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■ PHONETICS

Henning Reetz and Allard Jongman, *Phonetics: Transcription, Production, Acoustics, and Perception*, Chichester, Wiley-Blackwell, 2008, 316

The full title of Henning Reetz and Allard Jongman's *Phonetics: Transcription, Production, Acoustics, and Perception* makes clear the main purpose the authors had in mind while writing this textbook. Namely, to provide a coherent description of phonetics in all of its four main areas. Many courses in phonetics focus on one or two of these areas, but Reetz and Jongman have found it "more rewarding to combine these subjects in a single course". The authors further add in the preface that "while [the book] is meant as an introductory course, many areas are discussed in more detail than it is typically the case for an introductory text." Indeed, at over three hundred pages, comprising thirteen chapters and three appendices the book provides a comprehensive overview of "this complex interdisciplinary subject". However, as we shall see, not all of the four areas mentioned above receive equal attention. The book employs a modular format so that later chapters are accessible even if some of the preceding chapters are skipped, and more advanced technical information is provided in the appendices. In addition, each chapter ends with a short list of exercise questions.

Chapter 1 (About this Book) provides a brief introduction to the subject matter, as well as an outline of the structure of the book. Chapter 2 (Articulatory Phonetics) covers the basic articulatory terms and the classification of speech sounds according to the place and manner of articulation. Chapter 3 (Phonetic Transcription) starts by briefly summing up the difference between broad and narrow transcription, and then proceeds to cover the main principles involved in transcribing English, using General American English as the reference model. Basic IPA symbols and diacritics are introduced, as well as the vowel quadrilateral. Chapter 4 (Place and Manner of Articulation of Consonants and Vowels) goes systematically through the transcription of many consonants of the world's languages. The IPA is given more attention than in the previous chapter. Chapter 5 (Physiology of the Vocal Apparatus) presents a detailed description of the anatomy of the respiratory system and the larynx, as well as mechanisms and principles involved in the vocal fold vibration. Chapter 6 (Airstream Mechanisms and Phonation Types) explains the alternative ways in which sounds can

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be produced, discusses clicks and implosives, as well as terms such as voicelessness, whisper, breathy voice and creaky voice. Aspiration and different VOT values are also given due consideration.

Chapter 7 (Basic Acoustics) elucidates the basic concepts of acoustics, such as the sound wave, principal dimensions used to define acoustic signals (frequency, amplitude and phase) and ways of measuring them. Chapter 8 (Analysis Methods for Speech Sounds) first deals with digitizing acoustic signals (explaining sampling rate and quantizing resolution); it then turns to methods that can be used to analyze complex signals, covering Fourier synthesis, analysis and transformation; finally, it explains the main concepts of spectral representation, such as ‘windowing’, waterfall, narrow and wide-band spectrogram and LPC (linear predictive coding) spectrum. Chapter 9 (The Source-Filter Theory of Speech Production) presents the acoustic theory of speech production based on concepts introduced in chapters 7 and 8. The concepts of resonance, damping, filters and formants are explained. Chapter 10 (Acoustic Characteristic of Speech Sounds) discusses the primary acoustic characteristics of speech sounds applying concepts and methods expounded on in the previous three chapters. Furthermore, it deals with identifying the spectrogram cues for different types of speech sounds. The final section of this chapter provides a flavour of the kinds of data that researchers use to address the nature of the mapping between the physically continuous signal and discrete linguistic categories (the theory of acoustic invariance is given the main focus).

Chapter 11 (Syllables and Suprasegmentals) finally shifts the perspective from individual elements to larger structures of speech. Stress, length, tone and intonation are all briefly discussed. Again, where possible, examples from General American English were used.

Chapter 12 (Physiology and Psychophysics of Hearing) lays out the structures of hearing organs, much like Chapter 5 did for the organs of speech production. The process of transforming sound waves into neural impulses is described in detail, with special attention provided for the subtle and intricate mechanisms of the inner ear. Finally, since human perception of the auditory frequency is relative and not absolute, some of different scales which maybe be used to represent frequency and amplitude are described here (logarithmic scale, mel scale, Bark scale). Chapter 13 (Speech Perception) reports on findings about the perception of speech, and the emerging consensus “about the nature of the acoustic properties that contribute to the perception of individual speech sounds or classes of speech sounds”. In the first section, which deals with perceptual cues to vowels, concepts such as vowel undershoot as well as extrinsic and intrinsic normalization are covered. Later in the chapter, the motor theory of speech perception by A. M. Liberman is discussed, which is followed by the explanation of the concept of categorical perception. Next, the question whether speech is ‘special’ is debated. Findings concerning speech perception and newly-born infants, as well of non-speech as perception and animal perception are brought up. The final portion of the chapter deals with the role of linguistic experience in speech perception and cross-language speech perception.

Appendices A and B provide general information on such physics concepts as mass, force, pressure, energy, power, intensity etc., with special attention paid to the decibel, RMS amplitude and calculations involving them.

What is apparent from the overview presented above, is the fact that the issues concerning phonology, transcription and suprasegmentals have been awarded the least thorough coverage, while the issues pertaining to acoustics were given prominence. The reason for this perhaps lies in authors' areas of interest. Henning Reetz (Professor at the Institute for Phonetics and Phonology at the University of Frankfurt, Germany) focuses his work mainly on articulatory and acoustic phonetics (especially with regard to automatic speech recognition), while Allard Jongman (Professor in the Linguistics Department of the University of Kansas) deals in the same areas of articulatory and acoustic phonetics, but focusing more on perception, especially in terms of cross-linguistic experiments and second language acquisition. Also, it seems that the few minor inaccuracies¹ present in the book are mostly found precisely in those chapters devoted to transcription and articulation. However, it is important to note that even when they provide only a cursory survey of the subject matter, the authors make sure to direct interested readers to the works that deal with those issues in detail.

The broadness and scope of Reetz and Jongman's textbook is truly refreshing. It is stimulating to be reminded just how germane the issues that psychology, anatomy and physics deal with are connected with the subject of phonetics. In conclusion, the authors admirably achieve the goals they set. Their in-depth introductory textbook is written in a clear and concise style, and provides an accessible source of information on the basic concepts of phonetics. Finally, a companion website is available at www.blackwellpublishing.com/phonetics.

- 1 For example, classifying the vowel [ɔ] (as in *caulk*) as lax on p. 34, only to accurately describe it as tense on p. 35, or stating that *pot*, *palm* and *father* contain three distinct vowels in RP (p. 21), while in fact both *palm* and *father* have [ɑ:] in RP.