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Vowels and Consonants

An Introduction to the Sounds of
Languages

Blackwell Publications, Malden 2001

The title of this book shows the author's modesty, or his sense of humor (or both): The treatment of vowels and consonants constitutes less than half its contents. Its scope is considerably wider than what we have been accustomed to see in an introduction to general phonetics. With respect to its editing technology, it is up to the commencing century.

In chapter 1 we find the basics of the evolution of speech, the relation between speech and language (without a mention of phonology), and a description of the basic speech waveforms. Chapter 2 is devoted to the suprasegmentals (prosodies), especially the function of tone and intonation, and the physiology of laryngeal excitation, with excellent photographs of the larynx showing the different modes of its speech function. Vocalic contrasts are illustrated in chapter 3, whilst the acoustic features of vowels, with the appropriate waveforms, spectrograms and $F_1 \times F_2$ charts follow in chapters 4 and 5. The discussion of consonants (chapter 6) again opens with examples of contrasts in isolated words. Then come, along with a basic classification of the consonants, a number of excellent spectrograms illustrating the effects of different 'manners' and 'places' of articulation. In chapter 7, after a brief presentation of the principal 'acoustic components' of natural speech, the basics of speech synthesis are offered. This is logically followed by a separate chapter devoted to the foundations of text-to-speech techniques (chapter 8). Automatic speech recognition, now one of the most up-to-date (and commercially significant) applications of human language technology, is the subject of chapter 9, which again includes traditional spectrograms, with formant traces, as well as examples of

frequency-and-amplitude quantized 'sections' (short-term spectra). Both the successes and the failures of automatic speech recognition are indicated. Chapters 10 and 11, dealing with the English consonants and vowels, are perhaps, in relative terms, the most traditional part of the book. In consideration of the novice, the century-long controversy as to the basis of the vowel quadrilateral (physiological? acoustic? perceptual?) remains unmentioned and the IPA quadrilateral is directly related to the mid-sagittal profiles of the tongue as well as to the ($F_1 \times F_2$) plane. Chapter 12 discusses the linguistic use of the different larynx modes, in terms of minimal and near-minimal pairs. Air pressure flow records are included here. Chapters 13 and 14 take up consonants and vowels again, but now the emphasis is on their classification in combination with their normal appearance in various languages of narrow or wide range. Many examples of contrasts in isolated words are quoted. Some idea of phonetic fieldwork is given, and it is shown how instruments that record articulations and speech waves help the researcher. Irregularities (e.g. slips, both in production and perception) are mentioned in chapter 15, which is mainly devoted to the contrastive role of vocalic and consonantal classificatory features.

As can be seen from the above synopsis, a relatively small section of the book is concerned with the suprasegmentals. In his many decades of research, Ladefoged has been rather more interested in the 'segmentals' than in the 'prosodies'.

The high didactic value of the 'paper' part of the publication under review is greatly enhanced by an accompanying CD. This contains visual as well as auditory effects. There are both photographs (mainly X-ray stills) and movies (laryngoscopic and X-ray) that further explain articulations. If the user of the book does not happen to have the applications needed to open and play the multimedia, he

gets them on the same CD. A particularly useful audiovisual ‘gadget’ includes a printed cardinal-vowel quadrilateral and an IPA chart of consonants, with corresponding aiff files. By clicking on a phonetic character one can hear the selected vowel in isolation or the selected consonant pre- and intervocalically (natural, not synthetic speech).

The book is written in a light, in places almost personal, style. Like every innovative work, *Vowels and Consonants* prompts queries. One issue will be selected here because, apart from phonetic theory, it has reference to the attached audio files. One way of formulating it is to ask: What kind of abstraction does a specific phonetic character represent? Or, on what general basis is an individual speech event represented by a specific symbol of the IPA? The book’s multimedia will no doubt provoke the student to analyze the acoustic data included on the CD (indeed he is encouraged to do so), select this or that vowel, or consonant (or a sequence of them, like a word) and try his own version. How can he decide whether his imitation is correct? Does he properly follow the model so that it can be transcribed with the same phonetic character(s)? The probability that the acoustic image produced by the student’s imitation will be, within measurement accuracy, identical with the model, is practically nil. Suppose he is fortunate enough to have a good specialist to tell him whether he has succeeded. What *objective* criterion does the judge use?

Looking at the problem from a different angle, one can ask: When are two specimen speech sounds, especially taken from two different languages, sufficiently alike to be ren-

dered, according to some objective criterion, by the same phonetic symbol? The classification of speech sounds differs not only between successive versions of the IPA chart, but also between such authoritative sources as, e.g. Ladefoged and Maddieson [1996] and Laver [1994]. About half a century ago, Ladefoged and Broadbent [1957] and Ladefoged [1967] investigated the ‘phonetic invariance’ both at the acoustic and the perceptual level. The conclusion that must be drawn from such investigations is that under specific, natural conditions, one particular speech sound may be classified variously. Phonetic transcription is an art, and a skill – an extremely useful skill. But the mystery of phonetic invariance is not very much nearer unravelling now than it was about 110 years ago when IPA began to be used. An extremist’s view might be: A phonetic transcription will not be entirely ‘objective’ before the computer is able to convert, with a negligible error rate, any incoming specimen of speech [including meaningless words, see e.g. Jones, 1956, App. B], and words of an unknown language, into a sequence of unambiguous phonetic symbols.

References

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