

Review of “Phonetic Data Analysis” by Peter Ladefoged.

Keith Johnson

Department of Linguistics

UC Berkeley

“Old people can be hard to control” (PDA, p. 14).

“Phonetic Data Analysis” (PDA) is a course book for instrumental or field phonetics courses and like Ladefoged’s other major textbook “A Course in Phonetics” defines not only (or primarily) the content of the course but also a set of attitudes for doing successful phonetic research. This book is important because Peter Ladefoged, more than any other person in the 20th century, defined the linguistic/phonetic curriculum, and a large swath of the phonetics research agenda in linguistics.

Ladefoged’s choices for the content of PDA were guided by his view of the aims of phonetic field work. For him the chief aim of phonetic field work is language description at a segmental phonetic level, with particular focus on unusual or rare sounds that challenge one’s view of what sounds are possible in language. This aim leads to a focus on discovering what exactly the speakers of a language do with their mouths, vocal folds, and lungs in order to pronounce the words of their language. As he discusses in this book, the instrumental tools that are necessary to achieve this aim are primarily based in acoustic speech analysis (spectrograms especially) with some supplemental physiological techniques for observing consonant place of articulation and consonant aerodynamics.

Thus, PDA is a practical book about how to discover patterns of consonant and vowel pronunciation using simple phonetic instruments that can be packed in suit case. This is the second of the widely imitated three-course phonetics curriculum that Ladefoged helped to

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establish in the UCLA Department of Linguistics. The first is an introductory course, for which he wrote *A Course in Phonetics*, and the third is a course on “Phonetic Theory”. I mention this curriculum because I think that it is useful, in considering the range and limitations of PDA, to keep in mind the pedagogical context in which it was developed - particularly that phonetic theory is not missing in the plan. Though, if your aims for cross-linguistic phonetic instrumental field work are a little more oriented toward explanatory phonetics as grounding for phonological patterns, or toward cognitive theories of speech motor control or speech perception, you would write a different book. In this book Ladefoged focusses on speech sound description, introduces the tools of phonetic study with enough detail and clarity to get the student started, and vividly exemplifies his uniquely successful attitudes toward phonetic research.

Tools of phonetic study.

Though two of the chapters in PDA are about “exotic” phonetic instrumentation (palatography and aerodynamics), the tools of the trade illustrated in this book are mainly acoustic. Chapter 1 is a very detailed and helpful overview on how to conduct phonetic research. Ladefoged discusses such seemingly mundane details as how often to take breaks, how to get a consultant back on task after some chitchat, and how much to pay speakers. He also emphasizes the importance of the word list in his style of phonetic research - with recollections of some of his favorite word lists. The discussion in this chapter on audio recording technique is also especially valuable.

The acoustic speech analysis chapters are then on “Pitch, loudness, and length” (Chapter 4), “Characterizing vowels” (Chapter 5), “Acoustic analysis of consonants” (Chapter 6), and “Acoustic analysis of phonation types” (Chapter 7). These are wonderful chapters full of tips and tricks for getting spectrograms and waveforms to give up their secrets. They are very detailed, providing an outline of his analysis strategy in particular cases rather than a cookbook of measurement techniques for every situation. One of the clearest messages of the chapters is pragmatism. For instance, the acoustic theory of speech production teaches that consonant place of articulation can be discerned from speech spectrograms - and clearly listeners get some consonant place information from the speech acoustic signal. Ladefoged states though, “Acoustic

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phonetic analysis is not the best way to find out about different places of articulation. You can do much better with the simple palatography techniques described in chapter 2, or even by just looking at the speaker's mouth" (pp. 159-60). This passage is a good illustration of Ladefoged's pragmatic approach to the tools of phonetic analysis - use the best tool for the job at hand. His pragmatism is also illustrated by his approach to selecting and working with consultants cited at the top of this review. If he were a furniture maker I imagine that he would favor using a power saw over a chisel except for just those bits that really needed a chisel.

Chapters 2 and 3 ("Finding the places of articulation" and "Aerodynamic investigations") describe, with humor and sympathy, the instrumental phonetic techniques that Ladefoged championed for years. Though, Ladefoged was constantly tinkering with methodology (illustrated here by his mentioning a couple of ways of getting palate traces, and a couple of ways to apply the transfer material in palatography), these chapters are extremely valuable as authoritative guides to his methods worked out over many years of field work. The chapters are amply illustrated and include all of the details that one would need to follow in a research study. Perhaps more than any other parts of PDA, chapters 2 and 3 are the most significant contribution of this book.

The presentation of acoustic analysis methods in PDA is enhanced by Ladefoged's vivid demonstration of mistakes. It is natural in teaching phonetics to pick the best, clearest, examples we can come up with to illustrate acoustic analysis, and then inevitably the student doesn't get the same result and assumes that he/she is no good at this stuff. Ladefoged does a service to teachers by showing pitch traces with the parameters set wrong (p. 80), recordings made with the volume too loud (clipping, p. 95), non significant VOT differences (p. 99), unreadable spectrograms and the parameter changes that make them readable (p. 107), display artifacts in drawing spectrograms on computer screens (p. 112), data messiness caused by talker idiosyncrasy (p. 129). It is a great service to the student to show such common problems because these things come up so frequently and are such a deterrent to students. My only complaint is that the illustrations in chapters 2 and 3 (palatography and aerodynamics) are so beautiful. It would have been great to see a palatogram ruined by the speaker swallowing before the photo could be taken, or a nasal airflow trace corrupted by leak around the gasket separating

the nose and mouth.

One of the most difficult problems that one faces in writing a book on technical methods is that in order to be explicit you need to show screen shots of the analysis software dialog boxes to show how to adjust the analysis parameters. This ties the discussion, to an extent, to a particular software package. Ladefoged mainly describes the use of a software package developed in the UCLA Phonetics Lab called Macquiner. One of the main reasons that he chose this software is that it supports multichannel aerodynamic data recordings from custom hardware that is sold with the software. He says, “Programs come and go fairly rapidly, so in making this comparison between two particular programs (Praat and Macquiner: KJ) I may already be out of date” (p. 84). But, in general, the instructions that Ladefoged gives are applicable regardless of the particular software package that one uses, because there is a standard set of speech analysis parameters for acoustic phonetics. Though the details differ slightly among software packages as to what the default settings of these parameters are and how they can be changed, the information that Ladefoged gives for Macquiner applies to other packages as well. (I would note that regrettably this unofficial set of standards is not followed in the popular Praat package. I prefer to use WaveSurfer which is also freely downloadable, multi-platform software.)

Attitudes toward one’s work.

In concluding this review, I will mention three attitudes toward one’s work that Ladefoged exemplified in PDA.

Phonetics is not rocket science. Repeatedly in PDA Ladefoged emphasizes the accessibility of phonetic research. From his story of using the crumbs from burnt toast to perform a quick palatographic study of Basque, to his insistence that “phonetic ability is not an esoteric skill” (p. 10). Ladefoged emphasizes over and over that phonetics is not rocket science. You can get the supplies for palatography at the grocery store and the hardware store; use a flashlight and a camcorder. You can calibrate your air pressure equipment with a ruler and a glass of water. I think that this emphasis comes partly from the reaction that phoneticians often get from our

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colleagues in linguistics; as if microphones are cyclotrons, and an analysis of variance is the theory of relativity. Of course, some phoneticians may cloak the work in obfuscation (phoneticians are not alone in this!), Ladefoged definitely tries to avoid such hocus-pocus mumbo-jumbo and presents phonetic research as the sort of thing you could do at a party if you wanted to.

Self-respect and respect for others. The risk of not obfuscating one's work is to give the impression of lack of seriousness, as if research that could be done with toast crumbs at a party is not real research. In reality though, Ladefoged in no way encourages a lax attitude on the part of the researcher. On the contrary, we have instructions here to be thinking about how you will write up the results during all stages of planning and execution of a study (p. 27), of showing up for work prepared (p. 11, 29), to devise a measurement plan in acoustic studies and write it down and stick to it (p. 142), and to always maintain a professional relationship with consultants (p. 14). He recommends that the linguist pay twice the usual local rate for laborers, always pay consultants even if they are willing to volunteer, "fire" consultants (he says "move on") if things aren't working out, and insist with consultants that "work on their language is work and not play" (pp. 9-14). In this approach to working with others we see a high level of self-respect that the work is important, and a high level of respect for the consultant's role in the work.

Skepticism and enthusiasm. I don't know how many phonetic studies have involved measurement of intensity as a cue for stress, or F2 transition as a cue for place of articulation, but it has to be a large number. So it is a bit of jolt to read that intensity "is usually not a very useful acoustic property to measure" (p. 93) and "I ... have never found acoustic analysis useful for determining the place of articulation" (p. 160). Ladefoged's critical evaluation of phonetic research methods is apparent throughout PDA. His rule for textbook writing was that the author's responsibility is to present the consensus of the discipline - material that teachers want their students to know. But this rule comes up against his natural skepticism toward received wisdom. The tension is especially fascinating to observe, and is present through much of PDA, when Ladefoged is both the originator of the received wisdom and its critic.