Functional Phonetics Workbook

Fourth Edition

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Preface

The *Functional Phonetics Workbook* was designed to be used in several ways. It is a valuable classroom resource for instructors who teach an introductory phonetics course. It can also be used, with the accompanying audio files, by individuals as they learn the International Phonetic Alphabet (IPA) without access to formal instruction. The *Functional Phonetics Workbook* also provides a convenient review format for those who require a review of their phonetic transcription skills. For example, this might be a first-semester graduate clinician who has not reviewed phonetics since taking their introductory classes in communicative sciences and disorders. The student may find it a helpful review if they have been assigned a client who demonstrates a speech-sound disorder. The workbook focuses on the basics of phonetic transcription in General American English (GAE). Students should find the Phoneme Study Cards and Transcription Exercises very helpful study tools for learning the IPA sound/symbol associations.

New material added for the fourth edition includes updated examples, definitions, and activities across the text. The text has also been reorganized to allow for a discussion of vowels prior to the review of consonants. Chapter 15 has been added to provide students opportunities to practice transcribing word-level productions with speech-sound errors. Finally, the PluralPlus companion website has been updated with a variety of new resources. We hope that these changes help students progress more effectively in their transcription skills.

Workbook Format

The introductory chapters of this workbook provide background information needed for success in an introductory course in phonetics. This includes information on the IPA, a discussion of symbol formation and syllable shapes, and a review of basic anatomy and physiology concepts relevant to phonetics.
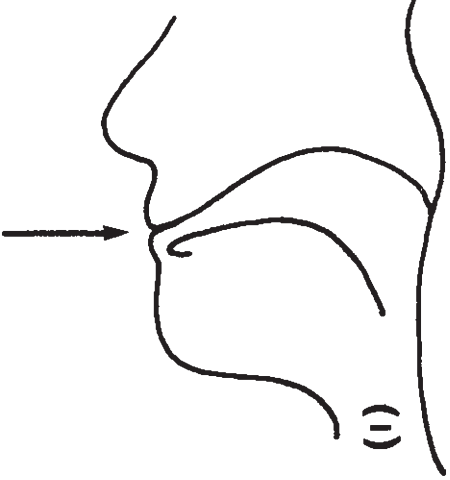
Chapters 4 to 12 center on learning to transcribe words with the vowels and consonants of GAE. Each chapter focuses on a different group of related phonemes. A phoneme description page is provided for each of the IPA phonemes. Each page is organized to provide the following information (see the following example): (1) description of place, manner, voicing, and relevant distinctive features; (2) vocal fold and velopharyngeal port positions; (3) tongue position and how the phoneme is produced; (4) common allographic variations; (5) word positions in GAE; and (6) clinical information. The Clinical Information section includes a listing of consonant cognate pairs (i.e., sounds made in the same place and the same manner) and/or common articulatory errors that might be demonstrated on production of the reviewed phoneme.

For each phoneme, transcription exercises are provided to help students develop their phonemic awareness and transcription skills. A reference to the audio file that aligns with each exercise is provided in the right corner of each worksheet page. These audio files are titled by order of appearance in each chapter and can be accessed on the PluralPlus companion website (the URL and access code is available on the inside front cover of the workbook). Crossword Puzzles and Word Searches are also included and provide more practice in transcription skills. Answers to all of the Transcription Exercises, Crossword Puzzles, and Word Searches are listed in Appendix B: Answers to Exercises.

The final chapters of the text allow students opportunities to learn more about word stress, dynamics of connected speech, introductory clinical applications of phonetics, and dialectal differences.

Example of the Phoneme Description Page

Distinctive Features	Tongue Position
Voicing/Velopharyngeal Port	**Common Allographs**
Word Position	**Clinical Information**

1

The International Phonetic Alphabet (IPA)

Learning Objectives

After reading this chapter, you will be able to:

1. State why the International Phonetic Alphabet (IPA) was developed.

2. Name and explain three reasons for studying speech sounds.

3. Define phonetics and explain why it is a functional tool.

4. Identify the origin of many of the symbols of the IPA.

Speech-sound production is one of the core components of early communication development. Within the first few years of life, the majority of children will effectively learn to produce the various vowels and consonants needed to intelligibly communicate a range of intended messages. As children continue to develop, they may subsequently be exposed to the alphabetic symbols that are commonly used to represent the sounds of their language in writing. This can sometimes be challenging, particularly when there is not consistent alignment between alphabetic symbols and the speech sounds they are used to represent. Take the English language, for example. Although there are 26 letters in the English alphabet, there are roughly 44 speech sounds in the General American English (GAE) dialect. Moreover, there are more than 200 individual alphabetic letters and letter combinations that are used to represent the sounds produced within GAE.

Let's take a brief look at how we spell and pronounce some common English words. For example, the sound represented

by the diagraph "sh" has up to 12 different spellings, including the "sh" as in s<u>h</u>ark, the "s" as in <u>s</u>ugar, the "ch" as in <u>ch</u>ef, the "c" as in o<u>c</u>ean, the "ci" as in musi<u>ci</u>an, and the "ss" in "profe<u>ss</u>ion," just to name a few. Spelling variations are not unique to English consonants; they impact vowels as well. There are many variations for long vowels in particular, such as "o," "oe," "oa," "ow," "ou," and "o" with a silent "e" all being used to represent the long "o" sound and "a," "ea," "ei," "ey," "ay," "ai," "eigh," and "a" with a silent "e" serving as spelling variations for the long "a" sound. To make things more complex, the same alphabetic symbol can be used to represent different speech sounds. Consider the letter "t" in <u>t</u>hank, <u>t</u>ender, and no<u>t</u>ion; the "h" in a<u>ch</u>e, <u>h</u>oist, <u>h</u>our, <u>th</u>ree, and enoug<u>h</u>; and the "c" in <u>c</u>hair, soni<u>c</u>, and <u>c</u>itrus. While the same alphabetic symbol is used in each group of words, each context is associated with the production of a different speech sound. Finally, we also sometimes see silent letters used in written words, such as the silent "k" as in "know," the silent "b" as in "climb," or the silent "l" as in "could," just to name a few. George Bernard Shaw summarized these challenges with the English language in the preface to *Pygmalion*, the play that eventually became the musical and movie *My Fair Lady*, in stating "no man can teach himself what it should sound like from reading it."

Although there has been a constant push from various groups to regularize English spelling patterns, these movements have been met with resistance for centuries. Currently, the English alphabet alone does not serve as a reliable system for documenting the sounds that one hears. This poses a challenge for professionals interested in speech-sound production, which includes individuals who work in the field of communication sciences and disorders.

As a result of this challenge, the field has adopted use of the International Phonetic Alphabet (IPA) to aid in more accurate documentation of observed speech-sound production. First published in 1886 by the International Phonetic Association, the IPA is a sound-symbol system used to represent the sounds of all the languages of the world. Because it is not unique to a specific language's oral or written language practices, the IPA provides phoneticians with a more consistent, reliable method to communicate with one another. As a result of its unambiguous, one-to-one representation of spoken speech, the IPA has been adopted by the field of communication sciences and disorders as a tool for documenting production of speech sounds.

Foundational Knowledge in Studying Phonetics

Phonetics, the study of speech sounds, is an extremely useful tool for the speech-language pathologist. The IPA is used to transcribe, or record using the IPA, the speech production of a client. Transcribing the speech errors of a child or adult is an integral part of the assessment process. Effective transcription requires the development of several skills. First, students learning about phonetics must understand the different forms of transcription that might be used. We will first distinguish between broad and narrow transcription approaches. The distinction between these two approaches is in the level of detail provided in the transcription. When using broad transcription, individuals highlight the most salient features of observed phonemes. For example, the word "soup" is composed of three unique phonemes, /s/, /u/, and /p/. As such, the broad transcription of this target word would be /sup/. There might, however, be some variation in individual productions of this word, especially

as it relates to the final /p/ sound. Some individuals might produce this phoneme with added breathiness by directing the airflow out of the oral cavity. You might notice that others produce this final phoneme very quietly, holding the breath stream within the oral cavity. Broad transcription alone will not capture these subtle differences, known as allophonic variations. Narrow transcription provides us with added detail regarding an individual's productions. This is accomplished by adding diacritic marks to a transcription. Allophonic variations and diacritic marks will be discussed in later chapters of this text; however, if we wanted to distinguish between the productions of /p/ in the previous example, a superscript ^{h} would be used to denote the more breathy production (i.e., [sup^h]), whereas the unreleased marker $^\urcorner$ would be used to denote no audible airflow release associated with production of the final phoneme (i.e., [sup$^\urcorner$]).

Reading closely, you might have also noticed differences in how phonemes and groups of phonemes were listed above. From a linguistics-based perspective, there are different contexts in which slash marks, known as virgules (i.e., / /), versus brackets (i.e., [ ]) should be used in the transcription process. Virgules are used when engaging in phonemic transcription. Phonemic transcription centers on clearly contrastive phonemes that are used in a language. As such, phonemic transcriptions serve as a representation of the theoretical production of a phoneme or group of phonemes within a language. You would expect to see phonemic transcriptions using virgules alongside descriptions of words in a dictionary. This is because those transcriptions are documenting how that word would likely be produced rather than an individual person's production. For this reason, phonemic transcriptions typically make use of broad transcription as well. Brackets are used

when engaging in phonetic transcription. Phonetic transcription allows clinicians to document an individual person's production of a phoneme or set of phonemes. For example, a speech-language pathologist might be working with a child who demonstrates a w/r substitution. When asked to say the word "red," the child might produce that first phoneme in error. To document this, the clinician might write down that the child said [wɛd], the phonetic transcription of the child's production. Notice that brackets were used because this transcription represents a word that was actually produced. Depending on the level of detail needed to document a client's production, narrow or broad transcription might be used within the context of phonetic transcription.

It should be noted that there are fairly significant variations in the application of broad, narrow, phonemic, and phonetic transcription practices within the field of speech-language pathology. In fact, several of the major tests of speech-sound production, including the Goldman-Fristoe Test of Articulation–3rd Edition (Goldman & Fristoe, 2015), Arizona Articulation and Phonology Scale–4th Revision (Fudala & Stegall, 2017), Structured Photographic Articulation Test featuring Dudsberry–3rd Edition (Tattersall & Dawson, 2016), and Clinical Assessment of Articulation and Phonology®–2nd Edition (Secord & Donohue, 2014), present phonemes and/or full words that are transcribed without the inclusion of brackets or virgules altogether. To simplify things, some clinicians elect to present individual phonemes with virgules (e.g., initial /ɹ/ in "red"), as a way to indicate the hypothetical, target production of a phoneme. Then, when transcribing word-level or connected speech productions, they might use brackets (e.g., [wɛd]) to indicate that the transcription represents how the response was actually produced by a given client. This practice

aligns well with the focus of this workbook, and you will see it applied throughout the subsequent chapters.

The next step in developing strong transcription skills is building your own phonemic awareness skills. Phonemic awareness refers to a person's overall sensitivity to individual units of sound. Individuals who have strong phonemic awareness skills are able to isolate, blend, segment, and manipulate phonemes produced in words. This aids in an individual's ability to accurately perceive phonemes produced by others and document them within their transcriptions. For example, imagine that your professor asked you to transcribe the word "tough." Although this word is spelled with five letters, your phonemic awareness skills should allow you to segment this word into its three phonemes, /t/, /ʌ/, and /f/. This ability to perceive the phonemes that make up a word and their unique characteristics is critical to successful transcription skills. Especially in the early stages of learning phonetics, you will find it necessary to actively practice your phonemic awareness skills. Give it a try with the following examples: thin, could, teacher, animal, comparison. Remember to segment each phoneme, focusing on the sounds you hear rather than the letters used in the spelling of the word. You should have indicated that "thin" has three phonemes (i.e., /θ/, /ɪ/, and /n/), "could" has three phonemes (i.e., /k/, /ʊ/, and /d/), "teacher" has four phonemes (i.e., /t/, /i/, /tʃ/, and /ɚ/), "animal" has six phonemes (i.e., /æ/, /n/, /ɪ/, /m/, /ə/, and /l/), and "comparison" has 10 phonemes (i.e., /k/, /ə/, /m/, /p/, /ɛ/, /ɹ/, /ɪ/, /s/, /ə/, /n/). You will have more opportunities to practice these skills in Chapter 2 and throughout the remainder of the workbook.

Finally, successful transcription necessitates a strong understanding of the IPA symbols that are used to represent each phoneme. Accordingly, students who are learning phonetics must spend time practicing symbol selection and formation. Tables 1–1 and 1–2 provide a list of the IPA symbols for the phonemes of the GAE alongside their common grapheme, or orthographic symbol, and several words demonstrating use of the target phoneme.

Many consonant symbols of the IPA originate from the Roman alphabet. This includes the following consonant letters, which are used to represent phonemes produced in GAE: p, b, t, d, k, g, f, v, s, z, h, w, j, l, m, and n. If you reviewed this list closely, you might have noticed several alphabetic consonants that were not included. This includes the alphabetic letters: c, r, q, x, y. The orthographic "c" is not used as the sounds commonly associated with this letter can be represented by other phonemes present in the IPA. Most notably, the phonemes /s/ (e.g., as in "cent") or /k/ (e.g., as in "count") are typically produced in words that contain the orthographic "c." The letter "r" is actually part of the IPA; however, it is not commonly produced within the GAE dialect. When formed as an /r/, this symbol refers to the rolled or trilled "r" sound. The phoneme used to represent the consonantal "r" sound in GAE is /ɹ/. The reason why "q" and "x" are not used in the IPA is quite similar. If you produce the sounds commonly associated with these letters slowly, you might notice that you are actually producing two phonemes continuously. Namely, the "q" is produced as /kw/, and the "x" is produced as /ks/. Finally, the /j/ may look familiar to you, but in the IPA, it is used to represent the "y" sound as in "young." For this reason, the letter "y" is not needed for transcription purposes.

Other symbols are from the Greek alphabet or have been created especially for the IPA. The Greek lowercase theta /θ/ is used for the voiceless "th" as in "thigh." The /ð/ represents the voiced "th" as in "this." A lengthened sigmoid /ʃ/ represents the "sh" as in "ship." The /ʒ/ symbolizes the

TABLE 1–1. General American English Consonants and Their IPA Symbols

IPA Symbol	Primary Grapheme or Orthographic Symbol	Key Words
/p/	p	pal, apart, tap
/b/	b	barn, cabin, rub
/t/	t	tea, water, mat
/d/	d	dish, lady, sad
/k/	k	card, bacon, hook
/g/	g	game, sugar, bag
/f/	f	feed, afford, off
/v/	v	van, envy, have
/θ/	th	thin, something, cloth
/ð/	th	this, weather, bathe
/s/	s	sat, lesson, horse
/z/	z	zone, puzzle, jazz
/ʃ/	sh	ship, fashion, mash
/ʒ/	zh	treasure, beige
/h/	h	hit, behave
/tʃ/	ch	chip, scratching, pitch
/dʒ/	j	jam, magic, page
/w/	w	wet, sandwich
/j/	y	yard, beyond
/l/	l	leaf, mellow, hill
/ɹ/	r	rake, bedroom, car
/m/	m	men, camel, time
/n/	n	net, dinner, pine
/ŋ/	ng	singer, ring

"zh" sound, as in "beige." The IPA combines the symbols /t/ and /ʃ/ into /tʃ/ for the "ch" sound, as in "chick." Similarly, the /d/ and /ʒ/ join for /dʒ/ as in "Jack." The symbol /ŋ/ represents the "ng" sound, as in "ring."

The vowels of the IPA may be considered more challenging than the consonants, as you must learn a new sound/symbol system for the majority of them. For instance, the symbols "a, e, i, u" do not represent the traditional long vowel sounds. In addition, the IPA uses the symbols /ɪ, ɛ, æ, ɝ, ɚ, ʌ, ə, ʊ, ɔ/ to represent various vowel phonemes. Similarly, the diphthongs present another

TABLE 1–2. General American English Vowels and Their IPA Symbols

IPA Symbol	Primary Grapheme or Orthographic Symbol	Key Words
/i/	ee	eat, keep, free
/ɪ/	-i-	in, mitt
/e/	a-e	achy, racing
/ɛ/	-e-	ebb, net
/æ/	-a-	at, bat
/ɝ/ (stressed)	-ur-	earn, herd, fur
/ɚ/ (unstressed)		herder, percent
/ʌ/ (stressed)	-u-	up, cup, done
/ə/ (unstressed)		alive, relative, sofa
/u/	-oo-	boot, stew
/ʊ/	-oo-	hood, could
/o/	oa	oat, wrote
/ɔ/	-aw-	all, yawn, paw
/ɑ/	-o-	on, bomb
/eɪ/	a-e	age, face, say
/oʊ/	oa	oak, pose, toe
/aʊ/	ou	ouch, gown, how
/aɪ/	i-e	ice, shine, rye
/ɔɪ/	oi	oyster, coin, toy
/iɹ/	ear	ear, clearly, steer
/ɛɹ/	air	airplane, fairy, stare
/ɑɹ/	ar	art, smart, car
/oɹ/	or	organ, chores, floor

sound difference. The diphthongs are written as a combination of two vowel sounds fused together. This includes the use of /eɪ/ in the word "ace," /oʊ/ in the word "own," /aɪ/ in the word "island," and /ɔɪ/ in the word "coy." As you can see, the vowels of the IPA can be complex. You are learning a new, exciting language—it will take time and study, but your efforts will be rewarded as you master transcription with the IPA!

How Speech Sounds Can Be Studied

One of the ways that speech sounds can be studied is as isolated, separate, and independent entities. Another way speech sounds can be studied is by comparing one sound with another sound. As shared earlier in this chapter, this workbook will focus on the speech sounds that are part of GAE, the major dialect of English spoken in the United States. Refer to Chapter 16 for a definition of GAE.

A detailed study of speech sounds involves three primary reference points: (a) the organs that produce speech and their function in producing speech sounds (articulatory phonetics), (b) the physical properties of the individual speech sounds (acoustic phonetics), and (c) the process by which the individual speech sounds are perceived and identified (auditory phonetics). More recently, emphasis has been placed on the branch of clinical phonetics, which focuses on the use of phonetics to solve real-world problems. Articulatory phonetics is the focus of this workbook; however, speech-language pathology students will develop competencies across all four branches of phonetics as they progress through their undergraduate and graduate coursework. Regardless of the setting in which a speech-language pathologist is ultimately employed, a thorough knowledge of phonetics is essential for successful clinical practice.

? Study Questions

1. Why is mastery of the International Phonetic Alphabet (IPA) important?

_____

_____

2. From what language did many of the IPA symbols originate?

_____

_____

3. What is the purpose of the IPA?

_____

_____

4. Why are the IPA vowels considered more challenging than the consonants?

_____

_____

5. Define phonetics.

_____

_____

6. Name and describe the three primary reference points in the study of speech sounds.

_____

_____

7. Write the IPA phoneme that represents the following sounds:

a. "sh" _____   d. "ee"   _____

b. "th" _____ and _____   e. long "o" sound _____

c. "ng" _____   f. short "a" sound _____

8. What is the difference between broad and narrow transcription?

_____

_____