses.

Voice Quality II

Thursday, 13:20, Room: 5 (Blue)

Chair: Janet Slifka

THE LARYNGEAL ARTICULATOR: SOURCE AND RESONATOR

Jerald Edmondson¹, Mamalinani Cécile Padayodi¹, Zeki Majeed Hassan² & John H. Esling³

¹University of Texas at Arlington; ²University of Göteborg; ³University of Victoria

ID 1674

[extra files] [full paper]

The laryngeal articulator, consisting of the glottal mechanism, the supraglottic tube, the pharyngeal/epiglottal mechanism, and including three levels of folds: the vocal folds, the ventricular folds, and the aryepiglottic folds, is shown to be responsible for the generation of multiple source vibrations and for the complex modification of the pharyngeal resonating chamber that accounts for a wide range of contrastive auditory qualities. Laryngoscopic evidence drawn from Tibeto-Burman, Semitic, Cushitic, Kwa, and Gur languages demonstrates the distinctive use of the laryngeal articulator in pharyngeal trilling combined with glottal voicing, voiceless pharyngeal trilling, and epilaryngeal tube shaping to create opposing vocal register series. One such series is the [ATR/-ATR] contrast.

VOICE QUALITY AND CONSONANTAL WEAKENING: A CASE OF CORRELATION IN SCOUSE?

Massimiliano Barbera & Marlen Barth

Dpt of Linguistics University of Pisa

ID 1347

[full paper]

Liverpool English, also known as Scouse, presents peculiar characteristics on the segmental as well as on the paralinguistic level, probably linked with the Irish immigration (see [3], [6]). Maybe the most important feature is the lenition of obstruents to affricates or fricatives as a result of a lax voice context. The widespread velarization of all consonantal segments in Scouse seems to interact with the phonatory setting, causing a vocal type defined as adenoidal. Our analysis, based on a corpus of spontaneous speech produced by six native speakers, aims at an acoustic evaluation of the voice quality of Scouse through the use of parameters which allow us to classify the phonation types according to the labels used by Laver [5]. There seems to be a gender differentiation in relation with the frequency of lenition as far as the vocal characterization of the speakers is concerned.

INFANTS' PHONETIC ACQUISITION OF VOICE QUALITY PARAMETERS IN THE FIRST YEAR OF LIFE

Allison Benner, Isabelle Grenon & John H. Esling

University of Victoria

ID 1270

[full paper]

Little is known about cross-linguistic differences in infants' production and acquisition of voice quality parameters. In our study of Canadian English, Moroccan Arabic, and Chinese Bai infants, we found that for all infants, laryngeally constricted phonatory settings (harsh voice, creaky voice, whispery voice, and whisper) predominate in the first months of life and decline throughout the first year in favour of unconstricted settings (modal voice, breathy voice, and falsetto). To better understand the distribution of voice quality parameters in the infants' utterances, we analyzed the phonatory settings employed in babbling. We found that the babbling of Arabic infants was more likely to feature laryngeal constriction than the babbling of English infants. Bai babbling showed the least stable incidence of laryngeal constriction, possibly reflecting the more complex use of this feature in the infants' ambient language.

(2AFC). For one group the VOT values that they heard came from distributions with wide variance (wide group) around the category prototype and for the other group they came from distributions with narrow variance (narrow group). The slope of the labeling response curve was shallower for the wide group indicating greater perceptual uncertainty. This suggests that listeners are sensitive to the reliability of an acoustic cue when making category judgments and can rapidly adjust cue-weights in response to cue-reliability.

THE EFFECT OF AGE ON ACOUSTIC CUE WEIGHTING IN THE PERCEPTION OF INITIAL STOP VOICING CONTRAST IN HEBREW

Riki Taitelbaum-Swead¹, Minka Hildesheimer¹ & Liat Kishon-Rabin²

¹Department of Communication Disorders, Sackler Faculty of Medicine, Tel-Aviv University, ISRAEL;

²Department of Communication Disorders, Sackler Faculty of Medicine, Tel-Aviv University

ID 1440

[full paper]

Listeners use several acoustic cues with different relative weighting, for perceiving a phonetic contrast. The weighting depends on variables such as age and language. The purpose of this study was to examine the relative weighting of some acoustic cues to the perception of initial voicing of plosives in different age groups. Three groups of children and one group of adults, Hebrew speakers were evaluated. The relative weighting of three cues were tested: Voice Onset Time (VOT), initial burst, and the transitions to the following vowel. A similar hierarchy of cues was found in all groups, with VOT the primary one, although not in the same weighting. Adults give more weight to transitions and burst compared to children. These findings indicate the ability of the auditory system to focus on the important cues already at young age. However, there appears to be a continued shift in the weighting during development.

Perception V: Cue Use

Thursday, 13:20, Room: 6 (Black)

Chair: Asher Laufer

CLARIFYING THE SPEECH PERCEPTION DEFICIT IN DYSLEXIC CHILDREN

Souhila Messaoud-Galusi, Valerie Hazan & Stuart Rosen

University College London - Department of Phonetics and Linguistics

ID 1457

[full paper]

It has often been claimed that dyslexic children show deficits in various speech-perceptual tasks. In this study, dyslexic and chronological-age-matched control children were asked to identify words, and label monosyllables from a voiced/voiceless plosive continuum, in quiet and in noise. Correlations on these tasks with reading and reading-related skills were weak and about half of dyslexic children had categorization slopes within the normal range in quiet. Both reading groups performed similarly well for labeling in noise and when identifying words in noise. The identification of words in noise was found to be related neither to reading nor to the consistency of categorical labeling. This study confirms that only a subgroup of children with dyslexia appears to have speech-perceptual deficits.

WITHIN CATEGORY PHONETIC VARIABILITY AFFECTS PERCEPTUAL UNCERTAINTY

Meghan Clayards, Richard N. Aslin, Michael K. Tanenhaus & Robert Jacobs

University of Rochester

ID 1590

[full paper]

We explored a mechanism for adjustments in the perceptual weighting of multiple probabilistic cues in speech. Subjects heard words that varied along a voice onset time (VOT) continuum (eg. "beach" to "peach") while performing a two alternative forced choice task

Thursday, 14:20

Poster VI

Thursday, 14:20

Chairs: Caroline Smith, Frank Kügler

THE ARTICULATORY AND ACOUSTIC STUDY OF FRICATIVE VOWELS IN SUZHOU CHINESE*Feng Ling*

Department of Chinese, Translation and Linguistics, City University of Hong Kong

ID 1321; Poster No. 2

[full paper]

The fricative vowels in Suzhou Chinese are investigated in this study. The acoustic results show that the fricative vowel has more noise and a lower F2 than its pure vowel counterpart. The F1 and F2 relations with the vowel height and backness of common vowels are not appropriate for the fricative vowels. The lower F2 of fricative vowel is due to the vowel constriction located in a more anterior position than the pure close vowel.

SPEAKER CONSISTENCY OF COARTICULATORY GESTURES IN CLUSTERS OF LABIAL AND VELAR PLOSIVES*Jacques Koreman & Aleksander Morland*

NTNU, Dept. of Language and Communication Studies

ID 1377; Poster No. 4

[full paper]

This article describes the changes in oral pressure during [pk] and [kp] sequences in asymmetrical [i:,u:] vowel contexts as well as in symmetrical [i:,u:,a:] contexts. Observed patterns are in part similar to those described in the literature. Although there are speakers who consistently use certain patterns in a given context, the patterns can also vary both within and across speakers.

ARTICULATORY FEATURES INFLUENCING REGRESSIVE PLACE ASSIMILATION IN GERMAN*Marion Jaeger & Phil Hoole*

Institut für Phonetik und Sprachverarbeitung

ID 1472; Poster No. 6

[full paper]

Within current phonological theories the typological patterns of regressive place assimilation are treated as the consequence of interactions among constraints that have acoustic-perceptual teleologies. Little is known, however, about the articulatory patterns underlying the typology of regressive place assimilation. Our current EMA study aims to investigate these patterns. Specifically, the timing and magnitude of tongue tip, lower lip, and tongue back movements of C1C2 productions across word boundaries in German will be studied. The following factors were controlled: manner of articulation of C1, and place of articulation of C2, and lexical factors. The results provide evidence for a greater reduction of tongue tip movements in function as compared to content words. Reduction of tongue tip movements was particularly likely in function words with /n#k/ clusters.

In addition, this word pair had a high co-occurrence frequency. With regard to C1C2 overlap results were mixed and warrants further investigations.

A STUDY OF MUSCULAR SYNERGIES AT THE GLOTTAL, VENTRICULAR AND ARYEPIGLOTTIC LEVELS*John H. Esling¹, Chakir Zeroual² & Lise Crevier-Buchman³*¹University of Victoria; ²Université Sidi Mohamed Ben Abdellah, Taza-Morocco; ³Université Paris III, Sorbonne-Nouvelle/CNRS-UMR7018

ID 1571; Poster No. 8

[full paper]

Glottal and epiglottal (pharyngeal) articulations, including sounds native to Arabic and canonical profiles, are examined to determine the levels of laryngeal stricture and muscular synergy involved in their production. An array of laryngeal manners of articulation is tested using video and high-speed laryngoscopic filming to identify active glottal, ventricular, and aryeepiglottic processes. The focus is on the ventricular level of laryngeal control, which has not been adequately described in the literature. Glottal stop is shown to depend on the ventricular level; the LCA, LTA, AE, TE, and VEN muscles are implicated in ventricular and aryeepiglottic adjustments; and the vibratory patterns of aryeepiglottic trilling are described.

MODELING THE PERCEPTUAL MAGNET EFFECT AND CATEGORICAL PERCEPTION USING SELF-ORGANIZING NEURAL NETWORKS*Bernd J. Kröger¹, Peter Birkholz², Jim Kannampuzha³ & Christiane Neuschaefer-Rube³*¹Department of Phoniatrics, Pedaudiology, and Communication Disorders, UKAachen and Aachen University; ²Department of Computer Science, University Rostock; ³Department of Phoniatrics, Pedaudiology, and Communication Disorders, UKAachen and Aachen University

ID 1013; Poster No. 10

[full paper]

Purpose: A neural model of speech production based on self-organizing neural networks is introduced. The model is capable of describing speech acquisition stages as well as speech perception effects. Method: 20 instances of the neural model were trained imitating early stages of speech acquisition (babbling and imitation) in order to create 20 different virtual toddlers. Perceptual experiments were performed using these virtual listeners. Results: Typical effects of speech perception occur by performing identification experiments on vocalic and consonantal acoustic stimulus continua. Consonantal categorical perception directly occurs during babbling while the perceptual magnet effect occurs later on during language specific imitation training. Conclusion: This neural model of speech production using self-organizing neural networks is capable (a) of illustrating the close relationship between production and perception of speech and (b) of elucidating the formation of speech perception effects during speech acquisition.

VOWEL IDENTIFICATION IN BALANCED BILINGUALS

Heidi Lehtola, Henna Tamminen, Maija S. Peltola & Olli Aaltonen

Department of Phonetics, University of Turku, Finland;
Centre for Cognitive Neuroscience, University of
Turku, Finland

ID 1386; Poster No. 12

[extra files] [full paper]

The native language affects non-native languages in such a way that the phoneme categories formed in infancy impede the perception of sound contrasts within the native language categories. Balanced bilinguals form in this respect an interesting group: do the two languages affect each other on the perceptual level, or can the two systems be kept apart in a behavioral attention-demanding task? In order to study the vowel perception of balanced bilinguals, a behavioral identification task was performed. In the light of the obtained results, it seems that bilinguals are behaviorally able to keep the two languages apart, and consciously choose to use one or the other in an attention-demanding identification task. Keywords: Bilingualism, vowel perception, identification, context language.

ENGLISH CLUSTER PERCEPTION BY TAIWANESE MANDARIN SPEAKERS

Yueh-chin Chang¹, Jiaqing Hong¹ & Pierre André Hallé²

¹National Tsing Hua University, Institute of Linguistics, Hsinchu, Taiwan; ²Laboratoire de Psychologie Expérimentale, CNRS-Paris V

ID 1459; Poster No. 14

[full paper]

Mandarin syllable structure does not allow consonant clusters. In this study, we investigated the perception of English initial consonant clusters by native speakers of Taiwanese Mandarin (TM). The results show that the factors which affect the perception of non-native clusters are the phonemic inventory of the native language, coarticulation within the cluster, articulatory command in producing consonant clusters, and native-language phonotactic constraints. However, these constraints are not an important factor in the perception of non-native clusters by TM speakers.

QUESTION INTONATION IN NON-SCRIPTED DANISH DIALOGUES

Nina Grønnum & John Tøndering

Linguistics Laboratory, Dept. of Nordic Studies and Linguistics, University of Copenhagen

ID 1202; Poster No. 16

[full paper]

Global intonation contour slopes in read speech have been found to vary systematically according to utterance type. Statements have the steepest gradients, wh-question contours are slightly less steep, questions with word order inversion less steeply falling again, and so-called declarative questions have no gradient at all, i.e. their global contour is level. Furthermore, in all but the very shortest utterances onset and offset of the global intonation contour appear relatively constant in the fre-

quency range across varying utterance length. This paper is a first exploration into Danish question intonation in nonscripted speech.

A PRAAT PLUGIN FOR MOMEL AND INTSINT WITH IMPROVED ALGORITHMS FOR MODELLING AND CODING INTONATION.

Daniel Hirst

CNRS, Laboratoire Parole et Langage, Université de Provence

ID 1443; Poster No. 18

[full paper]

This paper presents a revised version of an implementation of the Momel and INTSINT algorithms for the automatic modelling and symbolic coding of intonation patterns. The algorithms are implemented as external functions (respectively a C program and a Perl script), which are seamlessly integrated into the Praat speech manipulation software by means of the recently proposed plugin facility for Praat. Pitch detection is carried out using a subroutine to calculate optimal values of maximum and minimum F0 automatically. The implementation of the Momel algorithm incorporates a greatly improved treatment of the modelling of pitch contours in the vicinity of onsets and offsets of voicing. The version of the INTSINT algorithm implemented is the two parameter robust version which has been described in recent publications.

SIMULATING INTONATIONAL VARIETIES OF SWEDISH

Gösta Bruce¹, Björn Granström² & Susanne Schötz¹

¹Dept of Linguistics and Phonetics, Centre for Languages and Literature, Lund University; ²Dept of Speech, Music and Hearing, KTH, Stockholm

ID 1477; Poster No. 20

[full paper]

This paper introduces a new research project Simulating Intonational Varieties of Swedish (SIMULEKT). The basic goal of the project is to produce more precise and thorough knowledge about some major intonational varieties of Swedish. In this research effort the Swedish prosody model plays a prominent role. A fundamental idea is to take advantage of speech synthesis in different forms. In our analysis and synthesis work we will focus on some major intonational types: South, Göta, Svea, Gotland, Dala, North, and Finland Swedish. The significance of our project work will be within basic research as well as in speech technology applications.

CZECH SPEECH RHYTHM AND THE RHYTHM CLASS HYPOTHESIS

Jana Dankovicova & Volker Dellwo

University College London, UK

ID 1538; Poster No. 22

[full paper]

While a number of languages have been classified as either syllable- or stress-timed, the case of Czech remains unclear. In this paper we make predictions about Czech rhythm on the basis of our analysis of syllable complexity in recorded samples of Czech. The results on syllable complexity show mixed features. This

is reflected in the classification of Czech rhythm using rhythm measures based on durational variability of consonantal and vocalic intervals.

PROSODIC RISE AND RISE-FALL CONTOURS AND MUSICAL RISING TWO-TONE PATTERNS

Ernst Dombrowski, Thuid Holzrichter, Niels Münz, Alexander Nowak & Monika Poschmann

Department of Psychology, Christian-Albrechts-University Kiel

ID 1557; Poster No. 24

[full paper]

A series of musical rising two-tone patterns comprising 13 intervals, from unison to octave, is compared with two German nuclear contours, rise and rise-fall, both on utterances with upbeat-downbeat structure. The two-tone patterns are viewed as potential musical representations of the prosodic contours. However, because of rhythmic constraints they can only cover part of the prosodic contour information. Two ABX tests were carried out to examine whether the loss of contour information in the two-tone patterns is compensated for with other musical features. Results show that large and dissonant intervals are more likely assigned to the rise contour. Moreover, the rise is judged closer to the risings fifth (a I-V progression) and the rise-fall closer to the rising fourth (a V-I progression). This means that the relation between speech melody and musical melody includes aspects that are usually treated as exclusively musical.

TIMING PATTERNS IN WELSH

Dafydd Gibbon¹ & Briony Williams²

¹Universität Bielefeld; ²University of Wales, Bangor

ID 1585; Poster No. 26

[full paper]

Studies of duration in Welsh have concentrated on specific environments, such as word-final, pre-final and pre-pre-final positions, in relation to the positions of linguistic stress and phonetic pitch accent. The present approach is broader, in that it looks at the temporal patterning of syllable and foot sequences. First, general global and local measures of isochrony and irregularity are applied (standard deviation; pairwise variability). Second, since isochrony is a necessary but not a sufficient correlate of rhythm, a new algorithm is introduced for characterising grouping properties. Third, syllable sequences are segmented into feet using alternative duration relations and examined for their relation to grammatical groups. It appears that Welsh duration patterns are neither syllable-timed nor foot-timed in the accepted sense, but have what may be called a "rallentando timing", in which sequences of increasing length mark grammatically relevant prosodic units.

TOWARDS AN INTEGRATED UNDERSTANDING OF SPEECH OVERLAPS IN CONVERSATION

Jiahong Yuan, Mark Liberman & Christopher Cieri

University of Pennsylvania

ID 1617; Poster No. 28

[full paper]

We investigate factors that affect speech overlaps in conversation, using large corpora of conversational telephone speech. We analyzed two types of speech overlaps: 1. One side takes over the turn before the other side finishes (Turn-taking type); 2. One side speaks in the middle of the other side's turn (Backchannel type). We found that Japanese conversations have more short Turn-taking type of overlap segments than the other languages. In general, females make more speech overlaps of both types than males, both males and females make more overlaps when talking to females than talking to males. People make less overlaps when talking with strangers than talking with familiars, and the frequency of speech overlaps is significantly affected by conversation topics. Finally, the two conversation sides are highly correlated on their frequencies of using Turn-taking type of overlaps but not Backchannel type.

PROCESSING OF DISFLUENCIES AS A FUNCTION OF ERROR TYPE AND AGE

Judit Bóna¹, Mária Gósy² & Alexandra Markó¹

¹Eötvös Loránd University; ²Research Institute for Linguistics, Hungarian Academy of Sciences

ID 1028; Poster No. 30

[full paper]

The effects that speakers' disfluencies have on the listener are rather complex. Speech perception is an incredibly fast process, given that while the mechanism interprets the incoming waveform as a series of linguistic segments and suprasegmentals, it is also continuously ready to receive and correct the incoming erroneous messages. The goal of the present experiment was to describe the correction process and determine its efficiency. Various types of disfluency were tested with nine-year-old children, young adults, and elders. The results show that the time span of the corrective process depends upon the type of disfluency, the context, and the listener's age. The higher operational level the production error involves the more time is required for correcting it and the corrections are poorer than at lower operational levels.

THE DEVELOPMENT OF AKANJE IN RUSSIAN: NEW DATA

Sergey Kniazev & Evgeny Shaulskiy

Moscow State Lomonosov University

ID 1211; Poster No. 32

[full paper]

Paper deals with the problem of the historical development of unstressed vowel systems in Russian. A phonetic explanation for the development of all existing types is suggested on the basis of a hypothesis that assumes the priority of the non-dissimilative type. A new, probably most archaic, type of unstressed vowel system in Russian is shown to provide another argument in favour of the suggested explanation.

VOWEL TYPOLOGY IN CHINESE*Eric Zee¹ & Wai-Sum Lee²*¹Phonetics Lab, Dept. of CTL, City University of Hong Kong; ²Phonetics Lab, Department of Chinese, Translation and Linguistics, City University of Hong Kong

ID 1549; Poster No. 34

[full paper]

This paper presents the phonemic vowel typology of the 89 areally and genetically balanced Chinese dialects. Eight types of phonemic vowel systems are identified. The number of the vowel phoneme in the vowel systems ranges from 4 to 11. The 7-vowel system is the optimum system, whereas the 4-, 10- and 11-vowels systems are less common. The most frequently occurring vowel phonemes are /i a u/, to be followed by unrounded front mid vowels and rounded back mid vowels. As for the nasal vowels, the nasal [a] appears most frequently. Compared to the oral vowels, the number of nasal vowel types is smaller and the frequency of the nasal vowels in much lower. The findings are compared with those in the early studies of universals of vowel systems.

AN ACOUSTIC DESCRIPTION OF THE MONOPHTHONGS OF EAST ANGLIA*Emmanuel Ferragne & François Pellegrino*

Laboratoire Dynamique Du Langage UMR CNRS 5596

ID 1338; Poster No. 36

[full paper]

This study is a description of the monophthongs of East Anglia speech, an area in the south east of England. Formant measurements were computed on 11 vowels in /hVd/ contexts. The results are compared with those of previously published works on standard British English. Our findings highlight the similarities and differences between the two systems. Particular attention is paid to age-related issues and speaker normalization.

PROSODIC FACTORS AND SOCIOPHONETIC VARIATION: SPEECH RATE AND GLOTTAL VARIANTS IN TYNESIDE ENGLISH*Gerard Docherty*

Newcastle University

ID 1379; Poster No. 38

[full paper]

This paper presents findings from an exploratory study of the effect of speech rate on the variable realisation of /p t k/ in the Tyneside (north-east England) variety of English. While previous work on this particular variety has shown that patterns of variation observed in /p t k/ are strongly related to a range of social factors, in line with most work on sociophonetic variation there has been relatively little focus to date on the possible role of prosodic factors in governing such inter- and intra-speaker variation. This study considers one such factor (speech rate) in the performance of 32 speakers on a sentence production task. Findings suggest that rate cannot be entirely excluded as a factor in accounting for the patterns of variation observed, but that its influence is somewhat marginal being clearly present only at particularly high rates.

A REAL-TIME CASE STUDY OF RHOTIC ACQUISITION IN SOUTHERN BRITISH ENGLISH*Rachael-Anne Knight¹, Christina Villafañá Dalcher¹ & Mark J. Jones²*¹City University; ²University of Cambridge

ID 1352; Poster No. 40

[extra files] [full paper]

Development in the production of /r/ is attested in a speaker of Standard Southern British English (SSBE) between the ages of 3;8 and 3;11. The progression towards adult-like apical approximant /r/ is manifested along multiple dimensions and primarily involves a gradual raising of F2 and lowering of F3. In addition to changes in absolute frequencies of F2 and F3, however, we find that this speaker's development involves general reduction in variation of her output, elimination of apparent [w] substitutions concomitant with increased labiodental realisations, and decrease of F3-F2 distance. This latter acoustic cue is worth additional exploration, as F3 may remain stable between perceptibly different outputs. Moreover, the data show that development of /r/ may include a shift in the relative salience of F3 by means of increase in that formant's amplitude, again compensating for non-lowering of F3 to canonically /r/-like frequencies.

ORIENTING ATTENTION WHILE TRAINING HINDI SEGMENTS*Susan G. Guion & Eric Pederson*

University of Oregon

ID 1034; Poster No. 42

[full paper]

The current study experimentally manipulates attention to different aspects of the phonetic signal during learning. In an identification task, two native English speaking participant groups were trained on novel Hindi words containing unfamiliar consonants and vowels. Both groups were presented with the same auditory stimuli. One group was instructed to attend to the Hindi consonants and the other to the Hindi vowels presented in these words. The group oriented toward consonants showed greater consonant discrimination ability than the group oriented toward vowels in a post-test/pre-test comparison. These results confirm the importance of attentional mechanisms for phonetic learning.

PERCEPTION OF CZECH VOWEL QUANTITY BY ENGLISH LEARNERS OF CZECH*Václav Jonáš Podlipský*

Department of English and American Studies, Palacký University, Olomouc, Czech Republic

ID 1060; Poster No. 44

[extra files] [full paper]

Acquiring L2 vowel quantity can be difficult for native speakers of languages like English where vowel duration cues stress. This study tested whether English learners of Czech would categorize short and long vowels in a stressed or in an unstressed syllable differently than native listeners. The role of L2 experience was also explored. Results showed that the native and non-native listeners did not differ in category boundary locations in either syllable, although non-native perception was less

categorical in the unstressed syllable. No effect of experience was found. It is concluded that the L2 learners redefined the value of vowel duration as a cue.

A DISTANCE E-LEARNING COURSE IN PHONETICS

Michael Ashby, Jill House, Mark Huckvale, John Maidment & Kayoko Yanagisawa

UCL

ID 1165; Poster No. 46

[extra files] [full paper]

This paper reports the development and evaluation of an online distance course making available most of the elements of traditional on-campus phonetic training within a Virtual Learning Environment (VLE). Issues associated with the use of phonetic symbols in the teaching materials and communication tools of a VLE are addressed. An outline is presented of an up-to-date, research-driven syllabus for a distance course in English phonetics with associated exercises, ear-training and assessments. An eight-week pilot of the new course attracted 25 students across five continents, indicating a healthy global market for a course of this type. Retention rate to final assessment was 64%; an evaluation questionnaire assessing satisfaction on a five-point scale (1=best) showed an average score of 1.34.

PERCEPTUAL ASSESSMENT OF RUSSIAN-ACCENTED ESTONIAN

Lya Meister & Einar Meister

Institute of Cybernetics at Tallinn University of Technology

ID 1262; Poster No. 48

[full paper]

In the paper the experiments on perceptual assessment of Russian-accented Estonian are introduced. Speech samples were recorded from 20 speakers with a Russian background; clips of about 20 seconds from each speaker were selected for perceptual assessment. Two tests were carried out: first, 20 native Estonian speakers judged the samples and rated the degree of foreign accent on a six-point interval scale; secondly, two experienced phoneticians analyzed the same samples and compiled the list of pronunciation errors. The higher is the degree of accentedness judged by naïve listeners the more pronunciation errors was found by the experts. This general tendency is violated by several opposite examples. Finally, a simple method for accent assessment is proposed.

THE EFFECTS OF PHONETIC DISTANCE, LEARNING CONTEXT AND LEARNER PROFICIENCY ON L2 PERCEPTION OF ENGLISH LIQUIDS

Sally Chen & Janice Fon

National Taiwan University

ID 1526; Poster No. 50

[full paper]

This study aims to investigate the effects of phonetic distance, learning context and learner proficiency on L2 perception of English liquids. Reaction time difference between the pre- and post-tests was analyzed.

Results showed that the natural context induced the most progress for participants of a lower L2 proficiency level, while no preference was shown for those of a higher proficiency level. In general, L2 learners showed more progress for liquids occurring in novel phonotactic structures. Phone effect was significant only when L2 learners of lower proficiency perceived liquids in the singleton position.

INTRINSIC VOWEL PITCH IN DUTCH AND ARABIC

Jo Verhoeven¹ & Sarah Van Hoof²

¹City University London; ²University of Antwerp

ID 1198; Poster No. 52

[full paper]

This paper examines intrinsic vowel pitch (IF0) in Moroccan Standard Arabic and Belgian Standard Dutch in order to investigate the hypothesis that IF0 may depend on the size of the vowel inventory. The results of a production task with 11 Moroccan native speakers of Standard Arabic and 10 Belgian native speakers of Dutch reveal that IF0 in Arabic is significantly smaller (1.28 ST) than in Dutch (2.78 ST). These results are suggestive of a possible influence on IF0 of the size of the vowel inventory in a language. The effect of speaker sex on IF0 was not significant, while the front-back distinction in the articulation of vowels was significant in Belgian Dutch.

PERCEPTION OF JAPANESE PLOSIVES BY KOREAN SPEAKERS

Kanae Amino¹, SeongRim Ji² & Shigeko Shinohara³

¹Dept. of Electrical and Electronics Eng., Sophia Univ.; ²Graduate Program in Linguistics, Sophia Univ.; ³Phonetics Laboratory, Sophia Univ. Japan

ID 1410; Poster No. 54

[full paper]

This paper focuses on perception of Japanese voiceless plosives by Korean listeners to: 1) assess whether the categorization of utterance initial- and medial-Japanese plosives into Korean three-way laryngeal categories is the same as in loanwords from Japanese; 2) identify the acoustic cues relevant to the identified patterns. We used modified stimuli from nonsense word tokens of native Japanese speakers, manipulating F0, amplitude and temporal characteristics. Loanwords represented only a part of the perception patterns: utterance initial [p] was mostly heard as aspirated and medial [p] was identified as either aspirated or fortis. The acoustic cues of F0 on the following vowel and temporal characteristics particular to the positions had effects on the laryngeal percept.

IMPLICIT PHONETIC IMITATION IS CONSTRAINED BY PHONEMIC CONTRAST

Kuniko Nielsen

UCLA Department of Linguistics

ID 1641; Poster No. 56

[full paper]

The imitation paradigm (Goldinger, 1998) has shown that subjects shift their production in the direction of the target, indicating the use of episodic traces

in speech perception. By using this paradigm, two experiments were carried out to test: 1) if/how this implicit phonetic imitation interacts with linguistic representations when the change might impair linguistic contrast; 2) whether phonetic imitation can be generalized, and 3) whether word-level specificity can be obtained through physical measurements of a phonetic feature. The results revealed a significant effect of implicit phonetic imitation for extended VOTs, although there was no imitation observed for reduced VOTs. Furthermore, the imitated feature (extended VOT) was generalized to new instances of the target phoneme /p/ as well as to the new segment /k/. These results indicate that 1) knowledge of phonemic contrast modulates the implicit phonetic imitation, and 2) speakers possess sub-phonemic representations.

CONFUSION PATTERNS AND RESPONSE BIAS IN SPOKENWORD RECOGNITION OF GERMAN DISYLLABIC WORDS AND NONWORDS

Robert Felty

University of Michigan

ID 1294; Poster No. 58

[full paper]

The abundant research on lexical access in the last 30 years has shown that context effects such as lexical status, morphological complexity, and neighborhood density can affect word recognition. Very little research has investigated interactions between perceptual distinctiveness and context effects. This study used a spoken word recognition in noise experiment with German words and nonwords to research this interaction. Results showed a processing advantage for monomorphemic words over bimorphemic words, and that listeners are particularly sensitive to morphological information when presented with highly confusable stimuli.

A COMPARISON OF INDICES OF DIFFERENCE AND SIMILARITY, BASED ON LTASS AND TESTED ON VOICES IN REAL FORENSIC CASE AND IN CONTROLLED CONDITIONS

Gordana Varošanec-Škaric & Jordan Bicanic

Faculty of Humanities and Social Sciences, Dpt. of Phonetics, University of Zagreb

ID 1047; Poster No. 60

[full paper]

For 43 pairs of same and different voices in different speech contexts of real cases, LTASS has been made for the area between 800 and 3500 Hz on the basis of the recordings of speech over GSM mobile phones. SDDD and similarity indices in different speech context have been compared. For the sake of comparison of data achieved by the two speech recordings of standardized text read by 30 male and 35 female speakers, average values of indices are calculated for the same and different people: from 0 to 10 kHz and filtered voices from 0.8 to 3.5 kHz. The results of t-test have shown that the groups differ significantly, respectively greatest in the group of male voices recorded in the studio (0-10 kHz: $p < 0.001$), filtered studio voices ($p < 0.001$) and real cases (SDDD: $p < 0.01$; R: $p = 0.01$).

LARYNGEAL BEHAVIOR IN VOICELESS WORDS AND SENTENCES: A PHOTOELECTROGLOTTOGRAPHIC STUDY

Rachid Ridouane¹, Phil Hoole² & Susanne Fuchs³

¹Laboratoire de Phonétique et Phonologie (CNRS, Paris 3); ²Institut für Phonetik und Sprachliche Kommunikation, München; ³Zentrum für Allgemeine Sprachwissenschaft (ZAS), Berlin

ID 1688; Poster No. 62

[full paper]

An important challenge in the study of speech production is to gain theoretical understanding of how laryngeal and supralaryngeal movements are coordinated, and to determine which factors influence this coordination. This study investigates how these movements are coordinated during the production of completely voiceless words and sentences in Tashlhiyt Berber. Results show that the glottis does not simply remain open but that glottal aperture is continuously modulated in a manner that can be related quite systematically to the phonetic nature of the segments present in the sequence.

WHEN IS THE EMOTIONAL INFORMATION? A GATING EXPERIMENT FOR GRADIENT AND CONTOURS CUES

Nicolas Audibert¹, Véronique Aubergé² & Albert Rilliard³

¹Institut de la Communication Parlée - Gipsa Lab - CNRS UMR 5009; ²Institut de la Communication Parlée - Gipsa Lab - CNRS UMR 5009 / UMAN Lab; ³LIMSI CNRS, Orsay

ID 1502; Poster No. 64

[full paper]

The cognitive processing involved in the decoding of emotional expressions vs. attitudes in speech, as well as the modeling of emotional prosody as contours vs. gradual cues are recurrent question. This work aims at measuring the anticipated perception of emotions on minimal linguistic units, to evaluate if the underlying processing is compatible with the hypothesis of gradient contours processing. Selected monosyllabic stimuli extracted from an expressive corpus and expressing anxiety, disappointment, disgust, disquiet, joy, resignation, sadness and satisfaction, were gradually presented to naïve judges in a gating experiment. Results show that identification along gates of most of expressions follow a linear pattern typical of a contour-like processing, while expressions of satisfaction present distinct gradient values that make possible an early identification of affective values.

SOME ASPECTS OF PROSODY OF FRIENDLY FORMAL AND FRIENDLY INFORMAL SPEAKING STYLES

Dmitry Sityaev, Gabriel Webster, Norbert Braunschweiler, Sabine Buchholz & Kate Knill

Toshiba Research Europe Ltd

ID 1503; Poster No. 66

[full paper]

The current study investigates acoustic correlates associated with friendly formal and friendly informal speaking styles. A small corpus of speech was recorded

by a native speaker of American English. The results revealed that the most distinctive feature differentiating the two styles is the fundamental frequency. There was also a small difference found in the articulation rate and RMS energy between the two styles.

Thursday, 16:00**Sound to Sense: Modelling Fine Phonetic Detail**

Thursday, 16:00, Room: 1 (Red)
 Chairs: John Local, Sarah Hawkins

SOUND TO SENSE: INTRODUCTION TO THE SPECIAL SESSION

Sarah Hawkins¹ & John Local²

¹University of Cambridge; ²University of York

ID 1726

[full paper]

This paper forms the Introduction to the ICPHS-07 Special Session "Sound to Sense" (S2S). S2S is a Marie Curie Research Training Network (funded May 2007-2011) for interdisciplinary research on modeling the role of fine phonetic detail in speech understanding/recognition by humans and machines. The special session includes four position papers that illustrate some of the subject areas and aims of S2S, and two discussion papers. This Introduction sets the scene by defining what fine phonetic detail is, describing the theoretical motivations for investigating its influence on speech processing, and outlining why it is timely to investigate its role in how speech is understood.

NORMALIZATION OF CZECH VOWELS FROM CONTINUOUS READ TEXTS

Jan Volín & Davod Studenovský

Institute of Phonetics, Charles University in Prague

ID 1722

[full paper]

The effectiveness of vowel normalization methods has been suggested to be language-dependent. Six such methods have been used on Czech vowels to see which of them would lead to the best results in follow-up discriminant analyses while preserving the linguistically informative detail. The discriminant analyses had lower success rates for read continuous texts with multiple tokens from 75 speakers than for the carefully-pronounced monosyllables used previously by other authors, suggesting that the results might also be material-dependent. On the other hand, our variable data offered additional insights into sources of contextual variation and allowed us to identify the so-called enhancing contexts in which identity of a vowel is best preserved.

FINE PHONETIC DETAIL AND INTONATIONAL MEANING

Brechtje Post¹, Mariapaola D'Imperio² & Carlos Gussenhoven³

¹University of Cambridge; ²Aix-Marseille 1, CNRS (LPL), Aix-en-Provence, France; ³Centre for Language Studies, Radboud University Nijmegen

ID 1723

[full paper]

The development of theories about form-function relations in intonation should be informed by a better understanding of the dependencies that hold among different phonetic parameters. Fine phonetic detail encodes

both linguistically structured meaning and paralinguistic meaning. Keywords: Intonational meaning, paralinguistic meaning, fine phonetic detail, tonal alignment.

PRESERVING FINE PHONETIC DETAIL USING EPISODIC MEMORY: AUTOMATIC SPEECH RECOGNITION WITH MINERVA2

Roger Moore & Viktoria Maier

Dept. Computer Science, University of Sheffield, UK

ID 1724

[full paper]

Previous research has demonstrated competitive recognition results using a simulation of episodic memory - 'MINERVA2' - on the Peterson & Barney corpus of vowel formant data. This paper presents a modified implementation designed to work on real speech data, and results are reported on isolated-word recognition experiments conducted using the TI-ALPHA corpus. It is shown that access to fine phonetic detail is critical for achieving high recognition accuracy, whether it is provided by the episodic model or by hidden Markov models incorporating large numbers of Gaussian mixture components. However it is confirmed that, although MINERVA2 offers a powerful means for generalizing by accessing the fine detail retained in all the training data, it is severely hampered by its inability to model temporal sequence. It is concluded that a new episodic model is needed that is based on the principles of MINERVA2 but which overcomes such limitations.

EFFECT OF CROSS-WORD CONTEXT ON PLOSIVE IDENTIFICATION IN NOISE FOR NATIVE AND NON-NATIVE LISTENERS

Maria Luisa Garcia Lecumberri¹ & Martin Cooke²

¹University of the Basque Country; ²University of Sheffield

ID 1725

[full paper]

Studies of second language speech perception can highlight the role of prior knowledge in native language processing. This study compared native and non-native identification of plosives in words spliced from natural utterances when presented in noise, with/without the context of preceding word. Both listener groups performed at the same level in the absence of context at high noise, suggesting that cues surviving energetic masking and splicing were similar for the two languages or that they had already been acquired by the non-native group. However, native listeners gained significantly more when contextual information in the preceding word was present, indicating that cross-word, extra-syllabic, cues are less easily exploited by non-native listeners. An acoustic analysis revealed subtle durational differences in the preceding word rhyme, knowledge of which may contribute to the native advantage. Other possible explanations for the native benefit from cross-word context are discussed.

WHEN IS FINE PHONETIC DETAIL A DETAIL?*Rolf Carlson¹ & Sarah Hawkins²*¹KTH, CSC, Dept. Speech, Music and Hearing;²University of Cambridge

ID 1721

[full paper]

This paper discusses the papers by Moore and Maier, and by Lecumberri and Cooke, which are two of the four position papers in the ICPhS special session on Sound to Sense (S2S). The rationale for our comments is to illuminate and support the hypothesis that speech perception is a dynamic and adaptive perceptual process in the interpretation of the sensory speech signal. As background for the discussion of the two position papers, two further perceptual experiments are described. Their results are discussed with respect to (1) identification of phonetic detail by experimenters and by native and non-native listeners, (2) the perceptual and theoretical status of "detail" as additional versus fundamental auditory information, and (3) challenges in balancing the practical advantages of using tractable goals and data versus development of richer models whose parameters probably more closely reflect the processes of normal speech perception.

DETAILS AND CONTEXTS: COMMENTS ON THE PAPERS*Richard Ogden*

University of York

ID 1727

[full paper]

In this paper I make two main points: (1) we need a better understanding of context, (2) there may be naturally-occurring phenomena in conversational data which offer a good basis to see the interplay of segmental and prosodic factors in constructing meaning; it may be possible to use such data as the basis for further work. I aim to open a dialogue between quantitative and qualitative approaches to the study of language.

Intonational Development from Babbling to the Two-word Stage

Thursday, 16:00, Room: 2 (Orange)

Chairs: Aoju Chen, Paula Fikkert

DIVERSITY AND CONTRASTIVITY IN PROSODIC AND SYLLABIC DEVELOPMENT*Kimbrough Oller¹, Suneeti NathaniIyer², Eugene Buder¹, Kyoung-hwa Kwon¹, Lesya Chorna¹ & Kelly Conway²*¹The University of Memphis; ²The University of Georgia

ID 1758

[full paper]

The development of prosodic capabilities in infants has been studied extensively. Results have, however, often been contradictory, in part because approaches to the study have been divergent. A traditional approach with an innatist bias has sought to demonstrate very

early mastery of adult-like speech characteristics of the prosodic system. More recently, research has sought to illustrate that infants actively build a phonological system, including both prosodic and syllabic features. In our approach, adult-like features of speech are not expected to emerge fully formed early in life, but to unfold in infrastructural stages. We preview a longitudinal project on infant vocal development, and argue that two widely-studied prosodic phenomena (final-syllable lengthening and pitch control) show complexities that require recognition of the infant's active participation in development of prosody. This exploratory participation leads to nuances that contradict simplistic generalizations about early emergence of adult-like prosodic structures.

EARLY INTONATIONAL DEVELOPMENT IN CATALAN*Pilar Prieto & Maria del Mar Vanrell*

Universitat Autònoma de Barcelona

ID 1748

[full paper]

This paper focuses on the development of intonation f0 patterns in four Catalan-speaking children between the ages of 12 and 26 months approximately. To our knowledge, to date no work has addressed the acquisition of Catalan intonation. Pitch contours were acoustically analyzed in all meaningful utterances produced by each child, for a total of 3,143 utterances. Contrary to what has been claimed in the literature, our results reveal that children's emerging intonation is largely independent of grammatical development. The four children had clearly mastered the production of a wide variety of language-specific pitch accents and boundary tones well before they produced two-word combinations, regardless of the fact that the age for two-word production was 1;6 for two of the children and 2;0 for the other two.

INTONATION OF EARLY TWO-WORD UTTERANCES IN DUTCH*Aoju Chen¹ & Paula Fikkert²*¹Max Planck Institute for Psycholinguistics; ²Radboud University Nijmegen

ID 1757

[full paper]

We analysed the intonation contours of two-word utterances from 3 monolingual Dutch children (1;4 - 2;1) in the autosegmental-metrical framework. Our data show that children have mastered the inventory of boundary tones and nuclear pitch accent types (except for L*HL and L*!HL) at the 160-word level, and the set of non-downstepped pre-nuclear pitch accents (except for L*) at the 230-word level, contra previous claims on the mastery of adult-like intonation contours before or at the onset of first words. Further, there is evidence that intonational development is correlated with an increase in vocabulary size. Moreover, children show a preference for falling contours, as predicted on the basis of universal production mechanisms. In addition, the utterances are mostly spoken with both words accented independent of semantic relations expressed and information

status of each word across developmental stages, contra prior work.

THE PROSODY OF EARLY MULTI-WORD SPEECH: WORD ORDER AND ITS INTONATIONAL REALIZATION IN THE SPEECH PRODUCTION OF ITALIAN CHILDREN

Laura D'Odorico & Mirco Fasolo

University of Milano-Bicocca- Italy

ID 1749

[full paper]

The purpose of this study was to investigate, in a group of Italian children, the development of the capacity to use prosodic features to mark different syntactic organizations of multi-word utterances, during the first phase of syntactic acquisition. The focus is on the prosodic realizations of multi-word utterances in which children begin to use the argument structure of verbs (vocabulary size > 400 words, MLU range 1.3 - 3.0). Results showed that non-canonical order is not marked by specific type of intonation contours and does not show specific values of duration, F0 max, F0 min or key. On the other hand, when the (optional) subject is expressed in canonical utterances it is very frequently marked by primary stress.

surement technology. Devices and systems have become widespread, more versatile, easier to use and cheaper. Statistical methods to handle multichannel data returned by the face motion measurements are readily available. However, no comprehensive theory or, minimally common framework to guide auditory-visual speech analysis has emerged. In this paper it is proposed that Articulatory Phonology [3] developed by Browman and Goldstein for auditory-articulatory speech production is capable of filling the gap. Benefits and problems are discussed.

AUDIOVISUAL SPEECH SYNTHESIS

Barry-John Theobald

School of Computing Sciences, University of East Anglia

ID 1717

[full paper]

The ultimate goal of audiovisual speech synthesis is to create a machine that is able to articulate human-like audiovisual speech from text. There has been much interest in producing such a system over the last few decades and current state-of-the-art systems can generate very realistic synthesised speech. This paper presents a broad overview of audiovisual speech synthesis and considers possible future directions.

Audiovisual Speech: Analysis, Synthesis, Perception and Recognition

Thursday, 16:00, Room: 3 (Yellow)

Chair: Sascha Fagel

AUDIOVISUAL SPEECH: ANALYSIS, SYNTHESIS, PERCEPTION, AND RECOGNITION

Sascha Fagel

Berlin University of Technology

ID 1716

[full paper]

In many cases research in the fields of audiovisual speech analysis, synthesis, perception and (automatic) recognition is carried out separately with only limited account for the neighboring areas. But the author claims that these neighboring areas yield huge, currently idle potential to improve and better understand the field under investigation and that human speech as a phenomenon should be looked at from a more holistic point of view. This paper briefly looks into the fields of audiovisual speech research and tries to identify existing links between them as well as future collaboration for promising prospective mutual benefit.

SPEECH STRUCTURE DECISIONS FROM SPEECH MOTION COORDINATIONS

Marie-Agnès Cathiard & Christian Abry

Université Stendhal

ID 1720

[full paper]

Supporters of speech as an essentially motion phenomenon have forgotten the evidence, coming from static phases in the "elastic speech" flow, that these phases can give direct access to speech structures at their best. In fact the very name of this Structure-from-Motion (SfM) problem means that motion is just for recovering structures, when undersampled. By combining SfM with Multistable Perception, we will reinforce the claim that changes in the perceiver's mind, regarding stationary or repetitive audiovisual speech moving displays, are perceptual decisions on changes in structure, rather than simple low-level decisions on changes in motion direction. The outcome of this quest for speech structure recovery is that, contrary to other perception domains, where scientists are struggling in search of stabilizing biases, the very time unfolding of speech coordinations –and non-human primate calls– gives for free neural control biases within their natural integrative time-windows.

AUDITORY-VISUAL SPEECH ANALYSIS: IN SEARCH OF A THEORY

Christian Kroos

MARCS Auditory Laboratories, University of Western Sydney

ID 1718

[full paper]

In the last decade auditory-visual speech analysis has benefited greatly from advances in face motion mea-

AUDIOVISUAL SPEECH RECOGNITION WITH ARTICULATOR POSITIONS AS HIDDEN VARIABLES

Mark Hasegawa-Johnson¹, Karen Livescu², Partha Lal³ & Kate Saenko²

¹University of Illinois at Urbana-Champaign; ²Massachusetts Institute of Technology; ³University of Edinburgh

ID 1719

[full paper]

Speech recognition, by both humans and machines, benefits from visual observation of the face. It has often been noticed, however, that the audible and visible correlates of a phoneme may be asynchronous; perhaps for this reason, automatic speech recognition structures that allow asynchrony between the audible phoneme and the visible viseme outperform recognizers that allow no such asynchrony. This paper proposes, and tests using experimental speech recognition systems, a new explanation for audiovisual asynchrony. We propose that audiovisual asynchrony may be the result of asynchrony between the gestures implemented by different articulators. The proposed model of audiovisual asynchrony is tested by implementing an “articulatory-feature model” audiovisual speech recognizer with multiple hidden state variables, each representing the gestures of one articulator. The proposed system performs as well as a standard audiovisual recognizer on a digit recognition task; the best results are achieved by combining the outputs of the two systems.

Is there a Biological Grounding of Phonology?

Thursday, 16:00, Room: 4 (Green)

Chairs: Susanne Fuchs, Bernd Pompino-Marschall

IS THERE A BIOLOGICAL GROUNDING OF PHONOLOGY? DETERMINING FACTORS, OPTIMIZATION, AND COMMUNICATIVE USAGE

Susanne Fuchs¹, Bernd Pompino-Marschall² & Pascal Perrier³

¹ZAS Berlin; ²Humboldt University Berlin; ³GIPSA-lab, ICP & INPG Grenoble

ID 1769

[full paper]

This special session discusses the issue if there is a biological grounding of phonology. By reviewing current and past work from different speech research disciplines we suggest that (1) biological factors provide the limits, the frame of reference for phonology, (2) phonology is shaped by optimization processes taking into account the nonlinear relations of different representations of speech (acoustics, articulation, speech perception), and (3) sociolinguistic factors and communicative usage affect, for instance, speech acquisition and sound change. The first of the three suggestions is biological in nature whereas the last represents the non-biological nature of speech.

BIOLOGICAL AND SOCIAL GROUNDING OF PHONOLOGY: VARIATION AS A RESEARCH TOOL

James M. Scobbie

Queen Margaret University Edinburgh

ID 1765

[full paper]

Phonological-phonetic sound systems are abstractions away from substance, so while they are grounded in biological capacity, they also reflect phonetically unnatural relationships arising from a variety of linguistic factors. Sociolinguistic variation is one of these non-biological factors. Pilot results of Scottish English derhoticisation and the social distribution of articulatory variation are presented. The patterns are more radical than the systems that are normally examined in research into the grounding of onset/coda allophony. Some speakers are only very weakly acoustically rhotic in codas due to a rhotic articulation being far more delayed than rhotic systems, being in practice covert for sociolinguistic reasons.

IRREGULAR PHONATION AND ITS PREFERRED ROLE AS CUE TO SILENCE IN PHONOLOGICAL SYSTEMS

Janet Slifka

Speech Communication Group, MIT and Eliza Corporation, MA, USA

ID 1767

[full paper]

Regions of silence in the speech stream are commonly produced by pressing the vocal folds together and by spreading the vocal folds apart. Given that irregular phonation normally arises from both of these actions, it is proposed that there is a preferred role for irregular phonation in phonological systems – that of a cue to silence whether that silence is related to a segmental contrast or a prosodic structure and whether or not that silence is actually fully achieved. This preferred role for irregular phonation as a meaningful sound is grounded in the physical reality of managing vocal fold vibration.

STOP PLACE CONTRASTS BEFORE LIQUIDS

Edward Flemming

Department of Linguistics & Philosophy, MIT

ID 1764

[full paper]

All languages allow stop place contrasts in prevo-calic position. Many languages allow stop place contrasts before liquids [l, r]. Indeed, stop-liquid clusters like [br, gl] are among the most common word-initial consonant clusters [2]. The preference for stop-liquid clusters is commonly attributed to Sonority Sequencing constraints. Here we pursue an analysis in terms of the availability of cues to place: contrasts are preferentially permitted in environments where they are most distinct. According to this analysis the high sonority of liquids is relevant only insofar as sonorous sounds are better able to support the realization of these cues. It also offers an account of more specific restrictions on place contrasts that are not amenable to an analysis in terms of sonority sequencing. Specifically, we will present evidence that

the cross-linguistic dispreference for coronal-velar contrasts before laterals is due to the acoustic similarity of these clusters.

ARTICULATION CHANGES IN DIFFERENT VOICING PATTERNS

Kiyoshi Honda¹, Shinji Maeda² & Miyoko Sugito³

¹Univ. Paris III (France) and ATR-CIS (Japan); ²CNRS and ENST (France); ³Institute for Speech Communication Research (Japan)

ID 1766

[full paper]

Human speech arises from orchestrated activities of phonatory and articulatory organs and reflects human-specific characteristics in anatomy and physiology. The tongue and larynx are less tightly coupled in humans, and they are also innervated separately from the cortex. These biological specificities provide aerodynamic and acoustic bases of speech production and contribute to generating a parallel time-pattern of gradually changing vocal signals with ripples in amplitude and spectrum due to rapid articulatory movements. A close look at local sound variations suggests that tongue-larynx linkage still exists as an old trait common to the primate family, as seen in the variation of vocal frequency due to articulation. Contrarily, articulatory control may also be influenced by laryngeal control, as seen in irregular articulation in certain vocal expressions. Vowel devoicing may be a complex case of such bilateral interactions, and a special attention was made on the topic in this report.

SYLLABLE STRUCTURE AS COUPLED OSCILLATOR MODES: EVIDENCE FROM GEORGIAN VS. TASHLHIYT BERBER

Louis Goldstein¹, Ioana Chitoran² & Elizabeth Selkirk³

¹Haskins Laboratories & Yale University; ²Dartmouth College; ³University of Massachusetts Amherst

ID 1768

[full paper]

A theory is presented that claims the basis for syllable structure is to be found in the modes of a system of coupled oscillators that control intergestural timing in speech. Onsets correspond to the in-phase mode and codas to the anti-phase mode. Articulatory data from Georgian and Tashlhiyt Berber are presented that support the association of onsets with in-phase mode.

Nasalization Processes at the Interface between Phonetics and Phonology

Thursday, 16:00, Room: 5 (Blue)

Chairs: Solange Rossato, Véronique Delvaux

NASAL PROCESSES AT THE INTERFACE BETWEEN PHONETICS AND PHONOLOGY

Véronique Delvaux¹, Angélique Amelot² & Solange Rossato³

¹FNRS/Université de Mons-Hainaut; ²Université Paris III; ³Gipsa-Lab, Grenoble

ID 1733

[full paper]

This paper introduces to a special session on nasalization at the XVIth ICPhS. Nasal studies have a long history, at the interface between phonetics and phonology. Nasal processes are best accounted for by considering the phonetic constraints acting on the production and the perception of nasal sounds, as well as the nasal phonological patterns in the world's languages. Alternately, nasal studies improve our general understanding of phonetic and phonological processes. The three invited papers of the session are presented and discussed in this framework.

NASALS AND NASALIZATION: THE RELATION BETWEEN SEGMENTAL AND COARTICULATORY TIMING

Patrice Speeter Beddor

University of Michigan

ID 1728

[full paper]

Cross-language acoustic and perceptual studies in our lab test the hypothesis that certain aspects of variation in the temporal extent of vowel nasalization are linked to concomitant, inversely related variation in the duration of a flanking nasal consonant. Data from English, Thai, and Ikalanga are reported that support this hypothesis, and phonological phenomena consistent with the observed patterns of variation are considered.

INVESTIGATING THE AERODYNAMICS OF NASALIZED FRICATIVES

Ryan K. Shosted

University of Illinois, Urbana-Champaign

ID 1729

[full paper]

Nasalized oral fricatives do not exist in phonemic opposition to oral fricatives in any language of the world. It has been claimed that nasalized fricatives cannot exist phonetically; however, numerous grammatical descriptions suggest otherwise. This claim is addressed by measuring the presence of nasal airflow during the production of various anterior fricatives in conditions of coarticulatory nasalization. If nasal exhalation is taken as the definition of nasalization, then nasalized fricatives are shown to occur in speech. The potential acoustic and perceptual consequences of nasal flow during oral fricatives are discussed.

COMPATIBILITY OF FEATURES AND PHONETIC CONTENT. THE CASE OF NASALIZATION

Maria-Josep Solé

Universitat Autònoma de Barcelona

ID 1730

[full paper]

This paper reviews data on the compatibility of nasalization with manner and voicing features. First, it addresses the relations between nasalization and manner features and discusses the scales of nasalization spreading in the light of aerodynamic and acoustic factors. Second, it examines the interdependent relations between voicing and nasality. These observations lead to propose disfavoured sequences involving nasals. The paper argues that aerodynamic and acoustic interactions between features determine their likelihood to combine within segments and when segments follow each other.

MOVING PHONOLOGICAL SCIENCE FROM PAPER TO THE LABORATORY: THE CASE OF NASALS AND NASALIZATION

John J. Ohala

University of California, Berkeley

ID 1732

[full paper]

The three papers in this session illustrate dramatically how far phonological science has evolved over the past few centuries. The behavior of speech sounds, in this instance, nasals, which previously could only be described or notated in a variety of ways, is now explained by reference to physical principles from anatomy, physiology, and acoustics, and perception.

COARTICULATORY TIMING AND AERODYNAMICS OF NASALS AND NASALIZATION

Didier Demolin

Universidade de São Paulo & Université libre de Bruxelles

ID 1731

[full paper]

This paper discusses Beddor, Shosted and Solé papers that deal with the relation between segmental and coarticulatory timing for nasals and nasalization; the aerodynamics of nasalized fricatives and the compatibility and phonetic content of features in the case of nasalization. Three points are discussed: (i) the hypothesis of a constant size of velum gesture; (ii) nasalized fricatives and (iii) nasalization in manner features and voicing.

Speech Timing: Approaches to Speech Rhythm

Thursday, 16:00, Room: 6 (Black)

Chairs: Eric Keller, Robert Port

SPEECH TIMING: APPROACHES TO SPEECH RHYTHM

Eric Keller¹ & Robert Port²

¹University of Lausanne; ²Indiana University

ID 1777

[full paper]

In recent years, a number of authors have suggested various oscillator-based mechanisms to account for rhythmicity. This session brings together a number of researchers who have proposed and/or examined these proposals in detail with respect to a number of languages (English, Japanese, Brazilian Portuguese and French).

HOW PROSODIC VARIABILITY CAN BE HANDLED BY A DYNAMICAL SPEECH RHYTHM MODEL

Plinio Barbosa

State University of Campinas

ID 1774

[full paper]

A method is shown for using a two-coupled oscillator model of speech rhythm to handle variability of durational patterns in natural data. In this framework, speech rhythm is the quasi-optimal output of the coupling of two components, one using local syntactic information and a phrase stress oscillator. The syllabic oscillator pulses are anchored at vowel onsets, implementing the carrier component of speech rhythm production, the building block of prosodic timing. The model generates complex patterns of V-to-V durations via the consequence of a phrase-stress oscillator's entrainment to the syllabic oscillator. This mechanism can cope with intra- and inter-speaker rhythmic variability.

QUANTIFYING VOWEL-ONSET PERIODICITY IN JAPANESE

Michael Connolly Brady & Robert Port

Indiana University

ID 1773

[full paper]

Many researchers agree the brain must employ some expectancy mechanisms for speech as it unfolds through time. We posit that an adaptive oscillator may be made to synchronize with speech expectancies. In a recent study of compensatory mora relationships, we found that voice onsets are the most salient events for determining rhythmic structure. Based on circular statistics, we find some vowel onsets should be treated as strong coupling targets while others should be treated more as distractions.

APPROACHES TO CONVERSATIONAL SPEECH RHYTHM: SPEECH ACTIVITY IN TWO-PERSON TELEPHONE DIALOGUES*Nick Campbell*

ATR Labs, Kyoto, Japan

ID 1775

[full paper]

This paper examines speech activity patterns in telephone dialogues and illustrates some details of their timing organization. It is shown that partners participate actively, even when listening, through frequent use of speech overlaps and backchannel utterances.

VOWEL-ONSET INTERVAL AS A TIMING UNIT FOR SINGLETON/GEMINATE STOP DISTINCTION IN JAPANESE*Yukari Hirata & Connor Forbes*

Colgate University

ID 1772

[full paper]

This study examined whether vowel onset intervals in Japanese disyllables can serve as a reliable timing unit in Japanese. Duration of vowel onset intervals was measured in Japanese disyllables containing singleton and geminate stops spoken in a carrier sentence at three speaking rates. Analysis included the vowel onset interval duration divided by the mean mora duration, and this value was predicted to show timing regularity in terms of the mora, in accordance with Brady Port and Nagao, 2006. Results supported this prediction.

WAVES, BEATS AND EXPECTANCY*Eric Keller*

University of Lausanne

ID 1776

[full paper]

In this study, a mechanism for the emergence of beats is proposed. Examples from physics (e.g., pendulum, sine tones, or water waves) indicate that beats are produced by interferential patterns between similar events, creating mutually reinforced wave forms (“beats”) alternating with weakened wave forms (“off-beats” or “anti-beats”). In biological “coordinative structures”, similar task requirements can also create interferential events that translate into beat, e.g. the need to coordinate the horse’s anterior and posterior body portions for a canter. In speech, it can be argued that strong voice onsets coincide with a neurological anticipation of such onsets, which is likely to lead to the creation of beat reinforcement. Weakening would be predicted for rapid subsequent events. The notion of beat patterns operating within coordinate structures promises a number of useful hypotheses for the temporal structuring of gestures in speech.

Friday, 9:00**Prosody X: Tonal Realisation and Accommodation**

Friday, 9:00, Room: 1 (Red)

Chair: Nina Grönnum

TONAL REALIZATION OF SYLLABIC AFFILIATION IN SPANISH*Francisco Torreira*

University of Illinois at Urbana-Champaign

ID 1025

[full paper]

This study explicitly addresses the hypothesis that pitch accents are aligned to syllables by examining the F0 shape of rising accents over similar segmental material differing in syllabic affiliation. A consistent correlate of syllabic affiliation is found in the timing of the rising F0 movement with respect to an independent segmental landmark. Our results provide phonetic evidence of resyllabification and of the role played by the syllable as an abstract unit guiding speech production.

PHRASE-FINAL PITCH ACCOMMODATION EFFECTS IN DUTCH*Judith Hanssen, Jörg Peters & Carlos Gussenhoven*

Radboud University Nijmegen

ID 1554

[full paper]

A production experiment was carried out in order to establish the ways in which speakers of Dutch adjust the pitch contours of three frequently used nuclear contours, the Fall, the Rise, and the Fall-Rise, in phrase-final syllables with varying amounts of sonorant segmental material in the rime. It was found that the Fall and the Rise were somewhat compressed as well as somewhat truncated. The way the Fall-Rise was affected cannot properly be described in terms of either of these concepts, as its overall pitch range was reduced as sonorant portions were shorter. F0 range compression was thus applied to all three contour types, time compression only to the Fall and the Rise.

PROSODIC ACCOMMODATION BY FRENCH SPEAKERS TO A NON-NATIVE INTERLOCUTOR*Caroline L. Smith*

University of New Mexico

ID 1116

[full paper]

On-line accommodation to an interlocutor is often cited as an explanation for phonetic variation. Prosodic evidence for speakers' accommodation was investigated in a task that was expected to favor modification: giving directions to a non-native interlocutor, compared to the same task with a native interlocutor. Ten native speakers of French were recorded in spontaneous conversation in the two conditions. With the non-native, they used a significantly greater F0 range, and segmental modifications compatible with a more emphatic speech style, but did not modify speech rate or utterance duration.

These results suggest that accommodations can include both language-specific and universal properties, and that speakers can selectively implement different ways of accommodating.

Acoustics V: Miscellaneous

Friday, 9:00, Room: 2 (Orange)

Chair: Phil Hoole

AN ACOUSTIC STUDY OF NORTH WELSH VOICELESS FRICATIVES*Mark J. Jones & Francis Nolan*

Dept. of Linguistics, University of Cambridge

ID 1145

[full paper]

Welsh, a Celtic language spoken in Wales, is unusual amongst the languages of the world in having a minimum of 8 fricative contrasts at (at least) 6 places of articulation, a relatively large number. Most research on fricatives has been conducted on languages with a relatively small (but cross-linguistically common) number of fricative place contrasts. Welsh fricatives have not previously been the subject of a detailed acoustic study across speakers. This study begins to fill that gap, and also provides some phonetic information on how one language organises a large system of fricative place contrasts.

INVESTIGATIONS IN ARTICULATORY SYNTHESIS*Athanassios Katsamanis¹, Pirros Tsiakoulis¹, Petros Maragos¹ & Alexandros Potamianos²*¹National Technical University of Athens; ²Technical University of Crete

ID 1580

[full paper]

Modern articulatory speech synthesizers simulate the human speech production system in an increasingly accurate manner. In this direction, we relax the simplifying assumption of zero mean flow velocity during speech production and we investigate potential effects. Further, we introduce a reduced parameter set for our 3D articulatory model which simplifies its control and does not allow humanly infeasible articulations. Vowel-Fricative-Vowel synthesis experiments using our twofold augmented synthesizer are reported.

EARLY EXPERIMENTAL PHONETICS IN GERMANY - HISTORIC TRACES IN THE COLLECTION OF THE TU DRESDEN*Rüdiger Hoffmann & Dieter Mehnert*

TU Dresden, Institut für Akustik und Sprachkommunikation

ID 1063

[full paper]

At the beginning of the last century, the growing interest in foreign cultures and languages led to a rapid development of experimental phonetics. In Germany, Rousselot's scholar Panconcelli-Calzia introduced ex-

perimental phonetics as scientific field in Hamburg like Gutzmann and Wethlo did in Berlin. A number of historic instruments remembering these times are preserved in the Dresden University now. This paper gives a short overview of the development of the experimental phonetics in Hamburg and Berlin and the history of the phonetic collection in Dresden. In the main part, some projects concerning selected objects of the collection (Wethlo's cushion pipes, history of pitch measurement, mechanical voices from Kessel and Hoelbe) are summarized.

Production IX: Quantity and Speech Rate

Friday, 9:00, Room: 3 (Yellow)

Chair: Marianne Pouplier

NON-NEUTRALIZING QUANTITY IN WORD-INITIAL CONSONANTS: ARTICULATORY EVIDENCE

Astrid Kraehenmann & Aditi Lahiri

University of Konstanz

ID 1089

[full paper]

Stops in Swiss German contrast in quantity in all word positions. As in most languages with consonant quantity contrast, geminate stops are produced with significantly longer CD than singletons in intersonorant context. This holds word- and phrase-medially. Aspiration and voicing play no role in this contrast. Consequently, phrase-initially no CD cue distinguishes long from short stops. But do speakers utilize articulatory means to maintain the contrast in the absence of acoustic cues? In this study we investigated initial alveolar stops, focusing on their articulatory and acoustic properties in varying contexts using EPG. Our results are twofold. First, CD and duration measures of articulator contact mirror each other within a phrase: after vowel- and obstruent-final words geminates are longer than singletons. Second, phrase-initially, the contact data establish a clear quantity distinction. This means that even without acoustic CD cues, geminates are articulated with longer closure than singletons.

ACOUSTIC AND KINEMATIC CORRELATES OF PHONOLOGICAL LENGTH CONTRAST IN ITALIAN CONSONANTS

Barbara Gili Fivela¹, Claudio Zmarich², Pascal Perrier³, Christophe Savariaux⁴ & Graziano Tisato²

¹Università di Lecce; ²ISTC-CNR Padova-Italy; ³ICP-INPG Grenoble-France; ⁴ICP-Université Stendhal, Grenoble-France

ID 1616

[full paper]

In Italian, the length contrast is exploited in the consonant system. Previous articulatory studies focused on the temporal organization of gestures in Italian geminates and on the kinematics of the singleton/geminate distinction. Goal of this paper is to discuss data on lip

and tongue gestures in order both to directly test some hypotheses on the gestural organization of geminate consonants [cfr. Smith, 7] and to collect observations on the possible position of gestural targets in geminate and singleton consonants [cfr. Löfqvist's, 4]. Results show that Italian geminates appear to be best accounted for by a hybrid model with respect to Öhman's Vowel-to-Vowel model and Browman and Goldstein's Vowel-to-Consonant one. On the other hand, the data we considered point to the existence of a higher virtual target for geminates than for singletons.

THE EFFECT OF SPEAKING RATE ON VOICE-ONSET-TIME IS TALKER-SPECIFIC

Rachel, M. Theodore, Joanne L. Miller & David DeSteno

Northeastern University

ID 1541

[full paper]

Talkers differ in phonetic properties of speech. One such property is voice-onset-time (VOT), an important marker of the voicing contrast in English stop consonants. Research has shown that VOT is affected by speaking rate: for any given talker, VOT increases as rate slows. The current work examines whether this contextual influence varies across talkers. Many tokens of /ti/ (Experiment 1) or /pi/ and /ki/ (Experiment 2) were elicited from talkers across a range of rates. VOT and syllable duration were measured for each token. The results showed that although VOT increased as rate slowed for all talkers, the extent of this increase varied significantly across talkers. For a given talker, however, the extent of the increase was stable across a change in place of articulation. These findings suggest that talker differences in phonetic properties of speech reflect talker-specific contextual influences.

Perception VI: Prosody Effects

Friday, 9:00, Room: 4 (Green)

Chair: Silvia Lipski

THE PROCESSING OF WORD STRESS: EEG STUDIES ON TASK-RELATED COMPONENTS

Johannes Knaus, Richard Wiese & Ulrike Janßen

Institut für Germanistische Sprachwissenschaft, Philipps-Universität Marburg

ID 1209

[full paper]

The present paper reports results from three ERP studies showing components which reflect the processing of different word stress violations dependent on distinctive task properties (conscious vs. unconscious processing). The main findings were that the presentation of an incorrect stress pattern led to an N400-like component indicating increased costs in lexical retrieval. Such a component is not dependent on the task during the processing of stress violations. Furthermore, an enhanced positivity effect (P300) reflects a stress mismatch detec-

tion only if stress judgment was explicitly required in the task.

DISCRIMINATION OF ENGLISH INTONATION CONTOURS BY NATIVE SPEAKERS AND SECOND LANGUAGE LEARNERS

Hyekyung Hwang, Amy Schafer & Victoria Anderson
U. of Hawaii

ID 1309

[full paper]

Previous work has shown that advanced Korean learners of English (L2ers) are less effective than native English speakers (L1ers) at using English intermediate phrases (ips) to establish syntactic boundaries [10]. This study investigated whether the effect is due to perceptual differences between L1ers and L2ers, based on the interplay between phonology and perception (e.g., [5], [8], [9]). L1ers and L2ers listened to pairs of phrases in an AX task that crossed boundary strength with intonational contour. Little variation was found between L1ers' and L2ers' discrimination patterns, which correlated highly with each other. Both groups were more sensitive to a falling vs. level contour contrast than a rising vs. level contrast (in the context tested) and were more responsive to contour contrasts than boundary strength contrasts. The results suggest that the L2ers' poor use of ips in comprehension likely rests primarily on difficulty with prosody-syntax mappings.

SEGMENTAL VS. SUPRASEGMENTAL PROCESSING INTERACTIONS REVISITED

Satsuki Nakai & Alice Turk

University of Edinburgh

ID 1278

[full paper]

This paper investigates processing interactions between segmental (stop place) vs. suprasegmental (prosodic boundary) information in English using a two-choice speeded classification procedure. The results suggest that due to the presence of the boundary tonal contour, intonational phrase-boundary information can be processed more independently from stop-place information than phrase-internal, word-boundary information can. Our finding converges with lateralisation literature reporting left-hemisphere advantage for rapidly changing acoustic information (e.g. cues for stop place) and right-hemisphere advantage for sentence intonation for speakers of non-tonal languages.

First Language Acquisition III

Friday, 9:00, Room: 5 (Blue)

Chair: Katrin Schneider

PERCEPTUAL CATEGORIZATION OF SYNTHESIZED ENGLISH VOWELS FROM BIRTH TO ADULTHOOD

Lucie Ménard¹, Barbara L. Davis² & Louis-Jean Boë³

¹Laboratoire de phonétique, Université du Québec à Montréal; ²Department of Communication Sciences and Disorders, The University of Texas at Austin; ³Institut de la Communication Parlée

ID 1290

[full paper]

The experiment reported in this paper is aimed at determining the influence of non uniform vocal tract growth on the ability to reach acoustic-perceptual targets in English. An articulatory-to-acoustic model integrating non uniform vocal tract growth has been exploited to synthesize 342 5-formant vowels, covering maximal vowel spaces produced by speakers at 5 growth stages: newborn, 4 years old, 10 years old, 16 years old, and 21 years old (adult stage). 37 American English speakers served as subjects in a perceptual categorization experiment. Results show that the three cardinal vowels /i u a/ can be produced by speakers with a newborn-like vocal tract. It is suggested that articulatory-to-acoustic relationships for a given vowel may differ across growth stages.

INTONATIONAL REALISATION OF TOPIC AND FOCUS BY DUTCH-ACQUIRING 4- TO 5-YEAR-OLDS

Aoju Chen

Max Planck Institute for Psycholinguistics

ID 1647

[full paper]

This study examined how Dutch-acquiring 4- to 5-year-olds use pitch accent types and deaccentuation to mark topic and focus at the sentence level and how they differ from adults. The topic and focus were non-contrastive and realized as full NPs. A picture-matching game was designed to elicit topic-focus structures. It was found that children realise topic and focus similarly frequently with H*L, whereas adults use H*L more frequently in focus than in topic in sentence-initial position and nearly only in focus in sentence-final position. Further, children frequently realise topic with accentuation, whereas adults mostly deaccent sentence-final topic and use H*L and H* to realise sentence-initial topic because of rhythmic motivation. These results show that 4- and 5-year-olds have not acquired H*L as the typical focus accent and deaccentuation as the typical topic intonation.

GERMAN 5-YEAR-OLDS' INTONATIONAL MARKING OF INFORMATION STATUS

Laura E. Herbst

MPI for Psycholinguistics

ID 1473

[full paper]

This paper reports on findings from an elicited production task with German 5-year-old children, investigating their use of intonation to mark information status of discourse referents. In line with findings for adults, new referents were preferably marked by H* and L+H*; textually given referents were mainly deaccented. Accessible referents (whose first mentions were less recent) were mostly accented, and predominantly also realised with H* and L+H*, showing children's sensitivity to recency of mention. No evidence for the consistent use of a special 'accessibility accent' H+L* (as has been proposed for adult German) was found.

have more unused room in their vowel space for new category learning. However, our results demonstrated that Germans improved twice as much (20 percentage points) as Spanish speakers (10 percentage points) following 5-sessions of training on English vowels (high-variability identification with feedback). The results suggest that the large first-language vowel inventory of German speakers facilitates rather than interferes with new learning.

LEARNING L3: WHY LEARNING FRENCH FIRST IS BETTER THAN LEARNING GERMAN FIRST

Laura Catharine Smith & Wendy Baker

Brigham Young University

ID 1661

[full paper]

This study investigated whether differences in cross-language similarity between English-French and English-German vowels would translate into differences in accurately identifying and discriminating French and German vowels (i.e., /i/, /y/, and /u/). In addition, this study investigated whether these same differences in cross-language perception would also translate into differences in accurately identifying and discriminating vowels in a novel third language. The results suggest that learners exposed to a language with a greater perceived difference with the L1 are more able to generalize their perception of their L2 vowels to a novel L3.

Foreign Language Acquisition IV: Perceptual Training

Friday, 9:00, Room: 6 (Black)

Chair: Grit Mehlhorn

SECOND LANGUAGE VOWEL PERCEPTION TRAINING: EFFECTS OF SET SIZE, TRAINING ORDER, AND NATIVE LANGUAGE

Kanae Nishi & Diane Kewley-Port

Indiana University

ID 1018

[full paper]

This paper reports results of a series of vowel training studies. Study 1 trained two groups of Japanese learners of English on American English vowels and examined the effects of training set sizes (nine vs three more difficult vowels); Study 2 trained Korean learners of English and examined the efficiency of training protocols using both nine- and three-vowel sets. Study 3 compared the Japanese and Korean results on the untrained materials. Results suggested following: 1) vowel training works best when a large set of vowels, rather than a subset, is used; 2) training focusing on a smaller yet difficult vowels may have detrimental effects on later learning; and 3) improvement due to training on nonsense words may or may not carry over to untrained real word materials, possibly due to an interaction between native and non-native phonology.

AUDITORY TRAINING OF ENGLISH VOWELS FOR FIRST-LANGUAGE SPEAKERS OF SPANISH AND GERMAN

Paul Iverson & Bronwen Evans

University College London

ID 1082

[full paper]

This study compared how first-language Spanish and German speakers learn English vowels via computer-based auditory training. Spanish has fewer vowels than German, and thus Spanish speakers may

Friday, 10:00

Poster VII

Friday, 10:00

Chairs: Matthias Jilka, Jacques Koreman

EFFECTS OF PHONEME REPETITION IN SPOKEN UTTERANCE GENERATION*Markus Damian & Nicolas Dumay*

University of Bristol

ID 1346; Poster No. 1

[full paper]

The degree of phonological advance planning in spoken production was investigated with a paradigm in which speakers performed speeded naming responses to coloured line drawings of objects. Colours and object names were chosen such that a phoneme matched, or mismatched, between adjective and noun. A facilitatory effect of repeated phoneme was demonstrated, which was found not only when the phoneme occupied the word-initial position ("green goat"), but also in the central ("black pan") or word-final ("black monk") position. These results imply that speakers planned the phonological content of the entire phrase before starting their articulation. A facilitatory effect was additionally found when the repeated phoneme occupied a different position within each word ("green flag"). The latter result suggests that the spoken production system represents segments independently of their position within a word.

EMA AND THE CRUX OF CALIBRATION*Andreas Zierdt*

Institute of Phonetics and Speech Processing, LMU Munich

ID 1511; Poster No. 3

[full paper]

Electro-Magnetic-Articulography has been a well-established technology for many years. The new AG500 System even allows the investigation of articulatory movements in three dimensions. Still, calibration is a crucial point to obtain reliable and accurate data. After a short glance of the mathematical background and a review of previous methods, the present Circal device is discussed. Due to its construction a basic calibration problem probably remains, since the Circal neglects sensor orientations outside of the x/y-plane. Depending on the sensors actual position and orientation, a suboptimal calibration can have a mild or dramatic influence on the position calculation, which might even fail. Several approaches are thinkable to overcome the calibration problem, three types are discussed, which can be characterized as mechanical, physical, and mathematical solution. Finally the actual work on a mathematical solution is briefly presented.

SOUND DELETION IN COLLOQUIAL PERSIAN*Shahrbano Suzanne Assadi*

Laboratoire de Phonétique et Phonologie (UMR7018) CNRS/ Sorbonne Nouvelle

ID 1635; Poster No. 5

[full paper]

Among the differences that distinguish colloquial Persian from the formal variety is the deletion of sounds. This study is based on a corpus of 20 minutes of conversation with three native speakers from Tehran. The results show that 6% of sounds are deleted in colloquial Persian. Consonants are more likely to be deleted than vowels. Among consonants, the most frequent are the dentals and their deletion occur at the end of the syllable, especially in consonant clusters with the same place of articulation. The deletion affects more grammatical words than lexical ones.

LINGUAL CO-OCCURRENCE CONSTRAINTS IN BABBLING: AN ACOUSTICAL STUDY*Christine L. Matyear*

The University of Texas at Austin

ID 1667; Poster No. 7

[full paper]

Acoustical measurements of F2 transitions of 370 babbled CV sequences showed that places of articulation for consonantal closure correlate highly with vocalic tongue frontness/backness. This finding is interpreted as a confirmation of the MacNeilage & Davis Frame-Content theory of speech development.

DYNAMIC PHONETIC DETAIL IN LEXICAL REPRESENTATIONS*Christo Kirov & Adamantios Gafos*

Department of Linguistics, New York University

ID 1694; Poster No. 9

[full paper]

A dynamical model of phonetic detail is presented. The model is compared to an exemplar-based model, which has been shown to offer an account of (presumed) frequency-dependent lenition processes. The dynamical model is shown to account for the same lenition patterns. However, there is a key difference. In contrast to the exemplar model, the dynamical model is inherently temporal. This provides a handle on the temporal dimension of assembling phonological representations.

THE PHONETIC EVOLUTION OF REDUPLICATED EXPRESSIONS: REDUPLICATION, LEXICAL TONES AND PROSODY IN NA (NAXI)*Alexis Michaud¹ & Jacqueline Vaissière²*¹Langues et Civilisations à Tradition Orale, CNRS/ Sorbonne/ Sorbonne Nouvelle; ²Laboratoire de Phonétique et Phonologie, CNRS/ Sorbonne Nouvelle

ID 1075; Poster No. 11

[extra files] [full paper]

In Na, a Sino-Tibetan language with lexical tones, some reduplication schemes involve tone change, whereas others consist in full reduplication without tonal change. The synchronic coexistence of these two sets allows for an experimental comparison, which leads to a simple explanation. All the reduplication schemes of Na appear to originate in total reduplication, with-

out tone change, the schemes which now involve tone change resulting from a later evolution: the phonologisation of the effect of intonational boundaries on pitch. A High tone in final position within the reduplicated compound is lowered to Mid; an initial Low tone is raised, also to Mid. A reflection is set out concerning the historical conditions under which the allophonic variation of lexical tones could be reinterpreted as a difference of tonal categories.

AFFECTIVE SPEECH GATING

Ioulia Grichkovtsova¹, Anne Lacheret², Michel Morel¹, Virginie Beaucousin³ & Nathalie Tzourio-Mazoyer³

¹CRISCO, Université de Caen; ²MoDyCo, Université Paris X; ³GIN, CNRS UMR 6194, GIP Cyceron

ID 1539; Poster No. 13

[full paper]

This study tested the hypothesis that emotions may be identified earlier than attitudes in the flow of speech. The gating paradigm was chosen to investigate if such differentiation between emotions and attitudes was possible. Perception test results included the following variables: the identification point, the isolation point and the confusion matrices. Acoustic analysis was conducted and linked to the perception results. Anger and sadness were separated from the other studied affective states on the basis of the results analysis. Interestingly, happiness followed the identification pattern found for attitudes. The future directions of work are presented.

DIFFERENTIAL HEIGHT SPECIFICATION IN FRONT VOWELS FOR GERMAN SPEAKERS AND TURKISH-GERMAN BILINGUALS: AN ELECTROENCEPHALOGRAPHIC STUDY

Silvia Lipski, Aditi Lahiri & Carsten Eulitz

University of Konstanz

ID 1592; Poster No. 15

[full paper]

Despite similar phonetics, phonological analyses suggest a differential tongue height specification of the vowels /i/ and /e/ in Turkish and German. This was tested by use of the mismatch negativity (MMN), an automatic change detection response of the brain, which was recorded for Turkish-German bilinguals and German listeners. Our results support the predictions about the differential specification of tongue height features, i.e. in Turkish /e/ is specified for [LOW] and not underspecified as in German; whereas /i/ is underspecified for height in Turkish and specified for [HIGH] in German.

SEX-SPECIFIC DIFFERENCES IN F0 AND VOWEL SPACE

Adrian P. Simpson & Christine Ericsdotter

Friedrich-Schiller-Universität Jena

ID 1333; Poster No. 17

[full paper]

It has been suggested that the larger area of the average female acoustic vowel space is a consequence of compensating for poorer harmonic sampling of the spectral envelope resulting from a higher f0. This predicts that there should be variation in vowel space size within any group of males or females representing suf-

ficient interindividual range of average f0. Inspired by this, the present paper examines whether there is a correlation between a speaker's f0 and the size of the speaker's F2xF1 vowel space. A highly significant correlation between f0 and vowel space size is found in the female group of a sample of 87 German students. However, no such correlation is found between f0 and the Euclidean distance between same speaker tokens of /e:/ and /a:/.

SPECTRAL AND DURATIONAL PROPERTIES OF VOWELS IN KUNWINJUKU

Janet Fletcher¹, Hywel Stoakes¹, Deborah Loakes¹ & Andrew Butcher²

¹University of Melbourne; ²Flinders University

ID 1695; Poster No. 19

[full paper]

In this paper we investigate the spectral properties of vowels in a Northern Australian language, Kunwinjku. The language illustrates typical vowel dispersion patterns of other languages of the region, and of 5-vowel languages in general. The spectral properties of vowels suggest a system of sufficient dispersion, with phonemic close vowels being realized in the close/mid-close region of the vowel space and with a general anchoring of the system by an open central vowel. Vowel height also interacts with vowel segment duration, with open vowels being generally longer than relatively close vowels.

ON THE ACOUSTIC CHARACTERISTICS OF FRENCH SCHWA

Cécile Fougeron¹, Cédric Gendrot¹ & Audrey Bürki²

¹Laboratoire de Phonétique et Phonologie, UMR7018 CNRS-Sorbonne Nouvelle; ²Laboratoire de Phonétique et Phonologie, UMR7018 CNRS-Sorbonne Nouvelle and Laboratoire de Psycholinguistique Expérimentale, Université de Genève

ID 1698; Poster No. 21

[full paper]

This paper presents an acoustic study on the phonetic properties of French schwa based on the analysis of a large corpus of radio broadcasted news. In order to address the question of whether the optional status of schwa correlates with a specific phonetic nature, optional French schwa is compared to its neighboring full front rounded vowels /2/ and /9/, and to obligatory schwas. While optional schwas overlap with the acoustical space of its neighbors (being closer to /2/), it differs from both /2/ and /9/ in terms of aperture, degree of rounding, duration and variability of F2. Optional schwas differ from obligatory schwas by a greater aperture.

SENTENCE-DOMAIN EFFECTS ON TONAL ALIGNMENT IN ITALIAN?

Caterina Petrone¹ & D. Robert Ladd²

¹Laboratoire Parole et Langage (LPL) & Université de Provence; ²University of Edinburgh

ID 1221; Poster No. 23

[full paper]

In a production experiment, we investigated sentence-domain effects on the alignment of Italian ac-

cents, and found that the nuclear peak is aligned earlier in long sentences than in short sentences. These findings are superficially contrary to traditional “time-pressure” explanations for variability in tonal alignment and raise some questions about the domain of pitch gestures. When the effects of sentence duration on speaking rate are taken into account, however, our results may be consistent with much previous work.

PHONOLOGICAL CONTEXT EFFECTS FOR VOICING AND DEVOICING IN FRENCH

Isabelle Darcy¹ & Frank Kügler²

¹University of Tuebingen; ²University of Potsdam

ID 1244; Poster No. 25

[full paper]

We examine occurrences of categorical assimilation (neutralizations) in French, voiced and unvoiced word-final obstruents, and their perception in different phonological contexts. We first show the categorical nature of the alternation, supported in Exp. 2 by perceptual categorization data. In Exp. 3, the interpretation of this first percept appears to be corrected in certain contexts, inducing compensation. We argue that context effects are phonological in this case, rather than auditory or phonetic. We conclude that linguistic knowledge of alternations is necessary in compensation for categorical assimilation.

THE EFFECT OF INCREDULITY AND PARTICLE ON THE INTONATION OF YES/NO QUESTIONS IN TAIWAN MANDARIN

Yu-Ying Chuang, Yi-Hsuan Huang & Janice Fon

Graduate Institute of Linguistics, National Taiwan University

ID 1392; Poster No. 27

[full paper]

This study explored the effect of incredulity and particle on the intonation of yes/no questions in Taiwan Mandarin. Two types of questions were examined – ones with and without the question particle *ma*. Results showed that to convey incredulity, the overall pitch would be raised and enlarged. Moreover, questions without particles are significantly higher in pitch and larger in pitch range than questions with particles. This thus led to a conclusion that the degree of incredulity being expressed in questions with *ma* might not be as great as that in questions without *ma*.

TONE AND QUANTITY IN THE LIMBURGIAN DIALECT OF NEERPelt

Jörg Peters

Radboud University Nijmegen

ID 1563; Poster No. 29

[full paper]

The Limburgian dialect of Neerpelt is located in the northwestern corner of an area whose dialects are known for having a lexical tone contrast. It is not clear whether Neerpelt still belongs to the tonal dialects of Limburg, and there are other dialects in northwestern Limburg using a quantity contrast in place of the tonal contrast. To examine whether the dialect of Neerpelt has a tonal contrast, two reading tasks were carried out using tonal

minimal pairs from other Limburgian dialects as target words in different prosodic contexts. The results suggest that the dialect of Neerpelt has both pitch differences which cannot be reduced to durational differences and durational differences which can-not be reduced to a quantity contrast. We conclude that the dialect of Neerpelt has a lexical tone contrast comparable to the contrast in other tonal dialects of Limburg.

THE CONTINUUM OF SPEECH RHYTHM: COMPUTATIONAL TESTING OF SPEECH RHYTHM OF LARGE CORPORA FROM NATURAL CHINESE AND ENGLISH SPEECH.

Matthew Benton¹, Liz Dockendorf¹, Wenhua Jin¹, Yang Liu² & Jerold Edmondson¹

¹The University of Texas at Arlington; ²The University of Texas at Dallas

ID 1591; Poster No. 31

[extra files] [full paper]

Past research on the dichotomy of language rhythm classes (stress- vs. syllable-timing) has typically been performed on constructed speech data, e.g. “The North Wind and the Sun” text. Our research goes beyond the previously established speech rhythm studies by combining: (1) a data set of 175 minutes of audio from large corpora of natural English and Chinese speech and (2) natural language processing techniques to compute phonetic segment-statistics. Our findings generally agree with the previous result that Chinese and English fall into distinct rhythm categories. However, when individual speaker data were considered in our analysis, an overlapping continuum across both languages was shown to exist. These results indicate that using “ideal” data to measure speech rhythm does not fully explain the division between languages.

PERCEPTION AND PRODUCTION IN PITCH ACCENT SYSTEM OF KOREAN

Jungsun Kim & Kenneth de Jong

Indiana University

ID 1607; Poster No. 33

[extra files] [full paper]

This research investigates dialectal variations of pitch accent system in Korean. Specifically, this paper is focused on how speakers of a non-lexical pitch accent dialect are influenced by a lexical pitch accent dialect. Three experiments have participants from two dialectal regions produce pitch accent minimal pairs, and imitate and identify continua spanning pitch accent categories. Results show general correlation between productions and imitations and identifications in Kyungsang Korean speakers, and clear cases of divergence in Cholla speakers. Identification patterns suggest a variety of categorization schemes in these speakers, while their imitation results consistently indicate a lack of robust categorization.

VP FOCUS AND NARROW FOCUS IN KOREAN

Sun-Ah Jun¹ & Hee-Sun Kim²

¹UCLA; ²Stanford

ID 1671; Poster No. 35

[full paper]

According to the Focus Projection theory, a focused word projects its focus to a larger syntactic constituent. When a Verb Phrase (VP) has two arguments (e.g., “gave a boy a book”), focus on the verb-final argument licenses focus on the VP. According to the Information Packaging theory of focus applied to Korean, focus on a theme argument licenses focus on the VP. However, production data of Korean focus supports neither theory. Results show that in Korean a VP-initial argument is the most prominent in a sentence with VP focus regardless of the order or the type of the arguments, but is still not as prominent as the VP-initial word receiving narrow focus.

FORMANT STRUCTURES OF VOWELS PRODUCED BY STUTTERERS AT NORMAL AND FAST SPEECH RATES

Fabrice Hirsch¹, Florence Fauvet², Véronique Ferbach-Hecker¹, Marion Bechet¹, Fayssal Bouarourou¹ & Jean Sturm¹

¹Phonetics Institute of Strasbourg - Speech and Cognition Group; ²Centre Hospitalier Universitaire de Strasbourg // Phonetics Institute of Strasbourg - Speech and Cognition Group

ID 1103; Poster No. 37

[full paper]

The aim of this study is to analyse the steady-state portion of the first two formants (F1) and (F2) in the production of [CVp] sequences, containing vowels [i, a, u] pronounced in two speech rates (normal and fast), by groups of untreated and treated stutterers, and control subjects. Comparing data between the three groups of speakers, a reduction of vowel space is observed for stutterers at a normal speaking rate. When speech rate increases, no reduction of vowel space is noticeable, contrary to treated stutterers and controls.

DISCRIMINATION OF LEVEL TONES IN CANTONESE-LEARNING INFANTS

Ka Yan Margaret Lei

Language Acquisition Laboratory, The Chinese University of Hong Kong

ID 1620; Poster No. 39

[full paper]

This is an exploratory study on the perception of Cantonese tones in infants learning Hong Kong Cantonese as their native language. In the study, we examined whether infants at the ages of 6- to 8-months old possess the ability to discriminate level tones. Our findings revealed that infants were capable of discriminating at least some of the tonal contrasts in Cantonese. The results showed evidence for a possible relationship between the ease of tone discrimination and the degree of acoustic similarity between the tones. Among the three pairs of Cantonese level tones tested in our study, the pair having the greatest F0 difference, the high-level tone (T1) with the mid-low level tone (T6), was best discriminated as compared with the other two tone pairs which were acoustically closer in terms of F0 values.

SPEECH PERCEPTION AND TRANSITION OF SOUND CHANGE

Ching-Pong Au

Laboratoire Dynamique du Langage, CNRS-Lyon2

ID 1627; Poster No. 41

[full paper]

A dynamic multi-agent model was built in order to simulate language acquisition and sound change in a speech community. The simulation results provide plausible solutions that resolve some controversial issues regarding the sound change implementation such as the discrepancy between the Neogrammarian hypothesis and the lexical diffusion hypothesis. In the simulations, the patterns described by the two seemingly contradictory hypotheses both exist in the implementation of sound changes depending on the consistency of perceptual responses of the speakers in the population.

VOICE ONSET TIME AND THE SCOTTISH VOWEL LENGTH RULE IN ABERDEEN ENGLISH

Dominic J.L. Watt & Jillian H. Yurkova

University of Aberdeen

ID 1488; Poster No. 43

[full paper]

Voice Onset Time (VOT) was measured in word-initial /p t k b d g/ in carrier words read from lists by 9 speakers of Aberdeen English (AE). Vowel durations for /i e E a O o u/ and /ai/ were also measured so as to assess the extent to which the Scottish Vowel Length Rule (SVLR) [2] operates in the Aberdeen vowel system.

EFFECTS OF LENGTH OF RESIDENCE AND SPEECH ACTIVITIES ON DEGREE OF FOREIGN ACCENT

Xinchun Wang¹ & Jianhong Chen²

¹California State University, Fresno; ²The University of Shanghai for Science and Technology

ID 1114; Poster No. 45

[full paper]

A group of native Mandarin speaking professors teaching in a US university with a mean length of residence (LOR) of 12 years in North America was rated as accented as a group of native Mandarin speaking professors teaching English in China. Different speech activities did not appear to affect degree of accent. However, long excerpt of filtered speech may be used with caution for accent rating.

QUANTIFYING THE INTERLANGUAGE SPEECH INTELLIGIBILITY BENEFIT

Hongyan Wang¹ & Vincent J. van Heuven²

¹Dept. of English, Shenzhen University, PR China;

²Phonetics Laboratory, Leiden University Centre for Linguistics

ID 1263; Poster No. 47

[extra files] [full paper]

Generally, native listeners of a target language are better at understanding foreign-accented speech than any other type of listener, with one possible exception: if the listener speaks the same mother tongue as the speaker, e.g. when Chinese speakers and listeners communicate in English, the information transfer may be

more successful than with a native English listener. We review literature data, and present results of our own in an attempt to come up with the optimal quantification of this so-called interlanguage speech intelligibility effect. We argue that the benefit is best quantified in relative terms, as the residual in a linear model that remains after the main effects of speaker and hearer language background have been included.

TEMPO-NORMALIZED MEASUREMENT AND TEST SET DEPENDENCY IN OBJECTIVE EVALUATION OF ENGLISH LEARNERS' TIMING CHARACTERISTICS

Shizuka Nakamura¹, Hajime Tsubaki¹, Yusuke Kondo², Michiko Nakano² & Yoshinori Sagisaka¹

¹GITI, Language and Speech Science Res. Labs, Waseda University, Japan; ²School of Education, Language and Speech Science Res. Labs, Waseda University, Japan

ID 1644; Poster No. 49

[full paper]

In this paper, we present experimental results on tempo-normalized measurements and sentence sets for objective evaluation of English speech timing by Japanese learners. Phone-independent versus phone-dependent tempo normalizations were compared using raw duration differences between learners and native speakers. To observe the effect of test sentence differences, sentence length was adopted as a criterion. Through experiments, high correlations between subjective judgment and duration differences with normalization showed remarkable advantage of phone-dependent normalization. Large correlation differences between long sentences and short sentences indicated the need of careful choice of test materials. The subjective score estimation by linear regression showed better performance using long sentences and duration differences with phone-dependent normalization than conventional one using all sentences and duration differences without normalization.

THE PERCEPTION OF ITALIAN AND SPANISH LEXICAL STRESS: A FIRST CROSS-LINGUISTIC STUDY

Iolanda Alfano¹, Joaquim Llisterri² & Renata Savy³

¹Università degli Studi di Salerno - Universitat Autònoma de Barcelona; ²Universitat Autònoma de Barcelona; ³Università degli Studi di Salerno

ID 1341; Poster No. 51

[full paper]

A preliminary experiment studying the perception of lexical stress in isolated Italian words by Spanish subjects has been carried out in order to find out possible cross-linguistic differences in closely related languages. The results show that there is a combined effect of native language expectations and acoustic information present in the signal.

AUDITORY-PERCEPTUAL IDENTIFICATION OF VOICE QUALITY BY EXPERT AND NON-EXPERT LISTENERS

Olaf Köster¹, Michael Jessen¹, Freshta Khairi² & Hartwig Eckert³

¹Bundeskriminalamt; ²University of Bonn; ³University of Flensburg

ID 1152; Poster No. 53

[full paper]

In a perception task 13 types of voice quality were to be identified by two listener groups. Expert listeners with a professional background in forensic phonetics performed significantly better than the non-expert group. Furthermore, the non-experts produced more heterogeneous types of error. For prominent types of voice quality and stimuli with a strong scalar degree low error rates were observed for the experts.

INFLUENCES OF PITCH AND SPEECH RATE ON THE PERCEPTION OF AGE FROM VOICE

Ralf Winkler

Technical University Berlin

ID 1622; Poster No. 55

[full paper]

Listeners are able to rate a speaker's age with reasonable accuracy. Although several speech features are known to be characteristic for specific age groups, there is less knowledge about the perceptual relevance of that parameters. This paper describes the results of a perception study, where single word stimuli were synthesized and rated regarding the perceived age by 20 listeners. All combinations of pitch and speech rate were synthesized with male and female voices. Results show that speech rate had the largest impact on listeners' judgement. Although pitch variations alone did not show a large impact on listeners' judgements, significant differences between selected pitch levels at slow and fast speech exist. Our results contribute to the identification of the relevant features signaling a speaker's age. Results further support the assumption that a set of parameters almost always interact in signaling a speaker's age.

IDENTIFYING AND EVALUATING APRAXIC SPEECH DEFICITS USING MAGNETOMETRY

Dani Byrd¹ & Katherine S. Harris²

¹USC Department of Linguistics; Haskins Laboratories;

²Haskins Laboratories, New Haven, CT

ID 1009; Poster No. 57

[full paper]

An understanding of the relationship of speech and language symptoms to lesions in the frontal region of the dominant hemisphere depends on a fuller description of the speech phenomena than can be provided by transcriptional or acoustic investigation alone. This paper provides examples of how articulatory movement tracking can aid in describing apraxic speech deficits.

A PHONETIC AND PHONOLOGICAL STUDY OF SO-CALLED 'BUCCAL' SPEECH PRODUCED BY TWO LONG-TERM TRACHEOSTOMISED CHILDREN

Harveen Khaila¹, Jill House², Lesley Cavalli³ & Elizabeth Nash³

¹City & Hackney Teaching PCT; ²Dept of Phonetics & Linguistics, UCL; ³Speech and Language Therapy Dept, Great Ormond Street Hospital (GOSH)

ID 1476; Poster No. 59

[full paper]

Analysis of the 'buccal' speech spontaneously developed by two long-term tracheostomised children reveals speaker-specific strategies for setting air in motion, for generating a source of sound to replace normal voice, and for articulating vowels and consonants. The implications for communicating phonological contrasts are discussed.

CORRELATES OF TEMPORAL HIGH-RESOLUTION FIRST FORMANT ANALYSIS AND GLOTTAL EXCITATION

Manfred Pützer¹ & Wolfgang Wokurek²

¹Institut für Phonetik, Universität des Saarlandes, Saarbrücken; ²Institut für Maschinelle Sprachverarbeitung, Universität Stuttgart

ID 1471; Poster No. 61

[full paper]

This preliminary study visualizes the glottal excitation in a temporally highly resolved estimate of the first formant. Instantaneous estimates of the frequency and bandwidth of the first formant closely follow the electroglottographic contour. This is demonstrated for modal, breathy, and hoarse phonation of an [a:] produced by one male and one female speaker. The temporally highly resolved formant contours show glottal features such as the different durations of the open phase and fundamental frequency and/or amplitude perturbations of the vocal fold vibration. Keywords: linear prediction, electroglottography

THE PHONETICS OF EMPHASIS

Klaus J. Kohler & Oliver Niebuhr

Institute of Phonetics and Digital Speech Processing (IPDS), Christian-Albrechts-University, Kiel

ID 1055; Poster No. 63

[full paper]

Research is reported in a framework linking phonetic exponents to communicative functions. From the heterogeneous field of 'emphasis', two areas are selected: 'positive/negative expressive intensification' of verbal meaning, e.g. it's delicious! vs it stinks! German data are collected in controlled monologues and dialogues. On the hypothesis that 'positive emphasis' strengthens sonority, 'negative emphasis' weakens it, aspects of f₀, acoustic energy, duration, voice quality are tested statistically.

AN INCREMENTAL ANALYSIS OF DIFFERENT FEATURE GROUPS IN SPEAKER INDEPENDENT EMOTION RECOGNITION

Marko Lugger & Bin Yang

Chair of System Theory and Signal Processing, University of Stuttgart

ID 1390; Poster No. 65

[full paper]

This paper investigates the classification of different emotional states using speech features from different feature groups. We use both suprasegmental feature groups like pitch, energy, and duration and segmental feature groups like voice quality, zero crossing rate, and articulation. We want to exploit the selection of the most relevant features from these different feature groups to get a better understanding of the speaker independent emotion recognition. We study how these different feature groups overlap or complement each other. By using the sequential floating forward selection algorithm (SFFS), feature subsets maximizing the classification rate will be generated. For this purpose, we use a Bayesian classifier and a speaker independent cross validation. A detailed study is also done on the relevance of the feature groups for classifying different emotion dimensions known from the psychological emotion research.

AN ACOUSTIC DESCRIPTION OF HIGH VOWEL SYNCOPE IN LEZGIAN

Ioana Chitoran¹ & Ayten Babaliyeva²

¹Dartmouth College; ²Ecole Pratique des Hautes Etudes

ID 1492; Poster No. 67

[extra files] [full paper]

This paper reports on a preliminary acoustic description of high vowel syncope in one dialect of Lezgian, a NE Caucasian, Daghestanian language. Acoustic data from one speaker confirm the absence of a vowel in the syncope context, but traces of it remain visible (and audible) in the preceding stop release or fricative noise. This raises the question of possible vowel devoicing. It also suggests that a relevant account for the facts should be based on gestural overlap rather than deletion. In support of this hypothesis, two types of measurements are reported. First, vowel duration shows that even non-high vowels are considerably shortened when stress is shifted away from them, participating in a similar process as high vowels. Second, the duration of the inter-burst interval in resulting stop sequences varies depending on the stop place of articulation.

LANGUAGE EFFECTS ON THE DEGREE OF VISUAL INFLUENCE IN AUDIOVISUAL SPEECH PERCEPTION

Yuchun Chen¹ & Valerie Hazan²

¹Dept of Human Communication Sciences, UCL; ²Dept of Phonetics and Linguistics, UCL

ID 1271; Poster No. 69

[extra files] [full paper]

This study investigated language factors in the use of visual information in speech perception in Mandarin-Chinese, Thai, Japanese and English, languages differing in their use of tone information. Adult participants

were presented with the stimuli /ba/, /da/, /ga/ spoken by two English and two Mandarin-Chinese speakers. A syllable identification task was presented in auditory, visual and audiovisual (congruent and incongruent) conditions in clear and in noise. Chinese listeners used visual information in audiovisual speech processing to the same extent as English listeners, and the magnitude of the McGurk effect was the same across both groups in the noisy condition. Japanese and Thai participants showed a stronger McGurk effect in clear condition, which might be caused by the foreign-language effect as all speakers were non-native for them. The hypothesis that a lower reliance on visual cues is found for tone languages is not supported by these results.

Friday, 13:20**Prosody XI: Lexical Tone**

Friday, 13:20, Room: 1 (Red)

Chair: David House

TONE PRODUCTION IN WHISPERED MANDARIN*Charles Chang & Yao Yao*

University of California, Berkeley

ID 1655

[full paper]

Acoustic analyses of voiced and whispered Mandarin Chinese reveal significant differences in duration and intensity among the four lexical tones, differences that are moreover similar across the two phonation types. In contrast to previous claims, however, these differences among the tones are found to shrink in whisper rather than being exaggerated to facilitate perception. Furthermore, individual variation exists in the production of whispered tones, which are found to shorten or lengthen with respect to voiced tones depending on the speaker.

ACOUSTIC ANALYSIS OF LEXICAL TONES IN CONTEMPORARY STANDARD SLOVENIAN*Peter Jurgec*

University of Tromsø

ID 1053

[full paper]

The present investigation in acoustic properties of tones in Slovenian addresses vowel duration, intensity and fundamental frequency. Although no statistical differences between both lexical tones (or pitch-accents) were found in the first and second variable, the third was found highly significant. The results differ greatly from what was previously established. Roughly, the tone is Low on the stressed and High on all post-tonic syllables, in the first lexical class. In the second, the situation is vice-versa, such that the stressed vowel is High in tone and the rest of prosodic word is Low.

EXPRESSING 'CONFIRMATION' IN SWEDISH: THE INTERPLAY OF WORD AND UTTERANCE PROSODY*Gilbert Ambrazaitis*

Linguistics and Phonetics, Centre for Languages and Literature, Lund University

ID 1442

[extra files] [full paper]

An exploratory study on the prosodic signaling of 'confirmation' in Swedish is presented. Pairs of subjects read short dialogs, constructed around selected target words, in a conversational style. A falling utterance intonation was found on the target word, and the signaling of word prosody (lexical pitch accent) appeared to be, to a certain degree, optional.

Prosody XII: Hesitation and Articulation Rate

Friday, 13:20, Room: 2 (Orange)

Chair: Ineke Mennen

HESITATIONS IN THIRD GRADERS' PRODUCTIONS OF DERIVED WORDS*Jamie L. Edrington, Eugene Buder & Linda Jarmulowicz*

The University of Memphis

ID 1371

[extra files] [full paper]

This study examined third grade children's use of hesitations in elicited productions of derived words containing a stress-changing suffix (-ity). Eight derived words produced by 20 typically developing third-grade children were phonetically analyzed for five different hesitation types. The number of hesitations used differed significantly as a function of the children's linguistic skill. Children who were adept in their linguistic abilities used more false starts, but children who were weaker in their linguistic abilities used more glottal stops and pauses. Therefore, children's use of different hesitations, found only through a phonetic analysis, may reflect their stored representation of the derived words.

VOCALIC HESITATIONS VS VOCALIC SYSTEMS: A CROSS-LANGUAGE COMPARISON*Ioana Vasilescu, Rena Nemoto & Martine Adda-Decker*

LIMSI-CNRS

ID 1504

[full paper]

This paper deals with the acoustic characteristics of vocalic hesitations in a cross-language perspective. The underlying question concerns the "neutral" vs. language-dependent timbre of vocalic hesitations and the link between their vocalic quality and the phonetic system of the language. An additional point of interest concerns the duration effect on vocalic hesitation compared to intra-lexical vowels. Acoustic measurements have been carried out in American English, French and Spanish. Results on vocalic timbre show that hesitations (i) carry language-specific information; (ii) whereas often close to measurements of existing vowels, they do not necessarily collapse with them. Finally, (iii) duration variation affects the timbre of vocalic hesitation and a centralization towards a "neutral" realization is observed.

MEASURING RELATIVE ARTICULATION RATE IN FINNISH UTTERANCES*Jussi Hakokari¹, Tuomo Saarni², Tapio Salakoski², Jouni Isoaho¹ & Olli Aaltonen³*¹Department of Information Technology, University of Turku; ²Turku Centre for Computer Science;³Department of Phonetics, University of Turku

ID 1401

[full paper]

This paper presents two investigations into articula-

tion rate, or the distribution of segmental duration, in a Finnish language speech corpus. The first study, rank ordering of short utterances according to their component words' articulation rate, reveals that 75 % or more of Finnish utterances can be expected show some level of final lengthening. Also initial shortening, or accelerated speaking rate in the beginning of utterances, is present in amounts clearly above chance level. The second study, an investigation into how relative duration progresses in utterances, confirms the observations mentioned before. Furthermore, the second study shows the initial and final effects are statistically significant. Importantly, the results are near-identical to those obtained independently from Southern Swedish, even though the languages and corpora in question are entirely different.

Production X: Frequency and Recency

Friday, 13:20, Room: 3 (Yellow)

Chair: Doris Mücke

THE EFFECT OF LEXICAL FREQUENCY ON TONE PRODUCTION

Yuan Zhao & Dan Jurafsky

Stanford University

ID 1164

[full paper]

Previous research has identified robust effects on segmental production of lexical factors like word frequency, predictability or neighborhood density. One question that remains unanswered is whether such lexical effects hold also at the suprasegmental level. This study investigates whether lexical factors such as usage frequency affect tone production in Cantonese. We recorded Cantonese monosyllabic words of high and low usage frequency, controlling for segmental factors. The results show that lexical factors do influence suprasegmental production. Words of the same tone but of different usage frequency differ significantly in pitch height. Low-frequency words are hyperarticulated and produced with relatively higher pitch. The overall tone space of low-frequency words is more expanded than that of their high-frequency counterparts.

AN EXEMPLAR-THEORETIC ACCOUNT OF SYLLABLE FREQUENCY EFFECTS

Michael Walsh, Hinrich Schütze, Bernd Möbius & Antje Schweitzer

Institute for Natural Language Processing, University of Stuttgart

ID 1432

[full paper]

This paper presents an exemplar-theoretic computational model of syllable frequency effects which yields simulation results in keeping with experimental results found in the literature. The argument posited here is that syllable duration variability is a function of segment duration variability for infrequent syllables. However syllable duration variability for frequent syllables cannot

be predicted from segment duration variability. The simulation results support the hypothesis that frequent syllables are accessed as units whereas infrequent syllables are more likely to be produced on-line from exemplars of their constituent segments.

PHONETIC DIFFERENCES BETWEEN MIS- AND DIS- IN ENGLISH PREFIXED AND PSEUDO-PREFIXED WORDS

Rachel Baker¹, Rachel Smith² & Sarah Hawkins¹

¹University of Cambridge; ²University of Glasgow

ID 1507

[full paper]

It has been claimed that speakers distinguish between phonemically-identical initial syllables that differ in morphological structure, but the phonetic details are poorly understood. Five female SSBE speakers read scripted dialogues containing words with such syllables, half with true prefixes (Pr) e.g. *mistimes*, *displease*, and half with pseudoprefixes (PsPr) e.g. *mistakes*, *displays*. Each word occurred both with nuclear stress and in post-nuclear position. Pr words were longer up to voicing onset in the second syllable and had longer vowel and VOT, and shorter [s] than PsPr words. In nuclear mis-words, the average amplitude of the burst + aspiration was higher in Pr than PsPr words. Implications for models of morphological decomposition are discussed.

Perception VII: Audio-Visual Effects

Friday, 13:20, Room: 4 (Green)

Chair: Georg Meyer

THE EFFECT OF INCONGRUENT VISUAL CUES ON THE HEARD QUALITY OF FRONT VOWELS

Hartmut Traunmüller & Niklas Öhrström

Dept. of Linguistics, University of Stockholm

ID 1092

[full paper]

Swedish nonsense syllables distinguished solely by their vowels [i], [y] or [e], were presented to phonetically sophisticated subjects auditorily, visually and in cross-dubbed audiovisual form with incongruent cues to openness, roundedness or both. Acoustic [y] dubbed onto optic [i] or [e] was heard as a retracted [i], while acoustic [i] or [e] dubbed onto optic [y] were perceived as rounded and slightly fronted. This confirms the higher weight of the more reliable information and that intermodal integration occurs at the level of phonetically informative properties prior to any categorization.

AUDITORY-VISUAL INTEGRATION IN THE PERCEPTION OF AGE IN SPEECH

Sascha Fagel

Berlin University of Technology

ID 1001

[extra files] [full paper]

Five speakers of different age uttering one sentence were recorded audiovisually. Stimuli were cre-

ated where auditory and visual information are coherent (from the same speaker) as well as incoherent (combinations of audio track from one speaker and video track from another speaker). The subjects' task was to rate the age either by the whole speaking person, only by the voice while ignoring the face, or only by the face while ignoring the voice. Results reveal that subjects integrate both modalities if available in all three tasks. Additionally it could be shown that a) this effect is stronger if visual information should be ignored, b) in coherent stimuli the subjects rely more on the visual information, and c) the robustness of the visual modality exceeds that one of the auditory modality. Overall results give evidence for vision as the leading modality with respect to age perception in audiovisual speech.

A PERCEPTUAL DESYNCHRONIZATION STUDY OF MANUAL AND FACIAL INFORMATION IN FRENCH CUED SPEECH

Emilie Troille, Marie-Agnès Cathiard & Christian Abry
Département ICP-Parole et Cognition de GIPSA-Lab
ID 1237 [full paper]

French Cued Speech, adapted from American Cued Speech, disambiguates lipreading by a manual code of keys allowing the deaf to recover a more accurate phoneme identification. Using movement tracking of manual and facial actions coproduced in CS, Attina et al. evidenced a significant anticipation of the hand over the lips. In this study we tested the natural temporal integration of this bimodal hand-face communication system, using a desynchronization paradigm in order to evaluate the robustness of CS to temporal decoherence. Our results obtained with 17 deaf subjects demonstrate hand gestures can be delayed relative to the lips without consequences for perception, as long as this delay does not push the hand outside the visible articulatory phase of the consonant constriction state. Perceptual coherence or recomposition of coherence (recoherence) depends crucially on the compatibility of hand and mouth states, i.e. on the timing patterns evidenced in preceding production studies.

Foreign Language Acquisition V: Vowels

Friday, 13:20, Room: 5 (Blue)

Chair: Patricia Ashby

THE PRODUCTION OF NORWEGIAN VOWELS BY FRENCH AND RUSSIAN SPEAKERS

Wim A. van Dommelen

Dep. of Language and Communication Studies, NTNU, Trondheim

ID 1530 [full paper]

This study looks into the production of Norwegian front and central vowels spoken by native and second language speakers with backgrounds from French and Russian, respectively. The vowels' first three formants

were measured and normalized to reduce the effect of speaker gender. Based on the vowel systems of the three languages involved, larger deviations in Russian than in French L2 productions were hypothesized. The expectations were to a certain degree borne out by the data. Apart from vowel pattern deviations, the two L2 groups' productions differ in terms of the scatter of the formant values. The results demonstrate the difficulty of explaining L2 acquisition behaviour by existing models.

OLD SOUNDS IN NEW CONTRASTS: L2 PRODUCTION OF THE ENGLISH TENSE-TAX VOWEL DISTINCTION

Juli Cebrian

Universitat Autònoma de Barcelona

ID 1576 [full paper]

This paper examines the production of the English tense-lax contrast in high and mid front vowels by native speakers of Catalan. Despite the absence of temporal contrasts in the L1, Catalans have been found to rely on duration in their perception of English vowels. Some English vowels have been found to be perceived by Catalans as near identical to L1 vowels. This study explores this further by examining English speakers' perception of Catalan vowels. In addition, reliance on temporal and spectral cues is assessed in an L2 production experiment. Results indicate that learners implement a temporal contrast but mostly fail to produce a spectral contrast even when perceived similarity data predicted accurate L2 production.

CROSS-LANGUAGE PERCEPTUAL ASSIMILATION AND DISCRIMINATION OF SOUTHERN BRITISH ENGLISH VOWELS BY GREEK AND JAPANESE LEARNERS OF ENGLISH

Angelos Lengeris & Valerie Hazan

University College London

ID 1340 [extra files] [full paper]

This study examined whether Greek (Gr) and Japanese (J) learners of English perceive the Southern British English (SBE) vowels in the same way. Both languages have five vowel qualities in their vowel inventories but only Japanese has short/long versions of each quality. Experiment 1 assessed the perceived relationship between the eleven SBE vowels (in /b_b/ and /b_p/ contexts) and the L2 vowel categories for both language groups via a cross-language mapping test. Experiment 2 assessed the discrimination of several SBE vowel contrasts by the same participants via a categorical oddity discrimination test. Differences between the two L2 groups in both experiments support the view that L2 perception cannot be predicted by an abstract phonological description of the two vowel systems. L1 experience with duration helps perception of some L2 contrasts; Gr listeners nonetheless seem to be able to use duration to some extent.

Phonetic Psycholinguistics V: Phonological Variation

Friday, 13:20, Room: 6 (Black)
Chair: Andrea Weber

TRACKING PERCEPTION OF PRONUNCIATION VARIATION BY TRACKING LOOKS TO PRINTED WORDS: THE CASE OF WORD-FINAL /t/

Holger Mitterer & James M. McQueen

Max Planck Institute for Psycholinguistics

ID 1026

[full paper]

We investigated perception of words with reduced word-final /t/ using an adapted eye-tracking paradigm. Dutch listeners followed spoken instructions to click on printed words which were accompanied on a computer screen by simple shapes (e.g., a circle). Targets were either above or next to their shapes, and the shapes uniquely identified the targets when the spoken forms were ambiguous between words with or without final /t/ (e.g., bult, bump, vs. bul, diploma). Analysis of listeners' eye-movements revealed, in contrast to earlier results, that listeners use following segmental context when compensating for /t/-reduction. Reflecting that /t/-reduction is more likely to occur before bilabials, listeners were more likely to look at the /t/-final words if the next word's first segment was bilabial. This result supports models of speech perception in which prelexical phonological processes use segmental context to modulate word recognition.

MORPHOLOGICAL ENCODING VIA PHONOLOGICAL FEATURES: FROM PHONETICS TO GRAMMAR

Mathias Scharinger¹, Aditi Lahiri¹ & Henning Reetz²

¹University of Konstanz; ²University of Frankfurt

ID 1400

[full paper]

What is the best way to account for phonetic surface variants resulting from a productive vowel alternation? How does the lexical representation of such vowels look like? This paper proposes a single representation for the present tense root vowel in German irregular (strong) verb forms which show an alternation between [a]/[ɛ] and [e]/[i] in the corresponding person/number realizations. The claim is that the alternating vowels do not have a place of articulation feature specification in their underlying form. Evidence for this feature-based approach comes from two crossmodal immediate repetition priming experiments which compare irregular (strong) with regular (weak) verbs. The latter do not have any root vowel alternations.

A PSYCHOACOUSTIC BASIS FOR DISSIMILATION: EVIDENCE FROM TANGKHUL NAGA

Ryan K. Shosted

University of Illinois, Urbana-Champaign

ID 1518

[full paper]

The dissimilation of sequential aspirated obstruents is investigated in Tangkhul Naga. Acoustic, aerodynamic, and perceptual data were gathered to understand the alternation between aspirated and unaspirated prefixes in the verbal morphology of the language. Production data confirm that prefix onsets are aspirated only when the onset of the following syllable is sonorous. Two prefixes may occur in sequence. The traditional account predicts that the first of these will be unaspirated because it precedes an obstruent, not a sonorant. This is confirmed in the production data. However, perceptual data suggest that speakers of the language tend to hear an aspirated consonant in this position. This strengthens the claim that processing of repeated items is difficult and perhaps dispreferred—a psychoacoustic explanation for phenomena such as Grassmann's Law. This dissimilation pattern is still only perceptual in Tangkhul, but variation in production suggests dissimilation may be emerging at the production level also.

Friday, 14:20

Poster VIII

Friday, 14:20

Chairs: Katalin Mády, François Pellegrino

EPG CHARACTERISTICS OF VELAR STOPS IN NORMAL ADULT ENGLISH SPEAKERSMarko Liker¹ & Fiona Gibbon²¹University of Zagreb, Faculty of Humanities and Social Sciences; ²Queen Margaret University, Edinburgh

ID 1059; Poster No. 2

[full paper]

This study aimed to determine the main characteristics of normal tongue palate patterns for velar stops. EPG data from the EUR-ACCOR database were analyzed for nonsense VCV sequences containing /k/ in nine vowel contexts for seven English speaking adults. Incomplete EPG closure across the palate for /k/ occurred in 19% (range 4%-41%) of utterances with the most number of incomplete closures in /aka/ and the least in /uki/. As predicted, place of articulation was dependent on vowel context. The most fronted was the velar occlusion in /iki/ and the most retracted in /aka/. In terms of amount of contact, /k/ in /iki/ environment had almost twice as much tongue palate contact compared to /aka/ in all speakers (mean 42% for /iki/ compared to 22% for /aka/). There was considerable interspeaker variability in all variables. The implications of the results for diagnosing and treating speech disorders are discussed.

PHONETIC VARIATION IN ANONG VOWELS

Ela Thurgood

Department of English, California State University, Chico

ID 1176; Poster No. 4

[full paper]

The study presents an acoustic analysis of Anong vowels, a language on the edge of extinction, investigating how language death affects their range, distribution, and degree of variability. The three most significant processes operating on Anong vowels are then discussed: coloring, nasalization, and laryngealization.

BAYESIAN FRAMEWORK FOR VOICING ALTERNATION & ASSIMILATION STUDIES ON LARGE CORPORA IN FRENCHMartine Adda-Decker¹ & Pierre André Hallé²¹LIMSI/CNRS bat. 508 F-91403 Orsay cedex;²LPP/CNRS 19 rue des Bernardins, 75005 Paris

ID 1562; Poster No. 6

[extra files] [full paper]

The presented work aims at exploring voicing alternation and assimilation on large corpora using a Bayesian framework. A voicing feature (VF) variable has been introduced whose value is determined using statistical acoustic phoneme models (3-state gaussian mixture Hidden Markov Models). For all relevant consonants, i.e. oral plosives and fricatives, their surface form voicing feature is determined by maximising the

acoustic likelihood of the competing phoneme models. A voicing alternation (VA) measure counts the number of changes between underlying and surface form voicing features. Using a corpus of 70h of French journalistic speech, an overall voicing alternation rate of 2.7% has been measured, thus calibrating the method's accuracy. VA rate remains below 2% word-internally and on word starts and raises up to 9% on lexical word endings. In assimilation contexts rates grow significantly (>20%) highlighting regressive voicing assimilation. Results exhibit a weak tendency for progressive devoicing.

DIFFERENTIATING THE EFFECTS OF SPEECH TEMPO ON CV COARTICULATIONAugustine Agwuele¹, Harvey, M Sussman², Björn Lindblom³ & Amanda Miller⁴¹Texas State University, San Marcos; ²University of Texas At Austin; ³University of Texas at Austin;⁴Cornell University

ID 1595; Poster No. 8

[extra files] [full paper]

When suprasegmental and contextually induced variations interact, coarticulation of consonant and vowel undergoes more complex, and often subtle, resistances and assimilations. This study empirically documents the separate effects of increase in speech tempo on C-locus and V-midpoint F2 patterns. Two female speakers of American English each produced 810 tokens [3V1 * 3tops * 10V2 contexts * 3repetitions]. Modified locus equation regression metric was employed to dissociate the effects of tempo on the vowel F2midpoints relative to the F2onsets at the CV boundary. The analyses uncovered two main systematic changes to F2onsets and these were attributed to (a) rate-induced reduction of the vowel space, (b) rate-induced changes on coarticulation per se.

TEMPORAL EXTENT OF NASALIZATION RELATIVE TO THE TONGUE ARTICULATION IN FRENCH NASALIZED VOWELS

Julie Montagu

LPP UMR 7018/CNRS Paris 3

ID 1612; Poster No. 10

[extra files] [full paper]

The goal of this study is to investigate the temporal extent of nasalization in French oral vowels followed by nasal consonants. The extent of this nasalization was expected to vary as a function of vowel height. Results of this study show that the temporal extent of nasalization is related not only to the height dimension but also to the front-back position of the tongue. More specifically, it is shown that mid-low [E] patterns with front high vowels [i, y], and that mid-low [O] patterns with back high vowel [u], implying that the mid-low vowels do not pattern together as would be expected were the extent of nasalization mainly related to the height dimension. Links between the articulatory gestures (velum opening, height and front-back positions of the tongue) and their timing are outlined in the discussion.

ARTICULATORY MODELING OF CONSONANT RELEASE GESTURE

Hosung Nam

Yale University & Haskins Laboratories

ID 1648; Poster No. 12

[full paper]

This study examines the dynamics of consonant release motion. The release in syllable onset is shown to exhibit consonant-like speed to reach the rest position but the rest position corresponds to that of a concomitant vowel. We attempt to model such dual status of the release motion in the task-dynamic speech production model by splitting dynamic blending parameter into stiffness and target.

PHONETIC REALIZATION OF CONTRASTIVELY ASPIRATED AFFRICATES IN NEPALI

G. N. Clements & Rajesh Khatiwada

LPP, CNRS/Sorbonne-nouvelle (Paris)

ID 1650; Poster No. 14

[full paper]

Minimally contrastive aspirated affricates are rare among the world's languages. We investigate the realization of these sounds in Nepali, an Indo-Aryan language spoken in Nepal. Static palatography of CVCV forms reveals no articulatory difference between plain and aspirated affricates at the supralaryngeal level. However, a study of their acoustic characteristics shows that aspiration has variant realizations according to the nature of the consonant (voiced or voiceless), the identity of the following vowel (open /aa/ vs. palatal /i/), and position within the word (first vs. second syllable). Moreover, aspiration is not realized uniquely or even primarily at the affricate release, but more reliably on the following vowel, which is partly or entirely aspirated or assibilated, according to the following vowel. It is suggested that some of this variation may be attributed to the enhancement of an auditorily weak feature – [spread glottis] – by more salient secondary features.

SECONDARY STRESS VOWELS IN AMERICAN ENGLISH: TARGET UNDERSHOOT OF F1 AND F2 FORMANT VALUES

Mariko Sugahara

Doshisha University

ID 1680; Poster No. 16

[full paper]

We investigated whether the distinction between primary stress and secondary stress was ever correlated with vocal tract shape difference, which is acoustically realized as F1 and F2 transition differences. Since the syllables with secondary stress are usually shorter than those with primary stress, a natural prediction is that vocal tract articulators undergo some target undershoot when the secondary stress vowels are produced, which is in turn reflected as the target undershoot of F1 and F2 values. Our investigation of the F1 and F2 values of the first syllable of the DIgest(n)-diGEST(v) pair and the IMport(n)-imPORT(v) pair indicates that both F1 and F2 formants of the secondary stress vowels do not fully

achieve their target values. That is, there is a phonetic reduction (target undershoot) of F1 and F2 values of the secondary stress vowels.

THE SENSITIVITY OF INTRAORAL PRESSURE IN CONSONANTS AND CONSONANT CLUSTERS TO FOLLOWING VOWEL CONTEXT IN GERMAN

Laura Koenig¹ & Susanne Fuchs²

¹Haskins Labs and Long Island University, Brooklyn;

²Center for General Linguistics (ZAS) Berlin

ID 1705; Poster No. 18

[full paper]

Most studies of intraoral pressure (IOP) variation have focused on consonantal voicing, place, and manner, but indirect data suggest that IOP during consonants may also show coarticulatory effects due to surrounding vowels. Here, we explore how IOP varies in consonants and consonant clusters of two German speakers depending on the following vowel (/i, I/ vs. /A/). Our data suggest that IOP varies consistently with vowel context, particularly with respect to the duration of the IOP pulse. Comparison with simultaneously-recorded EPG data indicate that the IOP results reflect longer articulatory contact time in the high vowel context.

TALKING UNDER CONDITIONS OF ALTERED AUDITORY FEEDBACK: DOES ADAPTATION OF ONE VOWEL GENERALIZE TO OTHER VOWELS?

E.J.S. Pile¹, H.R. Dajani¹, D.W. Purcell² & K.G. Munhall¹

¹Queen's University, CANADA; ²University of Western Ontario, CANADA

ID 1710; Poster No. 20

[full paper]

Evidence of perceptual learning has been found in various sensory systems, including the auditory system, but little research has examined the specificity of such learning. In the current study, participants' auditory feedback was altered in real time such that they heard their production of "head" shifted completely to sound like "had". This feedback modification induces a compensatory change in speech production. Following a period of training with this auditory feedback, subjects were tested on the vowels in "hid" and "hayed" to determine whether learning on one vowel generalized to nearby vowels. All participants produced a reliable compensation to the altered feedback, but there was no transfer of this compensation to the other vowels. Production of the nearby vowels also had no effect on the unlearning of the trained vowel.

PROCESSING OF ACOUSTIC CUES FOR VOICING IN ENGLISH: A MMN STUDY

Outi Tuomainen & Heather van der Lely

Centre for Developmental Language Disorders and Cognitive Neuroscience, UCL, London

ID 1600; Poster No. 22

[full paper]

In speech perception, multiple acoustic cues are used to signal a specific speech sound contrast. In the present

experiment the processing of those acoustic cues that are responsible for syllable final stop consonant voicing in English was studied (i.e. vocalic duration and F1 offset frequency). Altogether nine subjects participated in an identification experiment of which six subjects took part in an active and passive (event-related potential, ERP) discrimination task. The subjects were presented with four different versions of English non-words [bot] and [bod] and their corresponding non-speech analogues as a control condition for the discrimination task. Results showed that the duration cue plays the most important role in British English syllable final stop voicing as measured with both identification and discrimination tasks. However, more data will be reported in the final paper. Keywords: speech perception, cue-weighting, Event-related potentials, mismatch negativity (MMN)

EFFECTS OF NOISE ON LEXICAL TONE PERCEPTION BY NATIVE AND NON-NATIVE LISTENERS

Tasha Dees¹, Ann Bradlow², Sumitrajit Dhar¹ & Patrick C.M. Wong³

¹Department of Communication Sciences and Disorders, Northwestern University; ²Department of Linguistics, Northwestern University; ³Department of Communication Sciences and Disorders, & Northwestern University Interdepartmental Neuroscience Program, Northwestern University

ID 1609; Poster No. 24

[full paper]

Speech in ecological environments is often accompanied by noise, which often proposes challenges to the listeners. In this study we examined differences in native Mandarin-speaking and native English-speaking adults' ability to perceive lexical tones and vowels in different noisy listening conditions (white noise and multi-talker babble noise) at different signal-to-noise ratios. We found that although white noise impaired both listener groups' speech perception ability, Mandarin multi-talker babble noise impaired Mandarin listeners to a greater extent. These results provide evidence for the differential effects of energetic and informational masking on native and non-native speech perception and the perceptual consequence of the reorganization of the auditory system after native language learning.

MUSICIANS OUTPERFORM NONMUSICIANS IN A STUDY WITH SHADOWING SPEECH

Barbara Pastuszek-Lipinska

Adam Mickiewicz University

ID 1646; Poster No. 26

[full paper]

In order to examine whether music education may be viewed as one of the factors which improve second language acquisition there were developed a research project. Two groups of subjects : with music training and without musical background were recruited and their responses to foreign language stimuli were recorded and then examined. Research results provide an evidence that musically trained people encounter fewer difficulties in foreign language sounds discrimination.

THE EFFECT OF DURATION SHORTENING ON THE ACOUSTIC CHARACTERISTICS OF THE DIPHTHONGS IN HANGZHOU CHINESE

Jian Li

Department of Chinese, Translation and Linguistics, City University of Hong Kong

ID 1353; Poster No. 28

[full paper]

This study investigates whether the shortening of duration caused by fast speech rate and syllable final stop has an effect on the spectral characteristics of the diphthongs in Hangzhou Chinese (HC). Diphthongs in the open and closed syllables produced in normal and fast speech are investigated. The results indicate while the duration of the diphthongs are shortened in fast speech as compared to normal speech, the spectral targets of the diphthongs are not substantially changed, which may be due to the increased articulatory effort. The diphthongs in the open and closed syllables are different in temporal and spectral characteristics, which are not likely to be a direct result of duration shortening. The relationship between vowel duration and spectral reduction is discussed in the paper.

AN ACOUSTIC STUDY OF PLAIN AND PALATALIZED SIBILANTS IN OCOTEPEC MIXE

Silke Hamann¹ & Heriberto Avelino²

¹Utrecht University; ²Berkeley University

ID 1665; Poster No. 30

[full paper]

In Totontepec Mixe, the stem-initial sibilants /s t͡s ʃ/ undergo a palatalization process when the prefix /j/ is added. Earlier descriptions report that this palatalization is realized either as addition of a glide (in the case of the alveolar and retroflex sibilants) or as a change in the primary place of articulation (in the case of the affricate). The acoustic measurements in the present study indicate that all palatalized sibilants have undergone secondary palatalization (they have an additional glide), and that only the retroflex segments show a consistent change in primary place of articulation.

AN ACOUSTIC STUDY OF VOWEL CONTRASTS IN NORTH INDIAN ENGLISH

Olga Kalashnik¹ & Janet Fletcher²

¹Monash University; ²University of Melbourne

ID 1696; Poster No. 32

[full paper]

The preliminary findings of an acoustic phonetic analysis of the vowels produced by speakers of English as a second language from North India are presented in this paper. Citation-form monophthong productions of a group of male NIE speakers were recorded and acoustically analysed. Results confirm a number of earlier impressionistic studies including the lack of a quality distinction between many tense/lax vowel pairs. North Indian English also appears to illustrate some vowel patterns that suggest it may be a separate subvariety of IE.

PROSODIC PARAMETERS FOR THE DETECTION OF REGIONAL VARIETIES IN ITALIAN

Elena Sardelli & Giovanna Marotta

Dept of Linguistics, Univ. of Pisa

ID 1227; Poster No. 34

[full paper]

The paper investigates the prosodic parameters which can be considered as relevant for the detection of regional varieties in spoken Italian. On the basis of acoustic analysis of three Italian varieties (Rome, Milan and Catanzaro), a crucial role is recognized in scaling and duration. Besides these features, tonal patterns and local pitch range also came out as being significant in variety discrimination through statistical distances. The same parameters are found relevant in sentence-type discrimination within the same variety. Results allow us to consider prosody as an important source of information for developing an automatic model in the geographical recognition of the speaker.

THE PHONETICS AND PHONOLOGY OF WH-QUESTION INTONATION IN MALTESE

Alexandra Vella

University of Malta

ID 1677; Poster No. 36

[extra files] [full paper]

This paper reports on a preliminary analysis of wh-question intonation in Maltese. The study aims to provide evidence for a characterisation of one aspect of the intonation of wh-questions in Maltese. It focuses on the initial H tone reported to occur at the beginning of such questions in Maltese and tries to establish an empirical basis for an analysis of this H tone. Results show that a H tone target is indeed always present on the wh-word in Maltese wh-questions. Moreover, the H target seems to be associated with the first syllable of the wh-word, whether this syllable is accented or not. Furthermore, the H tone in question is characterised by a raising in F0 as compared to other H tone targets across a range of different sentence types.

DURATION, PAUSES, AND THE TEMPORAL STRUCTURE OF MANDARIN CONVERSATIONAL SPEECH

Li-chiung Yang

Spoken Language Research, Dept. of Foreign Languages and Literature, Tunghai University, Taichung

ID 1687; Poster No. 38

[full paper]

In this study, we investigate pauses and durational patterns in Mandarin spontaneous conversation, as well as investigate how reliably such elements can serve as boundary-marking predictors across different types of speech modes and how language activities are affected by their cognitive correlates. Our results show that pause duration is significantly correlated with specific boundary status. We show that the duration elements are a fundamental component of discourse organization in spontaneous speech and simultaneously reflect exigencies of both cognitive processes and interactive communicative exchange.

MULTIFACTOR ANALYSIS OF DISCOURSE TURN IN GREEK

Antonis Botinis, Aikaterini Bakakou-Orphanou & Charalabos Themistocleous

Department of Linguistics, University of Athens

ID 1702; Poster No. 40

[full paper]

The present article concerns the study of turn construction in telephone conversations in Greek news broadcasts. The article is based on the segmentation of discourse in turn constructional units (TCUs) and the analysis of TCU structure as a function of prosodic characteristics of speaker, pause, fundamental frequency (F0), as well as syntactic structure and lexical elements, focusing on turn-taking and turn-leaving. The examination of significant correlations justifies a multifactor model of linear construction of TCU.

DISTRIBUTION OF DISFLUENCIES AND ERRORS IN ENGLISH DISCOURSE

Nanette Veilleux¹, Alejna Brugos², Stefanie Shattuck-Hufnagel³ & Alicia Patterson³

¹Simmons College; ²Boston University, MA;

³Massachusetts Institute of Technology, Cambridge, MA

ID 1712; Poster No. 42

[full paper]

this increase is due to the heavy processing requirement incurred either in planning the next chunk of discourse or in the introduction of many new or high perplexity entities. In a sample of academic lecture speech, we find that non-error disfluencies (e.g. filled pauses) occur preferentially shortly after but not right at the beginning of a discourse segment. This suggests that the processing load may not increase just at the boundary onset, i.e. that the speaker can make use of earlier planning during the first portion of the new segment. In contrast, errors of selection or serial ordering of grammatical elements do not show a boundary-related peak in their distribution across a discourse segment, supporting the hypothesis that this second kind of nonfluent event arises at a different point in the speech production planning process.

ABSTRACT PHONETIC CATEGORIES ARE PREDICTABLE FROM QUANTITATIVE PHONOTACTICS

Eleonora Cavalcante Albano

State University of Campinas

ID 1639; Poster No. 44

[full paper]

This paper presents a new finding and discusses some of its theoretical implications. The finding is that phonetic categorization, including major class membership, is entirely predictable from phonotactic biases in 3 Brazilian Portuguese word databases. The predictor parameters are log frequencies of 'VC, 'CV and V'CV sequences consisting of the 7 stressed vowels combined with the 19 onset consonants, plus the 5 pre-stressed vowels. Correct vowel categorization arises through discriminant function analysis of 'VC and 'CV data. Correct consonant categorization arises through discrimi-

nant function analysis of V'CV data. Results are consistent across databases and, thus, suggest that statistical biases in the lexicon can be stable enough to code phonetic categories. These findings have a bearing on the issue of the relationship of phonotactics to phonetics.

EVALUATING PHONOLOGICAL STATUS: SIGNIFICANCE OF PARADIGM UNIFORMITY VS. PROSODIC GROUPING EFFECTS

Renate Raffelsiefen & Caren Brinckmann

Institut für Deutsche Sprache

ID 1684; Poster No. 46

[full paper]

A central concern of linguistic phonetics is to define criteria to determine the phonological status of sounds or sound properties observed in phonetic surface form. Based on acoustic measurements we show that the occurrence of schwa in German is determined exclusively by segmental and prosodic structure, with no paradigm uniformity effects. We argue that these findings are consistent with a uniform representation of syllabic sonorants as schwa sonorant sequences in the lexicon. The stability of schwa in CVC-suffixes (e.g. German diminutive suffix -chen), as opposed to its phonetic absence in segmentally comparable context, is argued to be conditioned by the prosodic organisation of such suffixes external to the phonological word of the stem.

INTRODUCING A COMPREHENSIVE APPROACH TO ASSESSING PRONUNCIATION TALENT

Matthias Jilka¹, Henrike Baumotte¹, Natalie Lewandowski¹, Susanne Reiterer² & Giuseppina Rota¹

¹University of Stuttgart; ²University of Tübingen

ID 1462; Poster No. 48

[full paper]

This paper introduces a comprehensive project with the objective of finding the neuronal correlates of pronunciation talent. It concentrates on the first part of this undertaking, describing the extensive tests necessary to measure phonetic talent in its various dimensions such as production and perception, the segmental and suprasegmental levels of speech or different utterance forms such as spontaneous speech, reading and imitation. The project also investigates psychological and behavioral influences on pronunciation performance, as well as correlations with general linguistic aptitude. Example tasks making use of the distinction between categorical and realizational differences in intonation are used to demonstrate the detailed analyses allowed by the chosen approach. The described measures allow a reliable classification of talent level to be used in the selection of subjects for the neuroimaging studies in the second part of the project. Additionally, they provide general insights into the interactions between the examined talent-related parameters.

AN ACOUSTIC STUDY OF FIRST- AND SECOND-GENERATION GUJARATI IMMIGRANTS IN WEMBLEY: EVIDENCE FOR ACCENT CONVERGENCE?

Bronwen Evans, Ajay Mistry & Caroline Moreiras

University College London

ID 1505; Poster No. 50

[full paper]

The present study investigated differences in the vowel production of first- and second-generation Gujarati immigrants in Wembley, north London. Subjects were recorded producing the eleven British English monophthongal vowels in the phonetic context /hVd/. F1 and F2 formant frequency values were measured and compared with existing acoustic and auditory descriptions of London English. The results demonstrated that second-generation immigrants had not acquired the foreign-accented vowels of their parents. Instead, these subjects produced vowels that were more similar to Standard Southern British English (SSBE) speakers than to those of second-generation immigrants in similar ethnic communities in London.

FROM RUSSIAN TO POLISH: POSITIVE TRANSFER IN THIRD LANGUAGE ACQUISITION

Grit Mehlhorn

University of Leipzig

ID 1709; Poster No. 52

[full paper]

Multilingual learners possess a larger repertoire of phonetic-phonological parameters, of language awareness and phonological knowledge as well as an increased cognitive flexibility, which supports their acquisition of the phonetics of further foreign languages. This paper shows phonetic similarities between Russian (as L2) and Polish (as L3) which can be used for positive transfer by native speakers of German (L1) learning these Slavic languages. Pedagogical implications concerning the teaching of phonetics for a third language are drawn.

PERCEPTION OF MANDARIN TONES BY CHINESE- AND ENGLISH-SPEAKING LISTENERS

Tsan Huang

SUNY at Buffalo, Department of Linguistics

ID 1447; Poster No. 54

[extra files] [full paper]

This paper reports on two experiments that tested the hypothesis that native phonology may influence speech perception. Both experiments used natural speech tokens of Standard Mandarin tones and Chinese- and American English-speaking listeners. The results from both the AX discrimination and the degree of difference rating experiments show language-specific effects: the Chinese-speaking listeners' tone perception space was warped due to tone sandhi processes that neutralize two otherwise contrastive lexical tones. On the other hand, the English-speaking listeners showed phonetic listening, paying more attention to the similarity in pitch offset and onset between a pair of tones.

THE REASSIGNED SPECTROGRAM AS A TOOL FOR VOICE IDENTIFICATION

Sean A. Fulop¹ & Sandra Ferrari Disner²

¹California State University Fresno; ²no affiliation

ID 1649; Poster No. 56

[full paper]

A precise imaging scheme, the reassigned (or time-corrected instantaneous frequency) spectrogram, holds out considerable promise for identifying the speaker of an utterance. Unlike conventional spectrograms, reassigned spectrograms can display a few tens of milliseconds of phonation in great detail, without blurring in the time or frequency domains, and they are also impervious to many forms of noise or channel contamination. They are thus able to reveal some unique time-frequency features of an individual's phonatory process. While further testing is needed to establish evaluation criteria and confidence estimates, it is encouraging to see how readily pairs of reassigned spectrograms can be matched in the set illustrated herein. At the very least, such images can augment the techniques that are currently in use for speaker identification and verification.

THE PHONOLOGICAL DEFICIT IN DEVELOPMENTAL DYSLEXIA: IS THERE A SUPRASEGMENTAL COMPONENT?

Catherine Dickie¹, Mitsuhiro Ota¹ & Ann Clark²

¹University of Edinburgh; ²Queen Margaret University

ID 1441; Poster No. 58

[full paper]

Adult dyslexics were tested on a range of tasks which were presented in two closely matched versions: a segmental version and a suprasegmental version. The tasks targeted phonological contrasts on one hand and the metalinguistic ability to manipulate phonological units on the other hand. Results showed that dyslexics did show a deficit in suprasegmentals as well as segmentals when the tasks involved manipulation, but the representation of suprasegmental contrasts does not appear to be impaired.

SPEECH BREATHING IN PATIENTS WITH ADDUCTOR SPASMODIC DYSPHONIA

Ruth Huntley Bahr, Katie Biedess & Marion B. Ridley

University of South Florida

ID 1547; Poster No. 60

[full paper]

Inductive plethysmography was used to calculate respiratory measures related to volume, timing, thoracic displacement and respiratory efficiency in patients with adductor spasmodic dysphonia (ADSD) compared to controls. Results revealed significant differences between groups and across tasks. Those with ADSD had statistically higher ventilation rates, more breaths per minute, a higher degree of muscular inefficiency/breathlessness and labored breathing. Differences between tasks were attributed to a higher cognitive-linguistic demand required during conversational speech. These findings support the idea that individuals with ADSD may experience difficulties with respiration as the effects of their Botox injection dissipate.

EFFECTS OF AUDITORY FEEDBACK ON HEARING-IMPAIRED SUBJECTS' PRODUCTION OF THE ROUNDING FEATURE: A PILOT STUDY

Johanna-Pascale Roy¹, Lucie Ménard¹, Amélie Brisebois¹ & Mark Tiede²

¹Université du Québec à Montréal; ²Haskins Laboratories & MIT R.L.E.

ID 1561; Poster No. 62

[full paper]

This paper describes a pilot study that investigated the effects of auditory feedback on vowel production in prelingually hearing-impaired subjects. The rounding feature in French vowels is used to study the effects of hearing state on labial configurations and acoustic patterns. Subjects were recorded in two conditions: without their hearing aid (no auditory feedback) and with their hearing aid (with auditory feedback). The results show that temporary deprivation of auditory feedback causes changes in vowel production in the labial space. However, these changes are not reflected by a variation in vowel contrast, even though subjects tend to speak more clearly without their aid. It may be hypothesized that prelingually hearing-impaired subjects produce robust rounding features minimally influenced by temporary deprivation of auditory feedback.

CONTENT-BASED TRANSFORMATION OF THE EXPRESSIVITY IN SPEECH

Grégory Beller & Xavier Rodet

IRCAM

ID 1419; Poster No. 64

[full paper]

In this paper we describe a speech expressivity transformation system giving the opportunity to a user to modify the expressivity of a spoken utterance. Statistical models are learned on a multispeaker expressive database using a Bayesian Network. The acoustic modification of the speech signal is achieved by a phase vocoder technology. The parameters of those transformations are context dependents. They change along the sentence in respect of pragmatic information such as stressing and depending on the phonetic transcription of the text. The system is now working for several acted emotions in French and is used for an artistic purpose dealing with multimedia and cinema.

TESTING THE ECOLOGICAL VALIDITY OF REPETITIVE SPEECH

Greg Kochanski & Christina Orphanidou

The University of Oxford

ID 1632; Poster No. 66

[full paper]

Can one trust experiments conducted with repetitive speech to represent normal language behaviour? We compare the spectra of repetitive productions of sentences with the same sentences read from a randomised list. We use a data-driven spectral distortion measure that is trained to respond to linguistically relevant differences. The measure is a distance measurement which is based on a classifier that separates sounds into linguistically equivalent and linguistically nonequivalent

categories. We find that repetitive speech is not distinct from individually uttered speech. The difference between these two sorts of speech is smaller than variation within each. It is substantially smaller than typical differences between utterances produced by different subjects.

AN ACOUSTIC STUDY OF REAL AND IMAGINED FOREIGNER-DIRECTED SPEECH

Rebecca Scarborough¹, Jason Brenier², Yuan Zhao¹, Lauren Hall-Lew¹ & Olga Dmitrieva¹

¹Stanford University, Department of Linguistics;

²University of Colorado, Department of Linguistics

ID 1673; Poster No. 68

[full paper]

The acoustic properties of foreigner-directed speech are surprisingly understudied, and many existing studies evoke imagined interlocutors to elicit foreigner-directed speech. In this study ten native English speakers described the path between landmarks on a map to two confederate listeners (one native English speaker and one native Mandarin speaker) and to two imagined listeners (described as a native English speaker and a non-native speaker). Vowel duration, rate of speech, and vowel space size were examined across native-foreigner and real-imagined conditions. Stressed vowels were longer and rate of speech was slower in the foreigner-directed and imaginary conditions than in the native-directed and real ones. Vowel space differences were not significant. So, speakers made acoustic-phonetic adjustments in foreigner-directed speech that are consistent with those seen in listener-directed clear speech, and these accommodations were greater when the listener was imagined rather than real.

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THE INTERNATIONAL PHONETIC ALPHABET (revised to 2005)

CONSONANTS (PULMONIC)

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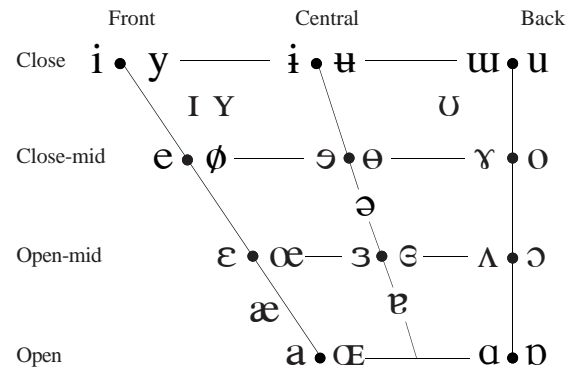
	Bilabial	Labiodental	Dental	Alveolar	Post alveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			r					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
ʘ Bilabial	ɓ Bilabial	ʼ Examples:
ǀ Dental	ɗ Dental/alveolar	pʼ Bilabial
ǃ (Post)alveolar	ɟ Palatal	tʼ Dental/alveolar
ǂ Palatoalveolar	ɡ Velar	kʼ Velar
ǁ Alveolar lateral	ɠ Uvular	sʼ Alveolar fricative

VOWELS



Where symbols appear in pairs, the one to the right represents a rounded vowel.

OTHER SYMBOLS

ɱ Voiceless labial-velar fricative	ɕ ʑ Alveolo-palatal fricatives
ɰ Voiced labial-velar approximant	ɺ Voiced alveolar lateral flap
ɸ Voiced labial-palatal approximant	ɺ Simultaneous ʃ and x
ħ Voiceless epiglottal fricative	
ʕ Voiced epiglottal fricative	Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.
ʡ Epiglottal plosive	

kp ts

DIACRITICS Diacritics may be placed above a symbol with a descender, e.g. ɲ̥

◌ [◌] Voiceless	◌̥ ◌̜	◌̤ Breathy voiced	◌̤ ◌̜	◌̪ Dental	◌̪ ◌̜
◌̣ Voiced	◌̣ ◌̤	◌̥ Creaky voiced	◌̥ ◌̤	◌̫ Apical	◌̫ ◌̜
◌̨ Aspirated	◌̨ ◌̩	◌̦ Linguolabial	◌̦ ◌̩	◌̬ Laminar	◌̬ ◌̜
◌̙ More rounded	◌̙	◌̧ Labialized	◌̧ ◌̩	◌̭ Nasalized	◌̭
◌̘ Less rounded	◌̘	◌̨ Palatalized	◌̨ ◌̩	◌̮ Nasal release	◌̮
◌̚ Advanced	◌̚	◌̩ Velarized	◌̩ ◌̩	◌̯ Lateral release	◌̯
◌̠ Retracted	◌̠	◌̪ Pharyngealized	◌̪ ◌̪	◌̰ No audible release	◌̰
◌̡ Centralized	◌̡	◌̩ Velarized or pharyngealized	◌̩		
◌̣ Mid-centralized	◌̣	◌̥ Raised	◌̥ (◌̥ = voiced alveolar fricative)		
◌̤ Syllabic	◌̤	◌̥ Lowered	◌̥ (◌̥ = voiced bilabial approximant)		
◌̥ Non-syllabic	◌̥	◌̥ Advanced Tongue Root	◌̥		
◌̦ Rhoticity	◌̦ ◌̧	◌̥ Retracted Tongue Root	◌̥		

SUPRASEGMENTALS

ˈ Primary stress	
ˌ Secondary stress	
ː Long	fəʊnəˈtɪʃən
ˑ Half-long	eˑ
◌̥ Extra-short	ẽ
◌̥ Minor (foot) group	
◌̥ Major (intonation) group	
◌̥ Syllable break	.i.ækt
◌̥ Linking (absence of a break)	

TONES AND WORD ACCENTS

LEVEL	CONTOUR
ẽ ^{or} ˩ Extra high	ẽ ^{or} ˩ Rising
é ˨ High	ẽ ˨ Falling
ē ˨ Mid	ẽ ˨ High rising
è ˨ Low	ẽ ˨ Low rising
ẽ ˨ Extra low	ẽ ˨ Rising-falling
↓ Downstep	↗ Global rise
↑ Upstep	↘ Global fall