[REVIEW]

Sociophonetics: An Introduction

By Erik R. Thomas, Palgrave Macmillan, Basingstoke, 2011, xiv+356pp.

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1. Introduction

Sociophonetics, which is the interface of sociolinguistics and phonetics, is a field that has been growing rapidly in recent years. Authored by a leading scholar in the field, this timely textbook is targeted for graduate students and researchers who want to expand their areas of work. The book consists of an introduction to acoustic analysis and other experimental methods and a theoretical discussion about what sociophonetics addresses. This is a very good book for those interested in delving deeply into the methodology of the discipline.

Sociophonetics is usually defined as research about any kind of variation covered in sociolinguistics but is limited to studies utilizing modern phonetic research techniques, including acoustic and articulatory analysis and speech perception experiments. However, researchers view this field in many different ways. Some regard sociophonetics as phonetic studies involving dialectal variation, whereas others regard it as sociolinguistic studies using phonetic research methods. Some see it as a methodological construct whereas others see it from a theoretical perspective. This book aims to tie together these various strands—sociolinguistic and phonetic, methodological and theoretical—to show what questions sociophonetics can

* First of all, I would like to thank the English Linguistic Society of Japan for giving me the opportunity to review this book. I am also indebted to two anonymous reviewers for their encouraging comments and Shin-ya Iwasaki, secretary of the society, for handling my manuscript with patience. Any remaining errors are mine alone. I also thank my family—Kaoru and Sawa—for their endurance while I was writing this manuscript.

address.

In Chapter 1, Thomas discusses some important aspects of sociophonetics. Although both sociolinguists and phoneticians prefer bottom-up, or empirical, procedures, sociolinguists give priority to defining the linguistic community they are studying and phoneticians to collecting large amounts of data from individual subjects. Also, sociolinguists aim for naturalness in speech samples whereas phoneticians aim for experimental control. In sociophonetics, the methodological concerns of both sides must be taken seriously. As for research questions, linguistics encompasses two major concerns: how and why language varies and changes, and how language is structured. However, this division is not as disparate as it seems because any change or variation in linguistic characteristics necessarily entails a change or variation in the internalized grammar. Sociophonetics addresses the first question but also has much to contribute to the second. The area of interest in sociophonetics is what Hymes (1974: 196) refers to as “socially realistic linguistics,” which helps determine how language provides indices of social meaning and relates language variation to the cognitive structure of language.

The term *sociophonetics* was apparently first used in 1974. Sociophonetics research was initiated by Labov, Yaeger, and Steiner (1972), who used acoustic analysis to study vowel variation. In the 1990s, numerous researchers joined this area of study. Today, sociophonetics research has been extended to consonantal variation, prosodic variation, and even speech perception studies. All of these areas are covered in this book.

The book consists of 12 chapters. Although these chapters are not organized by subsection, they can be effectively divided into a few parts. Table 1 shows the book’s organization and its chapter titles. The page length of each chapter varies greatly and is indicated in the table to show the extent to which each topic is treated in the book.

Table 1. Book Organization

Chapters	
1. The Place of Sociophonetics (16 pp.)	[Introduction]
2. Production (38 pp.)	[Basics]
3. Perception (35 pp.)	
4. Consonants (48 pp.)	[Methodology] (234 pp.)
5. Vowels (46 pp.)	
6. Prosody (40 pp.)	
7. Voice Quality (27 pp.)	
8. Combinations of Different Types of Variables (5 pp.)	[Theoretical Discussion] (61 pp.)
9. Variation and the Cognitive Processing of Sounds (17 pp.)	
10. Sound Change (17 pp.)	
11. Social Factors and Phonetics (13 pp.)	
12. Lateral Transfer (9 pp.)	

In Chapter 1, after an overview of sociophonetics, Thomas mentions important topics not covered in this book. He briefly touches upon the issues of statistics and equipment, which are requisite knowledge for conducting sociophonetic experiments. He quickly explains hypothesis testing and sampling techniques (*random*, *quota*, *judgment*, and *convenience samples*), and lists the most useful and widely used statistical tests in the discipline. For recording and analysis equipment, he states several important points: the adequacy of equipment quality, whether equipment works properly, the distance between the microphone and the mouth, and background noise. These descriptions inform readers of what they should know about statistics and equipment before conducting experiments.

2. Methodology Focusing on Acoustic Phonetics

2.1. Basics

Chapters 2 and 3 describe basics of acoustics and introduce experimental techniques that will be applied to various variables in later chapters. In this book, phonetics is divided into speech production and speech perception, rather than the popular three-way division into articulation, acoustics, and audition, because direct observation of articulatory movement is rare in sociophonetic studies and information about articulation is addressed through acoustic analysis.

Most of Chapter 2 is devoted to acoustics and its relevant techniques. It begins with an explanation of basic acoustic and signal-processing concepts,

which include units of measurement (*hertz (Hz)*, *decibels (dB)*), sound waves (*complex waves*, *Fourier analysis*, *windowing*, *spectra*, *periodic* and *aperiodic signals*, etc.), digitization (*sampling*, *aliasing*, *pre-emphasis*), and visual representations (*waveforms*, *power spectra*, *wideband* and *narrowband spectrograms*). Thomas explains these requisite concepts very concisely in only 13 pages but does not cut corners. The chapter then includes an acoustic explanation of the *source-filter theory*, which is the acoustic modeling of human sound production. Next, the chapter proceeds to a more methodological discussion: measuring *fundamental frequency* using *autocorrelation*, narrowband spectra and spectrograms, and wideband spectrograms. The following explanation of how to measure *formants* presents not only the most popular method called *linear predictive coding (LPC)*, but also sufficiently explains its mechanism so that readers can adjust LPC settings during actual use and provides some precautions when using LPC. The chapter also includes more traditional formant estimation methods such as reading from spectrograms and spectra. Apart from acoustic techniques, this chapter concludes with a brief presentation of methods for direct measurement of articulatory movements and brain-imaging techniques. Thomas condensed the explanation of all the necessary acoustic concepts into a rather limited number of pages. Although this concise material appears to be good for reviewing one's knowledge of acoustics, it would be somewhat hard to follow without prior knowledge. Thomas seems to have carefully selected what to include in this chapter. For example, the *pascal (Pa)*—the basic unit used for air pressure—does not appear in this chapter because it is probably not used in the context of sociophonetic research, yet it is an absolutely essential term if you are interested in audiology; the *quantization bit rate* is not explained in the section on digitization whereas the *sampling rate* is, perhaps because the former cannot be adjusted practically whereas the latter is often set by users.

Chapter 3 explains techniques and experimental designs used in perception experiments. Thomas first shows that the perceptual scales of *pitch* and *loudness* of sound do not equate to their corresponding physical scales, and he lists several perceptual scales of pitch (*mel*, *Bark*, *ERB*, *semitone*). This is followed by an explanation of methods used in perception experiments such as identification tasks and discrimination tasks, choice and treatments of stimuli including acoustic modification, and presentation procedures. This is a very good overview on how to conduct perception tests, and it will help readers design their own experiments.

2.2. Particular Variables

The following four chapters include discussions of consonants, vowels, prosody, and voice quality in turn. Sociophonetic research has thus far given the most attention to vowels, and Thomas shows readers how past approaches work. However, his intention is also to present techniques on other variables and even newer techniques on vowels in the hope that the current imbalance of researchers' attention will even out. He explains how to read spectrograms and the different ways of making measurements so that readers can choose what and how to measure in their research. The chapters are interspersed with examples of spectrograms and measurement graphs, many of which are from past sociophonetic studies. Although techniques discussed in these chapters relate to speech production, readers can adapt the information to perception experiments.

The discussions in Chapters 4 to 7 are extensive in that they cover quite a broad range of topics and phenomena, yet at the same time, they are thorough in that they not only present measurement methods but also provide accounts of why sounds acoustically appear the way they do (i.e. the link between articulatory movements and resultant acoustic properties). For example, Chapter 4 "Consonants" includes a discussion on how to distinguish manner and place of articulation on spectrograms. This chapter not only offers readers information about how to read such information from spectrograms, but also provides the reasons why the articulatory movements create such spectrogram patterns. This information will be helpful to readers when they encounter atypical experimental results. This general explanation of spectrographic patterns is followed by examples from past sociophonetic research, which will help readers contemplate what they can do with these techniques. The explanation for place of articulation includes the methods using frication and burst spectra as well as *formant transitions*. The chapter also covers *voice onset time* and other voicing properties, *glottalization*, variations of liquids, consonant deletion, and so on. This chapter gives readers acoustic grounds for why consonants appear on spectrograms the way they do, and also covers a broad range of consonant realization.

Likewise, the discussions in Chapters 5 to 7 are also thorough and extensive, which I present briefly due to space constraints. Chapter 5 "Vowels" begins with a short discussion on speech styles, followed by an explanation of how to measure duration and formants. The discussion on formant measurements is quite extensive, including the timepoints in the segment to measure, *formant trajectory*, and *vowel normalization*. The section on

vowel normalization includes reviews of several standard methods proposed thus far. The chapter concludes with a section on *undershoot* phenomena.

Chapter 6 deals with prosody, which is an underexplored domain. It begins with a discussion of global factors (i.e. pauses and rate of speech), followed by a section on lexical prosody (i.e. *tone*, *pitch accent*, and *stress*). Under this section is a discussion on prosodic rhythm: the traditional concept of *stress-timing* and *syllable-timing* and more recent measurements such as those of Ramus (Ramus, Nespor and Mehler (1999)) and Low and Grabe (1995). The following discussion of intonation is especially focused on the Tone and Break Index (ToBI) transcription system (Beckman, Hirschberg and Shattuck-Hufnagel (2005)). The chapter also touches on *declination* and *pre-boundary lengthening*. This chapter is more cross-linguistic in nature than the others.

Voice quality, which is “unchartered territory in sociolinguistics” (p. 224), is discussed in Chapter 7, a much shorter chapter than the preceding three. It concerns laryngeal factors (fundamental frequency range, phonation) and supralaryngeal settings (larynx height, tongue settings, labial settings, nasality).

3. Theoretical Discussion

The last five chapters cover more abstract matters on the nature of sociophonetics, leading up to the lateral transfer model in Chapter 12. These chapters are relatively short compared to the previous methodology chapters, and they vary considerably in page length, from the shortest at 5 pages to the longest at 17.

In Chapter 8, the shortest chapter, Thomas argues for the need to combine different kinds of variables in analyses, both in production and perception research. He maintains that examining only a few variables does not provide a holistic picture of how social identity is indexed by linguistic variation and how linguistic change occurs. This chapter also touches on the links between linguistic variation and cognitive processing, which taps into the discussions in the following chapters.

Chapter 9 concerns the cognitive processing of sounds, which Thomas considers the key concept in sociophonetics. In this chapter, sociophonetic knowledge is first explored in terms of variability in cues used for contrasts, phasing of articulatory gestures, and undershoot. Most of the chapter's pages are devoted to how sociophonetic investigation can contribute to testing the *Exemplar Theory* (Johnson (1997)). This theory has advantages

over other traditional phonological theories in that it assumes simultaneous acquisition of linguistic specifications and social indexical information.

Chapter 10 begins with a review of several concepts and models about sound change proposed thus far: the concepts of *ease of articulation* and *maximal dispersion*, and phonetic models that regard sound change as a probabilistic phenomenon originating from misperception, and those that regard sound change as originating from speakers' vacillation between less clear and more clear enunciation according to communicative needs. Next, the chapter addresses how sociophonetics has changed the method for examining sound change in terms of Labov's principles of vowel shifting (Labov (1994)), *mergers*, *lexical diffusion*, and propagation of changes.

Chapter 11 is a more detailed discussion of how sociological factors are related to sociophonetic analysis. Thomas argues that sociophonetics should address the cognitive and neurological relationship between phonological/phonetic processing and *social indexing* (i.e. the linking of linguistic variables to social categories). This chapter covers intraspeaker variation (*style* and *register*, *accommodation*) and clustering of subjects (*speech community*, *social network analysis*, *communities of practice*, individual variation). It also discusses cognitive encoding of sociolinguistic knowledge.

The last chapter, Chapter 12, is titled "Lateral Transfer," a term used in regard to biological evolution. Other than parent-offspring transmission via reproduction, DNA can be propagated between organisms in several ways, by processes called *lateral DNA transfer*. Thomas argues that linguistic evolution is better modeled by a tree diagram with extensive reticulation due to lateral transfer than by a traditional Stammbaum tree with only mother-daughter relationships that is analogous to 19th-century notions of biological evolution. Thomas argues that an individual's linguistic development is influenced by many other people and groups and resembles a tree with reticulation. He also emphasizes the connectedness of the social and structural sides of language, which makes language subject to lateral transfer. He concludes this chapter by stating that sociophonetics offers two advances over the earlier sociolinguistic approach—namely, an intensified focus on cognition and a modern view of phonological structure—and that the field ties together two seemingly disparate elements, social structure and phonetics.

4. Conclusion

As an acoustic phonetician, I had the impression that this is a very well-

written textbook on acoustic phonetics, coupled with intriguing essays on the nature of sociophonetics. This book is oriented to acoustic phonetics and does not cover everything one needs to know to begin sociophonetic research, as mentioned in Section 1. Instead, a broad range of concepts and techniques in acoustic phonetics are thoroughly explained with sociophonetic examples. This book could serve as a stand-alone textbook on acoustic phonetics. It is not a superficial how-to book for novice learners. A profound understanding of the domain would definitely help in actual experimental scenes, which usually do not go as if they were typical textbook examples and require researchers to draw on their background knowledge. I would recommend this book to anyone who already has some knowledge about acoustic phonetics, for example, graduate students who have completed a course on acoustic phonetics or learned acoustic phonetics under supervision or by themselves, or researchers who want to increase their expertise. The theoretical discussion was also interesting. Unlike a research paper that simply argues one position, this book presents numerous ideas drawn from previous studies, which are all interconnected in Thomas's idea of what is meant by sociophonetics. Throughout both the methodological and the theoretical parts of the book, Thomas's tone is overwhelmingly informative, with numerous cited references, and the discussion is extensive and thorough.

The author of this book, Erik R. Thomas, is a leading scholar in the field of sociophonetics and has many publications including books on African American English. He has conducted research involving acoustic analysis and speech identification experiments on African American English, and is currently working on an analysis of new dialect formation among Mexican Americans in a community in southern Texas. In his research career, he has not only used acoustic phonetic techniques in his own experiments, but also written extensive reviews of perception experiments, including those using various methods to acoustically modify stimulus signals (Thomas and Reaser (2004), Thomas (2002)). The knowledge and skills accumulated in such a research career appear to underlie the incomparably detailed explanation of acoustic techniques in the book, and his interests seem to have led to the final chapters on language change and cognition.

5. Related Materials

Although the publisher did not provide a companion website, sound files for the exercises in the book and errata are housed by the Sociolinguistic

Archive and Analysis Project at North Carolina State University (<http://ncslaap.lib.ncsu.edu/sociophonetics/>). Also, teaching materials from Thomas's 2011 course are available (<http://ncslaap.lib.ncsu.edu/sociophonetics/course.html>). These materials might be helpful while reading this book or could be used in a lecture course.

A couple of other books on sociophonetics have recently been published: Preston and Niedzielski (2010) and Di Paolo and Yaeger-Dror (2011). Preston and Niedzielski (2010) comprises a collection of 17 sociophonetic studies. The book is organized into three parts: studies related to "production," to "perception," and to both "production and perception." The perception part includes Thomas's study on African American Speech (Thomas, Lass and Carpenter (2010)). This is a more suitable book than the book under review for those wanting to browse quickly through sociophonetic findings. Di Paolo and Yaeger-Dror (2011) was published in the same year as Thomas's book and is another textbook aimed at graduate students. The book sprang from the Best Practices in Sociophonetics workshops, and its 16 chapters were contributed by different authors. Its chapters cover topics not detailed in Thomas's book such as field methods, corpora, transcription, and statistics. This book is more "a practical how-to manual" (p. 3) whereas Thomas's book provides a more in-depth discussion. For those interested in reading a short introduction to the field, Thomas has contributed a chapter in each of two handbooks (Thomas (2007, 2013)); he has also recently written a short practical guide (Thomas (2014)).

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