Cypriot Greek geminates: the contrast between [ɾ] and [r]

Spyros Armosti[1], Kyriaki Christodoulou[2],
Marianna Katsoyannou[2] and Athanassios Protopapas[3]
[1]*Department of Linguistics, University of Cambridge; United Kingdom*
[2]*Department of Byzantine and Modern Greek Studies, University of Cyprus; Cyprus*
[3]*Institute for Language & Speech Processing; Greece*

The use of [r] in Cypriot Greek (CyG) has been noted by Christodoulou (1967) and Arvaniti (1999). In both cases, this sound was presented as an alternative p ronunciation for [´]. However, its precise phonological and phonetic status remains unspecified. Here we examine the acoustic properties that sustain an observed contrast between [ɾ] and [r] in CyG. In particular, we test the hypothesis that [r] is a phonetically distinct geminate segment.

The temporal and frequency characteristics of [ɾ] and [r] in a medial position were examined in order to establish the contrast between these two consonants. Six words representing minimal and quasi -minimal pairs with singleton and (putative) geminate [ɾ] (e.g. [maɾa] 'yeast' *vs.* [mara] 'hair') were produced by 14 native CyG speakers 6 times each (3 in slow and 3 in fast tempo) in matched sentence context. The target segments always occupied the C_2 position in a $C_1V_1C_2V_2C_3V_3$ 3-syllable mid -sentence sequence. Measurements included the duration of all six segments (and thus of the syllable containing each target segment and of the preceding and following syllable) as well as the mid -segment RMS amplitude, pitch, and first two formant frequencies of the target segments and the adjacent vowels.

The results indicate that the two sounds are distinguished by duration and intensity, with [r] being consistently longer and less loud than [ɾ] for every speaker.

The findings support the interpretation of this [´]-alternative pronunciation as a geminate [r] according to the CyG system of gemination.

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Pitch range variation when speaking in noise

Lluïsa Astruc-Aguilera
Department of Linguistics, University of Cambridge; *United Kingdom*

This study is intended to extend an earlier investigation into the effects of increased vocal effort on pitch range. The assumption in the literature is that expa nding the pitch range involves increasing the distance between the high and the low tones (Cohen et al 1982, 't Hart et al 1990, Ladd 1990, 1993, Hirschberg and Litman 1993, Liberman and Pierrehumbert 1984, Gussenhoven et al 1997).

The earlier investigatio n (Astruc 2005: ch. 3) looked at the accentuation of right -dislocated phrases (such as 'these Romans' in 'They are crazy, these Romans) in Catalan using computer-generated masking noise to obtain an increase in the speakers' vocal effort (Lombard effect), and thus in their pitch range (Lane and Tranel 1971, Junqua et al 1999), that would bring out and help to identify any potential pitch accents. The corpus was composed of seven minimal pairs of Catalan right -dislocated phrases and appositions (accented) an d which were read twice by five Central Catalan speakers under four noise conditions (silence, and three increasing levels of noise), thus yielding 560 phrases:

(1)   a. Apposition (accented)
       És Mona, *la dona* ('[She] is Mona, *the wife*')
       b. Dislocation (deac cented)
       És mona, *la dona* ('[She] is cute, *the wife*')

Fundamental frequency was measured at 8 points in each utterance. Preliminary results (based on the data of one speaker) showed a significant increase in overall pitch level, but not in pitch range, whi ch contradicted expectations predicated upon descriptions in the literature. The present study analyses the remaining data to find statistical confirmation of the preliminary results.

* From January 2006, Associate Lecturer at the Open University
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Rising intonation in Estonian: an analysis of map task dialogues

Eva Liina Asu
Institute of the Estonian Language, Tallinn; Estonia

The existence of rises has been commented on since t he earliest experimental studies on Estonian intonation (Peters 1927) but there seems to be confusion as to what the attitude towards rising tunes should be. In traditional accounts of Estonian phonetics (e.g. Ariste 1977) and in prescriptive textbooks (Kr aut 1998, Ehala 1999), all rising intonation is labeled as uncommon and foreign sounding. The few existing studies on the prosody of colloquial Estonian, however, report an abundance of final rises (Asu and Nolan 2002; Keevallik 2003: 360). Asu (2004) dist inguishes between three different types of high endings according to the level at which the rise starts and the nature of the IP -boundary: (1) a rise from low to high followed by a plateau (L*+H 0%), (2) a rise followed by a high boundary (L* H%), and (3) a high followed by a plateau (H* 0%).

The aim of the present paper is to examine the distribution and function of rising tunes in Estonian map task dialogues. All instances of high terminals in six map task dialogues including six speakers were classified according to their discourse function. It appears that most rises appear in the turn -final position and on feedback phrases but there are also plenty of rises that can be associated with turn -medial positions. A closer examination of rising tunes shows that the different boundary tones imply a difference in meaning: a rise with a high boundary carries an interactional meaning whereas the rise ending in a plateau acts more as a continuation marker.

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Does the fine phonetic detail of function words affect intelligibility?

Rachel Baker

Department of Linguistics, University of Cambridge; United Kingdom

Function words have a wide range of phonetic forms. If perception uses systematic variation to interpret linguistic structure, function words' fine phonetic detail could provide important cues to grammatical structure. An experiment investigates this proposal by measuring utterance comprehension when words contain appropriate and inapp ropriate phonetic detail.

Function words (e.g. *she's*) and matching content words (e.g. *banshees*) were elicited in sentences (*the girl saw the man **she's** in love with* (Function sentence, F); *the girl saw the **ban**shees in London* (Content sentence, C)). Cross -splicing of function and content word segments created two '*incorrect*' groups that were mismatched for phonetic detail and two '*correct*' groups:

Sentence group	Example (F or C indicates source; numbers indicate different tokens of same sentence)
Incorrect Function (IF)	[The girl saw the man]$_F$ /Si z/$_C$ [in love with]$_F$
Incorrect Content (IC)	[The girl saw the ban]$_C$ /Si z/$_F$ [in London]$_C$
Correct Function (CF)	[The girl saw the man]$_{F1}$ /Si z/$_{F2}$ [in love with]$_{F1}$
Correct Content (CC)	[The girl saw the ban]$_{C1}$ /Si z/$_{C2}$ [in London]$_{C1}$

Sentences will be presented in cafeteria noise at an appropriate signal -to-noise ratio to 30 participants who write down what they hear. More errors are predicted for IF than CF, and for IC than CC.

If these predictions are confirmed, this would support the view that systematic differences between function and content word phonetic detail are important phonetic cues for utterance comprehension due to the information they reflect about grammatical structure. However, if IC is worse than CC, and IF is no different to CF then explicitness of articulation might be perceptually important, as content words are generally longer and less phonetically reduced than function words. Implications for models, eg. Polysp (Hawkins & Smith, 2001) and NAM (Luce & Pisoni, 1998) are discussed.

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The Phonetics and Phonology of the High Rising Tone (HRT) in Southern Californian English and London English

Angela Barry
Department of English Language and Linguistics, University of Sheffield; United Kingdom

Apart from House (2003) there is not yet a substantial body of research on HRT in British English. The current poster aims to address this issue by investigating the form of emergen t British English HRTs through a comparison of HRTs in Southern Californian (So Cal) English, which are more established.

Southern Californian English and London English speakers took part in a map task in order to obtain casual speech. Data was controlled for gender and dialect in order to carry out a cross-dialectal, cross -speaker analysis of HRT. Data was acoustically analysed in PRAAT. The following measurements were taken: pitch range of rise (in ERB), alignment and duration of rise (in milliseconds). Rises were also coded for place in turn and conversational move.

Once the data was coded for these phonetic and pragmatic factors, a statistical analysis was carried out on the data. Results show that female speakers in the corpus had larger rises than male speakers, and So Cal speakers produced larger rises than London speakers. Females aligned their rises later than males in the corpus. Turn final rises were larger in pitch range than non-turn final rises, and rises that occurred with the first mention of a landmark were larger in pitch range than rises that did not occur with first mention landmark.

This poster presents these results, along with others, and provides a comparison of the phonetics and phonology of HRTs in Southern Californian English and L ondon English speakers.

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Revisiting the phonemic basis of perception. Evidence from eye -tracking

William J. Barry & Bistra Andreeva
Institute of Phonetics, Saarland University; Germany

Experimental methods operating with perception units defined in linguistic terms will limit answers about perception to those linguistic concepts.

Eye-tracking offers the possibility of directly relating the time course of word recognition, the lo west level of communicatively relevant perception, to the phonetic structure of the word without recourse to linguistic meta -units. Evidence has been found of a direct link between the continuous processing of the acoustic input and word recognition as ref lected in fixation frequency. However, it is limited to the contribution of VC transitions to word recognition dependent on the post -vocalic consonant and is therefore interpretable, within a direct realism framework, as sequential phoneme based perception : Overlapping phonemic units predict the take -up of coarticulated coda information during the preceding segment.

Using German word pairs with an initial structure (C)CCV(----) differing only in the vowel segments, which always differ in the [±round] feature (e.g., Stuhl – Stier), the time course of recognition relative to vowel onset is compared with that for the recognition of vowel-onset words (e.g. Arm – Ohr.). The time course for the recognition of cross -spliced stimuli is also examined. This well known condition of anticipatory lip -(de)rounding is thus being tested not in relation to the identity of the fricative but in its temporal, accumulative contribution to semantic processing.

The differences in processing time are discussed in relation to the d uration of the prevocalic consonantal stretch, the nature of its secondary coarticulatory feature ([±round]) and their implications for the role of phonemic units in lexical access .

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Phonetic Transcription Self-Study Programme

Sally Bates, Lucy Ellis & Martin Duckworth
Department of Speech & Language Therapy, College of St. Mark & St. John; United Kingdom

This paper concerns the training of speech and language therapy (SLT) stu dents in phonetic transcription. We have recently launched a Self -Study Programme which is aimed at both undergraduate SLT students and practicing SLTs seeking CPD in this area. It is produced within the virtual learning environment 'Blackboard' and take s the user through a number of graded transcription fields which include ear -training drills, longitudinal developmental data, simulated clinical data and real clinical data.

The programme affords users further opportunity of refining their auditory discrimination and transcription skills in addition to supplementing and extending their experience of different types of speech disorder and of different accent systems. The Programme is structured in such a way as to allow the ongoing addition of data and the incorporation of phonological analysis tasks.

Delegates will be invited to test their own skills and to provide feedback on aspects of the Programme design and presentation of the material.

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A study in applied sociophonetics: identification of voices in shouted speech

Helen Blatchford[1] and Paul Foulkes[2]
[1]City University; United Kingdom
[2]University of York; United Kingdom

Research in sociophonetics has concentrated on identifying variation in speech production at the level of the speaker group. Here we shift the focus to the individual, and to speech perception. We report two experiments which assess the ability of listeners to recognise familiar voices from shouted samples. The e xperiments represent an application of sociophonetics to the forensic domain.

The experiments were executed in connection with a murder case. A witness claimed to recognise the voice of a masked gunman, based on two shouted words: 'get him'. Our experiment s were designed to provide evidence on the likelihood that (i) a listener can identify a known voice from a shouted sample, and (ii) that a two word sample is sufficient for identification.

The main subjects were nine undergraduates who formed a close soci al network, plus six foils. Each was recorded shouting. Two shouted utterances were extracted for listening tests: for Test 1 *get him*, and for Test 2 *face down on the ground and hands behind your back now*. Fourteen listeners participated in the tests: eigh t of the subjects who had provided the stimuli and five others from the same network. In Test 1 listeners correctly identified familiar speakers in 52% of cases (accuracy for individual voices: 83% to 19%). Listener performance ranged from 96% to 22%. Only 27% of foil stimuli were rejected. The longer samples in Test 2 predictably led to improved performance. The overall identification rate was 81% (range: 100%-31%). Listener performance ranged from 100% to 48% accuracy. Rejection of foils increased to 64%.

These results suggest that recognition of shouted voices is far from perfect, even in closed tests carried out among a close network. Results varied significantly in respect of listener, speaker, and sample length. Courts should therefore treat lay witnes s reports with extreme caution.

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Tone Coarticulation

Bruce Connell

Department of English, Glendon College, York University Toronto; Canada and
Department of Anthropology, Univer sity of Kent, Canterbury; United Kingdom

Tone coarticulation - tone variation due to the influence of tonal context - has received little attention in the phonetics literature, with only three languages, Mandarin, Thai, and Vietnamese, having been studied from this perspective. All of these are Asian and feature tone systems typical of this geographical region, having primarily contour tones. Based on data from these three languages, no clear consenus emerges as to the nature of tone coarticulation. Hyman (Hyman 1978, Hyman & Schuh 1974) has discussed tone assimilation as a phonological process in African languages, and argues it needs to be considered in terms of both horizontal and vertical influence. The present study examines tone coarticulation in Mambila, an African language with four level tones. Eight native speakers were recorded reading randomized list of words. Speech materials used consisted of naturally occurring words, combined to give all possible occurrring combinations of bi -tonal sequenc es in the language. Both horizontal and vertical coarticulatory effects are examined as to horizonantal directionality (anticipatory or perseverative). Results are discussed in light of both the findings for Asian languages and Hyman's predictions, as well as the relation between tone coarticulation and well known F0 phenomena such as downdrift.

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Fine alignment differences among Irish dialects

Martha Dalton and Ailbhe Ní Chasaide
School of Linguistic, Speech and Communication Sciences, Trinity College Dublin; Ireland

A comparison of the peak location in nuclear and initial prenuclear accents was carried out for three closely related dialects of Connaught Irish: Cois Fharraige, May o and Aran Islands. This was done across conditions where the number of unstressed syllables following the nuclear and preceding the initial prenuclear accents was varied from 2 -0. Clear differences in peak timing emerged between the three dialects. In C ois Fharraige Irish the timing of the peak is unaffected by the presence and/or number of adjacent unstressed syllables: in all nuclear conditions the peaks are aligned to the left -edge of the accented syllable; in prenuclear conditions the peaks are align ed to the right-edge of the accented syllable. In Aran Islands and Mayo Irish there is variability in peak timing in both prenuclear and nuclear positions. In Aran Irish the location of the peak is affected by the number of unstressed syllables in both n uclear and prenuclear positions. The peak is mostly associated with the stressed vowel, shifting under realisation pressures in those conditions where there are no unstressed syllables following (the nuclear) and preceding the (prenuclear) accent. Mayo I rish is more variable. In nuclear position the peaks behave like those of Aran, i.e. the peak is mostly associated with the stressed vowel. However, in prenuclear conditions there is extreme variation. Where there is no anacrusis there is a delayed peak and when the size of the anacrusis is greater than one this results in an early peak.

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English Phrasal Accent Lengthens Multiple Domains

Snezhina Dimitrova, Alice Turk and Mari ko Sugahara
Department of Linguistics and English Language, University of Edinburgh; United Kingdom

Turk & White (1999) propose two alternative accounts for durational differences between English accented vs. unaccented words: that accentual lengthening affects (1) a single domain that extends from the left edge of a pitch -accented syllable up to the right edge of a word, or (2) two separate, non -contiguous domains: the pitch accented syllable itself, as well as the final syllable of the accented word.

We used four-syllable English words pronounced by speakers of Scottish English to test these two alternatives. All of the words had primary lexical stress on the first syllable, followed by either three unstressed syllables (1000 patterns, e.g. *celibacy*), or by one unstressed, one secondary stressed, and one unstressed syllable (1020 patterns, e.g. *helicopter*). Our preliminary results show that accent consistently affected both primary -stressed and final syllables, but not intervening unstressed syllables: p rimary-stressed syllables were on average 16% longer when part of an accented word, and final unstressed syllables were on average 13% longer. Differences between medial unstressed syllables were non -significant. A smaller, 5.5% lengthening effect was foun d on the secondary-stressed syllables of 1020 words: this effect was statistically significant, but was not reliably present for all words.

The preliminary results support the view that accent -related lengthening does not spread uniformly from the pitc h-accented syllable to the end of the word. These findings raise the possibility that durational patterns on accented words are realised using two separate mechanisms: 1) accentual lengthening on primary -stressed syllables, and 2) final lengthening which functions to clearly demarcate the accented word.

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Prosodic modulation of sociophonetic variants

Gerry Docherty
University of Newcastle upon Tyne; United Kingdom

This paper focuses on the influence of prosodic characteristics of an utterance on the occurrence of variants which are known to be of sociophonetic significance within a particular variety. There is considerable evidence that segmental properties of speech are governed t o some extent by the prosodic frame within which they are set (e.g. Cho & McQueen, 2005). While, the large part of the work which underpins our understanding of prosodic modulation of speech production has arisen from carefully controlled laboratory experi ments, there is some evidence (e.g. Cole et al 2003) that similar types of variation can be tracked in more naturalistic corpora.

Sociophonetic studies have tended to control for some of the relevant prosodic features by limiting their analyses to certain phonological environments (e.g. word -medial, or word-final position, etc,) and to certain stress environments (e.g. studies of glottaling of word -medial /t/ in English have tended to be restricted to *s_w* contexts), but a question remains about how much of the within- and between-variance observed in such studies can be accounted for by a wider range of prosodic factors. The present study sets out to address this.

In this paper, data from the Newcastle -upon-Tyne section of the *Phonological Variation and Change* (Milroy, Milroy & Docherty 1997) corpus has been analysed to investigate the effects of a number of prosodic factors on realisational variants of (p) (t) and (k). The paper assesses the extent to which variable patterns of usage correlate with a number of prosodic characteristics including speech rate, phrasal accent and organisation.

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Vowel-lenition in Cypriot Greek and its implications for fricative-vowel coarticulation

Eftychia Eftychiou
Department of Linguistics, University of Cambridge; United Kingdom

The study comprises an investigation of the phenomenon of vowel -lenition in Cypriot Greek (henceforth CG). The high vowels of Standard Greek, /i/ and /u/, tend to be lenited   or elided when occurring in unstressed syllables and between voiceless consonants (Dauer 1980; Arvaniti 1991). Although vowel -lenition is claimed to be much rarer in CG (Arvaniti 1999), impressionistic evidence suggests that the process is as common in CG as well. Foreign listeners claim, for instance, to hear only four syllables of an otherwise five -syllable word (e.g. /ɛpiʃtiɌisi/ (invigilation) heard as [ɛpiʃtiɌis]). Native listeners report hearing the vowels, so the study hypothesises that coarticulator y information is retained in the – now final – consonant to inform the listener as to the underlying presence of a vowel.

An experiment was designed in which the two high vowels were adjacent to the alveolar fricative /s/ in order to investigate the natur e of vowel-lenition as a categorical or gradient process, and to identify possible fricative -vowel coarticulatory strategies. Results show that vowel-lenition in CG is a gradient phenomenon, resulting in productions of full, lenited and elided vowels. Furt hermore, fricatives whose adjacent vowels have been elided are shown to differ from canonical word -final fricatives through a series of acoustic measurements – frequency of the major spectral peak of the fricative, its centre of gravity, its duration and i ts F2 and F3 transitions – which suggest that traces of the vowel are always present in the consonant.
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Control of Laryngeal Constriction and the Emergence of Babbling

John H. Esling, Allison Benner, Qian Wang, and Izabelle Grenon
University of Victoria; Canada

In this paper, we will illustrate the relationship between early infant vocalizations and the emergence of babbling in pre-linguistic infants from three different language backgrounds: English, Moroccan Arabic, and Bai. In our collaborative work with researchers in France, Morocco, and China, we have demonstrated that articulatory phonetic control begins in the pharynx. In the first six months of life, infants from all the language backgrounds we have observed develop articulatory phonetic control through an active exploration of the phonetic possibilities afforded by the laryngeal constrictor. In early infancy, babies produce all pharyngeal manners of articulation and gradually develop the capacity to exploit the full range of laryngeal articulatory settings, including control of pitch and voicing. We demonstrate that the development of articulatory phonetic control at the level of the laryngeal constrictor sets the stage for the emergence and control of language-specific prosodic features in early babbling. This analysis forms part of a larger project whose objectives are to document the phonetic development of infants in the first year of life; to highlight the role of laryngeal mechanisms in phonetic development; and to determine whether laryngeal and pharyngeal articulations develop differently according to whether or not the infant's ambient language includes these sounds. We will present audio files from each stage of development in each language to illustrate similarities in the growth of "phonetic awareness" during prebabbling and differences as the sounds begin to be used linguistically in babbling at the end of the 12 months.

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Short vowel configurations in RP past and present: an acoustic and sociolinguistic study

Anne Fabricius
Department of Language and Culture, Roskilde University; Denmark

Torgersen and Kerswill (2004) report on r egional dialect levelling in the southeast of England, citing different movements in the short vowel systems which have led to similar outcomes in different locations. They infer the workings of a chain shift in Ashford, Kent, contrasting with singular vow el movements in Reading, west of London. Their account of this phenomenon refers to dialect supralocalisation outcomes from different starting points.

The question then arises whether reported changes in RP in the direction of vernacular accents (Wells 19 94) have also affected the short vowel system. Reports of RP short vowel movements over the twentieth century are complicated. Bauer (1985) for example debates whether fronting of STRUT can be seen in data from a series of female speakers born between 1919 to 1960, while Harrington et al (2000) show backing and lowering of STRUT by Queen Elizabeth II from the 1950s to the 1980s, a movement which brought this vowel (and most others) closer to that of female BBC newsreaders in the 1980s.

This study will take up the topic of the short vowel system by comparing acoustic measurements from continuous speech data taken from the MARSEC corpus of British English (as reported in Deterding 1997) with interview data from a corpus collected in Cambridge, U.K. in 1997-1998. Within the corpus it will compare younger upper -middle class, public school educated speakers (born in the 1970s and 1980s) from the Southeast with similar speakers from other parts of England. The data seem to indicate that younger generation modern RP speakers have a 'triangular' alignment of short vowels as opposed to a 'quadrilateral' alignment found in older RP speakers. The relative placements of the TRAP and STRUT vowels play an important part in these different alignments. The paper will consi der methodological issues related to a phonetic versus sociolinguistic view of vowel systems, and also compare the Southeast speaker results with Torgersen and Kerswill's results from Ashford and Reading and Harrington et al's results from the Queen's Chri stmas broadcasts.

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Articulation of clicks in children with velocardiofacial syndrome

Fiona Gibbon[1], Alice Lee[1], Ivan Yuen[1], & Lisa Crampin[2]

[1] *Speech Science Research Centre, Qu een Margaret University College; United Kingdom*
[2]*Glasgow Dental Hospital and Yorkhill Hospital; United Kingdom*

We report electropalatographic (EPG) data on a rare type of compensatory articulation, namely clicks, in the speech of a girl (S) and a boy (E) with velocardiofacial syndrome. Clicks are complex speech sounds that under normal circumstances only occur in the languages of Southern Africa. Results showed that S produced alveolar clicks [!] fluently for all /d/, /k/ and /g/ targets; whereas E prod uced alveolar clicks [!] for the alveolar stops and affricates, and palatal click [⌀] for the velar stops. Timing and tongue -palate contact patterns from the EPG data revealed that the production of clicks always involved a sequence of two closures, one i n the alveolar and the other in the velar region. The first phase of the click sequence involved alveolar closure. The second involved simultaneous alveolar and velar closures. The release of the alveolar closure resulted in an audible click sound. The final phase involved velar closure only. The timing and contact details of clicks varied between speakers and across target sounds, which showed that different strategies were used to indicate the phonemic difference between the targets. The clicks show ed by S and E were possibly learned misarticulations that they used to produce plosives with strong bursts in the context of ongoing velopharyngeal inadequacy.

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Phonetic Conditioning of Word-final Ejective Stops in the Speech of Scottish English Pre-School Children

Olga Gordeeva and James M. Scobbie
Speech Science Research Centre, Queen Margaret University College; United Kingdom

Ejective stops are produced with glottalic airstr eam initiated by an upward action of the closed glottis, while there is an occlusion in the oral cavity. In English, ejective stops have been occasionally observed as free variants occurring in word -final positions. However, there are no systematic studie s addressing their phonetic conditioning factors.

We describe the distributional characteristics of the word -final ejective stops found in the speech of Scottish English children. The subjects (N=7; aged 3;4 to 4;9) grew up in Edinburgh in Middle Class fam ilies. Three were recorded longitudinally. The children produced CVC-words ending with oral obstruents in semi -structured elicitation tasks. The words appeared in utterances of variable length in initial, medial or final positions. Ejective stops were iden tified auditorily and acoustically based on the burst amplitude, duration and the lack of glottal friction.

Five out of the seven children produced ejective stops. The longitudinal data suggest that the subjects use them rather categorically: i.e. some chi ldren don't produce them. Among the children with ejectives, 13.5 % of all word -final obstruents involved the glottalic airstream production. The ejectives appear significantly more frequently in phrase -final positions than initially or medially. While the y appear predominantly in lexemes ending with phonologically voiceless stops, 11.7% of the ejectives also appeared in items PIG and FOOD accompanied by complete final de -voicing.

We further discuss the appearance of these typologically rare sounds in the s peech of the children in relation to the adult input, acoustic salience and the elicitation mode.

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Child affective prosody in Scottish English and French.

Ioulia Grichkovtsova
Speech Science Research Centre, Queen Margaret University College; United Kingdom

The main objective of this research is to investigate the production of affective speech by bilingual and monolingual children cross -linguistically. Recent studies suggest t hat there is a number of available means to express emotions in speech (pitch range, rhythm, voice quality, etc), but their usage, level of importance and meaning vary in different languages. Cross - linguistic differences in affective speech may lead biling ual children to perceive and to express emotions differently in their two different languages. A cross -linguistically comparable corpus of 6 bilingual Scottish -French children and 12 monolingual peers, average age - 8, was recorded according to the develop ed methodology. This talk presents results on pitch range, peak alignment and rhythm for bilingual children and their monolingual peers, comparing their emotions and languages. The majority of children realize differences between some emotions in each of the measurements, taken in this study. Monolingual children use analysed acoustic parameters in a much more homogeneous way than bilinguals. Some results of bilingual children do not strictly correspond to those of monolingual. Having a wider range of means and ways for affective realizations, bilinguals may represent a particular group of speakers who express vocal emotions in a different manner than monolinguals. Child data is currently compared to adult data and used in cross -linguistic perception tests, developed to explore further the child mastering of affective prosody. Understanding of child monolingual and bilingual usage of affective prosody will be specifically important for theories of phonetic learning, and may have implications for second langua ge acquisition theories in general.

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Learning English in an L1 context: a study of the voicing contrast in Malayaccented English

Shahidi Hamid

University of Newcastle upon Tyne; United Kingdom and Universiti Kebangsaan; Malaysia

This poster presents some key findings from a study of the realisation of the voicing contrast in the speech performance of learners of English whose first language is Malay (and who are resident in Malaysia). Since there is very little documentation of the phonetic properties of Malay itself, the poster begins by presenting the results of an acoustic study of the Malay voicing contrast with a focus on contextual variants and a range of acoustic measures s uch as VOT and closure duration. Results are then presented, first relating to the realisation of the voicing contrast in Malay-accented English and, second, evaluating Malaysian listeners' identification/discrimination abilities with voiced/voiceless stop s in Malay and English. The results are discussed in light of models of the acquisition of L2 sound patterning focusing in particular on the situation presented by acquiring L2 within an L1 context.

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Acoustic Evidence of a Prevailing Emphatic Feature over Multisyllabic words in Arabic

Zeki Majeed Hassan
Department of Linguistics, Gothenburg University; Sweden

An acoustic study is carried out to see whether the phenomenon of phary ngalization is confined to the emphatic consonant and the adjacent vowels or if it extends over the whole word in Arabic. Measurements in Hz of F1 & F2 of front unrounded vowels in monosyllabic, bisyllabic and trisyllabic words in Iraqi Spoken Arabic (ISA) having emphatic vs. non- emphatic consonants were made. Values in Hz of F1 were subtracted from those of F2 using Praat. Resultant values showed significant narrowing between the two formants for all the vowels in the vicinity of emphatic compared to those of non-emphatic consonants suggesting a prevailing emphatic feature over the whole word. The same measurements were made for multisyllabic words having pharyngeal vs. front consonants but no such prevailing feature has been found. This feature is attribut ed to the secondary coarticulatory configuration formed in the pharyngeal area by the projection of the root of the tongue towards the back wall of the pharynx and a possible lowering of the velum toward rising tongue dorsum. This study also suggests that this pharyngeal configuration is assumed prior to the primary articulation in anticipation of the emphatic consonants which bears out Hassan's (1981, 1983). A more biomechanical experimentation is needed on the intergestural timing (Gick, et al. 2005) between this pharyngeal configuration and the primary articulation and their perceptual implications.

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/mist/ = "mist" or "missed"? Acoustic properties of phonemically identical but morphologically different word pairs

Naomi Hilton [1], Sarah Hawkins [1], Martin Cooke [2], Karalyn Patterson [3]
[1]*University of Cambridge; United Kingdom*
[2]*University of Sheffield; United Kingdom*
[3]*Medical Research Council Cognition and Brain Sciences Unit, Cambrid ge; United Kingdom*

Word pairs like mist-missed and find-fined are generally considered to be homophones, yet have different morphological structure, with the alveolar in missed and fined marking the past tense. We tested the hypothesis that this morpholog ical difference leads to subtle but significant pronunciation differences in certain contexts, e.g. with missed tending more towards the acoustic properties of a voiced coda compared with mist. Stories containing mist and missed in 15 different phonologica l contexts, were recorded three times each by Standard Southern British English speakers. Parameters under investigation are duration of segments and other units, centre of gravity (COG) of /s/, various measures of relative amplitude and frequency between the coda consonants and the vowel, and formant frequencies in the vowel. Continuous density hidden Markov models (HMMs) for each syllable were trained, allowing the measurement of automatic speech recognition discrimination performance for each pair. Preliminary results for three speakers show several differences, e.g., as expected, /s/ has lower -frequency COG and lower amplitude in missed than mist, except when /t/ is elided (as in "missed seven"). Inspection of the probability densities modelled by each H MM state confirm these findings. Similar work on find -fined, at fast and slow rates, is underway. Multivariate statistics will be discussed, as well as comparisons of the HMM and standard acoustic phonetic measurement methods. The findings have implication s for models of speech perception and spoken word recognition by humans and machines, and for the performance of aphasic patients with apparent deficits in morphological processing.

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Voice source variation in vowel-consonant sequences in Middlesbrough English

Mark J. Jones [1], Carmen Llamas [2]
[1]*Department of Linguistics, University of Cambridge; United Kingdom*
[2]*School of Language and Literature, University of Aberdeen; United Kingdom*

Preaspirated word-final plosives have recently been identified in varieties of British English (e.g. Watt and Allen 2003; Jones and Llamas 2003). Peak glottal width is assumed to coincide with the formation of the oral closure. Early vocal fold abduction relative to oral constriction is reported to be rare cross-linguistically before plosives but occurs universally before voiceless fricatives (Gobl and Ní Chasaide 1999).

This acoustic instrumental study investigates voice quality effects on preceding vowels for preaspirated stops and voiceless fricatives in Middlesbrough English. Durational measures of voice offset time are found to be largely identical regardless of manner of articulation.

The interaction of glottal gestures in word-final /ts/ clusters is also examined. In mirror-image /st/ clusters in word-initial position across English varieties, short-lag Voice Onset Time (VOT) is found, even if long-lag VOT occurs for initial /t/. Short-lag VOT in initial /st/ clusters may arise from blending of the /s/ and /t/ glottal gestures, with /s/ dominant, and peak glottal abduction occurring early relative to /t/ release (Munhall and Löfqvist 1992). A similar effect might be expected to eliminate preaspiration in the final /ts/ clusters. However, preaspiration is observed with word-final /ts/ clusters in Middlesbrough English for most speakers.

The occurrence of preaspirated word-final /ts/ clusters supports views on different gestural organisation for pre- and post-vocalic consonants. Alternatively, relative contextual invariance for preaspirated /t/ may take precedence over constraints on gestural blending. Further research is required to test the possible effect of a morpheme boundary before /s/.
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A spectrographic analysis of STRUT, TRAP, and DRESS vowels in London speech

Miho Kamata
University of Leeds; United Kingdom

This is a preliminary report of an on-going socio-phonetic PhD study on accent variation in London, which has often been claimed to have different accents on a continuum with RP and Cockney being its extremes as an acrolect and a basilect. There are several mesolectal varieties referred to by a number of possibly overlapping terms such as 'London (or, more generally, south-eastern) Regional Standard' and 'Popular London' speech (Wells 1982: 302-303), 'Estuary English (EE)' (Rosewarne 1984), and 'South East London Regional Standard' and 'South East London English' (Tollfree 1999).

The phonological variables selected in this paper are the vowels in the strut, trap, and dress lexical sets (Wells 1982). These were chosen because they are said to be phonetically realised differently by speakers of RP, Cockney and "EE" (Wells 1982, Tollfree 1999) with a certain degree of interrelatedness, such as the possible merger of /ɒ/ and /ɑ̃/ in RP linked with the lowering and centring of /e/ (and /l/) (Wells 1982: 291-292).

This paper pays particular attention to the acoustic characteristics of these vowels elicited from speakers born and bread in London. Their F1 and F2 values are measured in Hz, and transformed into S-units by a vowel formant normalisation technique called S-Transform (Watt & Fabricius 2002) that allows direct visual and statistical comparison for multiple speakers regardless of their physical differences. Further attempt has been made to identify correlations between speakers' social variables (age, social class, speech style) and their phonological variables (the quality of their vowels).

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Variation in (r) production by Jordanian speakers

Ghada Khattab[1] and Fida Al-Tamimi[2]
[1]University of Newcastle; United Kingdom
[2]University of Sheffield; United Kingdom

This paper reports an analysis of /r/ production by 46 male and female Jordanian speakers belonging to three different social classes: high, middle, and low. Arabic (r) is normally realised as a tap or a trill, though there are very few acoustic investigations of its realisations (Al-Tamimi, forthcoming, Shaheen, 1979). Investigations of other languages have shown that taps and trills are produced differently depending on context (Lavoie, 2001: 84), language, and even speakers of the same language (Lindau, 1985: 161). The purpose of this s tudy is therefore to (1) explore whether realisations of the Arabic (r) echo the diversity of realizations found in other languages, and (2) investigate a change in progress in (r) production by high class Jordanian females. Speakers read word-list items which included initial, medial and final /r/ followed or preceded by the short and long Arabic vowels /u -uu, a-aa, i-ii/. A total of 2050 tokens were auditorily and acoustically analysed. Results show that upper class females use an approximant variant for medial geminate (r)'s, and vary between the approximant and the tap for final geminate and singleton (r)'s. Males and females from other social classes use the trill instead, while the tap appears in the speech of all male and female classes in initial and medial singletons. Factors relating to linguistic contexts, articulatory complexity, and social prestige are used to explain the rich realisation of the Jordanian (r) and the social class and gender differences in its production.

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Denasalization in Korean

Young Shin Kim and Michael Ashby
University College London; United Kingdom

This study presents auditory, acoustic, laryngographic and aerodynamic data indicating that the so-called "nasal" consonants of Korean, which are generally regarded as unproblematic, are commonly realized in onset position as non -nasal stops having most of the properties generally associated with voiced plosives.

Simultaneous speech and laryngograph recor dings were made of two male and two female speakers reading scripted connected speech. The materials contained numerous examples of word -initial nasals, either phrase -initial, or preceded within the phrase by the full range of possible sounds, and followed in turn by a range of vowels.

There were 160 tokens of bilabial nasal (40 items x 4 speakers), and 80 tokens (20 x 4) of alveolar nasal. Among bilabial examples, 29 out of 40 items (72.5%) are denasalized by all speakers, while 8 (20%) are given a sonoran t realization by all speakers. Of the alveolar examples, 97.3% are denasalized. Acoustic analysis shows that the audibly denasalized realizations lack the characteristic formant structure of sonorant nasals, and may also exhibit devoicing in phrase -initial position. Many examples (about 70% of the alveolar tokens, for example) show plosive –like bursts.

In a supplementary experiment, one subject recorded the same test materials, using a Glottal Enterprises measurement system with airflow transducers in a Rot henberg mask. The results confirm zero airflow in the "denasalized" tokens, even when adjacent to other nasals receiving sonorant realisation.

The phonological contexts for denasalization remain to be clarified, but preliminary indications are that the eff ect is associated with stressed, word -initial positions (even within the phrase).

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The perceived pitch of intonational plateaux: new data

Rachael-Anne Knight
City University Lond on; United Kingdom

Previous research (using resynthesised falling nuclear accents presented to seven listeners in a same-different task) has demonstrated that plateaux in the intonation contour sound higher in pitch than peaks with the same maximum fund amental frequency (Knight, 2004). These results were attributed to the sluggishness of the auditory system which fails to phase lock to the brief section of high frequency contour in a peak. However, in this study the peak and plateau stimuli did not only differ in terms of the duration of the high frequency in the contour. Specifically, although the rising section of the contour started at the same location and frequency for both sets of stimuli, it was shallower and of longer duration for peaks than plateaux. These differences in the rising section may have affected the results (cf. Gosy and Terken, 1994). The present study replicates the original experiment but uses stimuli where the rising section is of the same gradient and duration for both peaks and plateaux (the falling section remains the same as in the original study). Results from the present study are discussed with reference to the original study and the claim that plateaux sound higher in pitch due to the greater duration of high frequency mat erial. Initial results indicate that plateaux are still perceived as higher in pitch than peaks when the gradient and duration of the rising section are controlled. However, when created in this way, the stimuli sound less natural than in the original experiment. Theoretical implications are discussed in relation to pitch perception and intonational phonology.

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Effect of linguistic background on perceptual judgements of hypernasa lity

Alice Lee, Susanna Brown, and Fiona Gibbon
Speech Science Research Centre, Queen Margaret University College; United Kingdom

This study investigated the effect of linguistic background on listeners' perceptual judgement of hypernasality. Twenty -four listeners (12 Cantonese and 12 English) rated 9 non -nasal Cantonese sentences spoken by speakers with hypernasality due to different aetiologies, using direct magnitude estimation. Results showed that Cantonese listeners were significantly ($t = 2.125$, $p < 0.05$) more reliable at judging hypernasality in male speakers than English listeners (Cantonese $r = 0.55$; English $r = 0.39$). Furthermore, Cantonese listeners gave a mean rating of 94.88 to male speakers, which was significantly higher than the ratings assigned by the English listeners (mean 79.16; $t = 2.492$, $p < 0.05$). Cantonese listeners also gave significantly higher ratings to the female speakers (mean 96.99) than did the English listeners (mean 67.36; $t = 3.521$, $p < 0.05$). However, both groups of listeners ranked the speech samples in a similar way. The results suggest that listeners who have minimal knowledge about the phonetics of a language may tend to be relatively conservative and thus possibly underestimate the degree of hypernasality presen t when making perceptual judgements of speech.

Vowel acoustic characteristics of Greek Spontaneous and Non-spontaneous speech

Angelos Lengeris
University College London; United Kingdom

One of the factors that have been found to affect vowel production is speaking style (Lindblom 1994). According to the theory of Hyper -Hypo Speech (Lindblom 1983, 1990), the acoustic characteristics of the same vowel exhibit a wide range of varia tion along a continuum of hyper - (non-reduced) to hypo - (reduced) speech. The present study investigated duration and spectral characteristics of vowels in Standard Modern Greek (henceforth Greek) produced in two different speaking styles, namely, conversa tional and read speech. Frequencies of the first three formants (F1 -F3) and durations were measured for 2124 vowel utterances spoken by four native speakers of Greek. The Euclidean distances from the centroid of each speaker's vowel space were also compute d for each vowel in both speaking styles. Statistical analyses were performed to examine style -induced differences when moving from read to spontaneous speech in terms of duration, frequencies of the first two formants and Euclidean distance from the center of the vowel space. It was found that vowels in spontaneous speech were significantly shorter and less peripheral than vowels in read speech. Additionally, high vowels were significantly shorter than mid and low vowels regardless of speaking style. Final ly, Greek vowels showed greater formant variability in spontaneous speech, which combined with the centralization evident, resulted to extensive overlapping formant distributions in spontaneous speech. These findings add to the existing evidence in the lit erature that read speech (used commonly in speech production experiments) differs in a highly systematic way from the type of speech that speakers use in their everyday life.

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Methodological imperatives for investigating the phonetic organisation and phonological structures of spontaneous speech

John Local and Gareth Walker
University of York; United Kingdom

We describe and exemplify a methodology for providing an integrated account of the communicative function of parametric phonetic detail and its relationship with interactional organisation. We exemplify our analytic approach by documenting two different phonetic designs of stand-alone "so" in a corpus of recorded American English telephone conversations. These two designs - which encompass particular loudness, pitch and laryngeal characteristics - correlate with different communicative functions and have different consequences for the interactional-sequential organisation of the talk. We argue that if phonology is to be truly concerned with function and linguistic contrast we need to induce those functions and domains of contrast from a thorough-going phonetic and sequential analysis of talk-in-interaction.

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The effects of stress and neighbouring vowel on speaker -distinguishing properties of /r/ in Standard Southern British English

Kirsty McDougall

Department of Linguistics, University of Cambridge; Un ited Kingdom

A growing body of work shows that formant frequency dynamics have an important role to play in distinguishing speakers (Greisbach, Esser and Weinstock 1995, Ingram, Prandolini and Ong 1996, McDougall 2005, Rose 1999). Static (instantaneous) m easures of formant frequencies reflect both the physical dimensions of a speaker's vocal tract and the way the speaker configures the vocal organs to produce each sound. Dynamic (time -varying) properties of formant frequencies provide more information abou t a speaker because these measures reflect the movement of a speaker's articulators from one phonetic target to the next.

The present study extends an investigation of individual differences in the formant dynamics of /r/ (McDougall 2005: ch. 5). The previ ous study analysed realisations of /r/ in /«rV/ contexts, where V = / i ù, Q, Aù, •ù, uù/ and received nuclear stress, produced by ten male Standard Southern British English speakers. High levels of speaker -specific variation were yielded by the frequencies of F1, F2 and F3 measured at time -normalised intervals along the formant contours, with the identity of the V following /r/ having some impact on the degree of speaker discrimination achieved. To complement the initial dataset, a symmetric set of /Vr «/ tokens with nuclear stress preceding instead of following the /r/ will be analysed. Graphical techniques, ANOVA and discriminant analysis will be used to compare the degree of speaker -specificity of /r/ under the different vowel context and stress conditions. Results will be discussed with respect to their applicability in forensic speaker identification.

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Phonetic cues to idiomatic and literal interpretation in English

Katy Mackay and Michael Ashby
University College London; United Kingdom

Van Lancker and Canter (1981) claimed that listeners were able to distinguish literal and idiomatic renderings of ambiguous sentences when heard out of context, and identified pauses, open juncture, pitch contours and word-durations as probable cues. Recently, Ashby (to appear) has analysed the prosody of non-compositional idioms, and suggested that focus effects might provide an alternative explanation of the Van Lanker and Canter results.

This experiment used 15 sentences which can be interpreted idiomatically or literally (*It broke the ice*, *I had an axe to grind*, etc). Four speakers recorded them embedded in disambiguating paragraphs leading to either the literal or the idiomatic meaning. In a s econd condition, the speakers were asked to try deliberately to convey the literal or the idiomatic meaning. Corresponding stretches were cut from the recordings and paired, forming a listening test with 136 comparisons. In each pair, the same sequence of words is heard, from the same speaker, but one of the two is "idiomatic", and the other is "literal". Twenty listeners took part, giving a total of 2720 forced -choice judgments.

Results confirm that literal and idiomatic versions are discriminable out of c ontext. Of twenty listeners, seventeen do better than chance, and several achieve significant scores ($p<0.01$) even considered individually. However, we do not find confirmation of the cues which earlier work postulated as accompanying literal and idiomatic production. On the contrary, and in accordance with our hypothesis, the highest -scoring sentence pairs are exactly those where focus distinctions mark the literal interpretation.

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On the nature of schwa: a comparative study between English and Portuguese

Adriana Marusso [1] and Thaïs Cristófaro -Silva [2]
[1]*Federal University of Ouro Preto*
[2]*Federal University of Minas Gerais*

This paper presents a contrastive analysis of the schwa in Bri tish English (BE) and in Brazilian Portuguese (BP). Both languages are said to have a schwa in unstressed final position, offering very similar environments for comparison: *cedar* [ˈsiˑdə] vs. *Cida* [ˈsidə], *sicker* [ˈsɪkə] vs. *sêca* [ˈsekə], *packer* [ˈpɒkə] vs. *peca* [ˈpɛkə], *parker* [ˈpɑˑkə] vs. *paca* [ˈpakə], *collar* [ˈkɒlə] vs. *cola* [ˈkɒlə], *lawler* [ˈlɔˑlə] vs. *Lola* [ˈlɒlə], *looter* [ˈluˑtə] vs. *luta* [ˈlutə]. Whereas in English a schwa is related to a number of different vowels, in Portuguese a schwa occurs always as the manifestation of a reduced /a/. The main issue we will address in this paper is whether a schwa presents different properties when related to a number of different vowels, as is the case in English, and a schwa which is related to a single phoneme , as is the case in Portuguese (Browman & Goldstein (1992), Marusso (2003)) . Our results show that, in both languages, a final unstressed schwa presents similar acoustic characteristics regarding vowel quality and duration. The study also takes into accoun t the possible influence of the preceding vowel sound on the variability of final schwa, which is shown not to influence the nature of a schwa. Our results indicate that the phonetic characteristics of a schwa are the same either as the reduced variant of any full vowel, as in English, or as the reduced variant of a single phoneme, as is the case in Brazilian Portuguese.

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Lipspeaking: an evolving discipline

Ben Matthews
Speech Science Research Centre, Queen Margaret University College; United Kingdom

Lipspeakers are being increasingly trained and used by hard of hearing (HOH) adults in Britain to facilitate communication in a variety of settings —education, doctors appointments, b usiness meetings, and telephone calls. Lipspeakers silently reproduce the mouth patterns of a speaker in a way which is easier to lipread.

In the case of telephone calls a very HOH person will not be able to lipread the speaker. In other situations, suc h as a lecture or a doctor's appointment, speakers often do not or can not make the necessary adjustments for effective communication with a lipreader to be achieved. This could be because of distance (as for a lecturer), because of obscuring facial hair (e.g. Father Christmas) or just because of a general lack of awareness about the communication difficulties involved for HOH people. In such cases, a lipspeaker may be employed as an aid to communication.

Training for lipspeakers includes some basic phone tics, particularly about which speech sounds have the same appearance. Strategies which trainers advocate include limited use of manual gestures to differentiate words which are not lipreadable. This consists mainly fingerspelling the initial letters of proper nouns and homophenous content words. Use of such manual gestures is dependent on the wishes of the HOH client. They are also trained to slowing down mouth gestures, while ensuring a minimum lag time behind the actual speaker.

This study investig ates lipspeaking as a productive/receptive process as well as the views of lipspeakers and HOH service users on this new and evolving service.

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The role of imitation in learning to pronounce

Piers Messum,
Department of Phonetics and Linguistics, University College London; United Kingdom

Imitation is widely assumed to be the principal mechanism by which a child comes to reproduce the phonetic characteristics of his first languag e. Sound qualities, contextual temporal variation and some other phenomena are all believed to be acquired this way. Pedagogical and therapeutic practices are generally based on the assumed naturalness of imitation as a learning mechanism for pronunciatio n.

However an imitative account presents some theoretical problems and child developmental data is often difficult to explain within such a framework. As an alternative, I present two classes of mechanisms to explain replication. The first describes cont extual temporal variation (vowel length changes, 'rhythm', etc) as the result of canalising pressures arising from children's style of speech breathing. Under their influence the child warps his segmental output, with the consequential timing effects being epiphenomenal rather than primary.

The second mechanism describes the development of segmental speech sounds as a process which culminates in a child being able to judge the similarity between his own and others' productions, but does not take this abilit y to be a prerequisite (i.e. a capacity acquired prior to word production). Instead, adult judgments of similarity are used by an infant to determine equivalences between its articulatory gestures and adult speech sounds. This permits early word reproduc tion, which provides the data from which the young child can then determine criteria for similarity and, hence, the capacity for learning words by imitation seen in older speakers.

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Investigating the goals of speech production: the integration of emphasis-cuing parameters

Timothy Mills

Department of Linguistics and English Language, University of Edinburgh; United Kingdom

During speech production, many physical parameters are man ipulated to produce an intelligible signal. The current study examines one way in which these parameters might be integrated into larger functional units.

In this experiment, we investigate the integration of emphasis -cuing acoustic parameters, as seen in the following sentence pair: "They aren't sending a woman. They are sending a MAN." The production of emphasis involves several acoustic parameters: duration, frequency, intensity, and spectral balance. Are these produced as an integrated unit? (In other words, does a disruption to one triggers a compensation in the others, as when lip -movement compensates for jaw obstruction in bite -block experiments?) Or are they produced independently of one another?

Utterance-final words with and without emphasis were e licited. Manipulation of sentence type (statement/question) generated different F0 environments for the utterance -final words. The F0 manipulation characteristic of questions obscures the F0 cue to emphasis, so that frequency contributes more to signalling emphasis at the end of statements than at the end of questions. Measurements of other parameters associated with focus - duration, intensity, and spectral balance - were made to determine whether they responded. Initial results and their implications will be discussed.

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Effects of syllable structure on vowel-to-vowel coarticulation in Cantonese, Thai and English

Pik Ki Peggy Mok

Department of Linguistics, University of Cambridge ; United Kindom

This study investigates the effects of phonological syllable structure on vowel-to-vowel coarticulation. Most previous studies on vowel-to-vowel coarticulation used only open syllables. However, various studies show that syllable onset and coda consonants are different articulatorily and acoustically. This suggests that syllable structures could affect degree of vowel-to-vowel coarticulation. Open syllables (/CV_1.pV_2/ and /CV_1.tV_2/) versus closed syllables (/CV_1p.V_2C/ and /CV_1t.V_2C/) are compared in Cantonese, Thai and English. The vowels used are /a/ and /i/ (or /ɪ/ for closed syllables in Cantonese, and long vowels in Thai). Six native speakers per language read 7 repetitions of the materials embedded in carrier phrases at a normal speech rate. F1 and F2 frequencies at vowel edge (offset for V_1 and onset for V_2) and the intervocalic duration are measured. Preliminary results show that syllable structure has different effects on v-to-v coarticulation in the three languages. Cantonese shows more coarticulation than Thai, with closed syllables generally allowing more coarticulation than open ones. English also shows more coarticulation than Thai in F2 of V_2 for both open and closed syllables. Different syllable structures do not induce signific ant difference on v-to-v coarticulation in Thai while they interact with different target vowels and intervocalic stops in English. Thai, an isolating language with strong monosyllabic tendency, unreleased final stops and the most stable realisation of syllable final stops among the three languages, shows the least vowel-to-vowel coarticulation. The results suggest that the realisation and stability of syllable structure in a language could determine degree of vowel-to-vowel coarticulation.

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Timing relationship between spoken and sung utterances in Japanese

Hitomi Nakata
School of Languages and European Studies, University of Reading ; United Kingdom

This study examines the timing relationship between spoken and sung utterances in Japanese, based on acoustic measurements. A set of identical phrase s was read aloud and sung in quasi-spontaneous conditions by six subjects. Durations of segments, moras, and higher prosodic units were compared based on a waveform measurements.

Studies of sheet music, language acquisition, or metrics are said to support the hypothesis that rhythmic properties are shared by language and music within a particular culture (e.g. Patel & Daniele, 2003) . However, little empirical evidence has been put forward, and most of that comes from studies of English.

In the present study, an acoustical analysis of various segmental/prosodic units provided evidence that musical constraints do *not* appear to impede real isation of speech timing; i.e. segmental/moraic/phrasal proportions w ere unchanged in singing. However, it was observed that not only vowels but also some consonants showed adjustments in duration in singing. The durational effects of d iscourse factors s uch as pausing and positional effect and of musical convention are also briefly considered .

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Acoustic characteristics of vowels produced by Greek speakers with profound hearing impairment

Katerina Nicolaidis and Anna Sfakianaki
Aristotle University of Thessaloniki; Greece

Vowel production by speakers with hearing impairment has been shown to deviate in important ways from that of speakers with normal hearing. Typical errors inc lude vowel substitution, neutralisation, prolongation, diphthongisation and nasalisation (Markides 1983). Research on the acoustic characteristics of vowels has provided evidence of reduced ranges in the F1 and F2 formant frequencies, a more centralised vo wel space and the production of less differentiated vowels (e.g. Angelocci et al 1964; Ryalls et al 2003). Reduced differentiation of vowels has been attributed to limited auditory feedback and the relative invisibility of the articulatory gestures needed for vowel production. Differences have also been reported with respect to variation in the F1 vs. F2 formant frequencies, as higher frequencies tend to be more affected (i.e. hearing sensitivity is greatly reduced above 1000 Hz for individuals with hearing impairment) and visual information relating to tongue position is less easily accessible. This paper investigates selected acoustic characteristics of all five Greek vowels produced by six Greek speakers with hearing impairment. The speech material analys ed was of the form /ˈpVCV/ where V=/i, e, a, o, u/, C=/p, t, k, s/; stress location was on the first syllable and all sequences were embedded in a carrier phrase. Acoustic data were recorded from three male and three female young adults with profound heari ng impairment, i.e. three frequency pure tone averages was greater than 100dB, and six individuals, three male and three female, with normal hearing. The study examines the duration and F1, F2 formant frequencies of the stressed and unstressed vowels produ ced by the speakers with hearing impairment vs. normal hearing, and discusses differences as a function of hearing level, speaker, stress and context. The results reveal important variability in the acoustic characteristics of vowels in relation to the abo ve factors and the paper discusses findings with reference to previous literature on other languages.

Introducing the DyViS project:
'Dynamic variability in speech: a forensic phonetic study of British English'

Francis Nolan, Gea de Jong and Kirsty McDougall
Department of Linguistics, University of Cambridge; United Kingdom

This presentation will introduce DyViS, an ESRC -funded research project [RES-000-23-1248] at Cambridge, which aims to improve the forensic phonetic knowledge base. An increasing number of court cases involve the need to establish a speaker's identity from a crime -related recording of speech. Such analysis is constrained, however, by a conspicuous lack of t he population data needed to underpin phonetic attributions of identity.

The project will provide a large -scale database of speech collected under simulated forensic conditions. 100 male speakers of Standard Southern British English (SSBE) aged 18 - 25 will be recorded to exemplify a population of speakers of the same sex, age and accent group. The database will be used to investigate two kinds of dynamic variability in speech. First, a number of articulatory -acoustic dynamic features of speech will be evalu ated with respect to their reliability as indices of speaker identity. The rationale for looking at such dynamic features of speech is that speakers are likely to exhibit the most uniform acoustic properties at moments in the stream of speech when linguist ic targets are achieved, but move between the targets in individual ways. Second, speaker identity will be investigated with respect to the dynamics of diachronic sound change. We hypothesise that within a homogeneous speech community, those sounds which a re undergoing change are those most likely to exhibit individual variation. Preliminary results will be presented comparing / •ʊ/ which is thought to be relatively stable in SSBE and /u ʊ/ which is becoming progressively fronted (Hawkins and Madgley in press).

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Prosodic characteristics of sarcasm

Uta Panten

Department of Humanities, University of Central Lancashire; United Kingdom

The present study investigates the acoustic correl ates of sarcasm. A production study on sarcasm and nonsarcasm was used to extract possibly relevant parameters like speech rate, mean f0 and pitch range. Then, the extracted parameters for sarcasm were used to resynthesise the nonsarcastic data, in order t o find out whether it would make them sound sarcastic. The originally recorded utterances and the seven different manipulated versions were then used as stimuli in a perception study. Results revealed that subjects are able to distinguish between sarcasm an nonsarcasm when presented as a separate utterance and that manipulations with all parameters combined led to originally nonsarcastic utterances being recognized as sarcastic. Additionally, a dependence on speaker and intra - utterance context was detected .

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Intonational variation: asking questions in northern Italian dialects

Elinor Payne

Department of Phonetics and Linguistics, University College London; United Kingdom

It has been claimed that rising pitch in yes/no questions is an ethologically/biologically based intonational universal (Bolinger, 1982; Ohala, 1996; Gussenhoven 2004). Specifically, it is claimed that a pre-linguistic association of high pitch with physical small ness and 'social' submissiveness naturally lends itself to linguistic encoding of rising pitch with phrase types expressing uncertainty, e.g. questions. However, as Ladd (1996) notes, there is considerable language-specific variation in question intonation, and the use of rising pitch is arguably a *conventional*, not automatic, extension of this iconic form -meaning relationship. This paper examines two northern Italian dialects which contain alternative (morphosyntactic) cues to yes/no questions, to establis h whether these interact with intonational cues. A characteristic feature of many northern Italian dialects, unlike Italian, are clitic subject pronouns, and clitic - verb inversion in questions:

e.g.   <u>Trevigiano</u>:   ***el*** *ga magná un pomo.*   *ga-**o** magná un pom o*?
       <u>Italian</u>:   *ha mangiato una mela.*   *ha mangiato una mela?*
                               he's eaten an apple.   *he's eaten an apple?*

In Parmense, declaratives are found to have falling nuclear pitch accents (H*+L or H+L*), while yes/no questions have predominantly RISES (L+H* or L*+ H). Trevigiano has FALLS (H+L*), RISES (L*+H) and RISE -FALLS (L*+H or L+H*, plus a phrase accent L) for declaratives, wh -questions *and* yes/no questions. Thus, not only is there intonational allomorphy within a particular phrase type (statements can be sign alled by a fall or a rise), but there is no clear contrast between different phrase types (the same allomorphs are used for questions and statements). These differences strongly suggest question intonation is above all a dialect-specific convention.

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Southern Italian rhythm: stress-timed or simply less syllable-timed?

Elinor Payne[1] and Laurence White[2]

[1]Department of Phonetics and Linguistics, University College London; United Kingdom
[2]Department of Experimental Psychology, University of Bristol; United Kingdom

Italian is generally considered to have "syllable-timed" rhythm, in keeping with most Romance varieties. In this paper we present evidence to support the impression (Grice *et al* 2004) that southern Italian accents are less "syllable-timed" than standard and northern accents. Our evidence is based on recently proposed rhythm metrics, such as the standard deviation of intervocalic interval duration. These metrics capture, among other things, the greater incidence and longer realisation of geminate consonants in southern accents, which serve to increase syllable complexity at the phonological level and intervocalic duration at the phonetic level. The effectiveness of these metrics suggests that rhythm is based on the relative salience of stressed and unstressed syllables, rather than any top-down control of timing. We argue that salience is determined by a combination of syllable structure and segmental prosodic timing processes, which vary by degree both within and between languages. This supports the theory that rhythmic variation is continuous rather than categorical (Dauer 1983). At the same time, we argue that the cumulative effect of these processes produces rhythmic templates which are variety-specific but may cluster, at least perceptually, around a type. We are now looking for evidence of this perceptual clustering, testing how well listeners discriminate rhythmically diverse accents when segmental information is impoverished. We also consider the possible influence of rhythmic differences on other prosodic phenomena, such as alignment of pitch targets, and how this might bear historically on the intonational phonology of different varieties of Italian.

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Prosodic boundary in children with autism: listener perceptions

Sue Peppé, Ineke Mennen, Joanne McCann, Ivan Yuen, Robin Lickley, Pastora Martinez Castilla, Fiona Gibbon, Anne O'Hare, Marion Ruthe rford
Speech Science Research Centre, Queen Margaret University College; United Kingdom

Two recent projects involved one group of 100 typically -developing children, another of 31 children with high -functioning autism (HFA) and a third of 39 children with AS (Asperger's syndrome), all aged 5 -14. The prosodic skills of all the children were assessed using the PEPS -C test [1]. One of the tasks evaluates the children's ability to make prosodic breaks to signal syntactic boundaries, using utterances where the m eaning may vary depending on the prosodic phrasing. Judgments by the tester suggested that many of the children, in all groups, either sounded ambiguous (made no difference between breaks and non -breaks) or were misleading (made breaks where the target dem anded none, and vice versa). Ongoing research involves analysis of 12 utterances each from 25 children in each group, and judgements from 20 phonetically-naïve students of the utterances on a 6 -point scale. This will be used as a measure of inter-rater reliability. Utterances where judgements diverge from targets will be examined to see if one group is likely to be more ambiguous or misleading than another, and whether errors occur more frequently in particular categories of utterance. The occurrence of pro sodic boundary markers such as pause, final syllable duration and fundamental frequency factors will be examined for their correlation with judgments, and whether these vary according to the presence or absence of autism spectrum disorders.

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An investigation of word level stress in individuals with Down syndrome

Michèle Pettinato, Sarah Barrett -Jones and Penny Roy
Department of Language and Communication Science, City University;   United Kingdom

Individuals with Down syndrome (DS) are known to present with prosodic anomalies, but few detailed investigations on this topic have been undertaken. Moreover, it is not clear whether difficulties with prosody are purely due to motor and p hysiological factors or whether there are underlying cognitive, representational deficits. The first explanation would suggest that prosodic abilities in DS should essentially be the same of those found in normal development, but realised with less accura cy. Whereas if the latter explanation is the case, prosody in DS should additionally *differ in kind*. This question was approached by examining the generation of word level stress.

A nonsense word repetition task was used to compare a group of 16 childr en and adolescents with DS to a control group of 11 typically developing children matched on receptive vocabulary. Findings are discussed in relation to types of errors, the manner in which stress is realized and which metrical structures are particularly affected by errors. Preliminary analyses suggest that the group with DS not only has more difficulties with producing stress adequately, but produces changes to stress patterns which are not found in the control group. Although this result seems to indi cate that stress is not adequately represented in individuals with DS, a second perceptual task was carried out to check whether errors were in fact due to output difficulties. An XAB discrimination task was used to examine the perception of word level stress. Preliminary analyses show a significant difficulty in discriminating minimal stress pairs of four syllables in the group with DS. These findings are related to typical and atypical language acquisition as well as acquired language disorders.

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The quantity system of Dinka (Luanyjang dialect)

Bert Remijsen[1] and Leoma Gilley[2]

[1] Department of Linguistics and English Language, University of Edinburgh; United Kingdom
[2]Summer Institute of Linguistics

Kenstowicz & Rubach (1987) have hypothesised that languages can have no more than two levels of phonemically distinctive vowel length. One of the few languages for which a more complex – i.e., three-level – dinstinction has been postulated is Dinka (Andersen 1987 – cf. Table 1).

Table 1. Two inflections of two Dinka verbs, illustrating the quantity patterns in a minimal -set example. The words are transcribed in terms of each of the competing hypotheses.

		Andersen (1987)		**Our hypothesis**	
'pick'	NEGATION	tet	/V/	tett	/VCC/
	PAST	teet	/VV/	tet	/VC/
'explain'	NEGATION	teet	/VV/	teett	/VVCC/
	PAST	teeet	/VVV/	teet	/VVC/

In this paper, we present the results of a detailed acoustic study of quantity distinctions in the Luanyjang variant of Dinka. Our results reveal that minimal -set data as illustrated in Table 1 can be accounted for the most naturally by postulating two interacting quantity contrasts – one of vowel length, and the other affecting the quantity of the coda (cf. T able 1). The latter of these contrasts is realised by a range of prosodic parameters, affecting both vowel and coda. Given the results, our analysis may be relevant to similar controversies in related languages, such as Kalenjin (Local & Lodge 2004).
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Rhythm in ataxic dysarthria: A cross -linguistic study

Jessicsa C. Röder[1], Anja Lowit[1], Ellika Schalling[2], Lena Hartelius[3],
Pascal Auzou[4] and Ineke Mennen[5]

[1]Speech and Language Thera py Division, Strathclyde University; United Kingdom
[2]Department of Logopedics and Phoniatrics, Karolinska Institutet, Karolinska University Hospital, Huddinge; Sweden
[3]Department of Logopedics and Phoniatrics, Sahlgrenska Academy at Göteborg University; Sweden
[4]Unit of Clinical Neurophysiology
[5]Speech Science Research Centre, Queen Margaret University College; United Kingdom

Ataxic dysarthria is particularly characterised by a disturbance of rhythm which reduces intelligibility and gives an unnatural quali ty to speech (e.g. Kent et al. 1997).
It is generally assumed that the rhythmic disturbances in ataxic dysarthria are due to problems with the cerebellum, which is responsible for motor control.

Most studies into rhythm in ataxic dysarthria provide inform ation about speakers of English and German (stress -timed languages). Currently there is no detailed information available on the manifestations of problems in languages with other types of rhythm, e.g. syllable -timed languages.

This poster will report prel iminary results of a study that aims to develop appropriate methodologies for a cross -linguistic comparison of ataxic dysarthric speech, and to investigate in detail the rhythmic changes that can be observed in these speakers.

Six English and six French sp eakers with spino -cerebellar or cerebellar ataxia were assessed, alongside healthy matched control subjects for each language.
Collected data include materials to assess the characteristics of the presenting dysarthria as well as specific tasks to identif y rhythmic changes, therefore tasks ranged from highly rhythmic tasks to those eliciting more natural speech rhythm.
Rhythm measures used in previous research into ataxic dysarthria, as well as those developed in the area of cross -linguistic phonetics were applied to the data identify which were most suited to detect deviations of rhythm within as well as across languages.

Results will be presented with respect to the applicability of different rhythm measures in characterizing the rhythmic disturbances of ataxic speakers, as well as a comparison of rhythmic changes in ataxia across English and French.

Service d'Explorations Fonctionnelles Neurologiques
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Where the [l] [r] they?
An ultrasound tongue imaging study of Scottish En glish liquids

James M Scobbie[1] and Jane Stuart-Smith[2]
[1]Speech Science Research Centre, Queen Margaret University College; United Kingdom
[2] Department of English Language, University of Glasgow; United Kingdom

Recent multi-subject, socially-stratified research on Scottish English (specifically in Glasgow), has confirmed the existence of derhoticised speech in broadly -spoken Scots. Coda /r/ appears "weaker" than onset /r/, and indeed it can sound completely de leted. Additionally, some Scots have categorical "vocalisation" of /l/ in the coda with associated [l] -sandhi. It is unclear that these particular onset/coda allophony can and should be analysed using the models of gestural strengthening and weakening used to account for the far more subtle forms of coda weakening allophony seen in liquids in American English (Gick 2003) and other languages (Gick et al., in press). T he Scottish situation appears more radical phonetically, with potential phonological invento ry implications in the future.

We present new ultrasound data to exemplify some of this Scottish variation. Ultrasound provides a mid -sagittal tongue -surface co ntour able to show the extent and rough timing of tongue -root gestures towards the pharynx and tongue blade gestures towards the post-alveolar region (among other relevant features). The sampling rate of this data is 25Hz. In the laboratory setting, su bjects wear a helmet to which the probe is attached for stabilization, simplifying within -speaker quantitative spatial comparisons. Acoustic analysis of the tokens is also unde rtaken, and some rough articul atory-acoustic timing are presented.

Among the results we will exemplify categorical and gradient variation in liquid production within speakers, cov ert articulations, and indexical differences in tongue configuration.

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Syllable structure and phonotactics in Hong Kong English

Jane Setter
University of Reading; United Kingdom

One expects syllable structure and phonotactics to vary from language to language, but how does it vary from variety to variety? Using connected speech data from student presentations, this study investigates syllable structure and phonotactics in Hong Kong English (HKE), an emerging New Variety of English (NVE). Presentations by twenty students at the Hong Kong Polytechnic University were tape recorded and then transferred to computer.   One minute of speech, chosen for fluency, was analysed from each p resentation for features of syllable structure and phonotactics, in the light of what is known about these features in British English (RP accent) and Cantonese. It was found that, from twenty syllable types possible in British English (BrE), only twelve syllable types occurred in the HKE speech, the maximum syllable having six segments and being CCCVCC. This is in comparison with a smaller BrE sample from the SCRIBE corpus, which yielded fifteen syllable types, and previously published work on Cantonese, which indicates only null - or single-consonant onsets and codas to be possible. In addition, no syllables ending with more than two -consonants were found in the HKE data, in comparison with three syllable types with three -consonant codas in the BrE data.   However, BrE-type three-consonant syllable onsets appear in both the BrE and HKE data. The data is further analysed in terms of phonotactic constraints in both BrE and Cantonese, and shows differences in both cases, indicating that HKE patterns differ f rom both the native language, Cantonese, and BrE as a possible target.

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Practical Applications of Casual Speech Phonology

Linda Shockey
University of Reading; United Kingdom

The kinds of phonological simplifications/changes found in connected speech should inform all models of speech production, regardless of the style of speech being modelled.

There are differences between formal and casual speech, involving overall speech rate, basis of articulation, vocabulary, syntax, posture, and gesture. Phonology is not included in this list. This is because, while there are small differences between formal and casual speech, evidence from English points to the fact that virtually al l speech, regardless of style, shows the same patterns of difference from citation form. Because speakers do not know they are using these simplifications, they do not suppress them or favour them in any particular style. For English, these can be tied to factors such as lack of contrast in unstressed positions and simplification of syllable structure.

Studies show that listening to synthetic speech is more tiring than listening to natural speech, that more mistakes in perception are made, and that less information is retained over time when the input is synthetic (cf. Francis and Nusbaum, 1999, Stevens et all, 2005). Far from making synthetic speech less understandable, the inclusion of normal phonological reductions in synthetic speech can improve the naturalness of the output, thus making it easier to listen to. Inclusion of variation in pronunciation is more difficult to include in concatenative synthesis than in other types.

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The phonetic correlates of juncture and dorsality in a case of congenital aglossia

Adrian P. Simpson
Institute of German Linguistics, University of Jena; Germany

In the absence of what is arguably the most flexible and versatile component in the sp eech production process, it is of fundamental phonetic interest to see how a tongueless speaker approximates the phonetic patterns in his/her language. This study examines some of the phonetic patterns produced by a speaker of German from Upper Saxony who was tongueless from birth. In particular, we examine the laryngeal correlates of dorsality and juncture and show how the speaker employs a different range of glottal activity to do vowel juncture from that which she uses for dorsality. The analysis is ba sed on the recording of a word -list and a short prose text.

It will be argued that a more careful auditory and acoustic analysis of glottal relocation common to other speech pathologies, such as cleft palate, may reveal more differentiation being made on t he part of the speaker than a superficial hearing may at first suggest.
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Effects of talker and listener age on learning talker -specific fine phonetic detail

Rachel Smith

Department of Linguistics, University of Cambridge; United Kingdom

This paper extends an investigation of how listeners learn about talker -specific patterns of fine phonetic detail (FPD) at word boundaries. Smith (2004) manipulated talker familiarity and allophonic match/mismatch (using cross -splicing) in phonemically -identical sentences, e.g. *So he diced them—So he'd iced them*. Mismatch slowed the time taken to detect words when the talker was familiar but not unfamiliar; this result was interpreted as reflect ing memory for talker-specific FPD. The present study tests the hypothesis that listeners learn more about talker-specific FPD in proportion to its novelty. Talker and listener age are manipulated in a factorial design; speech from a talker in a different age-group is assumed to be more novel for listeners than speech from their own age -group, when accent is controlled. Age -groups are 18 - 20, *vs.* late 30s. All participants are SSBE speakers. Subjects are familiarised to half of the unspliced sentences from S mith (2004), presented in good listening conditions. Test trials use the other half of the unspliced sentences, spoken by familiar and unfamiliar talkers from both age-groups, and presented in cafeteria noise. Listeners transcribe the words heard. More accurate word identification is expected for familiar than unfamiliar talkers. When talker and listener *differ* in age-group, familiarity is predicted to cause a larger accuracy difference than when both are from the same age -group. This pattern would suggest that FPD is learned about in proportion to its novelty, with more abstraction across individual voices that speak in a similar way to the listener. However, if familiarisation improves accuracy more when talker and listener are from the *same* age-group, then properties distinguishing individuals within a familiar group may be most perceptually salient. Implications are developed for exemplar, abstract and hybrid models.

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Intonation deficits in Williams syndrome

Vesna Stojanovik, Jane Setter and Lizet van Ewijk
University of Reading; United Kingdom

Williams syndrome (WS) is a rare genetic disorder associated with relatively good linguistic abilities and poor general cognitive func tioning. Anecdotal evidence has suggested that individuals with WS have 'odd' intonation, however there has not been any systematic investigation of the expressive and receptive abilities in this population. The aim of the present study is: 1) to investiga te the understanding and production of intonation of children with WS using a specific software developed to assess comprehension and production of intonation in children (PEPS-C) Peppe, McCann and Gibon (2003); 2) to investigate whether there is a correlation between receptive and expressive language abilities and intonation skills. A group of children with WS is compared to a group of children matched for chronological age and a group of children matched for language age. The results show that the childr en with WS have severe deficits with expressive and receptive intonation in comparison to their chronological age matched peers. The children with WS also had impaired intonation abilities in some aspects of receptive and expressive intonation compared to their language age matched peers. Correlations were found between expressive language abilities and expressive intonation skills. The results will be discussed with reference to the outstanding theoretical issues regarding the independence of intonation fr om other linguistic and non -verbal abilities.

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An acoustic investigation of post-vocalic /r/ in Glaswegian adolescents

Jane Stuart-Smith

Department of English Language, Universi ty of Glasgow; United Kingdom

Although Scottish English is known to be rhotic, sociolinguists have been noting variation and change in postvocalic /r/, often calling it 'r -vocalization', in urban working -class varieties since the late 1970s (Romaine 1978). Extensive r-vocalization was confirmed in Glaswegian through auditory analysis of a socially -stratified dataset collected in 1997 (Stuart -Smith 2003). Auditorily, postvocalic /r/ in these speakers presents a range of realizations, from no discernible articulatory presence/diphthongization (in e.g. *car*), through to diphthongization with centralized vowels accompanied by uvularization or pharyngealization, also of a following consonant (in e.g. *card*).

This paper presents the results of an auditory and acoustic parametric analysis of postvocalic /r/ in the speech working -class Glaswegian adolescents. The data are taken from an age-stratified corpus of Glaswegian collected in 2003 and 2004 (ESRC Grant No. R000239757). We report results from instances of postvocalic /r/ as they occurred in wordlists read by a sample of 46 adolescents (12 boys, 11 girls), who fall into four age groups (10 -11 years; 11-12 years; 12-13 years; 13-14 years) by means of a longitudinal design. Here we analyse postvocalic /r/ in monosyllables following /a/ and preceding a pause or a consonant. The acoustic analysis considers the following features (after Plug and Ogden 2003): vowel duration; vowel quality; and – where appropriate – the nature of the following consonant.

Overall, our results reveal the complex phonetic variation which is found preceding, during and following, expected post -vocalic /r/ in these speakers.

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The onset of phrase-final lengthening in Japanese and Finnish

Alice Turk and Satsuki Nakai

Department of Linguistics and English Language, University of Edinburgh; United Kingdom

Comparisons of phrase-final vs. phrase-medial words in many languages show that with few exceptions, final lengthening effects occur on segments within the phrase-final syllable. In addition, studies report a lesser degree of lengthening earlier in the final word, e.g. on penultimate syllables, at least in some types of words. There are several alternative accounts of this pre-final phrase-final lengthening: lengthening occurs on pre-final syllables when

1) lengthening on a final syllable would endanger a phonological contrast: if a final syllable nucleus contained a non-expandable segment (e.g. schwa), lengthening required to signal phrase-finality might "spill over" to the preceding syllable (Cambier-Langeveld 1997),

2) the final syllable contains few, and/or intrinsically short duration segments: penultimate syllables will be lengthened if within the scope of a fixed-extent phrase-final Pi-gesture responsible for lengthening material with which it overlaps (Byrd & Saltzman 2003),

3) pre-final syllables are structurally marked, e.g. bear primary lexical stress.

We present utterance-final vs. phrase-medial comparisons from Finnish and Japanese, languages with phonemic vowel length. The dataset includes real and nonsense trochaic disyllables: e.g. *saasa, sasa, saasaa, sasaa.*

Penultimate syllable lengthening in Japanese and Finnish occurs regardless of final vowel length. In Finnish, penultimate vowel lengthening is reliable in our data only when this vowel is phonologically long; in Japanese, all penultimate syllables were lengthened to some extent.

Results suggest that properties of the final syllable are poor predictors of the onset of utterance-final lengthening.

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Cross-linguistic study of closure-related tongue perturbations

Yolanda Vazquez-Alvarez

Speech Science Research Centre, Queen Margaret University College; United Kingdom and UC Berkeley; USA

Houde (1968) discovered what he called 'closure-related tongue perturbations'. He concluded that these perturbations were the result of a passive reaction to oral pressure perturbations. More recently Lindblom et al. (2002) discarded a possible aerodynamic explanation for this phenomenon that they referred to as the 'trough effect'. Recent results from an ultrasound study (Vazquez-Alvarez & Hewlett *under revision*) showed that subject variation observed for this phenomenon is high which might be due to differences in intraoral pressure or anatomical differences. Other work like McAllister and Engstrand (1992) revealed a significant difference in the effect depending on language reporting the lack of such effect in French bilabial stops. In this study we recorded three native speakers of British English, Spanish and French, producing VCV sequences: V was /i/ and C was /p,b/. There were two different conditions: 1) Non-vented oral pressure, and 2) a leak tube used to evacuate oral pressure reproducing Houde's experiment. In the analysis, F2 transitions, which have showed to strongly correlate with tongue movement Vazquez-Alvarez (2005), were compared with pressure data. Results from the F2 transitions-pressure data did not support the explanation of the lowering of the tongue as a reaction to pressure build-up. However, the English transition data seems to support a strategy to maximise the perceptual contrast of the labial. Perhaps this enhancing gesture is a subject dependent strategy, hence the subject variability found in the ultrasound data.

Rhotics in transition: variation in Berwick English /r/

Dominic Watt
Centre for Linguistic Research, University of Aberdeen; United Kingdom

Post-vocalic rhoticity persisted until recent decades in rural Northumbrian accents, but has since receded markedly. This situation may be contrasted with that found directly across the border in Scotland, where rhoticity is still very much the norm, manifesting itself as a range of phonetic variants including alveolar taps and trills, retroflex approximants, and the more 'mainstream' alveolar approximant [̈]. It is not surprising, therefore, t hat post-vocalic rhoticity is a feature which in Scotland and northern England is closely associated with Scottish accents, and that it is the subject of overt comment by speakers living in the region, who seem aware that /r/ is a particularly socially and geographically sensitive phonological feature.

Rhoticity patterns were investigated in the speech of a total of 30 male and female informants (adults and adolescents) from Berwick upon Tweed in order to try to establish the extent to which the use (a) of post-vocalic rhoticity and (b) particular phonetic variants of /r/ in Berwick speech might be correlated with overtly expressed attitudes towards Scotland/Scottishness and England/Englishness (etc.) collected via extended structured interviews conducted us ing a modified version of the SuRE method (Llamas 1999).

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The emergence of tone unit structure in talk -in-interaction

Bill Wells[1] and Juliette Corrin[2]

[1]*University of Sheffield; U nited Kingdom*
[2]*University College London; United Kingdom*

How do language -specific features of English intonation emerge in a child's speech? Dr awing on video recorded data of a child C.A 1;10 - 2;1 with his mother, we employ prosodic and interactional analysis to explore how the child might discover intonational constructs through the joint negotiation of interactional practices such as turn -taking and repair. In this talk we consider the basic structure of the tone unit, often described in terms of 'h ead + tonic segment'. First, it is shown that the construct 'tonic segment', comprising the last major pitch accent of the turn constructional unit (TCU), is oriented to by both child and adult as delimiting the end of the turn at talk. Second, the emerge nce of the 'head', which constitutes a major advance in the child's construction of TCU's, is supported by the mother. For example, non -final segments of talk produced by the child that lack a pitch accent, i.e. potential 'heads', are not treated as comple te turns by his mother, who routinely waits for a tonic segment before taking her own turn. Conversely, the mother on occasion produces an incomplete TCU with no major pitch accent, i.e. a 'head', inviting the child to complete the unit with a word accomp anied by a pitch accent (tonic segment); when the child does so, his utterance is treated by the mother as having completed her turn. The discovery of such mechanisms for intonation development, embedded in the interaction itself, has wider implications fo r constructivist accounts of phonological and linguistic development.

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A domain and locus approach to prosodic timing processes

Laurence White
Department of Experimental Psycho logy, University of Bristol; United Kingdom

This paper presents a framework for the description of prosodic timing processes . In prosodic phonology, "domain" refers to any constituent conditioning the occurrence of connected speech processes. Timing eff ects may extend over several segments, necessitating a distinction between the superordinate constituent – domain – providing the context for the effect, and the subordinate unit – locus – manifesting the effect.

Three types of timing process are reviewe d:
- Domain-edge lengthening effects appear confined to phonologically -defined loci: word - initial lengthening (e.g. Oller, 1973) affects the word -initial syllable onset; u tterance -final lengthening (e.g. Wightman *et al.*, 1992) affects segments from the fina l primary stressed syllable to the utterance edge.
- Domain-head lengthening refers to the extra duration segments receive when in proximity to a pitch accent (e.g. Turk & White, 1999): the attenuation of accentual lengthening by word boundaries and its sub -lexical distribution indicate that the locus of the effect is the word.
- Domain-span compression is hypothesised to arise from an inverse relationship between constituent length and subconstituent duration: for example, polysyllabic shortening (e.g. Lehiste 1972) and utterance -span compression (e.g. Lehiste 1974). There is little compelling evidence for such processes, however: in particular, previously -observed polysyllabic shortening seems primarily to arise from the attenuation of accentual lengthening in polysyllabic words.

The accumulated experimental evidence suggests a prosodic timing model in which lengthening occurs at the edges of constituents and within pitch -accented words. Segments outside the loci of lengthening are not directly subject to a ny timing process arising from the organisation of syllables into words and higher -level prosodic constituents.

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Acoustic characteristics of stuttering

Nicole Whitworth and Monic a Bray
Leeds Metropolitan University; United Kingdom

This study aims to compare the speech of a speaker with no stuttering, one with stuttering and one with Down's syndrome including dysfluencies. The comparisons consisted of measures of number and durati on of syllables and sounds as well as filled and unfilled pauses using spectrography as the medium. Discussion of the outcomes of these measurements centres on the proposal that all three speakers share common patterns of articulation (the mouth opens and closes, the tongue moves from high to low and front to back) which shift and change within the individuals along a continuum. The label 'stuttering' does not specify any particular set of acoustic features.

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Is auditory word recognition direct or indirect?

Lukas Wiget

Department of Linguistics and English Language, University of Edinburgh; United Kingdom

Human listeners may recognise spoken words either directly, or indirectly b y means of an intermediate recognition process (e.g. the recognition of phonemes). I am addressing the issue of whether word recognition is direct or indirect by using a novel, two -stage experimental method.

In the first stage, a group of native English s ubjects (the phonemic group) are trained to recognise and distinguish two minimal pairs that span the non -English [f- ˏ] contrast; they thus learn to treat [ˏ] as a new phoneme. A second group (the allophonic group) are trained on minimal pairs that span t he English [f-θ] contrast and in which [ˏ] is used as a variant of /f/; this group thus learns to treat the new sound [ˏ] as an allophone of /f/.

The second stage features a repetition priming paradigm that makes use of a lexical decision task. The occurr ence of a facilitative priming effect in this task will be taken as evidence for the identity of two stimuli. Word recognition models that postulate an intermediate recognition process predict that the occurrence of priming for stimuli that involve the [f- ˏ] contrast (e.g. [bɒnf] and [bɒn ˏ]) depends mainly on the training group (phonemic: no priming; allophonic: priming). Direct models, on the other hand, predict that the amount of priming depends primarily on acoustic similarity between stimuli and not o n training group.

At the colloquium, I want to present this method and report on the results I have obtained. Current results suggest that repetition priming is indeed a viable method for my purpose.

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Developing text-to-speech for Irish (Gaelic)

John Wogan, Brian Ó Raghaille, Áine Ní Bhriain, Eric Zoerner, Harald Haraldson, Ailbhe Ní Chasaide, Christer Gobl

Phonetics and Speech Laboratory, School of L

This paper will describe t he research directed at developing a text -to-speech system for Irish, using the Multisyn Festival system. This research is being carried out under the EU funded INTERREG III programme, in collaboration with University of Wales, Bangor, where parallell work on Welsh is in progress. There is also collaborative input from colleagues of DCU and UCD, members of the Irish Speech Group. The paper will focus particularly on the difficulties facing such development for a "new" language, where many of the prerequis ites such as a pronunciation lexicon, letter to sound rules etc are not available and where there is no standard spoken dialect. With Irish there is the added difficulty that the sound system is very complex (involving 40 consonantal phonemes) and that t he orthographic system is archaic and therefore far from transparent. The system, as it currently stands, will be demonstrated.

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Correlation between systems of contrasts in langu ages and the transitional vocalic element in consonant clusters

Kayoko Yanagisawa
Department of Phonetics and Linguistics, University College London; United Kingdom

Clusters of a plosive followed by /r/, which occur in many l anguages, vary in their patt erns of coarticulation. Where the /r/ is realised as an approximant, the two consonants may be closely coarticulated. However, when the /r/ is realised as a tap, the two consonants need to be separately articulated, so any gestural overlap between the cl ustered consonants is minimised. In such clusters, a brief vocalic interlude normally occurs between plosive release and tap closure. This transitional vocalic element (TVE) has vowel -like acoustic and perceptual properties, but is non -syllabic. It also differs from other vowels in that it does not have formant structures unique to itself.

A study of plosive + tap clusters in four languages showed distinct language -specific differences in the relative duration of the TVE. These differences could be corre lated with aspects of the vowel systems in the respective languages. Specifically, relatively short TVEs were found in two languages (Russian and Catalan) in which vowel reduction takes place in unstressed syllables, and where a schwa -like vowel forms par t of the phonemic inventory. In two "non-schwa" languages (Spanish and Greek), TVE durations were relatively long, though none were as long as the actual schwas recorded in the "schwa -languages". It is argued that in "schwa-languages", TVE durations are k ept short to avoid misperception as a genuine schwa. Perceptual tests using synthetic stimuli are being designed, in order to test whether the durational threshold at which a TVE may be perceived as a syllabic vowel will similarly vary with language type.

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Requirements for Automated Accent Correction

Kayoko Yanagisawa and Mark Huckvale
Department of Phonetics and Linguistics , University College London ; United Kingdom

There are a number of applications for systems which would speak in your voice but in a language unknown to you: when giving a talk in a foreign language , for example. A system that "corrects" your foreign language pronunciation could also be useful in learning more native-like pronunciation.

Technically, there are now available audio processing systems that can modify the pitch, timing and spectral quality of speech recordings. However , these manipulations inevitably destroy some naturalness and speaker identity in the output speech. To determine a suitable compromise between increased intelligibility and decreased naturalness, we have designed a pilot study to investigate how such manipulations affect the intelligibility of foreign accented speech to native listene rs. The outcome will be a clearer idea of the degree of benefit of modifications, which will help create a specification for the design of a system for accent correction. Previous work includes Maassen & Povel (1985), who investigated how segmental and suprasegmental manipulations affect the intelligibility of deaf speech.

In our study, a recording of a Japanese intelligibility word list is made by a monolingual English speaker (E). The correct segmental quality (Q), pitch (P) and timing (T) are obtained from a native Japanese speaker (J). The intelligibility material can then be generated in eight conditions: $Q_E P_E T_E$, $Q_E P_E T_J$ ... $Q_J P_J T_J$. Analysis of the intelligibility of the different conditions to Japanese listeners can be interpreted in terms of the re lative benefit of "correcting" the three different aspects of the signal, with respect to this particular language pair.

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Affect mapping of voice quality and f0 cues

Irena Yanushevskaya, Christer Gobl and Ailbhe Ní Chasaide
Phonetics and Speech Laboratory, Centre for Language and Communication Studies,
University of Dublin, Trinity College, Ireland

The paper reports the results of perception tests administered to the speakers of Japanese as part of a cross-cultural investigation into language-specific voice quality-to-affect mapping. Three types of synthesised stimuli: (1) 'VQ only', (2) 'VQ+ f_0', and (3) 'f_0 only', were used to investigate the relative contribution of voice quality and f_0 variations to affect perception. Overall, stimuli with integrated voice quality variations (with or without f_0 variations) provided the strongest affect cueing while affect signalling of stimuli differentiated by f_0 only was found relatively weak. Comparison of the results of similar experiments suggests the importance of the study of cross-cultural differences in the use of voice source variations that have significant implications for the generation of expressive speech synthesis.

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Declination and supra-laryngeal articulation in Cantonese: an EPG study

Ivan Yuen

Speech Science Research Centre, Queen Margaret University College; United Kingdom

There are recent studi es showing that declination as a function of utterance positions in speech also affects supralaryngeal behaviour apart from fundamental frequency, for example, Fowler 1988, Vatikiotis -Bateson & Fowler 1988, Vayra & Fowler 1992, Krakow, Bell -Berti and Wang 1995. Vayra and Fowler (1992) showed that the open vowel /a/ became less open in the last syllable than in the first syllable of bi - and tri-syllabic Italian pseudo -words. The observation is interpreted as an effect of declination, because of reduced en ergy and increased relaxation of the tongue movement in the latter part of an utterance.

At the same time, there are studies showing that prosodic positions also affect phonetic properties of individual segments, for example, Fougeron & Keating 1997 and Ch o 1998.

The current study is an attempt to extend these findings in non -tonal languages to a tone language Cantonese and examine the effects of declination and prosodic positions on both f0 and supralaryngeal articulation. The preliminary findings sugge sted that individual segments tend to exhibit more peripheral articulation (hyper -articulation) at domain -initial positions in Cantonese. No effect of prosodic structure on supra -laryngeal articulation was observed. However, the effect of prosodic struc ture was mainly manifested in fundamental frequency. In addition to the observed declination in the data, we found that the degree of f0 reset at domain -initial position varies with the levels of nesting found in the test NP.

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Coarticulation and anti-coarticulation in Russian

Natalia Zharkova and Nigel Hewlett
Speech Science Research Centre, Queen Margaret University College; United Kingdom

It has been experimentally demonstrate d for several languages that discontinuity in lingual coarticulation occurs in symmetrical VCV sequences with non -lingual consonants. This study aimed at analysing lingual coarticulation in Russian, and at explaining observed coarticulatory patterns.

Ultrasound data from three native speakers of Russian were collected, using the QMUC ultrasound system. The data were symmetrical VCV sequences with the consonants /b/ and /p/, and the vowels /i/, /u/, /a/. The stress was on the second syllable. There were fift een repetitions of each stimulus.

The results showed great similarity of the consonant tongue contour to the tongue contours during the flanking vowels. However, the tongue contour of the consonant was closer to that of the second vowel than it was to the first, probably due to syllable boundary and stress factors. A Trough Effect (TE) – tongue lowering between two high vowels, and tongue raising between two low vowels – occurred in all subjects' productions in the /a/ context (66%), but there was big indiv idual variation in TE production in /i/ and /u/ contexts.

If TE is viewed as tongue deactivation and returning to neutral position when not needed as part of an active gesture (e.g. Lindblom et al. 2002, Browman & Goldstein 1990), then cross-linguistic differences between our data and the published data on e.g. English, German and Swedish (e.g. Engstrand, McAllister & Lindblom 1996) may result from differences in neutral positions, or "intra -speech resting positions" (Gick et al. 2004), between Russian and the languages where TE is strongly manifested.

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