

FOURTH EDITION

FUNDAMENTALS OF PHONETICS

A Practical Guide for Students

Larry H. Small

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Fundamentals of Phonetics

*A Practical Guide
for Students*

Fourth Edition

Larry H. Small

Bowling Green State University

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Preface

I began the manuscript for the first edition of *Fundamentals of Phonetics: A Practical Guide for Students* in 1996 when I could not find the “perfect” phonetics textbook that aligned with my lectures. I was hard-pressed to find a phonetics textbook that provided an abundance of practice exercises for students to become proficient in the skill of phonetic transcription of American English. Therefore, I was determined to create such a textbook. I would never have believed that almost 20 years later I would be writing a preface to the fourth edition of this book. I hope that this new edition continues to provide students with the tools they need to become skilled experts in phonetic transcription.

The fourth edition is similar in its basic format to the previous three editions. Each chapter has been revised with updated material and new exercises. A couple of the chapters have been reorganized in terms of content.

Recordings of many of the exercises in the text are available on supplemental audio CDs from Pearson. These recordings are essential in helping students learn the subtleties of pronunciation, both in relation to the segmental and suprasegmental characteristics of speech. A list of the recordings appears in the Appendix of this text.

New to This Edition

- Additional information relating to the use of computer fonts in phonetic transcription has been added to Chapter 1, *Phonetics: A “Sound” Science*.
- More exercises have been added to Chapter 3, *Anatomy and Physiology of the Speech Mechanism*. Information relating to resonance of the vocal tract has been restored to this chapter from previous editions.
- The information relating to the acoustics of speech sounds has been removed from Chapter 4, *Vowels*, and Chapter 5, *Consonants*, from the third edition, and has been incorporated into the new Chapter 6, *Acoustic Characteristics of Vowels and Consonants*. This new chapter provides expanded information relating to the acoustic characteristics of speech sounds; several new figures have been added as well.

- Chapter 9, *Dialectal Variation*, has been greatly revised. Updated information reflects current census data as it relates to the population demographics of the United States. The section on *regional dialects* has been expanded, and the section on East Asian languages has been reworked.
- A new section on Asian Indian English has been added to Chapter 9.
- Learning Objectives have been updated in each chapter to reflect new changes in content.
- Online Resources have been updated to include additional websites that should prove beneficial to students' understanding of phonetics.
- All references have been updated to reflect current philosophies and best practices in the speech, language, and hearing professions.
- The supplemental audio CDs contain new recordings to accompany some of the exercises in Chapter 7, *Connected Speech*, and Chapter 9, *Dialectal Variation*. The recordings for Chapter 7 emphasize the suprasegmental aspects of speech utilizing both adults and children as speakers. Chapter 9 incorporates new recordings of a female speaker from New Delhi to complement the new section on Asian Indian English.

Acknowledgments

I would like to express my sincere appreciation to several individuals who have helped in the creation of this fourth edition. First, I would like to thank my mentor and friend, Zinny Bond, who sparked my interest in phonetics when I was still a doctoral student at Ohio University. Without her inspiration and guidance, the first edition of this book would never have been made possible. It is especially gratifying that she continues to use my book in the classroom.

Also, I would like to thank Rob Fox and Ewa Jacewicz at Ohio State University for their continued assistance in the creation of recordings for the supplemental audio CDs. A big thank you goes to Mark Bunce at Bowling Green State University for his work in creating the actual CD masters.

I must thank Nandhu Radhakrishnan of Lamar University and Vijayachandra Ramachandra of Marywood University (both previous doctoral students at Bowling Green State University), who provided invaluable information relating to the new section on Asian Indian English in Chapter 9, *Dialectal Variation*. Additionally, I would like to thank Sethu Karthikeyan of Pace University for her comments and suggestions for this chapter.

A very special thank you goes to Kerry Rubadue, my Project Manager at Pearson. She has helped me transition to a completely new editorial team for this revision. I would also like to give a special thank you to my other Production Manager, Roxanne Klaas of S4 Carlisle, who made the editing process truly enjoyable and hassle-free. Without Kerry and Roxanne's support and encouragement, I am not sure I could have made it through the revision process. A final thank you goes to the reviewers for this fourth edition whose contributions assisted me in the editing process: Troy Clifford Dargin, University of Kansas; Sania Manuel-Dupont, Utah State University; and Sandra B. O'Reilly, C.W. Post College of Long Island University.

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Phonetics: A “Sound” Science

Learning Objectives

After reading this chapter you will be able to:

1. Explain the importance of the study of phonetics.
2. Explain the importance of the *International Phonetic Alphabet (IPA)* in phonetic transcription.
3. State reasons for variation in phonetic transcription practice.
4. State the benefits of using a Unicode font for phonetic transcription.

As adults, you are all familiar with the speaking process. Speaking is something you do every day. In fact, most people find speech to be quite automatic. It is safe to say that most of us are experts at speaking. We probably have been experts since the time we were 3 or 4 years old. Yet we never really think about the process of speech. We do not, as a rule, sit around thinking about how ideas are formed and how their encoded forms are sent from the brain to the speech organs, such as the teeth, lips, and tongue. Nor do we think about how the speech organs can move in synchrony to form words. Think about the last party you attended. You probably did not debate the intricacies of the speech process while conversing with friends. Speaking is something we learned during infancy, and we take the entire process for granted. We are not aware of the speech process; it is involuntary—so involuntary that we often are not conscious of what we have said until after we have said it. Those of you who have “stuck your foot in your mouth” know exactly how automatic the speech process is. Often we have said things and we have no idea why we said them.

Phonetics is the study of the production and perception of speech sounds. During your study of phonetics, you will begin to think about the process of speech production. You will learn how speech is formulated by the speech organs. You also will learn how individual speech sounds are created and how they are combined during the speech process to form syllables and words. You will need to learn to *listen* to the speech patterns of words and sentences to become familiar with the sounds of speech that comprise spoken language. A large part of any course in phonetics also involves how speech sounds are transcribed, or written. Therefore, you also will be learning a new alphabet that will enable you to transcribe speech sounds. This alphabet, the **International Phonetic Alphabet (IPA)**, is different from most alphabets because it is designed to represent the *sounds* of words, not their spellings. Without such a

systematic phonetic alphabet, it would be virtually impossible to capture on paper an accurate representation of the speech sound disorders of individuals seeking professional remediation. Using the IPA also permits consistency among professionals in their transcription of typical or atypical speech.

Another “sound” science related to phonetics is **phonology**. Phonology is the systematic organization of speech sounds in the production of language. The major distinction between the fields of phonetics and phonology is that *phonetics* focuses on the study of speech sounds, their acoustic and perceptual characteristics, and how they are produced by the speech organs. *Phonology* focuses on the linguistic (phonological) rules that are used to specify the manner in which speech sounds are organized and combined into meaningful units, which are then combined to form syllables, words, and sentences. Phonological rules, along with syntactic/morphological rules (for grammar), semantic rules (for utterance meaning), and pragmatic rules (for language use), are the major rule systems used in production of language.

The idea of studying speech sounds may be an odd idea to understand at first. We generally think about words in terms of how they appear in print or how they are spelled. We usually do not take the time to stop and think about how words are spoken and how spoken words sound to a listener. Look at the word “phone” for a moment. What comes to mind? You might consider the fact that it contains the five letters: p-h-o-n-e. Or you might think of its definition. You probably did not say to yourself that there are only three speech sounds in the word (“f”-“o”-“n”). The reason you do not consider the sound patterns of words when reading is simple—it is not something you do daily. Nor is it something you were taught to do. In fact, talking about the sound patterns of words and being able to transcribe them is an arduous task; it requires considerable practice.

As you soon will find out, the way you believe a word sounds may not be the way it sounds at all. First, it is difficult to forget our notions of how a word is spelled. Second, our conception of how a word sounds is usually wrong. Consider the greeting “How are you doing?” We rarely ask this question with such formality. Most likely, we would say “How ya doin’?” What happens to the word “are” in this informal version? It disappears! Now examine the pronunciation of the words “do” and “you” in “Whatcha want?” (the informal version of “What do you want?”). Neither of these words is spoken in any recognizable form. Actually, these words become the non-English word “cha” in “whatcha.” With these examples, you can begin to understand the importance of thinking about the sounds of speech in order to be able to discuss and transcribe speech patterns.

EXERCISE 1.1

The expressions below are written two separate ways: (1) formally and (2) casually. Examine the differences between the two versions. What happens to the production of the *individual* words in the casual version?

Formal

1. Are you going to eat now?
2. Can’t you see her?
3. Did you go?

Casual

- Ya gonna eat now?
Cantcha see ’er?
Ja go?

Phonetics is a skill-based course much like taking a foreign language or sign language course. In many ways, it is like learning a new language because as you learn the IPA, you will be learning new symbols and new rules to represent spoken language. However, the new symbols you will be learning will be representative of the *sounds* of English, *not their spelling*. As with the learning of any new language, phonetics requires considerable practice in order for you to become proficient in its use when transcribing speech patterns. This textbook is designed to promote practice of phonetic transcription principles.

At the beginning of each chapter, several *Learning Objectives* will be listed. By reading through the Learning Objectives, you will have a clear idea of the material contained in each chapter and what you should expect to learn as you read through the text and complete the exercises.

By now, you have noticed that exercises are embedded in the text. It is important that you complete the exercises as you go along instead of waiting until after you have completed the chapter. These exercises emphasize particular points, highlighting the material you just completed, assisting in the learning process. If you are unsure of an answer, simply look in the back of the book for assistance in completing the embedded exercises.

At the end of each chapter, you will find a series of *Review Exercises* so that you may gain expertise with the material presented. The Review Exercises help drive home much of the material discussed in each chapter. All of the answers to the Review Exercises are located at the back of the book. Similar to the embedded exercises, providing the correct answers for the Review Exercises will provide you with immediate feedback, helping you learn from your mistakes. There is no better way to learn! To aid in the learning process, all new terms will be in bold letters the first time they are used. In addition, all new terms can be found in the *Glossary* at the back of the book.

Study Questions at the end of each chapter will help you explore the major concepts presented. *Online Resources* also are provided to supplement the material presented in the text. *Assignments* at the end of the chapters were designed to be collected by your instructor to test your comprehension of the material. Therefore, the answers for Assignments are not given in the text.

There are several conventions that will be adopted throughout the text. When there is a reference to a particular Roman alphabet letter, it will be enclosed with a set of quotation marks: for example, the letter “m.” Likewise, references to a particular word will also be enclosed with quotation marks: for example, “mail.” Individual speech sounds will be referenced with the traditional slash marks: for example, the /m/ sound. When a word and its transcription are given together, they will appear in the following format: “mail” /meɪl/.

A set of three optional audio CDs provide listening exercises to accompany the text. Clinical practice generally requires phonetic transcription of recorded speech samples. Reading words on paper and transcribing them is not the same as transcribing spoken words. The audio CDs are designed to increase your listening skills and your ability to transcribe spoken English. Exercises requiring the audio CDs will be indicated with a CD icon in the margin of the text. There also will be a notation indicating the CD track number where the recorded exercise may be found. A complete listing of the audio tracks is given in the Appendix.

Variation in Phonetic Practice

Although the IPA was developed for consistency, not everyone transcribes speech in the same manner. The IPA does allow for some flexibility in actual practice. If you were to pick up another phonetics textbook, you would find some definite differences in transcription symbols. Therefore, alternate transcription schemes will be introduced throughout this text.

One reason transcription practice differs from individual to individual is due to personal habit or the method learned. For instance, the word “or” (or “oar”) could be transcribed reliably in all of the following ways:

/ɔr/, /or/, /ɔɹ/, /oɹ/, /ɔ̃ɹ/

All of these forms have appeared in other phonetics textbooks and have been adopted by professionals through the years.

Several years ago, I was assigned to a jury trial that lasted two weeks. Due to the length of the trial, the judge allowed us to take notes. So that no one could read my notes, I decided to use the IPA! Because I had to write quickly, my transcription habits changed. At the beginning of the trial, I transcribed the word “or” as /ɔ̃ɹ/ due to personal preference. By the middle of the trial, I had switched to /ɔr/, simply because it was easier to write and was more time efficient.

Another difference in ease of use of transcription symbols involves the symbol /r/, traditionally used to transcribe the initial sound in the word “red.” According to the IPA, this sound actually should be transcribed with the symbol /ɹ/. The IPA symbol /r/ represents a *trill*, a sound found in Spanish and other languages, but not part of the English speech sound system. Because /r/ and /ɹ/ both do not exist in English, /r/ routinely has been substituted simply because it is easier to write. Since most speech and hearing professionals have continued to use the symbol /r/ instead of /ɹ/ in written transcription, the tradition will be continued in this textbook.

As future speech and hearing professionals, you will be using the IPA to transcribe clients with speech sound disorders. Because the IPA was not originally designed for this purpose, clinicians have varied in their choice of symbols in transcription of speech sound disorders. In 1990, an extended set of phonetic symbols (known as the extIPA) was created as a supplement to the IPA to provide a more standard method for transcription of speech sound disorders (see Chapter 8). Similar to the original IPA, the extIPA has not been used consistently among phoneticians, linguists, and speech and hearing professionals.

Is one method of transcription “better” or more correct than another? Some linguists and phoneticians might argue that one form is superior to another based on linguistic, phonological, or acoustic theory. The form of transcription you adopt is not important as long as you understand the underlying rationale for your choice of symbols. In addition, you need to make sure that you are consistent and accurate in the use of the symbols you adopt. Throughout this book, variant transcriptions will be introduced to increase your familiarity with the different symbols you may encounter in actual clinical practice in the future.

The IPA and Unicode Fonts

Historically, the typical typewriter or computer did not lend itself well to the IPA. Some keyboard symbols were routinely substituted for IPA symbols simply because typewriters and computer keyboards did not have keys for many of

the IPA symbols. For example, the word “dot” was typically transcribed (i.e., typed) as /dat/ instead of the correct form /dɑt/ because it simply was not possible to type the vowel symbol /ɑ/.

You may not know it, but you already may have the ability to type IPA symbols with one of the fonts located on your computer. In Microsoft Windows 7 or 8, these include Times New Roman, Arial, Tahoma, and Lucida Sans Unicode. Mac OS X users can select from Helvetica, Lucida Grande, and Monaco. In 1991, the Unicode Consortium was established to develop a universal character set that would represent all of the world’s languages. The Consortium continues to publish the Unicode Standard, which in its most recent version, version 7.0.0, covers virtually all of the characters of all the languages of the world, including several character sets for the IPA. In addition, there are character sets for currency symbols, braille patterns, geometric shapes, musical symbols, mathematical symbols, and even emoticons.

The current version of the Standard allows for over 110,000 characters, each mapped to a unique alphanumeric sequence called a *code point*. A code point is a hexadecimal sequence of numbers (0 through 9) and/or letters (“a” through “f”) that uniquely identify each of the characters in the set. Each character also has a unique name. For instance, the code point for the Roman letter “j” is *006A*, and its name is “Latin small letter j.” Similarly, the code point for the Greek letter “θ” is *03B8*, and its name is “Greek small letter theta.” Since each character in the universal set is linked to an alphanumeric sequence, the word processor and font you select will determine the “look” of each individual character, that is, what appears on your monitor and what is reproduced by your printer. Keep in mind that any one particular Unicode font does not contain all of the code points from the universal set.

The nice thing about Unicode fonts is that they can be used on multiple platforms (e.g., Macintosh, Windows, Linux), and can be used with all word processing software packages. Unicode fonts also can be used when creating HTML documents for online use. In the past, cross-platform fonts did not exist. Also, there was a limit to the number of characters contained in any one font package; most fonts were limited to 256 characters. Fonts of different languages existed separately as well, making it difficult to switch between writing systems in the same document.

Another advantage of using a Unicode font with IPA symbols is that once the symbols have been typed into a particular document, you can switch to a different Unicode font and all of the symbols will remain intact. The only difference in appearance between fonts would be related to a particular font’s size and shape, and whether it is a serif or sans serif font. Prior to the utilization of Unicode, it was not possible to switch fonts without obliterating all of the IPA symbols in a document. Trust me, I know!

A number of Unicode phonetic fonts are available online. Many are available for free and are really quite easy to download and use. The phonetic symbols in this book were created with *Charis SIL*, a Unicode font available from SIL International (see “Online Resources” at the end of this chapter). This font contains over 2000 characters. *Doulos SIL* and *Gentium* are two other Unicode phonetic fonts available for free from the SIL International website.

There are three ways to enter IPA symbols from a Unicode font into a document: (1) make use of software that creates an alternate keyboard layout; (2) enter the code point for each IPA symbol; or (3) insert each symbol individually by using character maps available as part of the Windows and Macintosh operating systems.

The easiest method is to use an alternate keyboard layout. I obtained a specialized keyboard for entering the IPA symbols in this text from the website of the Speech, Hearing and Phonetic Sciences Department at the University College London (UCL) (see “Online Resources” at the end of the chapter). Once the keyboard was installed, all I had to do to enter the symbol /ʃ/ was to simply type SHIFT + “s.” Without such a keyboard, it would be necessary to type the unique code point for each character (which is a tedious and time-consuming task). In Microsoft Word (Windows), you would have to type the four-character code point, followed by the sequence ALT + “x,” for entry of a particular symbol. For instance, typing the sequence “0283” followed by ALT + “x” will yield the IPA symbol /ʃ/ (without the slash marks). With Mac OS X, you would need to go to *System Preferences*, and select either the *International* or *Language and Text* icon, depending on your version of the operating system. Then, click on the *Input* or *Input Sources* tab, and select the keyboard titled *Unicode Hex Input*. Once you have done this, you would hold down the OPTION key and then type the code point for the phonetic symbol you want. Alternatively, you also could use the “insert symbol” function (Windows) or use the “character palette” (Macintosh) to enter the symbols individually from a character map that shows all of the symbols associated with a particular font. This process is also very tedious and time-consuming.

EXERCISE 1.2

Configure your computer so that you can enter code points into a text document (see “Online Resources” at the end of the chapter for help). Then, enter the following code points and write the corresponding IPA symbol in the blanks provided.

Code Point	IPA Symbol
1. 0259	_____
2. 03B8	_____
3. 028A	_____
4. 0271	_____
5. 0279	_____

A Note on Pronunciation and Dialect

As you read this book, and as you attempt to answer the various exercises, please keep in mind that English pronunciation varies depending upon individual speaking style as well as on **dialect**. A dialect is a variation of speech or language based on geographical area, native language background, and social or ethnic group membership. Dialect involves not only pronunciation of words but also grammar (syntax) and vocabulary usage. As you will see in Chapter 9, there is no one fixed standard of English in the United States as is the case in other countries. Instead, Americans speak several different varieties of English depending upon the region of the country in which they live. Additionally, dialects such as African American English and Chicano English have particularly strong ties to ethnic group membership even though regional variations do exist among these dialects. The population of the United States contains many

foreign-born residents who have learned English as a second language. The dialect of English spoken by a foreign-born individual is affected, at least in part, by her native language. This is because foreign languages have a different set of speech sounds than those we use in English. There are sounds that are present in English that are not present in the foreign language, and vice versa. For example, English has 14 vowels, whereas Spanish has only 5 vowels. Therefore, when a native Spanish speaker is learning English, it is not uncommon for the speaker to substitute one of the 5 Spanish vowels for an English vowel that does not exist in the Spanish vowel system, contributing to the person's "accent."

Knowledge of dialects is extremely important when establishing a treatment plan for individuals with a communication deficit and whose speech patterns reflect regional or ethnic dialectal variation. Because a dialect should not be considered a substandard form of English, a speech-language pathologist should be concerned only with remediation of clients' speech sound errors, not their dialects.

The pronunciations used in this book often reflect the author's Midwest (northern Ohio) pronunciation patterns. This does not mean that alternate pronunciations are wrong! The numerous text and recorded examples, as well as the answer key, may not be indicative of the way *you* pronounce a particular word or sentence. Always check with your instructor for alternate pronunciations of the materials found in this book and on the supplemental CDs.

Study Questions

1. What is a *phonetic alphabet*?
2. Why is it important to use a phonetic alphabet in transcription of individuals with speech sound disorders?
3. Why is there variation in phonetic transcription from professional to professional?
4. What is the difference between *phonetics* and *phonology*?
5. What is a Unicode font? What are the advantages of using such a font?
6. What are three ways you can enter phonetic symbols into a document using a Unicode font?

Online Resources

Penn State Teaching and Learning with Technology. (2013). *Computing with accents, symbols and foreign scripts—Typing with non-English keyboards*. Retrieved from <http://symbolcodes.tlt.psu.edu/keyboards>
(information regarding phonetic font keyboards)

SIL International. (2014). *IPA Unicode keyboards*. Retrieved from http://scripts.sil.org/cms/scripts/page.php?site_id=nrsi&id=UniIPAKeyboard
(keyboarding information)

SIL International. (2014). *Welcome to computers and writing systems*. Retrieved from <http://scripts.sil.org/Home>
(phonetic fonts)

The Unicode Consortium. (1991–2014). Retrieved from <http://www.unicode.org>
(information regarding the most current Unicode standard; access to character code charts for all the world's languages, the IPA, and many different symbol and character sets)

University College London (UCL) Speech, Hearing and Phonetic Sciences. (2013). *Phonetic symbols, keyboards and transcription*. Retrieved from

<http://www.phon.ucl.ac.uk/resource/phonetics.php>
(phonetic font keyboard)

Wells, John. (2013). *The International Phonetic Alphabet in Unicode*. University College London (UCL) Speech, Hearing and Phonetic Sciences. Retrieved from

<http://www.phon.ucl.ac.uk/home/wells/ipa-unicode.htm>
(Unicode code points for the IPA symbols)

Wood, Alan. (2013). *Alan Wood’s Unicode resources: Unicode and multilingual support in HTML, fonts, web browsers and other applications*. Retrieved from

<http://www.alanwood.net/unicode/>
(information about Unicode fonts)

Phonetic Transcription of English

Learning Objectives

After reading this chapter you will be able to:

1. Contrast the differences between spelling and sound in English.
2. Describe the various sections of the IPA chart.
3. Define and contrast the terms *phoneme*, *allophone*, and *morpheme*.
4. Define and describe the components of a syllable.
5. Identify primary stress in words.
6. Describe the differences between broad and narrow transcription.

As you begin your study of phonetics, it is extremely important to think about words in terms of how they sound and *not* in terms of how they are spelled. As you begin your study of phonetics, it is extremely important to think about words in terms of how they sound and *not* in terms of how they are spelled. *The repetition of this first sentence is not a typographical error.* The importance of this concept cannot be stressed enough. You *must* ignore the spelling of words and concentrate only on speech sounds. If you have been troubled in the past with your inability to spell, do not fear—phonetics is the one course where spelling is highly discouraged.

For many, ignoring spelling and focusing only on the sounds of words will be a difficult task. Most of us started to spell in preschool or in kindergarten as we learned to read. It was drilled into our heads that “cat” was spelled C-A-T and “dog” was spelled D-O-G. Consequently, we learned to connect the spoken (or printed) words with their respective spellings. Imagine the following fictitious scenario between a parent and a child reading along together before bedtime:

“OK, Mary. Now, let’s think about the word ‘cat.’ It’s spelled C-A-T, but the first speech sound is a /k/ as in ‘king,’ the second sound is an /æ/ as in ‘apple,’ and the third sound is a /t/ as in ‘table.’ Notice that the first sound is really a /k/ even though the word begins with the letter ‘c.’ When ‘c’ begins a word, it may sound like /k/ or may sound like /s/, as in the word ‘city.’ Actually, Mary, there is no phonetic symbol in English that uses the printed letter ‘c.’”

Obviously, this type of interchange would cause children to lose any desire to read!