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From the President

The election of Dr. Angelika Braun as ISPhS' new Executive Vice President marks the end of the establishment of ISPhS' new Board of Directors (President, Executive Vice President, Vice Presidents, Past Presidents, Secretary General, Treasurer). It also completes the Executive Committee (President, Executive Vice President, Secretary General, three rotating Vice Presidents) which was joined by Dr. Asher Laufer, Dr. Stephen Lambacher and Dr. Hermann J. Künzel as the three rotating Vice Presidents of the first year (1999/2000).

This issue of ISPhS' official bulletin will be sent to almost 1,000 readers across the world. It comes to you in a new "coat". Due to a considerable increase in pages, a new binding procedure was necessary which is more comfortable to handle. The editors have, again, succeeded in collecting an impressive amount of relevant information about recent events and activities in the field of phonetics. In addition, the scientific section (Articles and Research Notes, Short Notes) has been extended to almost 30 pages. These sections will meet the needs of our members and continue to establish The Phonetician as a valuable publication for institutions and individuals outside our official membership. Our bulletin thus constitutes an important tool to achieve ISPhS' core interest, namely to promote phonetics at all levels of the educational systems and in all parts of the world.

In parallel with The Phonetician, ISPhS' homepage (www.isphs.org) has continued to prosper. It now also contains a list of useful links, a chat forum and a continuously updated list of vacant positions with links to the companies offering these jobs. As a consequence, the number of visitors has continued to increase over the past months. It is ISPhS policy to make its homepage as informative and attractive as possible for phoneticians as well as for the general public. Note, however, that The Phonetician 81 will be the last issue to appear on the web in full. Starting with Number 82 (December 2000), only the cover together with the table of contents as well as selected sections of each edition such as "Publications Received" and "Meetings, Conferences, and Workshops" will be accessible on the web. From then on, reading The Phonetician in its unshortened form will be a privilege of our members and subscribers only.

In another exciting improvement, ISPhS' membership list has been placed on an internet server and is being constantly updated by the President's and Secretary General's Offices. This list also contains current addresses and information on whether or not our members are in good standing. Those of you who have not paid your 2000 membership dues by November 2000, will not receive the next issue of The Phonetician (Number 82). Starting in 2001, dues must be paid before May of each year in order to receive the first annual issue of The Phonetician. In the 2000–II issue (Number 82) we will place a reminder in order to make sure that every member pays his/her dues in due time, i.e. early in 2001.
According to our tradition, several hundred copies of *The Phonetician* 81 (2000–I) will, again, go to members and institutions in the Third World Countries for free. This is understood as an act of solidarity with phoneticians who are working under especially difficult conditions.

After the General Elections in 1999, ISPhS' new administrative officials (Board of Directors, Committees, Regional Secretaries, Council of Representatives) have been appointed and are fully functioning. Our real power, however, is you, our membership. Let me, therefore, invite all of you to closely cooperate with those who have accepted formal responsibilities in our society. We highly appreciate your ideas, suggestions and critical comments as an important and positive input into our plans and actions for the development and strengthening of ISPhS.

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**From the Editors**

As a long-term reader you have noticed significant changes in *The Phonetician*. First of all, *The Phonetician* is getting thicker and thicker. This is a sign of well-being as we conceive it. The quality of its contents keeps up with our set of high standards. We still receive a large number of book reviews, which we try to publish as soon as our review editor Judith Rosenhouse edits them. Judith did a fantastic job again editing all the book reviews for this issue, and if you look closely you will notice that books get reviewed pretty quickly now in *The Phonetician*.

Second, there is another positive development – the section on brief research articles. In this issue, there are two articles: One by Pascal van Lieshout and Wassim Moussa about how detailed articulatory investigations can be useful for speech therapy and one by Wiktor Jassem on Polish vowels. We would like to thank these authors for their submissions. Also, we would like to express our thanks to a couple of anonymous reviewers who volunteered to review these papers. Let me tell you that we (and the reviewers) made an effort to keep the review process as short as possible. We succeeded to send the reviews back to the authors in less than two weeks. This way, *The Phonetician* can act very quickly to publish new developments in different areas of the phonetic sciences. We hope that these examples will encourage more submissions of brief research papers in the future.

Third, Eric Keller and Brigitte Zellner Keller wrote a short note on speech synthesis. The section entitled short notes will be reserved for well-written, short papers that may be interesting and useful for our readers.
Of course, other sections will continue such as *Phonetic Institutes Present Themselves* (in this issue Prague/Czech Republic and Rostock/Germany) and *Conference Reports* (in this issue we have a report on the 23rd Annual Meeting of the German Society for Linguistics and the 7th Conference on Laboratory Phonology).

We hope you enjoy reading this issue of *The Phonetician*. Please notice the advertisements about books and phonetic laboratory equipment in this issue. If you have any comments or questions, please do not hesitate to contact us (addresses are printed on the back of this issue).

Niels O. Schiller & Olaf Köster
Editors of *The Phonetician*

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**Call for Papers**

Let us remind you about the *Call for Papers*. The section "Articles and Research Notes" will be dedicated to the publication of brief research papers. Short papers in all areas of phonetics are welcome, including articulatory phonetics, acoustic phonetics, psycho-acoustics, cross language and L2 phonetics, speech synthesis, phonetic modelling, speech signal processing, speech perception and production, etc. Contributions should primarily focus on experimental work, but theoretical and methodological papers will also be considered. Manuscripts should not exceed a maximum of 1500 words (including no more than 2 tables or figures), but exceptions to this rule are possible. Authors should follow the guidelines of the *Publication Manual of the American Psychological Association* (4th edition) for the preparation of their manuscripts. Manuscripts will be reviewed anonymously and authors will receive the reviews within a couple of weeks after submission.

The title page should include the authors' names and affiliations, address, email, telephone, and fax numbers. Manuscripts should include an abstract of no more than 100 words and up to four keywords. The final accepted version of a manuscript should be sent both on hard copy and in electronic form. It is the authors' responsibility to obtain written permission to reproduce copyright material. Manuscripts should be sent (preferably in electronic form) to:

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The assessment of speech motor behavior using electromagnetic articulography

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Abstract

In this paper, we describe the use of electromagnetic midsagittal articulography (EMMA) for the assessment of speech motor behaviors. The protocol that was used (ESMA) was developed at the University of Toronto with the intention to create an articulatory database for future reference in basic research and clinical applications. As a way to illustrate its potential, we present data on two normal speaking subjects. Kinematic data and acoustic information was acquired for these two subjects using a variety of non-speech and speech tasks for three different speaking conditions. The results show clear task and speaking-condition effects for the selected kinematic and lip coordination variables. These effects are discussed with reference to coordinative dynamics.

Introduction

Speech poses some interesting challenges to researchers and clinicians in motor control. Compared to most other motor activities, speech movements are executed at a relatively high rate and, perhaps even more importantly, with relatively small amplitudes. In addition, not all the articulators that are important in speech production are readily accessible for measurement. Different methods are developed to overcome this problem. These methods have their limitations in terms of biological safety (X-ray Microbeam), temporal resolution (Ultrasound), providing only information on parts of the movements (EPG), or visualizing only the tongue (EPG, Ultrasound) or lips and jaw (e.g., strain-gauge system, Optotrak) [1]. Clearly, there was a need for a method that was safe for human subjects (and experimenters), could work at a high spatial and temporal resolution, and could measure the positions of the most relevant articulators that are active during speech-production.

That method was found in the 2-D Electromagnetic Midsagittal Articulography or E(M)MA system [2]. EMMA systems use alternating electromagnetic fields, which do not pose a major threat to human subjects [3], and allow for making repeated measurements on the same subject (for an example see [4]). Currently, there are three different EMMA systems available, but this paper will focus on the German AG100 system. The prototype of the AG100 was initially developed by Schönle and coworkers in the 80's [2], but the commercial version and its more recent developments are manufactured and distributed by the Carstens company in Germany [5]. The AG100, as a commercial product, has existed for more than 10 years and in that period a great deal of effort has been made to improve and validate the system. The most recent development is a 3-D system, allowing measurements outside the midsagittal plane [6]. Detailed descriptions of the methods, safety and accuracy regarding the use of EMMA can be found in the literature [2;3;7-13].
The AG100 has been used in a variety of studies, most of which have a strong basic research focus. Some studies, in particular from the University of Göttingen (Germany) where the prototype of the AG100 was originally developed, have shown more of an applied, clinical interest (e.g., see [14-17]). A further illustration of its potential in clinical applications was provided by a recent publication, which described the use of the AG100 as a movement-feedback system [18].

This paper describes a working protocol using EMMA for assessing dynamical aspects of speech motor behaviors in normal speakers and speakers with communication disorders. We will describe its rationale and potential use while referring to preliminary data we have collected on two normal speaking subjects. In the long term, we hope to establish a digital database of speech movements that can be used for reference in clinical diagnostics and for the evaluation of therapeutic intervention in speech and language disordered populations.

The protocol has been tentatively named "EMMA speech motor assessment" (ESMA) and consists of one non-speech task and nine different speech tasks, which are described in more detail in the methods section. Perceptual [19] and acoustic methods (e.g., [20]) have their limitations in evaluating oral motor function. The use of EMMA (and other types of instrumentation) in clinical research and practice may prove to be crucial in studying motor control in normal and disordered articulation.

In the past, verbal motor behaviors have often been described in terms of discrete temporal or spatial parameters as related to single articulatory movements (e.g., peak velocities, peak amplitudes, movement durations, target positions). In our approach, we do assess the behaviors of single articulators, but more importantly, we focus on movement coordination. After all, in speech production, as in other motor activities, coordination of the various degrees of freedom determines the success of the intended act. Coordination can be defined at many levels and can take many forms, varying from simple to highly complex patterns of interaction [21]. In all these cases, the combined degrees of freedom are joined together to act as a single unit. For example, in speech production Browman and Goldstein [22] proposed such units exist in the form of gestures. Gestures relate abstract specifications of vocal tract location and constriction degree to combined actions of specific articulators like for example, lips and jaw for bilabial consonants [23]. According to the Coordination Dynamics theory (see [24] for an overview), coordination is a self-organized, synergetic process. That is, coordinative patterns (be it simple or complex) and changes within these patterns are governed by lawful mechanisms of the coupling itself. These mechanisms can be modeled by a so-called "phase space", which describes all the possible states of a dynamical system and how they evolve in time. A given system will have preferred settings in this phase space, which are referred to as attractors. That is, given time, regardless the initial conditions from which a system originated, that system will converge to one of the attractor states [25]. So, if for example, upper lip and lower lip are coupled to produce lip closure and opening in a particular speech task, the lawful dynamical constraints that act upon that coupling will automatically pull the system towards a specific pattern. This pattern of coordination can be described using so-called order parameters, which reflect the state of the system as it evolves in time. Obviously, there must be a way to make a system change its state. For example, in changing the rate of movements, it is possible that at a given rate, the system spontaneously switches from one state to another as demonstrated in the finger experiments of Kelso and colleagues [26]. An ideal order parameter should reflect underlying stable states as well as qualitative changes in states, without being influenced by transient changes in the
surface characteristics of the coupled structures. For speech and others types of coordination, relative phase has been found to be such an "ideal" order parameter [25].

The idea that coordination in speech can be explained as non-linear dynamical processes, where units of action are self-organized and characterized by variations in specific order parameters such as relative phase [25;27;28], appealed to us. We realized that dynamical systems by their very nature need time to evolve and show their preferred states. This is one reason why in ESMA we prefer not to use single word trials. The other reason was more practical. In collecting data, especially on patients, one wishes to minimize the time needed to acquire all information to avoid physical and mental fatigue. For appropriate analyses of specific kinematic variables (movement duration, amplitude, etc.) one needs several repetitions of a given task. In having each task repeated for a fixed time period within a single trial, one can collect many repetitions and at the same time save some time in collecting the data. In addition, although used and analyzed in a different way, reiterant speech tasks have a long tradition in the clinical assessment of speech-motor control [29]. Real speech obviously does not involve simple repetitions of a single task, but speech production does show quasi-cyclic behavior at almost all levels (cf. [30]). That is, we adhere to the view that speech movements can be described and quantified as (non-linear) oscillators coupled in a non-linear way to produce simple or highly complex patterns, depending on the state of the system ([25],[31]). In real speech, many different tasks may be involved and this could obviously lead to large variations in coupling dynamics. This is not a problem for dynamical systems, but it is a problem for our current methods to qualify and quantify adequately the underlying dynamics of real speech. Therefore, in ESMA, we chose a more restricted range of tasks that include simple single syllable sequences and short sentences. Each task is repeated within a single trial for a fixed amount of time in order to give the system time to show its preferred state(s). We have to stress here that although most of the literature regarding attractors in speech talks about single preferred states or point attractors for mostly simple tasks (e.g., see [32]), nothing in coordinative dynamics states there should only be one particular preferred state. Systems can have multiple preferred states or even no preferred state, but at most a tendency for remaining close to, but not locked into preferred states. In fact, the latter option might be the more natural solution [25] since it offers flexibility to move around in phase space and at the same time a system will be attracted to certain solutions without being 'trapped'.

The purpose of this paper is to provide some preliminary data on the usefulness of ESMA in collecting speech movement data. We believe that in using a reiterant speech task design, we can utilize both traditional and non-linear dynamic tools of analyzing these data without putting too much of a demand on the patience and endurance of our normal and clinical subjects. Due to space limitations, we have to limit ourselves to a selection of kinematic descriptors of individual movements in addition to a continuous estimate of relative phase to qualify and quantify coupling dynamics [33].
Methods

Subjects

The data from this study are collected on two male subjects, both speaking English (Ontario-Canadian dialect) as their first language. The first subject (WM) is 23 years old and the second subject (IR) is 25 years old. Both subjects have no history of speech, language, or hearing problems.

Method

Procedures & Tasks

ESMA consists of a single non-speech task and nine different speech tasks. The non-speech task is a simple lip-closing task while the subject keeps his teeth in a clenched position. The speech tasks vary in linguistic structure and complexity. There are single syllable, multi-syllable and sentence stimuli. All stimuli, except for the sentence tasks, are pronounceable non-words. The syllable structures that were used in this experiment were as follows: cv (<pa>), vc (<ip>), cvc (<pap>), vcv (<ipa>), cv.cv (<pipa>), cv.cvc.cvc (<papiter>), cv.cvc.cvc (<pi.pap.ter>), and a trial with a switch from cv.cvc.cvc (<pipater>) to cv.cvc.cvc (<papipter>). These stimuli were chosen based on results from previous experiments [27;28], and cover a wide range of possible syllabic structures. The sentence tasks included 4 different types of sentences, in which the position of bilabial closure is either word initial (<the peacetalks mark the minister's progress>), word final (<the workshop forms the group's scholarship>), word medial (<the comments support the summit's response>), or mixed (<the people prepare the program's papers>). The sentences were matched as closely as possible for number of words, number of syllables and syntactic and rhythmic structure.

All stimuli were presented on a 24.7 by 18.5-cm screen of a Dell laptop computer monitor using PowerPoint (Microsoft Inc.). The stimuli were presented together with an auditory warning signal. After 4 seconds a checkmark symbol appeared in the left lower part of the screen, accompanied by an auditory signal (different from the first). Both events signaled to the subject that he could start the task execution. He then repeated the task until 12 seconds later the slide disappeared simultaneously with an auditory cue, indicating the end of the trial. For the speech tasks, one second after presenting the stimulus, the subject was reminded to take a deep breath by briefly showing a text saying "breathe in" in the upper left corner of the screen.

The subjects repeated all tasks under three different speaking conditions: normal, accurate, and fast. Prior to the start of the experiment, they received written instructions on what was meant by these labels. The instructions were as follows:

- Normal rate
  - Speak the way you normally do in conversation with friends, colleagues etc.
- Very accurate
  - Speak in a very articulate way, as if you are addressing an audience with hearing problems, but are not allowed to speak very loud
- Fast but accurate
  - Speak as fast as you can, but listeners should still be able to know what it is you are saying
For each task, the required speaking condition was clearly indicated in the lower right part of the screen and remained visible for the entire duration of the trial.

Prior to starting the experimental tasks, we collected data on the occlusal bite plane, using a plastic device (bite plate) to which two coils were attached in the midline at a fixed distance of 3 centimeters. Subjects simply held the device in their mouth using their teeth. The upper and lower incisors touched the device just behind the posterior coil (see [20] for a similar procedure).

In the present study, coils were attached to the midline of the vermilion border of upper and lower lip, lower lip, the lower incisors, the tongue blade (1 cm behind tongue tip), and finally, the tongue body (3 cm behind tongue blade coil). All coils were attached with Cyano Veneer, a cyano-acrylate based skin glue. The sensor placed on the mandible was also used to derive true lower lip and tongue movements by subtracting the lower jaw movement signal from these signals. In this paper, we will only focus on the movements of the lips, with jaw being subtracted from lower lip.

**Instrumentation**

All data were collected using a recent version of the Carstens AG100 system. It consists of a large helmet (62 cm) and an automatic calibration unit. After calibration, the mean spatial error typically is less than .25 mm in a 45 mm central radius in the midsagittal plane. All movement data were sampled at 400 Hz, while speech data were acquired simultaneously through the EMMA system at 16 kHz. All data were stored on hard disk before further processing. Figure 1 shows an example of a part of a recording from a trial in which subject IR repeated the disyllabic sequence <pipa>. In this figure, we see (from top to bottom) an acoustic spectrogram, the audio waveform, and vertical positions in time for tongue body, upper lip, lower lip, and jaw (the tongue blade was left out since it has no specific function in this trial). The two rectangular boxes in the figure indicate bilabial closure as demarcated by the acoustic silence interval, whereas the two vertical lines show the peak closure position for the lower lip and its relation to upper lip and tongue body position.

**Analysis**

As a first processing step, all movement signals were digitally low-pass filtered using a Hamming windowed FIR filter (101 points), with a cut-off frequency of 16 Hz for the reference points (nose and upper jaw) and 40 Hz for all other points. Subsequently, all movement signals were corrected for head movements on a trial-by-trial basis relative to the helmet position using the nose and upper jaw reference points. Finally, based on the information from the two receivers attached to the bite plate, data were rotated to align the subject's occlusal plane with the system's X-axis. This way we created a uniform coordinate system for all subjects (cf. [34]). This part of the analysis was done using custom software made by Carstens (Tailor Data Processing Program, v. 1.3, 1996).

In the next phase of analysis, all data were shipped to Matlab (version 5.3, The MathWorks, Inc.), where we used custom made procedures embedded in the MAVIS signal display software program [35]. As a general first step, all position signals were band-pass filtered using a 3rd-order Butterworth filter with a low cut-off frequency of 0.5 Hz and a high cut-off frequency of 6 Hz (the high-pass filtering at 0.5 Hz is used to eliminate baseline drifts). Next, the position signals were differentiated using a point-differentiation method to obtain velocity versus time functions. The velocity signals were band-pass filtered in the same way as the position signals. Position and corresponding velocity signals were segmented using an automated algorithm to detect zero-crossings. All position data were amplitude normalized per half cycle using maximum/minimum
values and mapped onto a unit circle. That is, positive position and velocity signals were amplitude normalized between 0 and +1, negative values were normalized between 0 and –1. This is a standard procedure to calculate appropriate phase values [33].

To obtain continuous estimates of relative phase, phase-time functions were calculated from the normalized position and velocity time functions. Relative phase values were derived by subtracting individual phase-time functions of the target articulators (e.g., upper and lower lip). Average relative-phase values and standard deviations were calculated for the entire time window as well as for successive 1-second intervals using circular statistics [36].

For the kinematic data, the automated peak-picking algorithms were used to detect minima and maxima in the position and velocity signals employed relative amplitude and time criteria. The optimal parameters for the criteria were determined by calculating a cyclic spatio-temporal index or cyclic-STI (cf. [37]). For each parameter setting, individual cycles as defined by the peaks and valleys in the signal were amplitude and time normalized, and standard deviations across cycle repetitions were computed at 2% intervals in relative time, the sum of which defined the cyclic STI (cSTI). This index provided a measure for the uniformity of a cyclic movement pattern. The computer selected the parameters that generated the lowest cyclic STI, that is, the most uniform cyclic pattern. Given these parameters, the selected peaks and valleys were used to derive the following kinematic variables:

a. Amplitude of closing movement
b. Amplitude of opening movement
c. Peak velocity of closing movement
d. Peak velocity of opening movement
e. Duration of closing movement
f. Duration of opening movement
g. Duration of total movement cycle
h. Kinematic stiffness of closing movement (= ratio peak velocity and amplitude, cf. [38])
i. Kinematic stiffness of opening movement
j. Velocity profile index (VPI) of closing movement (= kinematic stiffness times duration; cf. [38])
k. Velocity profile index of opening movement
l. Percentage of time to peak velocity of closing movement (relative time interval between onset of movement and peak velocity; cf. [39])
m. Percentage of time to peak velocity of opening movement
n. Slope of regression of stiffness vs. duration of closing movement ([38])
o. Slope of regression of stiffness vs. duration of opening movement
p. Slope of regression of VPI vs. amplitude of closing movement ([38])
q. Slope of regression of VPI vs. amplitude of opening movement
r. Root-mean-square (RMS) of movement velocity (estimate of average movement rate)

For this paper, due to space limitations, we will focus on a few selected variables that reveal specific characteristics of individual movements and their coupling as related to the task and speaking conditions in ESMA:

a. Relative phase (PHI) between upper and lower lip as a measure for lip coupling
b. Circular standard deviation relative phase (SDPHI) between upper and lower lip as a measure for the variability in lip coupling
c. Amplitude of lower lip closing movements (AMP)
d. Kinematic stiffness (= peak velocity/amplitude) for lower lip closing movements (STIF) as a measure of movement rate (cf. [38])
e. Percentage of time to peak velocity in lower lip closing movement (PERC) as a measure for the symmetry of the movement profile (cf. [39])

For both subjects, we used five consecutive intervals of 2 seconds for each 12-second trial to calculate separate means for the five variables mentioned above. Thus, we created a blocking or replication variable (n=5) used for a within-subject analysis of variance with repeated measures [40]. Given the possibility that assumptions regarding homogeneity for the covariance matrix were not met, probability levels that are reported were Huynh-Feldt epsilon adjusted [41].

All statistical tests were performed using NCSS 2000 [42]

Figure 1. Example of EMMA registrations for acoustic and kinematic data. Except for the spectrogram, y-axes display arbitrary units (see text for more details).

In this paper, we tested the effects of the factors task (TASK) and speaking condition (RATE). To this end, we created the following categories, for each of the three speaking conditions (normal, accurate, fast):

- non-speech task (LIPS)
- 1 syllable tasks (mean for <pa>, <ip>, <pap>; 1-SYL)
- 2 syllable tasks (mean for <ipa>, <pipa>; 2-SYL)
- 3 syllable tasks (mean for <papiter>, <pipapter>, 3-SYL)
Results

Table 1 shows the means and standard deviations for the factorial combinations of all five variables, separated by subject.

Lip closing movement

For lip closing amplitude (AMP), both subjects showed a significant TASK [WM: F(3,12) = 54.37, p < .001; IR: F(3,12) = 189.23, p < .001] and RATE [WM: F(2,8) = 9.00, p < .05; IR: F(2,8) = 240.24, p < .001] effect. Only IR also showed a significant interaction [F(6,24) = 33.64, p < .001]. WM showed smaller amplitudes for the 1-SYL and 3-SYL tasks compared to the other two tasks. Regarding RATE, WM showed a smaller amplitude for the accurate speaking condition, compared to the fast and normal rate conditions. For IR, things were a bit different. This subject showed a smaller amplitude for the 1-SYL tasks compared to the other tasks. For RATE, the smallest amplitude was found for the fast rate condition. This was most evident for the LIPS and 1-SYL tasks, which created the interaction effect mentioned above for this subject.

For kinematic stiffness (STIF), both subjects showed a significant TASK [WM: F(3,12) = 128.09, p < .001; IR: F(3,12) = 1022.25, p < .001] and RATE [WM: F(2,8) = 306.64, p < .001; IR: F(2,8) = 726.84, p < .001] effect. In addition, both subjects showed a significant interaction between both factors [WM: F(6,24) = 3.05, p < .05; IR: F(6,24) = 61.31, p < .001]. WM showed the lowest stiffness values for the LIPS task, and the highest values for the 3-SYL task, with the other two tasks equal. Regarding RATE, WM showed the following sequence in terms of stiffness: accurate < norm < fast. This is what could be expected based on the instructions for these speaking conditions. The interaction effect was mainly based on the small difference between normal and accurate speaking conditions for the 1-SYL task. Otherwise, all tasks showed the same RATE effect. For IR, the main difference in stiffness values was found between the 1-SYL tasks (higher) and the other tasks. For RATE, this subject showed only a small difference between normal and accurate speaking conditions, but a big jump in stiffness values for the fast rate condition. In general, these RATE effects were found for all tasks, except for the LIPS task. This underlies the interaction effect for IR.

For percentage to peak velocity (PERC), both subjects showed a significant TASK [WM: F(3,12) = 62.19, p < .001; IR: F(3,12) = 32.76, p < .001], but no RATE [WM: F(2,8) = 5.61, p = .06; IR: F(2,8) = 2.86, p = .12] effect. Only IR showed a significant interaction [F(6,24) = 11.80, p < .01]. For WM, the LIPS-task showed a shorter acceleration phase interval (PERC < 50%) compared to the speech tasks. Within the category of speech tasks, the acceleration phase became longer for tasks with more syllables. For IR, the effects were very similar except that in his case, the 1-SYL task showed the shorter acceleration phase and the LIPS-task was very similar to the 2-SYL task. However, as with WM for tasks with more syllables, the acceleration phase utilized a longer portion of the total movement duration.
**Inter-Lip coupling**

For relative phase (PHI), only WM showed a significant TASK effect [WM: F(3,12) = 47.05, p < .001; IR: F(3,12) = 2.50, p = .18]. RATE was not significant for either subject [WM: F(2,8) = 1.24, p = .33; IR: F(2,8) < 1] nor were the interactions. For WM, the LIPS task and the 3-SYL task both showed higher relative phase values (> 180°) compared to the other two tasks.

Table 1. Means and standard deviations for TASK by RATE factorial combinations of all five variables described in this paper, separate for the two subjects (see text for more details)

<table>
<thead>
<tr>
<th></th>
<th>AMP (cm)</th>
<th>PERC (%)</th>
<th>PHI (deg)</th>
<th>SDPHI (deg)</th>
<th>STIF (1/s)</th>
<th>SD-PERC</th>
<th>SD-PHI</th>
<th>SD-SDPHI</th>
<th>SD-STIF</th>
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<td></td>
</tr>
<tr>
<td>1 syl</td>
<td>0.65</td>
<td>52.84</td>
<td>162.28</td>
<td>36.30</td>
<td>10.42</td>
<td>0.14</td>
<td>11.28</td>
<td>27.78</td>
<td>12.83</td>
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<td>31.98</td>
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<td>0.10</td>
<td>14.28</td>
<td>28.54</td>
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<td>0.05</td>
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<td>31.59</td>
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<td>187.00</td>
<td>16.28</td>
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<td>6.81</td>
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<tr>
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<td>172.17</td>
<td>22.67</td>
<td>10.39</td>
<td>0.07</td>
<td>4.89</td>
<td>20.47</td>
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<td>183.83</td>
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<td>18.26</td>
<td>29.86</td>
<td>6.74</td>
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</table>

For the standard deviation of relative phase (SDPHI), both subjects showed a significant TASK effect [WM: F(3,12) = 74.72, p < .001; IR: F(3,12) = 41.64, p < .001]. Only WM showed an additional RATE effect [WM: F(2,8) = 19.80, p < .01; IR: F(2,8) = 4.17, p = .1], whereas IR showed a significant interaction [F(6,24) = 50.80, p < .001]. For WM, lip coupling was clearly more variable for the 3-SYL tasks compared to the other tasks. For RATE, he showed more variability for the accurate speaking condition, compared to the normal and fast rate conditions. For IR the most variable lip coupling was also found for the 3-SYL tasks, but in addition, the 1-SYL task was clearly
more variable than the other two tasks. In fact, the interaction effect found for this subject was largely due to the high variability in lip coupling found in the fast rate condition for the 1-SYL tasks.

**Discussion**

Before summarizing the data, we wish to remind our readers that these data are still preliminary and mainly serve here to demonstrate their potential use in describing and quantifying speech motor data of speakers with and without a communication disorder.

For the two normal speaking subjects we described in this paper, in general it can be said that TASK effects were clear, but not in the same direction for both subjects. The only consistent pattern we found for both subjects in this regard was that the most complex speech tasks (3-SYL) showed the longest acceleration phase and the highest variability in lip coupling compared to the other tasks. With respect to lip coupling, given the fact that the speech output is quite normal and intelligible, this higher variability is not "pathological" but might indicate a greater need for flexibility under these linguistically and motorically more demanding circumstances. In general, one could argue that in order to produce speech in an effective way, one needs flexibility, not a simple mode and frequency locking where two components are attracted to a single point in phase space (see Introduction). What many biological systems seem to prefer is the kind of self-organizing coupling behavior that is referred to as "relative coordination" [25]. In this mode, the system "possesses both flexibility and metastability. There is attraction (the ghost of the fixed point), but no longer any attractor" (p. 109). Within the view that articulators behave like (non-linear) oscillators, we can model their characteristics in terms of mass-spring systems, where stiffness relates to the intrinsic or resonating frequency of such a system (e.g., higher stiffness means higher resonating frequency). Relative coordination is closely linked to the concept of "broken symmetry", that is to differences in the intrinsic frequencies of the coupled structures (cf. [25;43]. If this were true for our data, we would expect to find a stronger asymmetry in stiffness (which is supposed to reflect intrinsic frequencies) values between upper and lower lip for the more variable couplings. Figure 2 shows the differences in stiffness values between upper and lower lip. If we compare these data with our standard deviations for relative phase, then it seems that the most variable couplings (e.g., 3-SYL tasks for both subjects) were indeed associated with a stronger asymmetry in stiffness values between upper and lower lip. The Pearson Product-Moment correlation between both data sets is .60, which is not perfect, but still significant (p < .01). So, perhaps the notion of relative coordination as mainly described for limb motor control thus far [25] might also be applied to speech [27]. The high variability for lip coupling (and concurrent stiffness asymmetry) found for subject IR in the fast rate condition for the 1-SYL tasks was likely due to high movement rates combined with small amplitudes. Under such circumstances, coupling might actually be lost in the sense that one of the articulators simply "freezes". In IR's case, this happened for the upper lip (not shown in our data). The process of adding or inhibiting degrees of freedom is another interesting characteristic of non-linear dynamical systems [44].

Regarding our speaking conditions, it was apparent that our two subjects were able to make a clear difference between normal and fast rates, as we would have expected. However, their approach to the accurate speech condition was different. WM in general produced slower movements, whereas IR was more likely to produce larger movements. A recent paper by Perkell and colleagues also found that in producing accurate speech, speakers may actually employ different strategies
Intuitively, it makes sense that if asked to speak "clearly" for an audience with hearing impairment (as mentioned in the instructions), this could mean either to do it slower (WM) or to make the movements more exaggerated, that is, clear to see (IR). For three subjects (out of 7), Perkell and colleagues found that clear speech was characterized by higher peak velocities, longer movement durations, and greater movement amplitudes [45]. Our subject IR showed a similar pattern (not shown), but WM was different, showing smaller amplitudes, smaller peak velocities, but longer durations (all data for lower lip closing). Perkell used single word trials embedded in a carrier phrase. The fact that both studies produced similar results regarding speaking conditions, might indicate that our approach in using reiterant speech is valid (see also [32] for a more direct comparison between single and reiterant speech tasks as related to coupling dynamics).

![Figure 2](image-url)

**Figure 2.** Differences in kinematic stiffness (STIF) between upper lip (UL) and lower lip (LL) for TASK and RATE factor levels (see text for more details).

Our two subjects varied rate consistently in the different speaking conditions as shown in the stiffness data (Table 1). However, in our study we found no significant rate effect for our relative phase data in either subject. This is in contrast to what has been claimed in the past for discrete measures of relative phase between lower jaw and upper lip [46;47]. This most likely relates to methodological differences between our study and the others, which used (a) single word trials; (b) discrete measures of relative phase; and (c) the jaw instead of the lower lip (minus jaw). These and other data [27] show that relative phase is a rather unique property of lip coupling where qualitative changes are based on differences in the nature of the coupling. Within the settings of a particular control state, it is not directly influenced by ongoing changes in movement rate or amplitude (see also [25]).
Conclusions

Based on a small number of subjects, we described the use of a working speech-motor assessment protocol (ESMA) using EMMA. The data we collected revealed some interesting differences in individual kinematics and lip coordination that are related to task and speaking conditions. Collecting larger samples of data using more subjects with and without communication disorders in the near future will help us set up a reference database that can be used for basic research and clinical applications. The design of the protocol allows us to derive accurate estimates of traditional kinematic descriptors and to reveal the underlying dynamical control mechanisms in the real-time nature of speech using non-linear dynamical systems theory concepts and tools.

Acknowledgements

The authors thank Dr. Schiller and an anonymous reviewer for their valuable comments and suggestions on earlier versions of this paper.

Endnotes

1 Originally, the abbreviation EMA was used for the AG100 system, whereas EMMA was used by Perkell and colleagues to denote the MIT system [8]. In this paper, we will use the term EMMA as a generic term for systems using alternating magnetic fields for flesh point transduction.
2 For 'he' please also read 'she' if appropriate.
3 For the non-speech task (lip closing) the subjects were told to perform the task under similar conditions as indicated for the speech tasks
4 The coil to measure mandible movements was attached to a thin (< .5 mm) thermoplastic mold, custom made to fit snugly and firmly to the lower incisors of the individual
5 Simply subtracting jaw signals from lower lip and tongue signals does not take into account rotational aspects of jaw motion. A recent paper by Westbury and colleagues [48] showed that errors introduced by ignoring jaw rotation are smallest for lower lip (median error .53 mm) and largest for tongue dorsum (median error 2.1 mm).
6 Project No. 8T.11D.029.16 funded by the Polish State Research Council (KBN)

Reference List


Normalisation of Polish Vowel Spectra*

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Abstract

Vowels in a database were analysed using Linear Prediction. For each of five male and five female speakers, 339 spectra were obtained, and each spectrum was described using 10 variables: the frequencies and the bandwidths of the first five formants. The data were normalised so as to minimise variation due to phonemic differences, thus extracting from the data the speaker-related information. Comparison of the results before and after normalisation showed dramatic improvement of the classification of the spectra according to speaker.

1. Introduction

The speech signal is known to carry information of various kinds, the most essential for communication being (a) linguistic, (b) personal and (c) environmental (or transmissional). Phonetic research is mostly concerned with (a) and (b). At the acoustic level, the two kinds of information are notoriously difficult to factor out. One of the earliest studies showing the intimacy of the two kinds of information is Ladefoged and Broadbent (1957). The conclusion of this much-quoted work is that, at the level of perception, a process of normalisation is involved. The vowels of a specific language (or dialect), which have mostly been the object of study, are not perceived in quasi-absolute terms, and may be conceptualised as forming a pattern in a multidimensional space whose co-ordinates are variable according to the personal characteristic of the given voice, individual if the listener is familiar with the voice, and categorial (e.g. male, female, child) if the voice is unknown.

The two kinds of information have been, over the last half-century, of particular interest to those engaged in speech recognition and those interested in speaker recognition. The former attempt to extract the linguistic information whilst the latter try to detach the personal information. One specific area of application of speaker recognition is forensic phonetics.

The earliest serious attempt to normalise vowels so as to, as far as possible, bring out a common linguistic pattern is Gerstman (1968). Since then, a number of normalisation methods have been suggested, and the most extensive study comparing results obtained from the application of some of the best known ones, is Deterding (1990).

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* Project No. 8T.11D.029.16 funded by the Polish State Research Council (KBN)
Twenty years ago, statistical *discriminant analysis* was used for normalising vowel spectra, probably for the first time, by Papçun (1980). Vowel spectra were obtained by using the third-octave spectrum. The best result obtained by Papçun was 86% correct classification with 4 discriminant variables. The specificity of the present study consists in a very exact description of the vowel spectra using five formant frequencies, and the corresponding formant bandwidths. In most previous studies of vowel normalisation using formants, usually just the frequencies of the three lower formants were used (cf. Deterding, 1990). Also, the number of spectra here forming the basis for the data is high: For each of the ten voices, there are 339 vowel spectra, representing the six Polish vowel phonemes, each spectrum specified with 10 original variables. But the most fundamental feature of the present study is that the normalisation is applied, not so as to extract the phonemic information, but instead, to extract the personal information.

2. The Mathematical Foundation

Suppose that we have a training sample \( \mathbf{x}_{i1}, \mathbf{x}_{i2}, \ldots, \mathbf{x}_{in} \) from the normal population \( N_p (\mathbf{\mu}_i, \Sigma_i), \ i=1,2,\ldots,k \). On the basis of this information we wish to classify the observation \( \mathbf{x} = (x_1, x_2, \ldots, x_p)' \) as coming from one of the \( k \) populations \( \pi_1, \pi_2, \ldots, \pi_k \).

Clearly, our best estimate of \( \mathbf{\mu}_i \) is \( \bar{x}_i = \frac{1}{N_i} \sum_{j=1}^{N_i} \mathbf{x}_{ij} \), and of \( \Sigma_i \) is \( S_i \) defined by

\[
S_i = (N_i - 1)^{-1} \sum_{j=1}^{N_i} (\mathbf{x}_{ij} - \bar{x}_i)(\mathbf{x}_{ij} - \bar{x}_i)', \quad i=1,2,\ldots,k.
\]

If \( N_i - p - 2 > 0 \), then the minimum variance unbiased estimator of the quadratic discriminant score for the \( i \)th population is (Krzyśko, 1990, p.36):

\[
a_i(\mathbf{x}) = -\frac{N_i - p - 2}{2(N_i - 1)} (\mathbf{x} - \bar{x}_i)'S_i^{-1}(\mathbf{x} - \bar{x}_i) - \frac{1}{2} \ln |S_i| + \frac{p}{2} \ln \frac{N_i - 1}{2} + \frac{1}{2} \sum_{j=1}^{p} \psi(\frac{1}{2} (N_i - j)) + \ln q_i,
\]

where \( \psi(x) = d \ln \Gamma(x) / dx \) and \( q_i \) is the a priori probability that an observation comes from the population \( \pi_i \), \( i=1,2,\ldots,k \). Using quadratic discriminant scores the classification rule becomes the following:

Allocate \( \mathbf{x} \) to \( \pi_j \) if the quadratic discriminant score \( a_j(\mathbf{x}) \) is the largest of \( \hat{u}_1(\mathbf{x}), \hat{u}_2(\mathbf{x}), \ldots, \hat{u}_k(\mathbf{x}) \), where \( \hat{a}_i(\mathbf{x}) \) is given by (1), \( i=1,2,\ldots,k \).

A simplification is possible if the population covariance matrices, \( \Sigma_i \), are equal. When \( \Sigma_1 = \Sigma_2 = \ldots = \Sigma_k = \Sigma \), the best pooled estimate of \( \Sigma \) is \( S \) defined by

\[
S = (N - k)^{-1} W,
\]

where

\[
W = \sum_{i=1}^{k} \sum_{j=1}^{N_i} (\mathbf{x}_{ij} - \bar{x}_i)(\mathbf{x}_{ij} - \bar{x}_i)'
\]

is the within-populations matrix and \( N = N_1 + N_2 + \ldots + N_k \).
If \( N - k - p - 1 > 0 \), then the minimum variance unbiased estimator of the linear discriminant score for the \( i \)th population in this case is (Krzyśko, 1990, p.39):

\[
e_i(x) = -\frac{N - k - p - 1}{2(N - k)}(x - \bar{x}_i)'S^{-1}(x - \bar{x}_i) + \frac{p}{2N_i} + \ln q_i.
\]

or equivalently,

\[
\hat{e}_i(x) = \frac{N - k - p - 1}{N - k}(x - \frac{1}{2}\bar{x}_i)'S^{-1}\bar{x}_i + \frac{p}{2N_i} + \ln q_i, \quad i = 1, 2, K, k.
\]

Using linear discriminant scores, we obtain the following form of the classification rule:

Allocate \( x \) to \( \pi_j \) if the linear discriminant score \( e_j(x) \) is the largest of \( \hat{e}_1(x), \hat{e}_2(x), \ldots, \hat{e}_k(x) \), where \( e_i(x) \) is given by (2) or by (2'), \( i = 1, 2, K, k \).

A third method of classification is the classification rule in the Fisher's discriminant coordinates space.

Let

\[
B = \sum_{i=1}^{k} N_i(\bar{x}_i - \bar{x})(\bar{x}_i - \bar{x})'
\]

be the between-populations matrix, where

\[
\bar{x} = N^{-1} \sum_{i=1}^{k} \sum_{j=1}^{N_i} x_{ij}.
\]

Let \( \lambda_1 > \lambda_2 > \ldots > \lambda_s > 0 \) be the nonzero eigenvalues of \( W^{-1}B \) and let \( l_1, l_2, \ldots, l_s \) be the corresponding eigenvectors of \( W^{-1}B \), where \( s = \min(k - 1, p) \).

The variates \( y_1 = l_1'x, y_2 = l_2'x, \ldots, y_s = l_s'x \), are called the Fisher's discriminant coordinates.

Let

\[
L = (l_1, l_2, \ldots, l_s), \quad y = (y_1, y_2, \ldots, y_s)' = L'x, \quad \bar{y}_i = L'\bar{x}_i
\]

and

\[
d_i(y) = (y - \bar{y}_i)'(y - \bar{y}_i), \quad i = 1, 2, \ldots, k.
\]

The classification rule in the Fisher's discriminant coordinates space is the following (Krzyśko, 1990, p.86):

Allocate \( x \) to \( \pi_j \) if

\[
d_j(y) = \min(d_1(y), d_2(y), \ldots, d_k(y)),
\]

where \( d_i(y) \) is given by (3), \( i = 1, 2, \ldots, k \), and \( y = L'x \).

Those interested in a simpler exposition of the discriminant analysis are referred to Tatsuoka (1971), Klecka (1980), and Krzanoski (1998).
3. Data

Ten speakers, 5 males and 5 females, read a 100-item word list, balanced for phoneme frequency and word occurrence frequency. Details concerning this list have been provided in Jassem (1997). Three sections were made within the (relatively) steady state of each vowel on the list, at 10 ms intervals, and the frequencies and bandwidths of the five lowest formants were measured using 16-order linear prediction. The total data sheet contained 3390 10-variate cases. These data are described in Kleśta (1998).

4. Results

Table 1 contains the means of the 10 variables for each speaker. After normalisation, these means are z-scores, and all the standard deviations equal 1. We will refer to the normalised formant frequencies and formant bandwidths by $F_1^*$, $F_2^*$, etc. and $B_1^*$, $B_2^*$, etc. Discriminant analysis extracts 9 canonical (or discriminant) variables, also called "roots". Each root is a linear combination of all original normalised variables. Table 2 presents the values of the 9 roots for our data. The eigenvalues can be seen to diminish for each successive root, reflecting the relative explanatory power of each root. Root 1 can be seen to explain little more than 50% of the variability in the data, but the first two roots already explain over 93%. This is important because it allows us to present the data in a plane with root 1 and root 2 as the co-ordinates, with little loss of information. Since there is practically no overlap between the female and the male spectra either before or after normalisation, we repeated the computation, for better insight, separately for the male and the female voices both for normalised and unnormarlised data, and the results, in a (Root 1, Root 2) plane before and after normalisation are shown in in Figures 1, 2, 3, and 4. (Details of the discriminant analysis before normalisation are given in Jassem 1999 and 2000).

<table>
<thead>
<tr>
<th>SPEAKER</th>
<th>$F_1^*$</th>
<th>$B_1^*$</th>
<th>$F_2^*$</th>
<th>$B_2^*$</th>
<th>$F_3^*$</th>
<th>$B_3^*$</th>
<th>$F_4^*$</th>
<th>$B_4^*$</th>
<th>$F_5^*$</th>
<th>$B_5^*$</th>
<th>N</th>
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<tbody>
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<td>1.36</td>
<td>7.3</td>
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<td>1.69</td>
<td>35.9</td>
<td>0.87</td>
<td>339</td>
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<td>2.73</td>
<td>0.97</td>
<td>9.2</td>
<td>1.48</td>
<td>16.2</td>
<td>1.64</td>
<td>30.6</td>
<td>1.12</td>
<td>339</td>
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<td>1.48</td>
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<td>11.1</td>
<td>1.06</td>
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<td>0.74</td>
<td>8.6</td>
<td>1.62</td>
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<td>1.38</td>
<td>24.9</td>
<td>0.82</td>
<td>339</td>
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Table 1. Means of the normalised variables
### Table 2. Standardised coefficients of the normalised variables for the 9 roots

<table>
<thead>
<tr>
<th>Variable</th>
<th>Root 1</th>
<th>Root 2</th>
<th>Root 3</th>
<th>Root 4</th>
<th>Root 5</th>
<th>Root 6</th>
<th>Root 7</th>
<th>Root 8</th>
<th>Root 9</th>
</tr>
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<td>-.29</td>
<td>.12</td>
<td>-.48</td>
<td><strong>1.01</strong></td>
<td>-.06</td>
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<td>.19</td>
<td>.13</td>
<td>.05</td>
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<tr>
<td>B1&lt;sup&gt;8&lt;/sup&gt;</td>
<td>-.03</td>
<td>-.92</td>
<td>.21</td>
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<td>-.59</td>
<td>.13</td>
<td>.68</td>
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<td>.19</td>
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<tr>
<td>F2&lt;sup&gt;8&lt;/sup&gt;</td>
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<td>.87</td>
<td>.28</td>
<td><strong>-.90</strong></td>
<td>-.09</td>
<td>-.19</td>
<td>-.10</td>
<td>-.16</td>
</tr>
<tr>
<td>B2&lt;sup&gt;8&lt;/sup&gt;</td>
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<td>-.13</td>
<td>-.20</td>
<td>-.02</td>
<td>-.92</td>
<td>-.20</td>
<td>-.08</td>
<td>.17</td>
</tr>
<tr>
<td>F3&lt;sup&gt;8&lt;/sup&gt;</td>
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<td>.27</td>
<td><strong>-1.40</strong></td>
<td>-.18</td>
<td>-.01</td>
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<td>.06</td>
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<td>-.03</td>
</tr>
<tr>
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<td>-.14</td>
<td>.03</td>
<td>-.08</td>
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<td>-.33</td>
<td>.39</td>
<td>.01</td>
<td>-.78</td>
</tr>
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<td><strong>-1.11</strong></td>
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<td>.01</td>
<td>.01</td>
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<td>.03</td>
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<td>.00</td>
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<td>.01</td>
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<td>-.08</td>
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<td>-.02</td>
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<td>-.00</td>
<td>-.00</td>
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<td>.12</td>
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<td>.999496</td>
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</tr>
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</table>

Figure 1: Female vowel spectra before normalisation
Figure 2: Female vowel spectra after normalisation

Figure 3: Male vowel spectra before normalisation
Note how the cumulative explained variation increases with each added root in Table 2 (bottom row). Although an exact 100% is only reached with 9 roots, practically all the variation (99.7%) is explained with only the first four roots. Table 2 allows us to see how the original ten variables contribute to the discrimination between the vowels. The highest coefficients for the first four roots, in absolute terms, are as follows: F5* for root 1, F4* for root 2, F3* for root 3 and F1* for root 4. The original variables that contribute most to the discrimination between the voices are, consequently, F5*, F4*, F3*, and F1* in that order. The contribution of the remaining original variables can be seen to be negligible.

<table>
<thead>
<tr>
<th>SPEAKER</th>
<th>% correct</th>
<th>AD</th>
<th>AI</th>
<th>AL</th>
<th>KK</th>
<th>LR</th>
<th>JI</th>
<th>JK</th>
<th>PW</th>
<th>TZ</th>
<th>WJ</th>
</tr>
</thead>
<tbody>
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<td>0</td>
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<td>0</td>
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</tr>
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<td>0</td>
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<td>0</td>
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<td>0</td>
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</tr>
<tr>
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<td>0</td>
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<td>0</td>
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</tr>
<tr>
<td>JI</td>
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<td>0</td>
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<td>0</td>
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<td>0</td>
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<tr>
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<tr>
<td>PW</td>
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<td>0</td>
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<td>339</td>
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</tbody>
</table>

Table 3. Confusion matrix for Speakers with 10 normalised variables
Table 3 presents the results of the classification of the spectra according to the speakers, after normalisation. All the spectra of eight speakers are classified without a single mistake. Three spectra out of 339 are misclassified for speakers KK and one for TZ. Table 4 gives overall scores for each speaker before normalisation (see Jassem 1999). The mean overall scores are: 72 percent before normalisation and 99.8 percent after normalisation. Normalisation has improved the classification of the spectra quite dramatically.

<table>
<thead>
<tr>
<th>SPEAKER</th>
<th>AD</th>
<th>AI</th>
<th>AL</th>
<th>KK</th>
<th>LR</th>
<th>JI</th>
<th>JK</th>
<th>PW</th>
<th>TZ</th>
<th>WJ</th>
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<td>56</td>
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<td>81</td>
<td>77</td>
<td>81</td>
<td>86</td>
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</table>

Table 4. Percent scores for the classification before normalisation

As formants three, four and five are found to be the most efficient in discriminating among the speakers, we repeated the computation for three, rather than ten, variables: F3*, F4* and F5*. The overall results of a discriminant analysis repeated with only F3*, F4* and F5* are presented in Table 5. A comparison of Tables 3 and 5 confirms the almost negligible loss of information. If a mean score of 99% is considered satisfactory, F3, F4 and F5 can be successfully used for a classification of vowel spectra, with ten voices, according to the speaker.

<table>
<thead>
<tr>
<th>SPEAKER</th>
<th>% correct</th>
<th>AD</th>
<th>AI</th>
<th>AL</th>
<th>KK</th>
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<tbody>
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</tbody>
</table>

Table 5. Confusion matrix for speakers based on F3*, F4*, and F5*

References


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**Announcement**

Who can help the President's office in completing the collection of "The Phonetician"?

The following issues are still missing: 1, 2, 3, 4, 5, 6, 7, 8, 9, 13, 25.

Contact: President's Office:
Ms Hedwig Hinzmann
University of Trier
Department of Phonetics
54286 Trier
GERMANY
e-mail: hinzmann@uni-trier.de
Lead don't follow

Lernout & Hauspie Speech Products [L&H] is the world's leading provider of speech and language technology products, solutions, and services to businesses and individuals worldwide. It is our mission to break down language barriers through advanced translation technology and to enable people to interact by voice - in any language - with the machines that empower them.

Founded in 1987, L&H has revolutionized the development and application of advanced speech and language technologies. The company delivers the broadest array of consumer, business and industry offerings in automatic dictation, translation, sound compression, voice synthesis and industrial documentation. As a NASDAQ and EASDAQ quoted company and headquartered in Ieper [Belgium], L&H maintains offices in more than forty nations in Europe, Asia, the Middle East, North America and South America. With over 5,000 employees - mainly linguists, scientists and engineers - we generated an annual revenue of $344 million in 1999.

For the development of language and speech technology, we currently have multiple vacancies in our International Headquarters in Ieper [Belgium] for (m/f):
**Linguists**

**Text Corpora & Lexica**

- Bahasa Indonesia
- Czech • Danish • English
- Farsi • German • Greek
- Hindi • Hungarian • Italian
- Modern Standard Arabic
- Malay • Russian • Tamil
- Taiwanese Min Nan • Thai
- Turkish • Urdu • Vietnamese
- Western Armenian

The Linguist Text Corpora & Lexica will work in the Linguistic Resources (LR) department of the Corporate Research & Development Division (CRD). He or she will closely co-operate with: (1) the other members of the LR department and its engineering support, (2) the team working on the specific language in the Linguistic Engineering Department of CRD, (3) the team that creates and collects linguistic resources in the country where the language is spoken.

The Linguistic Resources Linguist is the company-wide focal point for linguistic resources for the specific language. Linguistic resources include lexical databases, acoustic databases and electronic text corpora.

The linguistic resources are used to develop L&H’s language and speech technologies with an initial focus on TTS, ASR and Dictation.

**Function:**

As the Linguist you will:
- assist in the organization & follow-up of the collection and creation of linguistic resources by a local team that operates in the country where the language is spoken;
- assure the quality, consistency and conformity with L&H standards of the linguistic resources supplied by the local team;
- evaluate resource providers and distributors and assist in the negotiations of purchases of third party linguistic resources;
- contribute to the consolidation of linguistic resources, including the maintenance of catalogues;
- create, enhance and extend lexical databases for a language. The lexical databases will have to contain at least: orthographic representation, phonetic transcriptions, Part-of-Speech, inflectional codes and morphological structure;
- assist in defining the language-specific requirements for linguistic resources, including the definition of language-specific grammatical features and transcription conventions;
- make suggestions to optimize the working methods and to partially automate your tasks.

**Profile:**

- Degree in philology or linguistics;
- native proficiency of one of the above-mentioned languages and a good working knowledge of English;
- strong interest in formal linguistics and phonetic aspects;
- experience with programming, scripting languages (AWK, Perl) and computational linguistics is an advantage;
- ability to work in a team and independently;
- perseverance and thoroughness;
- willingness to travel abroad for limited periods of time;
- organized and detail-oriented.
**Computational Linguists**

- Bahasa Indonesia • Czech • European Spanish
- Farsi • French • German • Greek • Hungarian
- Urdu • Hindi • Italian • Malay • Mandarin
- Modern Standard Arabic • Polish • Swedish
- Tamil • Thai • Turkish • Taiwanese Min Nan
- Ukrainian • Vietnamese • Western Armenian
- English

**Function:**
- You will work within a multi-disciplinary team of linguists, engineers and programmers on the development of software systems in the field of Speech, Artificial Intelligence and Language.
- In the start-up phase, your tasks will typically include: basic phonetic and language study in view of technology development and assessment of third party providers of data and/or technology.
- You will be involved in all aspects of the development life cycle and focus on system specification and design, implementation of linguistic rule sets, grapheme to phoneme conversion, prosodic analysis, software testing and quality control, preparation of documentation.
- Training is given both on-the-job and through lectures and technical documentation.
- Dedicated development environments are provided which allow language specialists to focus on their content: formalizing linguistic knowledge.

**Profile:**
- University degree in linguistics, or equivalent;
- (near) native speaker (of one of the above-mentioned languages) with a conversational level of English;
- solid grounding in linguistic theory;
- good knowledge of and/or experience in one or more of the following areas: speech processing, natural language processing (NLP), computational linguistics, programming;
- ability to work in a team and independently;
- perseverance and thoroughness;
- willingness to travel abroad for limited periods of time.

If you are interested in one of these job opportunities and you believe to fulfil the required profile, please e-mail your detailed resume to: job-announce@lhs.be

Lermout & Hauspie Speech Products,
Personnel Department,
Mr. Pierre Eggermont,
Flanders Language Valley 50,
B–8900 Ieper, Belgium.
Fax: int+32 (0) 57.22.95.31

Short Notes

New Uses for Speech Synthesis

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Preface

A team of phoneticians, linguists, computer scientists and mathematicians at our laboratory over the past few years have developed large portions of a new speech synthesis system for French. Its distinguishing aspect is a greatly improved, natural-sounding quality. This system is freely downloadable (for non-commercial purposes) from www.unil.ch/imm/docs/LAIP/LAIPTTS.html, and it works in conjunction with the freely available Mbrola sound output system. Much of this presentation can also be obtained, in English and French, together with some illustrative sound examples, at the following web page: www.unil.ch/imm/docs/LAIP/LAIPTTS_sim.htm.

Speech Synthesis as part of Virtual Reality

For most of us, the term speech synthesis evokes memories of mechanical, monotonous or repetitive voices, while virtual reality makes us think of amazingly realistic film scenes. But in fact, speech synthesis has been much improved in the last ten years, and it is now firmly part of virtual reality. And with that, researchers in the humanities can now use speech synthesis in novel ways.

We estimate that many speech synthesis systems are now ready, among other things, for the following new tasks:

- Assisting the *language teacher* in certain language learning exercises, including as an aid to reading. Speech synthesis allows repetition at will, as well as the presentation of exercises specifically adapted to the needs of the student, plus the creation of sound examples that could not be produced by a human being (e.g., speech with intonation, but no rhythm).
- Assisting researchers in *linguistics or psychology* in producing speech stimulus material in specific and controlled ways, in order to test theoretical hypotheses. In this sense, speech synthesis is becoming an interesting experimental tool that favours the development of objective methods (*i.e.*, the use of instrumental, rather than impressionistic approaches). This encourages reproducibility of experimental results between laboratories.
- Simulating a "serious and responsible speaker" in various *virtual environments* (e.g., friendly helper's voice for the visually handicapped, a news reader in a virtual radio station, a speaker of an extinct and recreated language, or a salesman in a virtual store, etc.).

All these uses can be understood as a type of virtual reality, since we *simulate* a human speaker, in whole or in part, for a specific application.
The Limits of Current Speech Synthesis

At the same time, the time is clearly not yet ripe for some other potential uses of speech synthesis:

- Synthetic voices are still *insufficiently expressive*. We cannot yet simulate human emotion, such as joy, anger or sadness satisfactorily. This means that our artificial voices do not yet have the full, extended "vocal palette" of the human speaker required for "virtual theatre" or animated film applications.
- The synthetic *voices themselves* are still very limited. In some European languages, we may have a few male and a few female adult voices for a given language. But where are the children's voices, where are the adolescents, or where are the senior voices? With today's concatenative technology, the creation of a new voice represents a major effort, even for large and well-financed research teams.
- There is by and large still very little *dialectal synthesis*. Also, there is no synthesis of informal language, and no simulation yet of social class variants.

To the members of our laboratory, these are the true challenges of the future. In the following sections, we illustrate in some more detail what *good* speech synthesis can do at the present, and what we would like it to do in the future.

Speech Synthesis for Language Teaching

The learning of a second language involves a great variety of skills where speech synthesis can be used meaningfully. A good model of the language is particularly useful in the training of *prosodic and articulatory competence*. Speech synthesisers can slow down stretches of spoken language at will, which eases familiarisation and articulatory training with novel sound sequences. Learners can begin with speech sequences that are produced slowly and increase the speed as their facility improves.

Advanced learners, on the other hand, may wish to experiment with accelerated reproduction speeds. These are commonly used by the visually handicapped for scanning voluminous texts. English-speaking learners of French, for example, need considerable training to integrate French rhythm, which diverges considerably from the stress patterns characteristic of English. New examples can be generated at will with synthesis.

Another obvious area of application concerns *listening comprehension*. It is true that today's learners of major foreign languages can easily connect with Internet-based radio or TV from the desired language area. But at the same time, such transmissions can rarely be halted or slowed down at will. Many synthesis systems can be stopped in mid-stream, can back up one or several sentences, and can repeat what was just read out, possibly much more slowly. (Our system does not have this capacity yet, but it will soon.)

Which leads to yet another use of speech synthesis systems, that of a "*substitute native speaker*". Dictionaries and grammars (as correctors) increasingly show up on our computers. Why not add a speech synthesiser? When the language competence of the system begins to outstrip that of some of the better second language users, such systems become useful new adjunct tools. In fact, by their ability to produce natural-sounding speech from almost any text, they may soon become as indispensable on one's personal computer as the latest electronic dictionary.
Speech Synthesis for Training in Reading

A high-quality speech synthesis can also be at the basis of tomorrow's tools to combat illiteracy. We know that in our developed societies, illiteracy has stigmatizing status. The attraction of having such a tool on a computer is that the computer is precisely not a human, and is thus likely to be perceived as non-judgmental and neutral by individuals who are illiterate. Teaching materials could be combined with attractive, game-like interfaces to reinforce favorable preconditions for such learning. Endowed by a fully-adapted interface, a speech synthesiser could be used as an indefatigable and interactive repeater and assistant, which is required for reinforcing the learning of correspondances between the written and the spoken language.

Speech Synthesis for Linguistic and Psycholinguistic Experimentation

Knowledge about language and speech functions has considerably increased during the last twenty years. The overall picture of human linguistic functions is of such complexity that researchers capable of integrating all of this knowledge have become rare. In this sense, speech synthesis can become a useful tool for linguistic and psycholinguistic experimentation, since it allows knowledge to be incorporated from selected and diverse levels (phonetic, phonological, prosodic, lexical, etc.), and to verify the relevance of each as they interact with each other.

Although the use of speech synthesis in this context is still in its infancy, it is now possible to perform a number of manipulations with current speech synthesis systems. Humans cannot demonstrate these functions separately, since their active control of phonation does not permit it. Consider, for example, the following experiments:

<table>
<thead>
<tr>
<th>Experiment</th>
<th>How to do it with our synthesiser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate the effects of greater and lesser degree of monotony (fundamental frequency variation)</td>
<td>Adjust &quot;melody&quot; in Control</td>
</tr>
<tr>
<td>Demonstrate the effects of greater and lesser speech rate acceleration</td>
<td>Adjust &quot;linear speed&quot; in Control</td>
</tr>
<tr>
<td>Demonstrate the effects of no fundamental frequency variation at all</td>
<td>• Select &quot;Save Prosodics&quot; in Control</td>
</tr>
<tr>
<td>Demonstrate the effects of no rate variation at all</td>
<td>• Select &quot;Save Prosodics&quot; in Control</td>
</tr>
</tbody>
</table>
| Demonstrate the effects of the absence of word grouping in an utterance | • Open a text  
• Place commas after each word  
• Save the text  
• Have the synthesiser read the text and note the absence of the word grouping effect |
| Demonstrate the effects of the rhythmic structure of some frequent lexical words | • Create a list of 20 disyllabic words (e.g., armchair, language, Europe, avoid, excel, etc.)  
• Save the text  
• Have the synthesiser read out the entire list and listen for the rhythm |

Each of these experiments isolates an important aspect of prosodic structure, and in so doing illustrates its contribution to the overall acoustic effect.

**Historic Reconstruction**

As part of virtual reality, speech synthesis is also likely to become part of another interesting new trend, that of virtual historic reconstruction.

In quite a number of places in Europe, combined knowledge from manuscripts and excavations is being used to reconstruct the state of historic sites in precise detail. At York (UK), for example, a Viking village has been recreated in minute detail on the basis of accumulated evidence and at the place of the original site, *i.e.*, underneath a large shopping centre complex (http://www.jorvik-viking-centre.co.uk/). As visitors pass through the village in electric carts, real-size models of village inhabitants are heard to converse in a form of Old English that was recreated to be as similar as possible to the assumed form of the informal speech of the time. However, when listening carefully to the voices recreated at York, it appears that at least some of the modern speakers used to record the utterances were only partially comfortable with the language, since the fluency typical of informal, conversational speech is often lacking.

This is not an isolated case. A careful examination of examples of classical Latin (first century B.C.), recited by a known authority of Latin pronunciation, identified multiple pronunciation errors. This is easily understood: since Latin grapheme-to-phoneme rules, for any given period, differ considerably from those of any modern European language, and since there is no language community that uses classical Latin pronunciation on an every-day basis, it is difficult for a modern speaker to become fully and solidly conversant with its pronunciation. It is possible that a well-tuned speech synthesis system might soon do better than modern "non-native" speakers of Old English or classical Latin, and provide totally fluent and natural-sounding renditions of "informal Old English" and "Cicero's Latin". This is being tested with respect to recited classical Latin by a doctoral student writing his thesis in association with our laboratory. In preparation for a recreation of Latin synthetic speech, Latin and secondary sources concerning the phoneme inventory and pronunciation of classical Latin are being examined.

Surprising phonetic detail can be inferred from contemporary comments. For example, Cicero complains that Ennius always wrote "Phyrurus" as "Burrus" ("Burrum semper Ennius, numquam Pyrrhum", oratio 160). Quintus Ennius (239-169 B.C), who was later to become an influential Latin epic poet, was a native of Calabria and learned Toscan and Greek in his youth. He
grew up at a time when the region was just coming under Roman dominance. This supports the notion that Roman plosives were more strongly aspirated, or less voiced, than corresponding Toscan plosives (i.e., characterised by longer VOTs). During the same period, Greek loan words that were spelled with initial phi in Greek were reliably transliterated into Latin with "ph-". From indices such as these, it becomes possible to recreate a "hypothetical VOT line" for the unvoiced plosives of the time, with the longest VOTs associated with Greek, classical Latin VOTs taking an intermediate position, and Toscan VOTs occupying the least aspirated, or possibly even a negative VOT pole.

In an interesting sidelight on the difficulties generating an extinct language synthetically, extinct languages may contain diphones that are difficult or impossible to find in modern diphone bases. For examples, it can be concluded from the frequent omission of final "m" on tombstones as early as 259 B.C. that [-Vm V-] sequences were fully nasalised during most of the Roman period. In fact, Quintilian (1st century AD) comments directly on this by saying (Quint. inst. 9, 4, 40) "Whenever this same letter (i.e., 'm') ends a word and enters into contact with a vowel starting the next word, in a manner that a transition becomes possible, the final 'm' is barely pronounced, all while being maintained in the orthography, for example in multum ille and quantum erat, so that it gives nearly the impression of a sound of some new letter. In fact, it is not suppressed, but rendered indistinct, and only represents a type of sign that keeps two vowels from being confounded." Assuming one wished to recreate Latin appropriate to Cicero's time, one would probably have to use moderately aspirated or unaspirated plosives combined with nasal vowels. This is not easy to do with currently available diphone databases. French DBs do contain most nasal vowels, as well as unaspirated plosives, but they do not contain the nasal [u]. This means that the reconstitution of Latin may well require building an entirely new diphone database, or signal manipulations within an existing database to create missing diphones.

Synthetic reconstitution of historic languages will also serve to point out some limits of our knowledge of extinct languages. For example, what was the prosody of classical Latin? Since members of past civilisations were generally of shorter stature than contemporary humans, does that mean that their average fundamental frequency was higher? There is some indication that this may well be the case, since music written for 15th-16th century male singers often reaches into the very top of the contemporary tenor range. But even if we are led, by skeletal measures and serious correlational analyses, to assume an average fundamental frequency shift by a half an octave or more, we will probably remain in considerable doubt about the melody contours that would have to be postulated. In that sense, the synthetic recreation of extinct languages will serve to point out the numerous remaining weaknesses in our current understanding of such languages.

Synthesis of extinct languages is likely to be bound into attempts to recreate virtual historic sites. For example at the University of Caen (France), a multidisciplinary research team has launched a project on the "Virtual reconstitution of Antique Rome" (see http://www.unicaen.fr/rome/). Issuing from the formidable early-20th century effort of Paul Bigot's 70-m² 3D plaster cast of ancient Rome, the French team is in the process of digitizing and updating the entire cast, in order to provide the backdrop for a "3D virtual Rome" evolving over the centuries. In time, it is hoped that this virtual scene will become a photorealistic stage for recreating the scenes of classical Roman speeches. We in Lausanne hope to see our project on Latin synthesis contribute to the capacity for producing classical Latin oratory speech with as much realism as possible.
Where are we headed?

Despite all the justified enthusiasm about the improved capacity for increasingly pleasant-sounding synthesised speech, current capacities are still limited. Under good circumstances, we have a credible capacity for a relatively formal reading style. Practically unknown today are systems that give truly expressive speech. Expression of surprise, anxiousness, excitation or disappointment are very difficult to impossible to generate with present-day concatenative synthesis technology.

A number of research teams are working on these problems. Many such laboratories are part of the European COST 258 Project, see:


It is likely that in a few years' time, further steps will be taken towards greater realism of artificial voices. With the impressive results of Harmonics and Noise Modelling (HNM) of speech, for example, the technology for creating this capacity is already in place. As HNM systems mature and become available for the applications described here, speech synthesis can be more useful for understanding and assisting human communication in many novel way.

Acknowledgement

Grateful acknowledgement to Olivier Bianchi, University of Lausanne, for detailed information on classical Latin pronunciation.

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Information

Professor Kohler (Kiel, Germany) has been elected President of IPA for the period from 1999 until 2003. In this position he succeeds Professor John Ohala (Berkeley/California, USA). Professor John Esling (Victoria, Canada) will continue to serve as IPA's Secretary for the same period.

The Permanent Council for the Organization of International Congresses of the Phonetic Sciences (PC ICPhS) has elected Professor Klaus Kohler (Kiel, Germany) as its new President. The New Secretary General is Professor Björn Granström (Stockholm, Sweden).

The XVth ICPhS in Barcelona in 2003 will take place under the auspices of the Permanent Council for the Organization of ICPhS acting as a subcommittee affiliated to the IPA Council.
Presentation of Svend Smith Awardee

Svend Smith Award 2000:
Mark Tatham

Prof. Dr. Mark Tatham
Linguistics Department
Essex University
Colchester CO4 3SQ
maat@essex.ac.uk

Professor Mark Tatham BA Ph.D. FRSA FIoA is Professor of Linguistics at the University of Essex in the U.K. where since 1967 he has headed the Speech Research Team whose main developmental work is in the area of computational modelling of speech production and perception. Mark received his training at the University of Leeds and the University of California at Los Angeles. His initial work from the late 1960's concentrated on modelling the physical process of motor control in speaking and how this might fit in with general linguistic theory. In 1972, he proposed and was founding editor of the international Journal of Phonetics.

Mark's work in speech production modelling led to the development of 'cognitive phonetics' in the mid 1980's, which seeks to explain certain co-articulatory phenomena which are clearly the result of language-specific voluntary constraints on otherwise automatic speaking effects. Tatham and his colleagues claimed that speakers can constrain or enhance involuntary physical effects and thus increase the range of units available to a language's phonological inventory. He also claims that speakers and perceivers alike 'know' of this ability. The Theory of Cognitive Phonetics also provides a useful explanation for the ability of speakers to add emotional effects to the plain speech message.

During the 1990s Mark Tatham's ideas and refereed publications continued to increase. In particular, he became known for his theoretical work in the cognitive supervision of motor control, and was responsible for the linguistic modelling supporting a high level system of speech synthesis designed to simulate human planning and control in speech production. This work has been integrated with the theoretical ideas of cognition in speech into a text-to-speech synthesis research programme called SPRUCE. In addition, Professor Tatham has published some 100 papers, and contributed chapters to a number of books specialising in phonetics, psycholinguistics, and acoustics. He regularly presents papers at international conferences on phonetics and spoken language engineering. These papers have a common flavour: the computational modelling of human speech and testing his approach through the medium of speech synthesis.
Aside from his research, Mark Tatham is active in professional organisations and as a consultant to various funding agencies in Britain, the European Union and the United States. He is very active in the European Commission's ELSNET and SOCRATES initiatives in the research and teaching of phonetics and spoken language engineering, and is Chairman of ISCA Education Special Interest Group. He is an Honorary Vice-President of ISPhS, immediate past-Coordinator of the UK Government's Speech and Language Technology initiative, immediate past-Financial Controller of the European Acoustics Association, and from April 2000 moves from being a Vice-President and President Elect of the UK Institute of Acoustics to being its President. Finally, Mark is a Fellow-designate of the UK Institution of Electrical Engineers and a Fellow of the Royal Society for the Arts.

Professor Tatham is the recipient of the Svend Smith Award 2000 in recognition of his continuing contributions to the theoretical foundations of the phonetic sciences and his outstanding core and applied research in our field.

Jens-Peter Köster

**Obituary on William Sakow (1912-1998)**

Professor Dr. William Sakow, the 6th President of the International Society of Phonetic Sciences, a man of meager physical stature with the charisma of a giant, stood like a Greek orator in front of his every audience.

Dr. Sakow was born on September 26th, 1912 in Gifu prefecture, Japan. His firm faith in Christianity made him as benevolent as a clergyman, which might be the compliment he would appreciate most.

His educational and occupational career fostered and developed his Christian attitude. His secondary education was at Tamagawa-Gakuen, a mission school which pioneered Christian education in Japan. His tertiary education was at St. Paul's (Rikko) University. He became the Director of Tamagawa-Gakuen Academy, then an Assistant Professor at St. Paul's University, and then President of St. Margaret's College.

The Ministry of Education in Japan appointed Prof. Sakow as a member of Ministerial Advisory Boards for Higher Education in Japan, in Faculty Development and in Scholarship Development and Approbation. He also served as a Director on the Board of the Association of Private Colleges of Japan and then as President of the All-Japan Junior College Association.

Among his extended publications, *Introduction to American Phonetics*, the most informative book on American English Pronunciation and *Leaving My Journey Up To Thee*, a retrospective essay of his life, were truly outstanding.

Dr. William Sakow was awarded and presented the distinguished Order of Merit by the Emperor of Japan in 1983. In 1991, he was awarded the Honor of the Society (ISPhS) for his significant contributions to the Phonetic Sciences world-wide.
He passed away on December 2, 1998 at the age of eighty-six, after a lengthy illness. He is survived by his wife and five sons who too, have become distinguished in their own ways.

Seiki Sakiyama

**Obituary on Gordon Arnold (1920-1999)**

Gordon Arnold, who has died at the age of 79, was the co-author, with J.D. O'Connor, of *Intonation of Colloquial English* (Longman, 1961; second edition, 1973), which not only proved a successful textbook for learners of English but also exerted considerable influence on intonation studies in general. It combined new theoretical insights with a practical and teachable notation system and lively drill material.

Gordon came from Braintree in Essex. As an undergraduate at UCL, he read French, but his studies were interrupted by war service. When he graduated, in 1947, the then head of the Department of Phonetics, Daniel Jones, appointed him Assistant Lecturer, on the recommendation of his teacher of French phonetics, Helene Coustenoble. This procedure nowadays seems shockingly informal for an academic appointment — he had no MA, still less a Ph.D. — but nevertheless it worked out well. In due course he was promoted Lecturer (1950) and Reader (1966). He was the author of *Stress in English Words* (North-Holland, 1957) and a number of EFL phonetics textbooks. As well as the intonation book, there were *English Pronunciation Practice*, with A.C. Gimson (U. of London Press 1965, second edition 1973) and *Say it with Rhythm*, with O.M. Tooley (Longman, three parts, 1971-73). He played a substantial administrative role in College, becoming Tutor to Arts Students and Sub-Dean (1973) and then Senior Tutor (1979). In 1978 he was made a Fellow of the College. He took early retirement in 1982 with the title Emeritus Reader in Phonetics.

Gordon Frederick Arnold, born 22 Jan 1920, died 30 December 1999.

John Wells
Victoria A. Fromkin, an internationally renowned scholar of linguistics and a UCLA professor, died January 19, 2000 at age 76, after a two and a half year struggle with cancer.

Dr. Fromkin, a professor emeritus, was a scholar in a wide array of fields within linguistics, including the brain and language, the linguistic significance of speech errors, phonetics, and psycholinguistics. She compiled a major collection of speech errors and slips of the tongue produced spontaneously in normal conversation and by brain-damaged patients to better understand the mental representation of language.

Among her many publications, Dr. Fromkin is the senior author of the textbook, "An Introduction to Language," which has sold more than a million copies and has been translated into six languages. Despite her illness she was working hard until the last month of her life. Shortly before her death she received a copy of her latest achievement, "Linguistics: An Introduction to Linguistic Theory." She was the instigator of this contemporary textbook, written by members of the UCLA Department of Linguistics, with each of the chapters edited (and often partially rewritten) by her.

Dr. Fromkin became a graduate student in the department somewhat late in life, at age 39 in 1962. It was my first term teaching in an American university, and being faced with Vicki was a memorable experience. Her inquiring, logical mind never let me go uninterrupted for long. She sought the truth and would not take any watered down versions. I'm not sure about her, but I learned a lot in that class.

She received her Ph.D. three years later, an achievement that set the style of her rapid progress. In 1974, 12 years after entering as a graduate student, she became Chair of the Department, a feat that is almost certainly unequaled in any major linguistics department. Before becoming Chair she had begun to establish a name for herself as a substantial research scholar with several publications in phonetics, on topics as varied as the muscles involved in gestures of the lips to properties of tone languages. She had also begun her studies of speech errors, which led to her well-known interest in language and the brain.

Later, it looked as if she might be leaving linguistics by becoming an administrator. She was Dean of the Graduate Division and Vice-Chancellor for Graduate Programs from 1979 to 1980, the first woman to achieve the rank of vice chancellor or higher in the University of California system. But even during that time, she was still an active linguistic scholar, publishing many research papers and supervising several Ph.D. dissertations.

Dr. Fromkin received many accolades from her peers, having been elected President of the Linguistic Society of America (1985), and, perhaps an even more noteworthy honor, becoming the first non-medical Chair of the Board of Governors of the Academy of Aphasia. She was elected a fellow of the American Academy of Arts and Sciences, and recently became one of the very select group of linguists who are members of the National Academy of Sciences, the major scientific organization in the U.S., with only 1800 members. She was also a fellow of the New York Academy of Sciences, the Acoustical Society of America, the American Psychological Society, and the American Association for the Advancement of
Joseph Desmond O'Connor - known to everyone as "Doc"- was born on the 10th of December 1919 and grew up in the handsome once mainly spa town of Harrogate in West Yorkshire, 200 miles northwest of London. His paternal grandfather had been Irish. For his senior schooling, he attended a Jesuit foundation, St Michael’s College, in nearby Leeds. From there, he went to University College London in 1937. When the Second World War broke out, he was in the final year of a Course in French in which he gained first-class honours. He served in the Royal Armoured Corps throughout the war rising to the rank of Major. His talents had clearly impressed his teacher of French phonetics, the redoubtable Helene Coustenoble; and in turn Daniel Jones, founder at UCL of the first British university department of phonetics. After the War he returned to that department and remained in it for the whole of his working life except for some months in 1954 which he spent at Haskins Laboratories in New Haven, Conn., USA. He never cared to travel much.

For a decade beginning in 1964, he conducted with great geniality the annual University of London Summer School of English (in its heyday a most remarkable large-scale course, with its very full programme of phonetics tutorials and lectures among many other activities), introducing famous speakers from all walks of life and delivering his own phonology lectures with the same modest, easy, good humour. University College recognised his notable contribution to his subject and his important part in the development of his department by appointing him to a Chair of Phonetics in 1976. At his rather early retirement from teaching at the age of 60, in 1980, the title of Emeritus Professor was conferred upon him.

He took a good deal of interest in the EFL world, in which he became famous for the 1961/1973 Intonation of Colloquial English on which he collaborated with his UCL colleague, the late Gordon F. Arnold. The excellently accurate recordings they
made of substantial amounts of its text greatly helped many generations of students, though he came eventually to feel certain misgivings about some of his attempts to deal with the attitudinal aspects of its knotty subject. His brilliantly successful basic textbook, *Better English Pronunciation*, appeared in 1975. He wrote more phonetic readers than anyone else ever did. His didactic writings also included radio and film scripts and BBC gramophone courses. He contributed numbers of reviews to *Le Maitre Phonetique*, some of them of books only available in French or Danish. He produced papers on a wide variety of topics, among which was the seminal article 'Vowel, consonant and syllable - a phonological definition' (with J. L. M. Trim), which first appeared in *Word IX/2* in 1953. His most brilliant work was the remarkably wide-ranging *Phonetics* (Penguin Books 1973), indisputably one of the best general introductions to the subject. After that he wrote very little except for some EFL materials in collaboration with his only daughter, Mrs Clare Fletcher. A list giving most of his publications appeared at pp xi - xiv in *Studies in General and English Phonetics: Essays in Honour of J. D. O'Connor* (Routledge 1995) edited by the present writer.

In his well-earned retirement he devoted much of his time to his beloved local cricket club. He was a very private man but he had many friends far from limited to his professional contacts as was evident at the large gathering for his funeral. Those who were fortunate enough to have enjoyed his company will treasure the memory. He died on the 15th of July 1998 at the age of 78.

Jack Windsor Lewis

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tpkn@mail.ru or POB 500, LV-1050 RIGA, LATVIA
Phonetic Institutes Present Themselves

This section of *The Phonetician* is devoted to the presentation of phonetics institutes from all over the world. The purpose of this section is to give our readers an idea about what other phonetics institutes look like, what sort of equipment they have, what their main research areas are, and last, but not least, who their staff is. Ideally, this will help to increase the scientific exchange between phoneticians and their institutes.

If you would like to present your phonetics institute in *The Phonetician*, send a short description of it to the editors. In this issue, we shall publish a description of the Department of Phonetics at Charles University Prague and the History of Phonetics at the University of Rostock.

80 Years of Phonetics at Charles University Prague

Historical Review

This year, the Institute of Phonetics at Charles University commemorates 80 years since its foundation. Josef Chlumský, a former student and assistant of P. Rousselot, was appointed professor of phonetics at the Faculty of Arts in the academic year 1919/1920, and an institution dedicated to phonetics was established on January 1, 1920.

It was called the *Laboratory for Experimental Phonetics and a Phonographic Archive* to reflect its primary purpose as well as Chlumský’s emphasis on instrumental research which already covered the level of prosodic phenomena. The development of phonetics, however, remained balanced. In addition to Chlumský, substantial influence was also exercised by Antonín Frinta, a Czech slavist and bohemicist. He was an active API member since 1906, who was concerned with his mother tongue's variability of sound and who showed an early interest in phonostylistics. Moreover, from the late 1920's onward, the renowned Prague School of Phonology provided its counterparts with notable members, such as Nikolai Trubetzkoy and Roman Jakobson. This combination of progressive elements set a favourable environment for the development of a phonetics workplace at Prague.

As it appears, the opportunity was not wasted. Notably, the description of Czech both as a mother tongue and cross-linguistically was elaborated to a high standard. The laboratory's professional atmosphere and the technical equipment, quite good for its day, made Prague’s phonetic workplace an esteemed centre which also partly served as a training centre for Central Europe, particularly for Slavic languages. The scientific gain of this international interaction was mutual, however. At various times, before and after World War II, such persons as Branko Miletić, Ján Stanislav, Stojko Stojkov, František Daneš were among its students. Georges Straka, Karel Ohnesorg and Hans Walter Wodarz were on the staff as assistants.

The activities of the *Institute of Phonetics* (so named in 1946) were then directed by Bohuslav Hála, a versatile phonetician and an able organizer, particularly with respect to empirical and instrumental research. The 1950s saw the advent of the first segmentator, a machine unique in
those days, built for Prague's phonetics laboratory by Přemysl Janota, to help in the auditory analysis of speech.

Along with research, there were also significant advances in educational and general cultural activities, making the way towards stabilizing the pronunciation standard of Czech. From the initiative of Hála and under his leadership, a second workplace for phonetics was established at the Academy of Sciences in Prague following World War II. The co-operation of the two teams resulted in the preparation and publishing of Standard Pronunciation of Czech in mid-1950s. The relation between phonology and phonetics appeared mainly in the work of Milan Romportl.

Internationally, Czech phonetics received special appreciation when Prague's Institute was entrusted with the organisation of the 6th International Congress of Phonetic Sciences (1967). In light of the Czech phonetic traditions, it was no accident that separate sessions were devoted to prosody issues at this congress. As a follow-up event, an International Symposium on Intonology, presided over by Milan Romportl, was organised in Prague in 1970.

Internally, however, due to conditions outside the realm of science, imposed measures started to substantially limit the scope of work. As a result of reforms in higher education at the outset of the 1950s, the Institute of Phonetics lost its status as an independent unit, and the study of phonetics was possible only as a minor part of certain philological curricula. The adverse effects of these and other constraints were ever more acutely felt from the early 1970s onward. The loss of the technical background and, most noticeably, the ban on recruiting young new professionals had a significant negative impact. It is only today that the generation gap, thus created, is gradually being filled.

Significantly, there were international links that stayed alive. Among them was ISPhS, which found a way to preserve its membership for Central European experts in this international organization. Milan Romportl was the president of ISPhS for a number of years. Those contacts are presently being developed by Marie Dohalská, his former deputy. Přemysl Janota, a honorary vice-president of ISPhS, is a long time member of the Permanent Council of ICPhS. In addition, the individual support for Czech research came from laboratories abroad, such as Stockholm, Amsterdam, Berlin, Dresden, Halle (Saale). There was also co-operation with Ján Sabol's recently established laboratory at Prešov in Eastern Slovakia which was highly appreciated.

The Institute of Phonetics held its ground throughout those years primarily as an educational establishment, obliged to teach the basics of phonetics as a specialized subject for the mainstream philology curricula at the Faculty of Arts. The unavoidably large teaching loads had a positive result in maintaining a fairly high standard of awareness of the discipline among Czech students. Also preserved was an optional specialization in phonetics for doctoral studies within the framework of general linguistics. The possibility to publish the results of research in Phonetica Pragensia, a periodical published occasionally in foreign languages, was welcomed as well.
A turn for the better came with the early 1990s. The change of the educational system made it possible to establish a deeper grounding for the discipline within undergraduate studies. The Institute of Phonetics was made an independent unit again in 1993 and started to enroll a young workforce. Thanks to the funding provided through grants, the experimental capabilities were restored to an adequate level. The range of activities of its members is very diverse, as it is currently the country's only specialized center of phonetics.

**Educational activities**

*Linguistics–phonetics* is accredited within the five-year Master's degree study plan in combination with another, usually philological discipline. The Institute of Phonetics keeps an equal share in teaching with the Institute of Linguistics and Finno-Ugric Studies. A specialization in Phonetics can follow, then, in the three-year doctoral studies.

The phonetics part of the Master's degree provides students with a survey of the discipline so as to help them find practical applications wherever speech is being handled. It covers basic courses in both segmental and suprasegmental speech production and perception, elementary phonology, introduction to instrumental analysis and synthesis, as well as social issues of verbal communication. A Master's degree study plan in *phonetics* is currently under review.

Doctoral studies are modified individually according to the interest of each student, while their works relate to the current themes of research.

The Institute of Phonetics continues to provide specialist courses for the mainstream philology curricula of the Faculty.

**Research activities**

The overall objective is to renew thoroughly, and to gain new insights into the phonetic structure of Czech by using up-to-date technical capabilities of speech processing while keeping cross-linguistic comparisons in view. The research so far seems to be unfolding into two broad directions.

In line with the general trend, the developed themes cover topics motivated by the requirements imposed by applied engineering on the possible use of speech in automated communication systems. To date, these are mainly topics needed for functional and user-friendly synthesis of Czech including a prosody component. The Institute co-operates closely with the engineering teams of the Institute of Radio Engineering and Electronics, Academy of Sciences of the Czech Republic, and of the Department of Circuit Theory, Czech Technical University in Prague. This is also the focus of research within the European COST 258 project, as well as on grants funded by the Grant Agency of the Czech Republic.

Another objective pursued by the institute of phonetics is building a sufficiently broad phonetic database of Czech. This database should lead to a multi-layered description of speech, to be complemented later with evaluative annotations of the variability of forms perceived by the listeners.
Outreach in society and culture

The Institute's members are committed to the issues of language and culture. Their involvement covers primarily media and drama consultations.

Current international co-operation

Present-day institutional relations are contracted with: Institut für Phonetik, J.-W.-Goethe-Universität, Frankfurt am Main; Université Paris 7 and Institut für Akustik und Sprachkommunikation, Technische Universität Dresden. Contacts are maintained with academic teams at Jena, Liverpool, Ljubljana, Prešov and Zagreb. Co-operation within the International Committee of Slavic Scholars is also being revived.

Technical equipment

A WinNT-based server, LAN with 7 workstations, 2 special-purpose PCs, semi-professional sound recording and reproduction equipment, standard sound signal processing software, as well as software developed for specific tasks of analysis, modification and synthesis of speech, both insourced and obtained from partner teams.

Staff

Prof. Dr. Zdena Palková, Head of Institute
Prof. Dr. Marie Dohalská
Professor emeritus: Prof. Dr. Přemysl Janota
Mgr. Tomáš Duběda Mgr. Pavel Machač
Mgr. Jiří Hedánek Mgr. Marie Svobodová
Mgr. Jana Mejvaldová

Contacts

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Zdena Palková

Information

2-5 October, 2000
Workshop: Prosody 2000: Speech Recognition and Synthesis
Kraków, Poland
(e-mail: lin@amu.edu.pl; http://main.amu.edu.pl/~fonetyka)
Organized by:
Polish Phonetics Association
Deutsche Gesellschaft für Sprachwissenschaft (Sektion Computerlinguistik)
Acoustical Committee of the Polish Academy of Sciences
Supported by: The International Speech Communication Association - ISCA
The History of Phonetics at the University of Rostock

It was in 1924, when a man of practical orientation, Peter Dumas, the head of the Schwerin State Theater, began holding courses in voice and diction at the University of Rostock, Germany. He received the title of Lecturer in 1926. Peter Dumas was closely tied to the development of speech training at the University. After Dumas left the University in 1933, Fritz Lockemann was appointed Lecturer for speech and rhetoric on Mai 1, 1934.

Fritz Lockemann was well-known as the senior editor of the journal Wort und Ton, a bimonthly publication on vocal training, diction, speaking and singing and played an active role in many different areas of the field. But the focal point of his interest was rhetoric, especially the art of interpretation by changes in vocal qualities. Important to mention in this context are - in addition to a number of related articles - his dissertation Zur Ästhetik des reproductiven Kunstschaffens, Göttingen 1931, and his published dissertation to complete university lecturing qualifications Das Gedicht und seine Klanggestalt, with which he earned the venia legendi, the qualification for academic teaching in Speech and Rhetoric at the University of Rostock. When Lockemann left Rostock in 1947, Erich Sielaff, a professor of German specializing in didactic methodology, temporarily took over "Speech and Related Exercises".

The term "Phonetics" first appeared in the schedule of courses of the University of Rostock in the winter semester 1931/32 when Alfred Schmitt, a general linguist, announced the course "Principles of Phonetics (with emphasis on the historical development of speech sounds in ancient and current languages)". During the summer semester of 1932, Leo Weisgerber held a seminar on "Examination of Recent Publications on Speech Sounds and Linguistic Change (Phonology)". It is also important to mention that the first "Introduction to General Phonetics" was offered during the winter semester 1943/44 by the well-known comparative linguist Hans Jensen. Since then, this course has been offered from time to time.

In fall 1954, Walter Trenschel took over the areas of voice, diction, and speech training. This event marked the beginning of systematic phonetic research. Trenschel immediately began to develop a department of speech and established a phonetics laboratory. It was the first phonetic institution at the University of Rostock and was affiliated with the Institute of German Philology. Trenschel's teaching began with a course in practical aspects of "Voice and Diction", primarily for students of philology and German. Starting in 1957, this course was also opened to other students, notably students of theology. Speech training, including rhetoric exercises with emphasis on speaking in large rooms, finally became a mandatory curricular element for all students seeking a teaching degree. Starting in 1955, a seminar on "Spoken Poetry" was first offered leading to many lectures within and outside the university as well as to recitations on the occasion of university festivities. In 1967, the 1st International Summer Course launched the regular speech instruction of foreign students.

In February, 1956, an additional specialty field emerged serving the Rostock Clinic of Stomatology, where therapy for cleft palate patients was initiated and developed. This was followed shortly by cooperative teamwork with the University's psychiatric and ENT clinics, which provided the foundation for a scientifically based rehabilitative approach for the entire field. These efforts led to specific questions relative to teaching and to detailed observations pertaining to the production of speech sounds, contributing to the findings that normal production of speech...
sounds is only possible with adequate velo-pharyngeal closure. Cleft palates are therefore living proof of the orality of all German speech sounds, vowels as well as consonants. A lecture course designed for dentists, "Foundations of Phonetics and Speech Therapy" appeared in the program of the Clinic of Stomatology. This course was started in 1959 and was offered through the late seventies.

The most important area of phonetic studies at the University of Rostock pertained to research about the significance of nasal cavity function. This is reflected in a major study on the history of the term "nasality". This study led to the important question of whether the vowels of Standard High German were completely oral or produced with a nasal component. The problem was solved on the basis of intensity measurements in several experiments. These results can be found in Trenschel, W.: Oralität and Nasalität in der deutschen Standardaussprache, Trier, 1994. Based on specific techniques, it could be shown that nasality does not affect the coarticulatory process in Standard High German, not even in the neighborhood of nasal consonants. While maintaining velopharyngeal closure, the production of German vowels takes place in the oral and pharyngeal cavities with no involvement of the nasal cavity. This finding is supported by the strong expiratory stress in German and the glottal stop found at the onset of German vowels. This constituted a significant element in German phonetics.

The retirement of W. Trenschel in 1990 marked the end of phonetics as an academic discipline at the University of Rostock. For students in theology, "Voice and Diction" still continued until 1993. After that, the Institute was dissolved, courses were only occasionally offered by guest lecturers. However, since the end of 1998, a former student of the Institute again teaches "Voice and Diction" on a regular basis.

Walter Trenschel

5 Trenschel, W., Das Phänomen der Nasalität, Berlin 1977.
Meet Your Regional Secretaries

In this section, we will present our ISPhS regional secretaries who are the backbone of our organization. Regional Secretaries are the link between ISPhS members and the Board of Directors. In particular, they are responsible for the organization of local events of ISPhS, the organization of various additional activities in the field of phonetics and the distribution of *The Phonetician*. The Regional Secretaries give annual reports about their section to the Board of Directors.

Today:

Prof. Dr. Muhammad H. Bakalla  
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Muhammad Bakalla was appointed as Regional Secretary of the Middle Eastern world twice: 1978-1993, 1996-present. His section embraces some 80 members covering a vast area that includes all Arab countries as well as Turkey and Iran. His section is quite rich with its highly-praised phonetic traditions stretching over 14 centuries. Now, there is also growing interest in modern phonetics theories and techniques reflected both in the gradual increase in the number of young phoneticians graduating from universities on both sides of the Atlantic, and in the establishment of departments and institutes of phonetics which are equipped with modern phonetic instruments. However, there is still very little intra- and inter-cooperation amongst the various establishments, and also between the scholars within these institutions. This problem complicates the work and public relations of the RS in this region. But there is very strong hope, still, in bringing the various specialists and academies to work harmoniously together for improving the scientific productivity and the image of this region which was, once upon a time, the leader of the world in science and technology. Probably holding one of the future ICPhS herein and, probably, establishing a Pan-Mid East Chapter of ISPhS, IPA, and ICPhS will help to improve this state of affairs.

Muhammad Bakalla graduated and was awarded his BA from the Arabic Department, College of Arts, King Saud University, Riyadh, in 1964; then from the University of London where he obtained his Diploma (1968), M.Phil. (1970) and Ph.D. (1973), all these degrees were in General Linguistics and Phonetics. He became a Lecturer in Arabic Linguistics and Phonetics at his home university in 1974; Assistant Professor (1976); Associate Professor (1979); Professor (1983). In 1974, he became the curator of the Folklore Museum of the University. In 1975, he established the first Phonetics Laboratory in Saudi Arabia. Between 1975-1980, he was appointed as Deputy Dean of the Arabic Language Institute of his home university; 1980-1983 as Visiting Professor at National Taiwan University, Taipei; 1983-1985 as Director of University Textbook Center. In 1984, he founded his university Translation Center.
His interest in phonetics is sans frontier! It includes, among other things, speech analysis, speech synthesis, speech recognition, teaching phonetics to Arabs and speakers of other languages. He is currently working on a number of projects involving the establishment of Arabic phonetic norms and Arabic phonetic databases, forensic phonetics, and creating large Arabic corpora for linguistic and phonetic purposes.

Muhammad Bakalla's teaching activities cover specialized seminars and training on Arabic and comparative phonetics to MA and Ph.D. students. He also lectures on Arabic and general linguistic and phonetic subjects such as: dialectology, philology, speech communication, verbal and non-verbal communication, phonetics for speech rehabilitation, and also teaching phonetics to Arabs and speakers of other languages.

Currently, Prof. Bakalla is updating his *Bibliographies on Arabic Linguistics and Phonetics* published in London (1975), (1980), and (1983) and working on extensive projects involving all MA and Ph.D. theses and dissertations on Arabic Phonetics and Linguistics. He will appreciate and will acknowledge all the help he can be given from the respective institutions, researchers and academics in his field and all relevant fields. Great thanks in advance.

Prof. Bakalla appreciates and welcomes all the support and cooperation from members of his region. He will be happy to answer any query or to exchange information regarding Arabic Phonetics with people or institutions interested in our activities from any corner of the world!

Selected Bibliography:


The DGfS (Deutsche Gesellschaft für Sprachwissenschaft, German Society for Linguistics) organizes the largest European conference on linguistics. The annual meetings are held towards the end of February/beginning of March each year at varying places in Germany. Twelve workshops on different linguistic aspects, usually six on the main conference theme, six ranging freely from phonetics to text linguistics, offer an opportunity for everyone to present a paper and/or to participate in the discussions. Conference languages are German and English and occasionally French. Information can be found on the website http://coral.lili.uni-bielefeld.de/DGfS/.

The 22nd Annual Meeting of the DGfS was held from March 1–3, 2000 in Marburg. The conference theme was "The word – structures and concepts". This year, there were 539 participants from all over the world.

About 190 papers were presented by researchers from Europe, the United States and Canada, Asia, Africa, Australia and New Zealand in 12 parallel workshops, covering numerous linguistic areas, including parts of speech, conceptualization and grammaticalization, case, graphemic structures, phonology, word finding in acquisition and aphasia, and others. Papers in the workshops ranged from various aspects of linguistic theory and language modeling to language acquisition and loss. Usually, some of the organizers of a workshop decide to publish the papers.

Two plenary sessions completed the programme. The plenary speakers were Andrew Carstairs-McCarthy (The evolution of the language faculty: Morphological and nonmorphological evidence), William Labov (The triumph of regional dialects in America), James Pustejovsky (What do words reveal about concepts) and Anna Wierzbicka (Semantic primitives and lexical universals as a key to lexical semantics: The case of emotions).

Additionally, there were two CD-ROM demonstrations, one on the atlas of North American English and one on neuronal language modeling.

One plenary talk (Labov) and one workshop were devoted to phonology. "The word in phonology" brought together 18 papers on phonology and phonetics with topics on, e.g., Optimality Theory, the relationship between phonology and morphology, the relationship between sounds and prosodic features, syllable structure, word stress as well as special phonetic and acoustic aspects.


The next meeting of the DGfS will be held from February 28 – March 2, 2001, in Leipzig. The conference theme is "Language and Cognition".

Hilke Elsen, University of Munich & University of Eichstätt
Mail address: Rainfarnstr. 45, 80933 München, Germany
The 7th Conference on Laboratory Phonology was held from 29 June to 1 July, 2000 at the University of Nijmegen, The Netherlands. It attracted 145 scientists from the fields of phonetics, phonology, psycholinguistics, linguistics, etc. The conference was organized by Carlos Gussenhoven, Toni Rietveld (both Univ. Nijmegen), and Natasha Warner (Max Planck Institute for Psycholinguistics, Nijmegen). On Thursday, June 29, Carlos Gussenhoven opened the conference in the morning. The conference was divided into five thematic sessions, namely phonological encoding, speech processing, field work and phonology theory, speech technology and phonological theory, and the phonology-phonetics interface. There were 20 oral presentations, equally distributed among the five sessions, and 45 poster presentations. For every session, there was a commentator (discussant), who was an expert in the field, an invited speaker, and a couple of submitted oral presentations.

The conference started on phonological encoding. Pim Levelt was the commentator and gave a brief introduction into the field, mainly focusing on his model (Levelt et al., 1999, BBS). Traditionally, speech production has been an area where the paths of psycholinguists and phoneticians have crossed: Psycholinguists are interested in the psychological reality of the processes that enable humans to speak; phoneticians are interested in the concrete form of those spoken utterances. Pat Keating (UCLA) gave an overview of how Levelt's model works and how it relates to phonetic theories of how the articulation process possibly works. The other three presentations by Jurafsky (Univ. Boulder), Schiller (Univ. Maastricht & MPI for Psycholinguistics), and van Heuven (Univ. Leiden) focused on different levels of the speech production process (e.g., lemmas/lexemes, syllables, and intonation patterns).

The following topic, speech processing, was introduced by Anne Cutler. Whereas the first session focused on speech production, this session was centered around speech comprehension. Invited speaker was Janet Pierrehumbert (Northwestern Univ.), who reported about morpheme and word boundaries and their relation to glottal stops. Further oral presentations were about spoken word recognition (Moates), perception of speech timing (Kubozono), perception of stress (Peperkamp), and sources of variability in speech perception (Bradlow).

Friday, the second day of the conference, began with session three about field work and phonological theory. Leo Wetzels (Free Univ. Amsterdam) was the discussant and invited speaker was Didier Demolin (Free Univ. Brussels) who talked about the contribution of field work for the explanation of sound patterns. Other talks in this session discussed acoustic correlates of rhythm classes (Grabe), typology of accentual systems (Hualde), and prosodic cues (e.g. stress and tone) from linguistic structure (Remijsen).

Speech technology and phonological theory was the topic of the fourth session introduced and discussed by Lou Boves (Univ. Nijmegen). Aditi Lahiri (Univ. Konstanz) was the invited speaker. She gave a very comprehensive and intelligible lecture about an automatic speech recognition (ASR) system developed in her lab that makes use of underspecified representations in the phonological lexicon. Koreman (Univ. Saarbrücken) also talked about ASR, but from a more technical perspective. Comments by Lou Boves closed this session. It should be noted that posters were up for viewing during the whole conference, but on Friday there were two poster sessions between 11:30 and 14:30. During the poster sessions, there was extensive interaction between the presenters and the rest of the participants. The second day of the conference was closed by an
excursion to Kasteel Doorwerth, a castle nicely located near Arnhem, where an excellent dinner was served.

Saturday, the third and last day of the conference, was dedicated to the phonology-phonetics interface. Bruce Hayes (UCLA) introduced this session and Nick Clements (CNRS, Paris) opened the last day with his invited lecture on explosives, implosives, and nonplosives. Other oral presentations in this session focused on assimilatory processes (Solé), gestural overlap (Chitoran), and the association of tones (Frota). The last presentation of the conference was an invited lecture given by John Ohala (UCB) about the phonetics of phonologization.

In summary, this was a nice interdisciplinary meeting that was very well organized by the local organizers and some local graduate students. Large parts of this seventh LabPhon conference were dedicated to psycholinguistics (sessions 1 and 2), but pure phonetic investigations and their relation to phonological theory were also massively represented (sessions 3 and 5). We have every reason to look forward to LabPhon8 which will take place in two years from now.

Niels Schiller

Information

All members of ISPhS and their associates are reminded of the new Education Special Interest Group - EduSIG - which has been set up under the auspices of the International Speech Communication Association (ISCA, formerly ESCA).

The idea of the Group is to promote interest worldwide in education in any aspect of speech studies. We are currently developing the mailing list and a website - there will be discussion groups, collaborative work on teaching materials development and sharing of existing materials. Although the Group is only just getting off the ground you can help make it a success quickly by registering your name on the mailing list to begin with. Do this by accessing the list-website (as opposed to the Group website) and entering your details. Notices there tell you how to participate, including sending messages to the Group and accessing the (as yet empty!) archives!

Here's the URL:

http://www.mailbase.ac.uk/lists/isca-edusig

Mark Tatham
PArole is an interdisciplinary journal with the objective of publishing scientific papers, research reports or new reflections on all observable language phenomena. The subject areas covered can be summarized by the following keywords: second language acquisition, bilingualism, applied linguistics, translation and interpreting, intercultural communication, linguistic or phonological descriptions of oral or written language varieties, articulatory phonetics, general phonetics, speech recognition, forensic phonetics, language perception, sociolinguistics, psycholinguistics, neurolinguistics, cognitive psychology and pragmatics,… Papers in other areas of linguistics are also considered.

The journal is published four times a year. The four issues are generally grouped in double or triple volumes. The publishing of special issues directed by invited Editors is also possible. In this case, the invited Editors will be highly qualified researchers in their field. Proposals for special issues are welcome and will be considered with care. Proposals for book reviews and proceedings of seminars, symposia or congresses are also considered if they are related to the subject areas listed above. The main publishing language is French; papers can however also be submitted in English. At the discretion of the Editorial Committee, papers written in other Romance languages will also be considered. Whatever language is used, two abstracts (one in French, one in English) should be submitted with the paper. Papers should be accompanied by a list of subject keywords and the author’s full institutional address.

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Information about Reviewing Books

Reviews in *The Phonetician* are mainly dedicated to books related to phonetics and phonology in any way.

Book reviews for *The Phonetician* are usually written on the basis of books that arrive at our office from publishers. Prospective reviewers should address us if they want to review a specific book from the list of "Publications Received".

If you have a new book that is not on the list of "Publications Received" but you would like to review it, please get in touch with me before sending your review.

The title of the book should be exactly as given on the book cover. The length of the review can vary between 300 and 800 words, i.e., between half a page and one and a half pages.

The review should be factual and descriptive rather than interpretive, unless reviewers can relate to the book a theory or other information, which could be of benefit to our readers.

The text should provide as many names quoted or referred to as possible, to give the qualified reader a better idea of the orientation of the contents.

In case the reviewer is not a native speaker of English, I would appreciate it if s/he had the review edited by a native speaker of English before sending it to me. Otherwise I have to do this, which lengthens the editing process.

Book reviews are accepted for publication on the basis of both book contents and review adequacy. They are screened not only by the Review Editor, but also by the General Editors of *The Phonetician*.

Reviews should be sent to the Review Editor as soon as possible after receiving a book for reviewing. E-mail is the preferred mode of transmission, followed by fax and regular mail, in this order. The respective addresses are as follow:

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Please do not hesitate to contact me if you have any other related questions. Thank you for your cooperation.

Judith Rosenhouse
This volume is a collection of articles in memory of Professor John Macnamara (from McGill University, in Montreal, Canada) who passed away in 1996. The volume contains seventeen articles, written by his students, colleagues and friends, including two written by two of the editors. A brief introduction, by all three editors, describes the personality and academic contribution of Professor Macnamara, who worked on psycholinguistics and the relationship between psychology and philosophy. Much of this approach follows from his study of children's language acquisition, and mainly their acquisition of the lexicon.

The articles in the volume form four groups: Part 1 is Chapter 1, by R. Kearney, on "Language and Nationalism" (p. 1-14), and is linked to Macnamara's early work on language and ethnicity.

Part 2 deals with logic and concepts in: Chapter 2, by Anil Gupta, "Meaning and misconceptions" (p. 15-41); Chapter 3, by Michael Makkai, "On structuralism in mathematics" (p. 43-66); Chapter 4, by Ray Jackendoff, "The natural logic of rights and obligations" (p. 67-95); Chapter 5, by Storrs McCall, "Deliberation reasons and explanation reasons" (p. 97-108); Chapter 6, by David R. Olson "Truth and its negation: Macnamara's analysis of the place of logic in a cognitive psychology" (p. 109-117); Chapter 7, by Sandeep Prasada, "Names of things and stuff: An Aristotelian perspective" (p. 119-146).

The next two papers treat more philosophical topics: Steven Davis, Chapter 8, writes on "The unity of science and the distinction among syntax, semantics and pragmatics" (p. 147-159) and Leslie Margaret Perrin Mcpherson, in Chapter 9, on "Scientific theories that unconceal being: Intentions and conceptions in their genesis" (p. 161-220).

The last group includes papers dealing with the relationship between language and conceptualization: Chapter 10, by Steven Pinker and Alan Prince, "The nature of Human concepts: Evidence from an Unusual Source" (p. 221-261), Chapter 11 by Myrna Gopnik, "Some evidence for impaired grammars" (p. 263-283), Chapter 12, by Paul Bloom, "The role of semantics in solving the bootstrapping problem" (p. 285-309), Chapter 13 by Susan Carey and Fei Xu "Sortals and kinds: An appreciation of John Macnamara" (p. 311-335), Chapter 14 by D. Geoffrey Hall, "semantics and the acquisition of proper names" (p. 337-372), Chapter 15, by Yuriko Oshima-Takane, "The learning of first and second person pronouns in English" (p. 373-409), Chapter 16, by F. William Lawvere, "Kinship and mathematical categories" (p. 411-425), and Chapter 17 by Marie La Palme Reyes, John Macnamara, Gonzalo E, Reyes and Houman Zolfaghari "Count nouns, mass nouns and their transformations: A unified category- theoretic semantics" (p. 427-452). Macnamara himself is one of the authors in this last chapter, in a joint paper that had been "long in the making." The papers clearly alluded to topics that interested Professor Macnamara and in this they intended to continue his legacy.
Though these topics are not directly related to the interests of readers of *The Phonetician*, some articles (Chapters 12 and 15) refer to oral, phonetic or phonological aspects of language acquisition. More interesting for us are Chapters 10 and 11.

In Chapter 10, Pinker and Prince describe the complexity of human concepts. They analyzed, as an example, the past forms of English regular and irregular verbs. The irregular verbs seem to have some "logical" (phonetic) rules behind them; the regular verbs, do not. They thus demonstrated their view that English has two conceptual classifications: class categories and family resemblance categories. Their study goes on to psychological and "philosophical" considerations, which are not relevant for us here, but it is interesting to find this example analyzed in a semantic context.

In Chapter 11, Gopnik studied individuals with specific language impairment (SLI). The problem seems to be related to physiological factors, and probably with genetic features. The language features that were analyzed here, involved not only syntactic and semantic structural aspects, but also speech production, and thus phonology and phonetics. Examples were the non-phonotactic production of "–s" as the plural morpheme or the past tense marker in regular verbs in English. The analysis lead to the conclusion that SLI individuals learn and process language items in a different way than controls do, in not using rules and productive processes, but rather using memory and analogy.

In conclusion, we have reviewed this not-specifically-phonetic volume due to its phonetics-related discussions. This volume adds to other books where we sensed a relatively increasing tendency to combine different language fields in a linguistic analysis. Interdisciplinarity seems to be growing within linguistics after a long period of nearly complete separation of linguistic fields. We should not be surprised by such a tendency, for after all, "language, logic and concepts" are expressed also orally, using the phonetic and phonological systems.

**Newmeyer, Frederick (1998)**  
*Language Form and Language Function*,  
Cambridge, Mass., USA: MIT Press, 428 pp., cloth, $40

Reviewed by: Judith Rosenhouse  
Dept. of Humanities and Arts, Technion, I.I.T., Haifa, Israel

The book sets out to explore and compare formal (generative) linguistic theories with functional theories. In fact, this topic is presented in the first introductory chapter in the form of a dialogue between two young men, a formalist and a functionalist. The author admits he undertook the task of writing this book because though he supports formal grammar, he cannot ignore certain generalizations and justified ideas in the functionalist approach. As he writes (p. XI) "I resolved to devote a book to probing which of these generalizations are fully compatible with generative grammar and which appear to be major challenges to it."

There are seven chapters in the book. Chapter 1 is entitled "The form-function problem in linguistics" (p. 1-17); Chapter 2 "The boundaries of Grammar" (p. 23-94); Chapter 3 is on "Internal and External explanations in linguistics" (p. 95-164); Chapter 4 is "On Syntactic Categories" (p. 165-224, including an Appendix, pp. 208-224). Chapter 5 deals with "Deconstructing Grammaticalization" (p. 225-295); Chapter 6 with "Language typology and its difficulties (p. 297-
These titles reflect the various stages of the author’s "meta-approach" to the analysis of language and grammar. Chapter 1 surveys the basic differences between the formal (structural and generative) theories and the varieties of functional theories.

Chapter 2 examines three autonomous theses forming the center of the question of the "compartamentalization of form": the autonomy of syntax, the autonomy of knowledge of language with respect to language use, and the autonomy of grammar as a cognitive system.

Chapter 3 delves into the meaning of explanation of grammatical phenomena. The author argues that since structure results from a number of external factors in competition with one another, grammars cannot be the links of structures and their external motivations. Competing motivations have equally profound implications for the functionalist program for language typology.

Chapter 4 defends the classical view of generativists that their models are discrete entities not allowing a notional definition by analyzing the functionalists' approach. The appendix to this chapter challenges the idea that grammatical constructions must be attributed to a prototype structure.

Chapter 5 analyzes the notion of "grammaticalization" and concludes that it is a common term for the intersection of historical events, and as such is not relevant to the generativist-functionalist dialogue.

Chapter 6 discusses language typology as viewed by these two theories, and concludes that some typological generalizations are robust to explain certain theoretical views. He notes, however, that functionalists have not analyzed such problems rigorously whereas generativists have not investigated functional explanations for typological patterns.

Chapter 7 concludes the discussion stressing that the three autonomy hypotheses are fully compatible with functional explanation of grammatical phenomena.

The author also mentions (p. XI) that R. Jackendoff reminded him of the fact that "there is a phonological dimension to the issues that divide formalists and functionalists." The author comments on this that "with luck, it will not be long before some scholar submits to the same degree of analysis as I have done for the two approaches to syntax". This is relevant to our phonetic interests, which he briefly discusses later on in the sections on phonetic reduction as follows:

"Phonetic reduction" (p. 231) of verbs such as "can, will, shall" which have been reduced in English from full verbs to auxiliary (or modal) verbs have thus lost their main stress. Phonetic reduction is mentioned again (p. 237) as ensuing from the speaker's desire for ease of production (following Haspelmath 1998) in the discussion of grammaticalization as a result of other processes. Section 4.3.3 "Reanalysis, semantic change, and phonetic reduction – their temporal ordering in grammaticalization" (p. 248-251), considers grammaticalization as a result of syntactic (and simultaneous semantic) reanalysis. As far as phonetic erosion is concerned, the mainstream functionalist position is that it is a response to frequency of use, which itself is a response to semantic changes. But the author questions this position in presenting cases where phonetic erosion occurs as a result of natural phonological processes, say the loss of unstressed final syllables. Next, in section 4.4.2 "The independence of phonetic reduction" (p. 253-257), the author disagrees with the observation (by Heine, 1994) that "when a linguistic unit is grammaticalized its phonetic shape
tends to undergo erosion”. The author claims that phonetic reduction must be posited and explained independently of grammaticalization itself. He supports the idea that "least effort" forces lead to more frequently used items being in general shorter than less frequently used ones. This idea is related to the observations made by Zipf (1935) about word frequencies. Newmeyer puts forward further propositions describing words in terms of function and frequency, and assumes that if these are true, then the erosion associated with the reanalysis may simply be a least-effort response having nothing to do with grammaticalization. Other examples from the literature lead to the same conclusion. This analysis is part of the examination of grammaticalization. The chapter concludes that this term is not necessarily related to definite historical linguistic changes.

Another phonetic issue briefly referred to (Section 3.2., p. 178-180, "The notion of Canonical Structure Realization") is the phonetic form (PF) vs. the logical form (LF) of the two interface levels in the language structure (e.g., Chomsky, 1981, 1995). This issue is not developed any further, though it is noted that there is vast literature on the phonetic interpretation of phonological features (mentioning Beckman, 1988, and Keating, 1988).

To sum up, this volume is a very interesting study of two major and influential approaches to grammar and language in the 20th century. It reviews rich literature in both areas from the starting point of syntactic elements, structures and systems (or: categories and typology). For phoneticians, such information may contribute in complementing the perspectives of their daily research and the phonetic/phonological links with the whole of language form and language function.

Bloom, Paul, Mary A. Peterson, Lynn Nadel and Merrill F Garrett (eds.) (1999)

Language and Space,
Cambridge, Mass., USA: MIT Press, 597 pp. $ 29.50

Reviewed by: Judith Rosenhouse
Dept. of Humanities and Arts, Technion, I.I.T., Haifa, Israel

This volume is the outcome of two workshops on the topic, which were held in 1994. The major issue is actually interdisciplinary, combining both linguistic and perceptual aspects. Actually, the presence of neurolinguistics, psycholinguistics, anthropology and cognitive sciences in the studies increases their interdisciplinarity. Some of the issues are also treated from various complementary aspects. Fifteen chapters by well-known authors are included in the volume, and the editors hope these chapters will contribute to the understanding of the intricate questions that were raised in the workshops and enhance further research on them. Such questions include: how is space represented in our minds, and in different languages? How does the brain represent space? How many spatial representations are there? And, what happens to such representations after various kind of brain damage? Such questions are not directly related to phonetics or phonology, though this field is not entirely ignored in some of the contributed chapters, for example, in Chapter 1 (by Jackendoff), Chapter 3 (by Levelt) and Chapter 14 (by Shallice). In Chapter 5, "The confluence of space and language in signed languages," by Karen Emmorey (p. 171-210). Emmorey considers space as a phonological element. This follows the fact that "linguists have recently broadened the term phonology to mean "the patterning of the formational units of the expression system of a natural language"" (Coulter and Anderson, 1993:5, in this chapter, p. 172) Later on she goes on and
writes, "At the purely phonological level, the location of a sign is articulatory and does not carry any specific meaning. Where a sign is articulated is stored in the lexicon as part of its phonological representation" (sic., p. 172). Furthermore, signs do not distinguish sides (left or right) but dominant vs. non-dominant hands; i.e., side is not a distinctive feature in American Sign Language and other sign languages. She also refers the reader to a paper by Corina and Sandler (1993) on the topic of phonological structure.

The other studies in the volume, as listed below, do not refer, however, to phonetics or phonology:

Chapter 1, "The architecture of the linguistic-spatial interface" (pp. 1-30), by R. Jackendoff; Chapter 2 "How much space gets into language" (p. 31-76) by Manfred Bierwisch; Chapter 3 "Perspective taking and ellipsis in spatial descriptions" (p. 77-107) by Willem Levelt; Chapter 4 "Frames of references and Molyneux's question: Crosslinguistic evidence" by Stephen C. Levinson (p. 109-169); Chapter 6. "Fictive motion in language and 'Ception"' by Leonard Talmy (p. 211-276); Chapter 7 "The spatial prepositions in English, vector grammar, and the cognitive map theory" by John O'Keefe (p. 277-316); Chapter 8 "Multiple geometric representations of objects in languages and language learners" (p. 317-365) by Barbara Landau; Chapter 9, "Preverbal representation and language" (p. 365-384) by Jean M. Mandler; Chapter 10 "Learning how to structure space for language: A crosslinguistic perspective" by Melissa Bowerman (p. 385-436); Chapter 11, "Space to think" by Philip N. Johnson-Laird, (pp. 437-462); Chapter 12, "Spatial perspective in descriptions" (p. 463—492) by Barbara Tversky; Chapter 13, "A computational analysis of the apprehension of spatial relations" (p. 493-530) by Gordon D. Logan and Daniel D. Sadler; Chapter 14, "The language-to-object perception interface: Evidence from Neuropsychology" by Tim Shallice (p. 531-552); Chapter 15 "Space and language" (p. 553-578), by all the four editors of the book, concludes the volume.

The book is interesting to read, even for phoneticians, and not only because we all use these aspects of space in the language(s) we speak. We wish to report this book here, however, also because of what is missing, i.e., phonetics and phonology. Phonetics can also be considered from the dimension of space, both real and abstract. For example, on one hand, articulatory space parameters affect speech production in different manners in different languages (e.g., differences between male and female voices, or between classes of consonants or vowels). On the other hand, the phonetic and phonological structure of various language systems can be studied from the perspective of system similarity or distance. Maybe, then, if another workshop is organized on language and space, it could include also phonetic and phonological perspectives such as the effects of articulatory spaces on speech structure and production.
Stevens, Kenneth N. (1999)

Acoustic Phonetics,

Cambridge, Mass., USA / London, UK: MIT Press, 607 pp., hard cover $ 60

Reviewed by: Judith Rosenhouse
Dept. of Humanities and Arts, Technion, I.I.T., Haifa, Israel

For readers of The Phonetician the name of Kenneth N. Stevens is no doubt well known. We are therefore glad to welcome this eminent scholar's latest contribution to the field of phonetic acoustics; a heavy tome, with over 600 pages, thus entitled. In his preface, Stevens says that the book has evolved from a course for engineering students and graduate students in speech and hearing sciences, as well as some linguistics, cognitive sciences and medical engineering students. (Fant (1960) is acknowledged as a basic source of influence). Indeed, the author discusses material with the depth that can be relevant for advanced students of these fields. The book does not aim at comprehensiveness, not even for the sound system of English, "but to present an approach to modeling the production of speech sounds in general. An attempt is made to show that when reasonable assumptions are made about the physiological parameters involved in producing a sound sequence, acoustic theory can make predictions about the sound pattern, and these predictions agree well with the measured pattern" (p. VIII).

The volume is comprised of ten chapters. Chapter 1, "Anatomy and Physiology of Speech Production" (p. 1-57), serves as an introduction to the physical models of speech production. The following Chapter 2, "Source Mechanisms" (p. 55-126), and Chapter 3 "Basic Acoustics of Vocal Tract Resonators" (pp. 127) are still introductory from the linguistic point of view, since they put the main stress on the physical aspects of speech production. These are naturally more important for readers with the engineering background. Chapter 4, "Auditory Processes of Speech-like Sounds (p. 203-242) reviews theories of auditory psychophysics. Chapter 5, "Phonological Representation of Utterances" (p. 243-256), introduces notions and terminology relevant to auditory processing of speech. The following chapters in the second half of the book treat speech segments. Chapter 6, "Vowels: Acoustic Events with a Relatively Open Vocal Tract" (p. 257-322), describes the vowels with a thoroughness similar to that of the first chapters. The vowel description is organized in sections by their height and fronting features. Three chapters are devoted to consonants. They are described from the point of view of their acoustic-phonetic categories (bursts and transitions, sonorants, obstruents) as follows: Chapter 7, "The Basic Stop Consonants: Bursts and Formant Transitions" (p. 323-378), Chapter 8, "Obstruent Consonants" (p. 379-486) and Chapter 9, "Sonorant Consonants" (p. 487-556). The last chapter, Chapter 10, "Some Influences of Context on Speech Sound Production" (p. 557-582), extends the analysis beyond the single segments to contextual effects on segment production in phenomena such as coarticulation at syllable onsets and between syllable boundaries, as well as vowel reduction. Each of these last five chapters ends with a summary highlighting the main issues discussed.

The numerous pages dedicated to each chapter are written in a clear and precise style. The author explains the physical theories used in the calculation of speech production and does not hesitate to add the mathematical formulae whenever needed.

On the whole, the book seems to be more biased towards engineers than traditional linguists. The first chapter does not just describe the speech organs but considers them via physical units,
quantities and areas with an eye for production models presented in Chapter 2. Any other topic discussed in the book (e.g., acoustic features of gender-based differences) is also presented from this angle. This quality gives the book its technical and clear nature, but detracts from its relation to specific languages. As noted above, the book is based on the notion that coherent models should lead to coherent results; this is basically a physical and/or engineering approach.

All the discussed issues are accompanied by many enlightening and wonderfully clear figures and illustrations. Numerous illustrations are new; others are based on relevant references, many by Stevens himself.

The fifteen-page-long list of references not only attests to the author's erudition, but is also a fundamental part of the book and part of its design. It is a prerequisite for readers to know this literature in order to fully understand the descriptions, for many details (perhaps less essential ones to the physical theory) are just barely noted or left out when a referenced work is mentioned. Still, the systematic presentation of the major topics or principles of the subject under discussion in each chapter gives the reader a good understanding of and feel for the field.

Although four chapters are dedicated to the description of phonemes, I personally would have liked additional "advanced" linguistic-phonetic material and cross-language features to be included in the book. Much more could be said especially about topics related to the contextual features of speech sounds. This view is probably due to this reviewer's specific professional bias. But as the author specifically declares that completion is not an aim of his book, we should not try, perhaps, to look for additional issues. Maybe another volume, written in a similar manner by the author, would provide the additional material.

To sum up, the book does not aim at inventing a new theory (Stevens has done it amply in the past), but builds upon existing literature. The author hands to us a clear and coherent picture (from almost an engineering perspective) of the acoustic phonetic system of the English language, as an example of a human phonetic system. For this goal, the volume integrates physiological, articulatory, physical and perceptual aspects. It is a most updated and advanced summary of the results of the 20th century studies of the field and rightly leads us into a new century of research – and a new millennium.
This book is a collection of 99 five page articles from the very first Orage (Orality and Gestures; an 'orage' is a French 'storm') International Conference on voice and gestures in communication held in Besançon, France, in December 1998. It contains 40 contributions in English and 55 in French, written by 130 authors and co-authors, including the three lectures by Isabelle Guaïtella, Boris Cylrunik, and Bernard Teston, respectively, and a symposium organized by David McNeill. Despite the fact that many well known names from various fields contributed to this book, we chose not to quote anyone, lest we would have to quote all 130 authors in this review.

This publication reveals that doctors, teachers, and instructors may share common concerns as well as their need to exchange their views and the results of their experiments. The diversity of the themes presented below is striking. This conference constituted a great feat indeed, since it gathered a large assembly of scholars from so many different fields in plenary sessions exclusively.

The book is divided into 16 sections covering such topics as Cognition, Pathology, Sign Language, Instrumentation, Methods of Analysis, Suprasegmentals, Representation, Culture, Vocality, Situation, Complementarity of Gestures and Voice, Multimodality, Cross-Linguistics, SLA, Language Acquisition and Development. Some related topics are treated here under the same paragraph for reasons of convenience.

Pathology and Sign Language. Articles in these two sections reported observations on gesture and voice characteristics, i.e. suprasegmentals, gaze, gestures, use of space, lexical categories, and cognitive structures (real space/virtual space in sign language). These areas are studied with respect to such aspects as deafferentiation of the bodily and spatial senses, autism, language impairment, blindness, Alzheimer's disease and Parkinson's disease.

Cognition and Evolution of Communication. The papers here focus on: the evolutionary aspects of vocal behavior and of speech, universal gestures in the representation of time and space, the vocal expression of emotions, and the meaning of smile.

Methods of Analysis. This most informative section presents sign synthesizers, rules to map from text format to a format driving speech synthesizers, image analysis tools, and three verbal and nonverbal techniques used by psychologists in law suits. It also contains a typology of gestures and gaze and the presentation of a new computer transcription system for nonverbal manifestations.

Suprasegmental Level. The wide range of subjects contained in the articles here covers the acquisition of fluent speech, rhythm in read and spontaneous speech, modification of articulatory gestures under various speech rates, attitudes, the prediction and role of prosodic patterns, the role of prosody in echo-sentences, and pitch range modelling. More specific topics such as the timing structure in Arabic, a typology of vowel subcategories, and the description of a whistled language are also treated.
Strategies in the Use of Language and Gestures contains a series of unexpected and captivating experiments on gestures in children rhymes, in Congo Magic, in a Venezuelan prison, and during electoral campaigns in Benin. Other interesting experiments include the language of drumming and voice quality in Marathi Indian. We also learn about the contribution of gestures to "the comprehension of speech in teaching and in 'gestural theatre'", and in explaining 'how locks work', or 'how to make an Origami' (art of paper folding).

Body Gestures during Speech. The representation of gestures constitutes the majority of the contributions under this section. The variety of the subjects treated stresses the growing interest for gestures in communication. We thus learn about eyebrow and hand movements in relation to acoustic F0 peaks, and discover what gestures reveal about the prevalence of mental representations on verbal ones, or on memorization. The function of nonverbal behaviour in television reporting or in head movements, the iconicity and gestures, their synchrony with speech features, and their facilitation of lexical retrieval are other interesting topics.

Culture and Communication treats the subject in its manifold facets: the expression of world-view in intonation patterns, sound-symbolism, metaphoric gestures. Moreover, observations and experiments on particular cases are presented, such as physical contact in China, gesture strategies in interviews and in exolingual situations, and the gestures of caregivers.

Multi-modality. Papers in this section include: the role of gestures in discourse cohesion, the orchestration of gestures and voice features, the expression of emotions in plays, and the function of modulation in discourse. Four papers deal cross-linguistically with gesture and voice synchronization. They show the mechanisms of change as we pass from one language to another or from one context to another.

Second Language Acquisition and Learning. The increasing role of the nonverbal component in these two fields is revealed in papers concerning interferences between L1 and L2, communicative competence, and gestures in learners' "interlanguage".

Acquisition and Development. The section contains six papers on the intonation and gestures of early childhood in school conditions and in mother-child interactions.

This book is rich and provides many high-quality papers. Seldom do we have such an opportunity to scan the totality of issues related to one single field, and get informed about all the latest approaches and investigations from significant specialists worldwide in a single volume. Its major shortcoming would be the sketchy character of some of the papers. However, the palpable spontaneity, the freshness and the originality of most contributions are obvious. But the greatest value of the book lies in its inspiring character: ideas and suggestions are almost everywhere. Reading this book is like listening to those essential parts of interesting conversations. It is the first collection of papers on the recent research activity of a promising field. No doubt some of its authors will be considered as pioneers in their areas.
Collins, Beverley and Inger M. Mees (1998)

The Real Professor Higgins: The Life and Career of Daniel Jones,
Berlin, Germany: Mouton de Gruyter, xxv + 571pp., ISBN 3-11-015124-3

Reviewed by: Sandra P. Whiteside
University of Sheffield, Sheffield, UK

This book consists of fourteen illustrated chapters and an appendix giving a Historical background (pp. 455-482). This volume also contains a variety of background and archival material (e.g., old examination papers, a series of International Phonetic Alphabet charts and the chronological bibliography of Jones's publications), references and an index. This briefly summarizes the structure of the volume, before attempting to highlight some of its content.

Chapter 1 (1881-1903) describes details relating to Jones's birth (1881), family background, early life and early university years. It is also here that we are introduced to those who played a major role in inspiring Jones's interest in, and passion for phonetics. Chapter 2 details key events in Jones' life during 1904 to 1907, which were pivotal in leading Jones into phonetics. This includes his introduction to Paul Passy, Professor of Phonetics at the Sorbonne, who subsequently becomes Jones's tutor. We are also introduced to the Motte family who host Jones during his stay in Paris, and Cyrille Motte whom Jones later marries.

Chapter 3 describes Jones's early years (1908-10) as an academic at University College London (UCL), and Chapter 4 (1911-14) describes how Jones builds the Department at UCL, and some key events in his personal life, such as his marriage to Cyrille Motte. We also learn of the important role that Henry Sweet played in influencing the development of Jones's career and his religious beliefs. Possible links between Jones and Shaw's Pygmalion and Professor Higgins (rather than to Professor Sweet) are explored here, which also explains the aptness of this volume's title.

In Chapter 5 ("Studying Spoken Language"), we are told about some of Jones's publications such as Phonetic readings in English (Jones, 1912), The Cantonese phonetic reader (Jones & Woo, 1912) and A phonetic dictionary of the English language (Michaelis & Jones, 1913). In addition, Jones's activities and associations with the IPA, his editorship of, and contributions to Le Maître phonétique, are also highlighted. It is also here that we learn about his brief part-time visit at Oxford University following the death of Henry Sweet.

Chapters 6 and 7 cover events that took place during the First World War, and the adjustments Jones's staff and students had to make. In these chapters we learn about his Readership in Phonetics and the loss of Jones's father, both of which took place in the same year (1915). Jones's academic writings and publishing efforts peaked during and just after the war, and an example of one of these works was the Sechuana reader (with Solomon Plaatje, 1916). Chapter 7 includes details on the English pronouncing dictionary (EPD), the background and development of Jones's Cardinal Vowel model of vowel description, his work in experimental phonetics, the expansion of the Phonetics department at UCL in the later war years, and the birth of Jones's son Olivier (1917). The chapter closes with the end of war, which sees the publication of An outline of English phonetics, which is described in detail in Chapter 8 (The Outline).

Chapter 9 (1919-1921) describes further developments in the Department of Phonetics at UCL, and Jones's endeavors to set up an Institute of Phonetics. We also learn about Jones's last
major publication with H. S. Perera (1919 - *A colloquial Sinhalese reader*) before his appointment as Professor of Phonetics in 1921, the first such University Chair to be established in Britain. Chapter 10 (1921 -30) describes his later career years, the consolidation of his earlier work and the continued growth of the Phonetics Department. We also learn about some aspects of Jones's personal and family life, including the birth of his daughter Michelle (1922) and the loss of his mother (1925) and brother Arnold (1929).

Chapter 11 (1931-39) includes details of the move of the family home to Buckinghamshire, where Jones spent his efforts preparing the *Phoneme*, revising the *Outline* and the *EPD* We also learn about activities at UCL, the appointment of Dennis Fry, the Second International Congress of Phonetic Sciences at UCL in 1935 and the period leading up to the outbreak of war. Chapter 12 (1939-50) describes events during the Second World War and how the activities and functions of the department ceased. This gave Jones the opportunity to work on his publications, and the department eventually re-opened for the 1943-44 session. Jones's work with the BBC, and his promotion of the use of colloquial pronunciation are described together with details on the key events leading up to his retirement.

Chapter 13 charts Jones' final years in retirement, and includes details about the publication of the *Phoneme* (1950). The authors also provide a sign posted outline of the 3rd edition of this treatise, and some discussion of how the *Phoneme* was received by the academic world. During his retirement, Jones continued to work and publish major works. These, and the responses they received, are described in some detail. In fact we also learn that Jones continued to be active in his academic contributions right up to his death in December 1967.

Chapter 14 concludes the main section of the book and provides a critical appraisal of Jones' key contributions to the fields of phonetics and linguistics. These are widely encompassing and range from the establishment and organization of the first phonetics department in Britain to his contributions to phoneme theory.

In sum, this is an informative, absorbing and highly fascinating read for those interested in either Historical Phonetics or in a detailed and sensitive account of the life and career of Daniel Jones.
Drechsler, Renate (1997)
*Sprachstörungen nach Schädelhirntrauma. Diskursanalytische Untersuchungen aus textlinguistischer und neuropsychologischer Sicht,*
Tübingen: Gunter Narr Verlag, 337 pp., ISBN 3-8233-5090-0, DM 86,-

Reviewed by: Wiktor Jassem
Institute of Fundamental Technological Research, Polish Academy of Sciences, Poznań, Poland

The main thesis of this monograph is that peculiarities in the speech behavior after brain trauma are the result of a number of disturbances at different levels and the interaction of these disturbances. Individual patients display various combinations of these factors, and therefore both diagnostic and therapeutic procedures have to be very highly individualized. Post-traumatic patients with brain injuries cannot be treated as a homogeneous group.

Discoursal behavior of seven patients was investigated for the experimental part of this work, which is therefore a multiple case study rather than a generalizing proposal, and can be described as a qualitative rather than a quantitative study. Six discourse conditions were assumed and analyzed, with different demands on the speech-planning and cognitive capabilities of the subjects. Four of these conditions were pure oral response assignments (e.g., the continuation of a story presented to the patient), one assignment was written, and the sixth was a part-playing game. The patients were also subjected to standard general psycho- and neuro-linguistic tests as well as a specific aphasic test. They were also required to give a linguistic-capability self-assessment.

Some of the author's findings may be summarized as follows:

<table>
<thead>
<tr>
<th>perspective/level</th>
<th>discoursal peculiarities</th>
<th>neuro- and psycho-linguistic interpretation</th>
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<tbody>
<tr>
<td>adaptation interaction</td>
<td>no perception of misunderstanding: implausible-to-nonsensical argumentation</td>
<td>altered self-consciousness, and self-assessment</td>
</tr>
<tr>
<td>rendition perspective</td>
<td>egotistic perspective, difficulty in empathy</td>
<td>impossibility of distancing from an egocentric stance reduced abstraction capability</td>
</tr>
<tr>
<td>macro-propositional level</td>
<td>drifting from thematic focus</td>
<td>failing monitoring and altered self-assessment</td>
</tr>
<tr>
<td>micro-propositional level</td>
<td>local coherence through over-associations</td>
<td>over-activation of contextual connections</td>
</tr>
<tr>
<td>systematic-linguistic level</td>
<td>lexical disturbances, semantic paraphrasing, phonematic paraphasia, consciousness of disturbance in syntax, semantics, phonology</td>
<td>aphasia with comprehension limitations, failing awareness of disturbance, phonematic paraphasia</td>
</tr>
</tbody>
</table>
Despite the extreme complexity and limited number of the investigated cases, the author gives helpful though cautious suggestions for therapy and rehabilitation.

In various descriptions of the experiments, there are pseudo-transcripts of the disturbed speech. These are written in a barely interpretable orthographic style. It would have helped the reader if these passages had been presented in a phonetic transcription.

*Neurolinguistische Aspekte der dysgrammatischen Sprachstörung bei Kindern,*
Tübingen: Gunter Narr Verlag, ISBN 3-8233-4720-9, DM 78,-

Reviewed by: Wiktor Jassem
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The book consists of 3 parts. Part A presents the theoretical psycho- and neurolinguistic background, Part B contains a description of the author's experiment with 50 children with agrammatism (and their teachers), and Part C mainly considers the specific problem of gender (sex). Section 1 of Part A is of a general nature, while Section 2 specifies and discusses the various errors of grammar observable in children with agrammatism, such as elisions, word disorder, discongruencies, wrong declension, etc. Section 3 considers the causes of agrammatism, specifically the question of language processing, and Section 4 is devoted to the particularly significant problem of heredity in speech defects. The experimental part of the monograph examines 50 cases and attempts to establish four groups of disorders. It also examines the effect of perception and intelligence deficits. Delayed language acquisition must be distinguished from disordered acquisition. Of particular interest is, naturally, the positive correlation between agrammatism and delayed brain maturation.

The four groups distinguished by Olah are: (1) Deficient word order combined with errors in verb inflection, (2) Errors of verb inflection without word disorders, (3) Erroneous noun plurals, and (4) Miscellaneous and complex agrammatisms. Type (3) is specific for German insofar as one of the peculiarities of this language, which strikingly distinguishes it from, e.g., English, is the unpredictability of (noun) plural endings.

Although the proportion of left-handed children was, in the author's sample, distinctly greater than normal, she is very cautious in drawing conclusions in this respect. More evident is the effect of heredity: 68 percent of the children under analysis came from parents with various language-impairments. The experiments indicated that agrammatisms may often be quite independent of cognitive (dis)abilities.

The basic dilemma whether agrammatism should be regarded as caused by defective acquisition or defective processing remains open. In any case, a correlation with perception deficits is quite obvious, as is the correlation with brain maturation. Over-representation is gender (sex) related; girls are at an advantage due to the positive effect of oestrogen.
The author regrets that, at least for German, there is still no normative test for the analysis of agrammatisms.

An extremely positive aspect of this monograph is its very comprehensive bibliography with over 500 titles.

Peltzer-Karpf, Annemarie and Renate Zangl (1998)
Die Dynamik des frühen Fremdsprachenerwerbs,
Tübingen: Gunter Narr Verlag (Tübinger Beiträge zur Linguistik), x + 187 pp., ISBN 3-8233-5098-6

Reviewed by: Henri Niedzielski
University of Hawaii, USA

The newest trend in some European countries is to start teaching foreign languages at an earlier age and more intensively. Within this context, this book reports on a longitudinal study of early second language development among 75 children, ages 6 to 10 years. The languages taught in various orders of succession were English and German. The approach used was that of Vienna Bilingual Schooling, which teaches the 3Rs in the first language during the first three years and the second language thereafter, while teams of teachers from both languages teach the other subjects.

The emphasis is on "(1) the recognition and making of linguistic patterns in a second (or third) language and (2) the interplay of neural growth and the dynamics of pattern development in monolingual and bilingual children (p. 168)."

Chapter 1 (p. 6-20) presents a model of neurobiological orientation, neuron plasticity and its role in bi- and multilingual development.

Chapter 2 (p. 21-25) describes the experiment (subjects, natural communication, psycholinguistic testing using the Peabody-Picture-Vocabulary Test, Imitation-Comprehension-Production Test etc). Some types of interaction among learners and with their teacher(s) in the first, second and third years are analyzed in chapter 3 (p. 26-52).

Chapters 4 and 5 (p. 53-106) address morphosyntactic development while lexical and semantic development is discussed in chapter 6 (p. 107-1230. It is postulated that the lexicon functions as a trigger in morphosyntactic development.

Chapter 7 (p. 124-145) focuses on spontaneous speech development in school years 1, 2, 3 and 4. Speech was elicited through picture descriptions, interviews, and dialogs. A whole page table (p. 145) summarizes the evolution determined by the child's desire to communicate and progressing from nonverbal answers to chunks, incongruous sentences and finally congruous sentences. Generally, communicative competence in the second language is dependent on the communicative competence in the first language.

However, other factors cause individual variations (Chapter 8, p. 146-151, for instance), how and when the second language is introduced, individual psycholinguistic abilities, and personality variables.

Chapter 9 (p. 152-158) consists of evolutionary charts for natural communication (learners' pragmalinguistic interaction among themselves and with the teacher, also spontaneous speech, and for achievement in psycholinguistic tests, in morphology, syntax, and semantics) in school years 1,
2, 3, and 4. The authors caution the reader that their findings may be valid only if four conditions are met: 1) The teacher has a near native-like proficiency, 2) The learners are peer-groups, 3) Each teacher uses only one language, 4) The input is rich and age-specific (p. 158):

The authors’ general conclusion is that, “The metamorphoses of systems can best be described by a dynamic trajectory moving from more diffuse to more refined constructions in the various subsystems, each exhibiting its own developmental path. The speed and intensity of pattern organization is dependent on the interaction of:

*The respective biological and linguistic a priori,
*The quantity and quality of the input, and
*System-internal reorganizational principles” (p. 170).

This book illustrates the high quality research and reporting to which the authors have already accustomed us (cf. the review of their previous book in The Phonetician, 80, 44-46). It is also a very attractive volume with numerous charts, tables and figures, as well as color photographs. I have enjoyed reading and learning from this publication and I recommend it very highly to all specialists of language learning or teaching and to all (psycho-)linguists.

**Zubizarreta, Maria Luisa (1998)**

*Prosody, Focus and Word Order,*


Reviewed by: **Judith Rosenhouse**

Dept. of Humanities and Arts, The Technion, I.I.T., Haifa, Israel

In her preface to the book, the author, Maria Luisa Zubizarreta from the University of Southern California, says that her analysis of the topic has undergone many changes and development stages during the 90’s. The book contains three chapters: (1) Introduction, (2) The relation between prosody and focus in Germanic and Romance, and (3) Classical structure, the position of subjects and a case of prosodically motivated movement in Romance. This indicates that the author works on syntactic and prosodic elements for more than one language, trying to understand certain prosodic differences between these language groups. Actually, her examples are taken from English, German, French, Spanish and Italian.

The Introduction (pp. 1-36) is very important. Section 1.1 prepares the reader for what is to come, providing the first notions and terms to be used. Section 1.2 supplies a preview of the results obtained in the following chapters, and Section 1.3 provides the theoretical basis for the following chapters.

The theoretical framework relies heavily on formal computational linguistic work, and especially on Chomsky’s recent works (from the 80’s and 90’s). And the author states that she assumes acquaintance with this literature and terminology. Thus, the topic of prosody is studied not from the phonetic or experimental viewpoint, but from a more theoretical standing, in an attempt to reconcile or at least explain the sometimes conflicting facts of spoken prosody as used within and among the above groups of genetically-related languages. Still, in the Appendix to Chapter 3 (pp. 151-158), we find some phonetic analysis of the focus and stress patterns in right-dislocated objects.
in Modern Standard Spanish, following the method used in Beckman and Pierrehumbert's (1986) analysis of right-dislocated tags in English.

Zubizarreta's work contributes not only in using rules and terms defined elsewhere in the literature in her new analysis, but also in suggesting new ones, which emerge from it. Two kinds of processes come into play in her description of prosodic structures: deaccenting and p-movement (prosodic movement). These can be attained within Chomsky's recent framework of the Minimalist Program that she uses in her analysis.

The main notion around which the discussion revolves is phrasal focus - what it is, how it appears in various sentence parts, and how it affects word order in various sentence types, contexts and languages. Previously, she says in the Introduction, she considered these as intonational constraints. In her present understanding, she presents them as related to the Nuclear Stress Rule, i.e., to deeper grammatical structures. Following Chomsky, she considers focus as the "nonpresupposed part of the sentence." Her examples show that various sentence parts can receive focus, wherever they are in the sentence, due to their dependence on the context of the previous sentence and their changed word order. Phrasal prominence (here equivalent to nuclear stress) reflects syntactic ordering. There are two varieties of syntactic ordering the standard asymmetric c-command ordering, and the ordering derived from the primitive relation of selection holding between a head and its associated argument. Part of the difference between Germanic and Romance languages in this area stems from the difference in the way the two syntactic orderings interact in the mapping onto phrasal prominence.

This book belongs to a new trend in grammatical theory in which researchers combine findings from more than one area of linguistics (here: syntax and phonology). As such, it contributes to our knowledge and understanding of various complex linguistic phenomena, such as focus, stress placement, and movement.

In addition to these chapters, the book includes a very long section of notes (pp. 159-198), which supports the theoretical background, since it refers to many topics discussed in the literature. There is also a bibliographical list (pp. 199-210) and an index including subjects and names (p. 211-212).

The book is clearly written, but requires concentration in reading for a reader who does not share the author's background. The prosodic components are the basis for the syntactic discussion, rather than the opposite. The prosodic features are not examined, but the underlying rules that lead to their surface forms are discussed. Since the book relies so heavily on syntactic theory literature and its stylistic conventions, it requires an adaptation period for phoneticians. In addition, it is rather confusing to keep track of old and new abbreviations that may be used in other grammatical theories (e.g., LF ["lexical focus", not "logical function"], FP, FF, PP, FI, and LI) without a "guide." Thus, a list of the abbreviations used in the book would have contributed much to assist in its reading, not only to readers who are not versed in computational linguistics literature (or rather, recent Chomskyan terminology), but also for those new terms coined by the author herself.

To sum up, this new book provides new insights to the analysis of prosodic problems. It clearly has much to offer to students of syntax and prosody (phonology, phonetics) in the Germanic and Romance languages. Moreover, since it deals with general rules, it may raise thoughts as to these questions in other languages as well.
"This book is an introduction to psychoacoustics, specifically geared towards those interested in music." It is based on many years of instruction on the topic at Stanford University (Stanford Center for Computer Research in Music and Acoustics) by the editor and his colleagues (J. Chowning, B. Gillespie, D. J. Levitin, M. Mathews, J. Pierce and R. Shepard) who between them wrote the 23 chapters of the volume. The book is intended as a textbook for college students, as well as for independent study by people interested in psychology and music. It is therefore written in an easy-to-read style, which would be attractive for readers.

The chapters include information about the amazing human hearing system, and human voice features, about human brain functioning and cognition (perception), about acoustics (physical notions, measurement and analysis methods), but mostly about the perception of musical sound. Since music uses similar, if not the same, production and perception means as speech, it seems to us that it would be interesting also for phoneticians to read this book. If anything, music is acoustically richer than speech and therefore yields more complex phenomena than speech in certain respects.

Chapter 1, "The ear and how it works" and Chapter 2 about "The auditory brain" (both by M Mathews) provide some physiological information. Chapter 3, "Cognitive psychology and music" (by R. Shepard) presents basic notions in music-related psychology. Chapter 4, "Sound waves and sine waves" which gives some theoretical physical background to the subject and Chapter 5, "Introduction to pitch perception" (both by J. Pierce), introduce some psychoacoustic notions. Various psychoacoustic perceptual features, of a less and more complex nature, as well as their physical (acoustic) correlates are discussed in the following chapters: Chapter 6, "What is loudness", and chapter 7, "Introduction to timbre" (by M. Mathews). These chapters deal with the basic notions of frequency, intensity and spectrum and their psychoacoustic parallels (pitch, loudness, and timbre). Chapter 8, "Hearing in time and space" (J. Pierce), Chapter 9, "Voice physics and neurology" (by P.R. Cook), Chapter 10, "Stream segregation and ambiguity in audition" (by R. Shepard), Chapter 11, "Formant peaks and spectral valleys", and Chapter 12, "Articulation in speech and sound" (both by P.R. Cook), explain the phonetic-physical phenomena marked in these titles. Chapter 13 deals with "Pitch perception and measurement" (by R. Shepard), Chapter 14, "Consonance and scales" (J. Pierce), takes us to the musical field, as does chapter 15, "Tonal structure and scales" (R. Shepard). Chapter 16, "Pitch, periodicity and noise in the voice" (P.R. Cook), deals with acoustic features of the (singing) voice, including its noise elements. Chapter 17, "Memory for musical attributes" (D.J. Levitin), is more psychologically directed in the sense that it examines the human memory capabilities concerned with music. Chapter 18, "Haptics", and Chapter 19, "Haptics in manipulation" (both by B. Gillespie), deal with taction and kinesthesia, i.e. haptics, which is relevant to sensing the mechanical aspect of musical playing and the motor control of muscles and body position during one's playing a musical instrument. This is a relatively young area of research in the context of music acoustics, but not unknown to performing students of music. Chapter 20, "Perceptual fusion and auditory perspective" (by J. Chowning), deals with the rather
complex psychoacoustic features experienced in the study of computerized music, such as the solo and chorus effects, closeness and distance perspective. Chapter 21, "Passive nonlinearities in acoustics" (by J. Pierce), describes nonlinear features of the decay of a sound (e.g., produced by a string or a gong) that form part of its characteristic sound. Chapter 22 (by J. Pierce), "Storage and reproduction of music", deals with computerized music, its writing (notes), storing (in files) and reproduction. Chapter 23, "Experimental Design in psychoacoustic research" (by D.J. Levitin), is a methodological treatise of the topic, with numerous examples (pp. 299-328). It is therefore the longest chapter in the book.

Three appendices accompany the text: "Suggested lab exercises"(pp. 329-343), "Questions and thought problems"(pp. 343-350), and "Sound examples on CD" (pp. 351-360), which explains the contents of the CD (with 80 examples) that accompanies the book. An index (for both subjects and authors) is the last section in this volume (pp. 361-372). References are given at the end of each chapter.

Altogether, the book is well designed and updated in the description of the psychoacoustic phenomena. Its style is flowing and easy to read, as intended. The reader can sense the writer's expertise in the contents of each chapter. It has numerous illustrative figures, hand-drawn (by computer), as well as tables and figures from the professional literature. As a textbook, it is indeed great for teaching, as promised in the Introduction. The chapters present the various topics in a logical order, so that when computerized music is discussed toward the end of the book the reader is ready for the new phenomena. Since the book treats a number of scientific fields (e.g., acoustics, psychoacoustics, music and speech acoustics, computerized music), it can serve as part of the reading required in a number of courses, according to their specific aims, and not only for the single course on which the book is based. As one course, the contents of the book would seem to require a relatively large number of class hours weekly, not to mention lab exercises and listening to the CD examples (but the number of hours per course in the original framework is not mentioned in the book). To sum up, the book fulfills its stated goals and seems very useful for anyone who would like to get a good updated notion of the various questions currently dealt with in these fields.
This volume presents the WordNet version 1.5 system, which is an electronic lexical database system, to beginners who have not yet heard of it, as well as to readers who are acquainted with its previous versions (described by G.A. Miller, 1990). The WordNet began as a lexical database on semantic analysis of the English vocabulary and has developed into an enormous linguistic tool with many applications. Thus, using it as a conventional dictionary is only one way to use it. The project developed gradually at The Princeton University Cognitive Science Laboratory, as G.A. Miller describes in the Introduction (pp. xv-xxii), mainly since 1985. In the "Foreword", the editor, Ch. Fellbaum, who joined the project in 1987, gives a good picture of the background and branches involved (interdisciplinary aspects of semantics, grammar, psychology and computer sciences) in project development, mainly dealing with the relationship between a lexicon and computers, the various methods that can be used in designing such a database, lexical issues such as context and coherence, as well as information retrieval and knowledge engineering.

The chapters of the book are written by past and present members of this project and are divided into three parts: Part I: "The Lexical Database" (pp. 21-127) which includes the first four chapters dealing with its structure. These are: (1) "Nouns in WordNet", by G.A. Miller, (2) "Modifiers in WordNet" by J.K. Miller, (3) "A Semantic Network of English verbs" by Ch. Fellbaum, and (4) "Design and Implementation of the WordNet Lexical Database and Searching Software" by R.I. Tengi.

Part II describes "Extensions, Enhancements and New Perspectives on WordNet" (pp. 129-196). The chapters of this section show the more recent developmental trends of the system: (5) "Automated Discovery of wordNet Relations" by M.A. Hearst, (6) "Representing Verb Alternations in WordNet", by K.T. Kohl, D.A. Jones, R.C. Berwick and N. Nomura, and (7) "The Formalization of WordNet by Methods of Relational Concept Analysis", by U. Priss.

Part III (p.197-405) makes up the bulk of the book. It is dedicated to "Applications of WordNet" in nine chapters that deal with various options of using and studying the system, in addition to a look-up dictionary. The title indicates that numerous areas of psychology, linguistics, knowledge engineering etc. are involved. In Chapter 8, S. Landes, C. Leacock and R.I. Tengi write about "Building Semantic Concordances"; Chapter 9 by Ch. Fellbaum, J. Grabowski and S. Landes analyzes "Performance ad confidence in a Semantic Annotation Task"; Chapter 10 is on "WordNet and class-based Probabilities" by Ph. Resnik; Chapter 11 describes "Combining Local Context and WordNet Similarity for Word Sense Identification" by C. Leacock and M. Chodorow; Chapter 12 is "Using WordNet for Text Retrieval" by E.M. Voorhees; Chapter 13, by G. Hirst and D. St-Onge explores "Lexical chains as Representations of Context for the Detection and Correction of Malapropism"; Chapter 14 "Temporal Indexing through Lexical Chaining" by R. Al-Halimi and R. Kazman, examines yet another applicational possibility; Chapter 15 "COLOR-X; Using Knowledge from WordNet for Conceptual Modeling" by J.F.M. Burg and R.P. van de Riet goes into this
psychological area; and the last chapter, 16, is on "Knowledge processing on an Extended WordNet" by S.M. Harabagiu and D.I. Moldovan.

The impression this book creates is great. A lot of work has been put into the design of the system and it can do a lot. Many semantic theories have been explored and used in it, and many applications are actually implemented, as the text shows. The various chapters present intricacies of the human lexicon (not limited to the English language, of course) and the interrelations between various items that require word and world knowledge, together with syntactic and morphological knowledge. (The system is designed, however, mainly for semantic knowledge analysis or retrieval). Thus, we learn about the behavior of classes of nouns, of (scalar or polar) adjectives, verbs and their complements, collocations, and about the ways people used diverse semantic categories to understand meanings. It would be interesting to compare the functioning of this system with other database systems, but discussion of this issue is beyond the present review.

One thing I miss (as a phonetician) in this system is voice operation. We recall that it is often noted in the book that WordNet is a semantic lexical system, not designed for other language components (even syntax is hardly dealt with). In this modern multimedia age, however, one would expect to find some attention paid to this aspect of language. A phonetic Text-To-Speech module would be an unrelated part of the system, yet not without merit.

[As a side-note I would add that Roget's Thesaurus is perhaps not the first thesaurus in the world (as mentioned on p. 7); Arabic literature of the 8th-9th century already had books dedicated to semantic topics (e.g., "The Book of the Horses" and "The Book of the Camels" by Al-Asma'i) which might be considered earlier forerunners of thesauri, though they differed in internal structures and scopes from Roget's work.]

The book ends with a rich subject and name Index (pp. 409-423), following an Appendix (p. 407) which describes the ways to obtain a free version of WordNet 1.6 from Princeton University via internet or e-mail. The address for further information is: ftp.cogsci.princeton.edu, and wordnet@princeton.edu.

Tătaru, Ana (1997)
Limba română. Specificul pronunțării în contras cu germana și engleză
(The Romanian Language. Characteristics of Pronunciation in Contrast to German and English Pronunciation),
Reviewed by: Charlotte Schapira
Department of Humanities & Arts, Technion, I.I.T., Haifa, Israel

The title of the book announces its two goals: achieving as precise as possible a description of Romanian pronunciation and providing a comparison with the phonetic systems of German and English respectively. Then, in the foreword, and repeatedly in other chapters, the author reveals an additional, normative purpose: she wishes to help preserve the specificity of the Romanian language from unwanted influences of incorrect pronunciation and foreign prosody. The book is dedicated to Romanian peasant women who "jealously guarded the linguistic treasure over the ages".

Ana Tătaru's academic work seems to have always been interwoven with the dramatic events of her private life. A first doctoral thesis written at Cluj University was not defended, as the author
went into voluntary exile in Germany. There she wrote and defended successfully, in 1975, a second thesis on the same subject: the comparative pronunciation of Romanian and English. All of her numerous subsequent publications, including a Romanian Pronunciation Dictionary - Rumänisches Aussprachewörterbuch (Heidelberg, 1984), deal with contrastive phonetics and provide a minute description and scientifically based argumentation of the correct pronunciation of Standard Romanian.

The book under review is divided into two parts. The first one, comprising chapters I to III, is devoted to the description and the discussion of Romanian particularities. From a theoretical point of view, as M. Borcilă also points out in his discussion of the book (announced as a "preface" but appearing at the end, pp. 203-212), the main interest of this work stems from the fact that, although globally following in the steps of the distinguished Romanian linguist S. Pușcariu, who was a pioneer of Romanian phonetics, Prof. Tătaru's own input reflects the results of a lifetime experience of research and teaching Romanian to foreigners as well as English to Romanian students. Innovatively, she exclusively uses the International Phonetic Alphabet, thus opening the correct reading of Romanian to a much larger population than formerly. Other original views are to be found in the discussion of the controversial "short post-consonantic" Romanian "i" ([i]), of the degree, the modes and the quality of the different combinations of juxtaposed sounds, and in the analysis of the specific prosody of standard, non emotional discourse.

The second part of the book (chapters IV and V) conforms to the leading principle adopted by the author in all of her contrastive studies: situating the compared languages on the same level and granting them equal attention. A very interesting discussion concerns the relations and correlations between writing and pronunciation.

The reader will find numerous topics of interest in this very serious and scholarly work. Questions of theory, as well as of detail are addressed and none of the controversial issues are avoided.

One may wonder, however, who is the audience for which this book was written. Being written in Romanian, with many references to other works in Romanian, it seems to be addressed to Romanian scholars, thus missing its second declared goal, that of helping foreigners to achieve a correct pronunciation of Romanian. Those to whom the book is accessible will find it interesting and enriching.
Tătaru, Ana (1997)

*Limba română. Specificul pronuntării în contrast cu germana și engleza. Antologie de texte literare în transcriere fonetică internatională*


Reviewed by: Charlotte Schapira
Department of Humanities & Arts, Technion, I.I.T., Haifa, Israel

Although this small anthology is designed as a companion volume to the previous one, it deserves attention in its own right. Here the audience is clearly indicated in a concluding note at the end of the booklet: the anthology is addressed to foreign students who, having reached an advanced stage in their study of Romanian, may wish to improve their pronunciation. The texts form a collection of very beautiful fragments of well-known literary works by famous XIXth and XXth century poets and writers, not presented in strict chronological order: poems by Tudor Arghezi, George Cosbuc, Mihai Eminescu, Octavian Goga, Marin Sorescu, George Topârceanu, and Lucian Blaga and fragments from prose works by Ion Agârbiceanu, the playwright Ion Luca Caragiale (who exercised an important influence on Ionesco's absurd drama and who was described by this author as "the most illustrious of all unknown writers"), the Moldavians Ion Creangă (XIXth century) and Mihail Sadoveanu (XXth century) and others.

Some of the texts are very difficult and in almost all of them there are words that need explaining, either as regards the standard form in use in contemporary Romanian or the meaning, especially for regional terms. Sometimes the explanations seem to lack systematisation; the elision, for instance, is sometimes indicated and sometimes it is not, i.e.: p. 26, in Goga's *Pace*: "o rază-atinge…", the elided noun rază is indicated in the margin, whereas in Eminescu's *Scrisoarea III*: "acea grindin-otelită" (p.12), the complete form of the word "grindină" is not mentioned. Likewise, a number of words (pahar, mâini, câini) are given in the standard form in the margin while others are not: "Mures" is not indicated as the standard form for "Murăș" (p.25) and the verbs in the preterite "fură" (*a fi*, 3rd person, plural, p. 1) or "pusei" (*a pune*, 1st person, singular, p. 2) - which are not used in standard Romanian and certainly not colloquially - are not mentioned as such.

For those students, however, who will be able to overcome the obvious linguistic difficulties, the anthology will prove very useful. Equally useful is the advice to try and learn some of the texts (poems mainly) by heart: indeed, this is the best way to experience their charm, as well as to improve the pronunciation.
This book presents a brief introduction into "the study of language in the brain." The book is divided into twelve chapters, mostly focusing on language use in brain-damaged patients. Each chapter ends with a brief summary. The text part comprises 168 pages, followed by a glossary covering many of the technical terms, from the field of neurolinguistics, that are used in the volume. The glossary is followed by a very selective list of further readings, a list of references, an author index, and a subject index.

The book starts with an attempt to define more exactly what the study of neurolinguistics involves. Due to its multidisciplinary nature, this is a difficult job, but it seems to be clear that linguists, psycholinguists, neuropsychologists, as well as neurologists all have an interest in how language is structured in the brain. In the first chapter, the authors give a brief history about the field of neurolinguistics and the second chapter provides a basic overview of the neuroanatomical structures in the brain. Armed with this information, the authors present the most important research methodologies for localizing the hemispheric dominance for language and specific linguistic processing problems following brain damage in Chapter 3.

Historically, research on this issue began when Broca and Wernicke presented their patients more than 100 years ago. So-called "Broca's aphasics" are considered to be non-fluent in speech production while comprehension is relatively spared. In contrast, so-called "Wernicke's aphasics" are relatively fluent, but their speech usually contains numerous circumlocutions and phonemic paraphasias, i.e., sound substitutions, rendering their speech hard to understand. Their comprehension, on the other hand, is severely impaired. With the help of cortical stimulation and, above all, modern brain imaging techniques such as PET, (f)MRI, and ERP, it is possible to localize lesions in brain-damaged patients and to identify the activity of brain areas in healthy subjects while they are engaged in certain linguistic tasks.

The next two chapters (Chapters 4 and 5) are about the classification of aphasic syndromes and their underlying symptoms. Aphasia is an impairment in the area of language without other cognitive deficits. Broca's and Wernicke's aphasia are described, but an introductory book, like the present volume, does not allow for detailed explanations. Chapter 6 is about childhood aphasia (including a discussion about children with specific language impairment, SLI) and Chapter 7 talks about damage to the right hemisphere of the brain. Since aphasic syndromes are mostly – but not always – tied to the left hemisphere, the book up until this chapter focused primarily on the left hemisphere. However, certain aspects of linguistic processing such as the processing of suprasegmental structures are mainly accomplished by the right hemisphere. Therefore, it is also important to describe the consequences of right hemisphere damage for the use of language. Chapter 8 focuses on dementia, e.g., as the result of Alzheimer's or Parkinson's disease, and its consequences for language processing.
Chapter 9 discusses specific language deficits, namely dyslexia and dysgraphia. Both are impairments that involve written language processing: dyslexia is a reading deficit and dysgraphia is a spelling deficit. Developmental dyslexia (childhood dyslexia) and acquired dyslexia (caused by brain damage) have to be distinguished because they are presumed to be caused by different processes. Developmental dyslexia is presumably caused by the inability to fully process the phonological input at a critical period, while acquired dyslexia is due to damage to the written word processing system. However, the discussion about dysgraphia is not satisfactory because it is much too short; slightly more than one page is clearly too little space for such a complex and well-studied deficit.

In Chapter 10, the authors discuss the phenomenon of bilingualism. Linguistic theory is introduced in Chapter 11. In this chapter, they try to tie these linguistic theories into what has been said earlier in the volume. On the one hand, this late discussion about linguistic theory has the advantage that all the data and facts about language and the brain have already been stated and can now be set into relation with the constructs of linguistic theory. On the other hand, this is a disadvantage for those readers who may have particularly little knowledge about linguistic theory. For less knowledgeable readers, it would have been better to discuss the basic linguistic levels in the beginning. The last chapter, Chapter 12, is an outlook into where the field of neurolinguistics will go in the future.

In summary, this is a decent introductory book about the study of language and the brain. Researchers in the field of aphasiology will probably not profit very much from it, because the book is too basic. For the beginning student, however, it may be an ideal introduction because a broad range of topics is covered. The historic developments and classic papers are mentioned in the individual areas of research and further readings are suggested. The individual chapters are relatively independent of each other and can be read independently. Unfortunately, very little is said about new imaging techniques and what their merits for the field may be. Nevertheless, the book seems to be an excellent source for a quick overview of the field of neurolinguistics. The truly interesting work, however, only starts once one gets involved into more specific issues. Due to space constraints, this volume cannot serve this purpose.

**ISPhS' New Website**

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www.isphs.org

Many new features have been added, e.g. a forum, an on-line membership application form, job opportunities, new links of interest etc.
Phonetik im Wissenschaftlichen Verlag Trier

Henning Reetz: **Artikulatorische und akustische Phonetik**


Veit Olaf Köster: **Stimmphysiologische Untersuchungen mittels Hochgeschwindigkeitskinematographie**

Für Phonetik und Phonatrie gleichermaßen von Bedeutung sind Fragen der Stimmphysiologie. Wie lassen sich Phänomene der Stimme auf physiologische Vorgänge im Kehlkopf zurückführen?


Damit bietet dieses Buch eine kritische Gesamtdarstellung eines Verfahrens, das in den letzten Jahren in der Stimmphysiologie zunehmend an Bedeutung gewonnen hat.

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Angelika Braun/ Jens-Peter Köster (Eds.): **Studies in Forensic Phonetics**

This book comprises a collection of recent papers by leading forensic phoneticians from eight different countries on various aspects of the field. They cover issues of basic research and methodology as well as specific aspects of forensic reports. Although the book is of interest primarily to phoneticians and speech scientists, it will also provide a good introduction to the many facets of forensic phonetics for those working in the legal field.

Walter Treuschel: **Oralität und Nasalität in der deutschen Standardaussprache**

In dem vorliegenden Werk geht der Verfasser davon aus, daß schlüssige Aussagen über orale und nasalen Schall nur aus der Aufzeichnung der Schallereignisse gemacht werden können. Auf der Grundlage von Schallintensitätsmessungen wir die Rolle der Nasenräume bei der Phonation erörtert und experimentell untersucht. ob die Vokale der deutschen Standardaussprache rein oraler Natur sind oder mit einem nasalen Anteil gebildet werden.


Meetings, Conferences, and Workshops

5th – 8th July 2000
Annual Meeting of the International Association for Forensic Phonetics
Rome (Italy)
(e-mail: pao@fu.it)

10 July – 18 August 2000
Summer Workshop on Language Technology
Johns Hopkins University, Baltimore, MD (USA)
(http://www.clsp.jhu.edu/ws2000/proposal.html)

15 – 30 July 2000
8th European Summer School on Language and Speech Communication - Text and
Speech Triggered Information Access (TeSTIA)
Chios Island (Greece)

23 – 27 July 2000
TISLR7: 7th Conference on Theoretical Issues in Sign Language Research
Amsterdam (The Netherlands)
(http://www.leidenuniv.nl/hil/sign-lang/tislr7/)

5 – 8 August 2000
IV. International Symposium Vocal Arts, Medicine & Voice Care
Salzburg (Austria)
(http://www.austrianvoice-chorusculture.at)

6 August 2000
Finite-State Phonology : SIGPHON 2000. Fifth Meeting of the ACL Special Interest
Group in Computational Phonology. A full-day workshop held at COLING 2000
Luxemburg (Luxemburg)
(email: sigphon2000@cs.rochester.edu)
(http://www.cogsci.ed.ac.uk/sigphon)

16 – 19 August 2000
VIIIth meeting of the International Clinical Phonetics and Linguistics Association
John MacIntyre Centre, Edinburgh, Scotland (UK)
(http://sls.qmced.ac.uk/ICPLA2000/index.htm)

16 – 18 August 2000
9th International Aphasia Rehabilitation Conference
Rotterdam (The Netherlands)
(http://www.eur.nl/fgg/emco)
17 – 19 August 2000

**Parts of Speech in and Across Languages**
University of Helsinki (Finland)
(parts-of-speech@helsinki.fi; http://www.ling.helsinki.fi/sky/pos.html)

21 – 25 August 2000

**LP2000: Item order**
Charles University, Prague (Czech Republic)
(email: fujimura.1@osu.edu)

22 – 26 August 2000

**Linguistic Theory, Speech and Language Pathology, Speech Therapy**
University of Padova (Italy)
(contact person: Elisabetta Fava, email: elifava@uxl.unipd.it)

29 – 30 August 2000

**InSTIL 2000 Symposium: Integrating Speech Technology in (Language) Learning**
University of Abertay Dundee, Scotland (UK)
(http://dbs.tay.ac.uk/instil2000/)

4 – 6 September 2000

**11. Konferenz zur Elektronischen Sprachsignal-Verarbeitung, ESSV 2000**
verbunden mit der ITG-Diskussionssitzung "Sprachsynthese"
Cottbus (Germany)
(beke@kt.tu-cottbus.de, http://www.kt.tu-cottbus.de/essv2000)

5 – 7 September 2000

**ISCA Workshop on Speech and Emotion**
Northern Ireland (venue tba)
(http://www.qub.ac.uk/en/isca/index.htm)

5 – 8 September 2000

**Xth European Signal Processing Conference (EUSIPCO-2000)**
Tampere (Finland)

7 – 9 September 2000

**Autumn Meeting 2000 of the Linguistic Association of Great Britain**
St. John's College, University of Durham (Great Britain)
(http://chwww.essex.ac.uk/LAGB)

13 – 16 September 2000

**The Third International Workshop on Text, Speech and Dialogue (TSD 2000)**
Brno (Czech Republic)
(email: tsd2000@fi.muni.cz)
(http://www.fi.muni.cz/tsd2000/)
14 – 16 September, 2000
**Variation Is EveryWhere (VIEW 2000)**
University of Essex, Colchester, England (UK)
(http://privatewww.essex.ac.uk/~patrickp/)

15 – 17 September 2000
**Tagung der Deutschen Gesellschaft für Sprechwissenschaft und Sprecherziehung**
Leipzig (Germany)
(email: slemke@rz.uni-leipzig.de)

18 – 20 September 2000
**International Workshop on Automatic Speech Recognition: Challenges for the Next Millennium (ASR 2000)**
Paris (France)
(http://www-tlp.limsi.fr/asr2000)

21 – 24 September 2000
**3. Internationale Stuttgarter Stimmtage: Das Phänomen Stimme – Stimmkulturen.**
Stuttgart (Germany)
(email: gesprochenes.wort@t-online.de)

25 – 28 September 2000
**International Workshop Speech and Computer (SPECOM 2000)**
St. Petersburg (Russia)
(http://www.spiira.nw.ru/speech/specom00.html)

30 September – 1 October 2000
**General Meeting of the Phonetic Society of Japan**
Reitaku University, Chiba (Japan)
(email: psj-k@m.u-tokyo.ac.jp)

2 – 5 October 2000
**Prosody 2000: Speech Recognition and Synthesis Workshop**
Krakow (Poland)
(http://main.amu.edu.pl/~fonetyka)

3 – 6 October 2000
**38th Annual Meeting of the Association for Computational Linguistics (ACL)**
Hong Kong (China)
(http://www.cs.ust.hk/acl2000)

7 – 8 October 2000
**1st SIGdial Workshop on Discourse and Dialogue (satellite of ACL-2000)**
Hong Kong (China)
(http://www.pitt.edu/~dialcal/ACL2Ksymp.html)
8 – 11 October 2000
Patterns of speech sounds in unscripted communication: production - perception – phonology
Institute of Phonetics and Digital Speech Processing, Kiel (Germany)
(email: ipds@ipds.uni-kiel.de)

11 – 13 October 2000
Multi-lingual Speech Communication
Kyoto (Japan)
(http://www.msc2000.atr.co.jp/MSC/)

16 – 20 October 2000
6th International Conference on Spoken Language Processing (ICSLP 2000)
Beijing (China)
(http://www.icslp2000.org)

9 – 12 November 2000
Meeting of the Language and Social Interaction Division of the National Communication Association
Seattle, WA (USA)
(email: mmaxwell@utxvms.cc.utexas.edu)

27 November – 2 December 2000
Denver, Colorado (USA)
(http://www.cs.cmu.edu/Web/Groups/NIPS)

3 – 8 December 2000
140th Meeting of the Acoustical Society of America
Newport Beach, California (USA)
(http://users.aol.com/inceusa/nc00_inf.html)

4 – 7 December 2000
8th Australian International Conference on Speech Science and Technology
Canberra (Australia)

4 – 8 December 2000
Conference on Human-Computer Interaction (OZCHI 2000): Interfacing reality in the new millennium
Sydney (Australia)
(http://www.cmis.csiro.au/ozchi2000/)
8 – 9 December 2000
*Transcription de la parole normale et pathologique*
Tours (France)
(e-mail: colloqueTours@ifrance.com)

9 December 2000
*Biannual Meeting of the Phonetic Society of Japan*
Kansei Gakuin University, Kobe (Japan)
(email: psj-k@m.u-tokyo.ac.jp)

11 – 15 December 2000
**Stress and Rhythm Workshop**
Central Institute of English and Foreign Languages
Hyderabad (India)
(vijay@ciefl.ernnet.in)
(http://www.cieflconf.homepage.com)

12 – 14 December 2000
**WAVEip: Workshop on the Analysis of Varieties of English Intonation and Prosody**
Wellington (New Zealand)
(http://www.vuw.ac.nz/lals/WAVEip)

**2001**

**Conference on Phonology (HILP5)**
Holland Institute of Generative Linguistics
(http://www.ling.uni-potsdam.de/aktuelles/hilp5_aktuell.html)

28 February – 2 March 2001
**23rd Annual Conference of the German Society for Linguistics**
University of Leipzig (Germany)
(dgfs2001@rz.uni-leipzig.de; http://www.uni-leipzig.de/~dgfs2001)

28 – 30 March 2001
**12. GLDV (Gesellschaft für Linguistische Datenverarbeitung) – Frühjahrtagung, Schwerpunktthema: Sprach- und Texttechnologie in digitalen Medien**
Gießen (Germany)
(http://www.uni-giessen.de/fb09/ascl/gldv2001/)

5 – 7 April 2001
**PTLC2001: 2nd Meeting of the Phonetics Teaching and Learning Conference**
Royal Holloway College, University of London, London (UK)
(http://www.phon.ucl.ac.uk/home/johnm/ptlc.htm)
9 – 11 April, 2001
New ITRW (ISCA Tutorial and Research Workshop) on Hands-Free Speech Communication
Kyoto (Japan)
(http://www.slt.atr.co.jp/hsc2001/)

18 – 22 June 2001
ORAGE 2001, ORAlity and GEstituality
Aix-en-Provence (France)
(email: orage2001@pl.univ-aix.fr)

18 – 22 June 2001
ISCA Tutorial and Research Workshop 2001, A Speaker Odyssey – The Speaker Recognition Workshop
The Hebrew University of Jerusalem, Jerusalem (Israel)
(http://www.odyssey.westhost.com/)

2 – 6 July 2001
Eighth International Congress on Sound and Vibration
Hong Kong (China)
(email: mmicsv8@polyu.edu.hk)

19 – 22 July 2001
4th International Conference of the Association for Linguistic Typology (ALT4)
University of California at Santa Barbara, California (USA)
(http://www.ling.lancs.ac.uk/alt)

22 – 27 July 2001
7th International Cognitive Linguistics Conference (ICLC 2001)
University of California at Santa Barbara, California (USA)
(http://www.unm.edu/~iclc/)

23–26 August, 2001
4th Pan European Voice Conference - PEVOC4
Stockholm (Sweden)
(http://www.speech.kth.se/voice/pevoc4)

27 – 31 August 2001
3rd International Conference on Cognitive Science (ICCS2001)
Beijing (China)
(email: iccs2001org@etang.com)
(http://www.ICCS2001.com)
2 – 7 September 2001
17th International Congress on Acoustics
Rome (Italy)
(email: ica2001@uniroma1.it)
(http://www.ica2001.it)

3 – 7 September 2001
7th European Conference on Speech Communication and Technology
(EUROSPEECH 2001)
Aalborg (Denmark)
(http://cpk.auc.dk/eusp2001/)

13 – 15 September 2001
2nd International Workshop on Models and Analysis of Vocal Emissions for Biomedical Applications
Firenze (Italy)
(http://www.det.unifi.it/Conferences/maveba2001/MAVEBA.htm)

3 – 5 October 2001
2001 International Workshop on Multimedia Signal Processing
Cannes (France)
(http://mmsp01.eurecom.fr/)

Interesting Web Sites:

- ISPhS: http://www.isphs.org
- IAFP: http://www.iafp.net
- ISCA: http://www.esca-speech.org
- IPA: http://www.arts.gla.ac.uk/IPA/ipa.html
- The Voice Center at Eastern Virginia Medical School: http://www.voice-center.com/index.html
- Center for Voice Disorders: http://www.bgsu.edu/voice/

If you know of any other interesting web-site, please send the address to the editors.
The Phonetician appears twice a year as a modern, scientific, international publication. It addresses the needs of individuals working in the various areas of phonetic sciences, including acoustics, speech communication sciences, linguistics/phonology, second language learning, speech signal processing, speech synthesis/recognition and voice/speech/hearing pathology.

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   3. Regional Secretary Dues $140.00
   4. Monies from IPS-98 $1989.08
   5. Advertising in the Phonetician $825.00
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   5. Printing and Mailing: TP 80 $1000.00
   6. Software and web support $1000.00
   7. Telephone $25.00
   8. Postage $401.37
      9. Subtotal $5716.54

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Respectfully Submitted
Prof. Ruth Huntley Bahr, Ph.D., Treasurer
Advances in Phonetics

Edited by Angelika Braun

From the contents:

The present volume contains a selection of papers presented on the occasion of the International Phonetic Sciences Conference, sponsored by the International Society of Phonetic Sciences (ISPhS) in Bellingham, WA in 1998. They cover a wide range of topics including speech production, intonation, (second) language acquisition, and speech technology and thus represent the variety of the most recent research activity in the field.

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