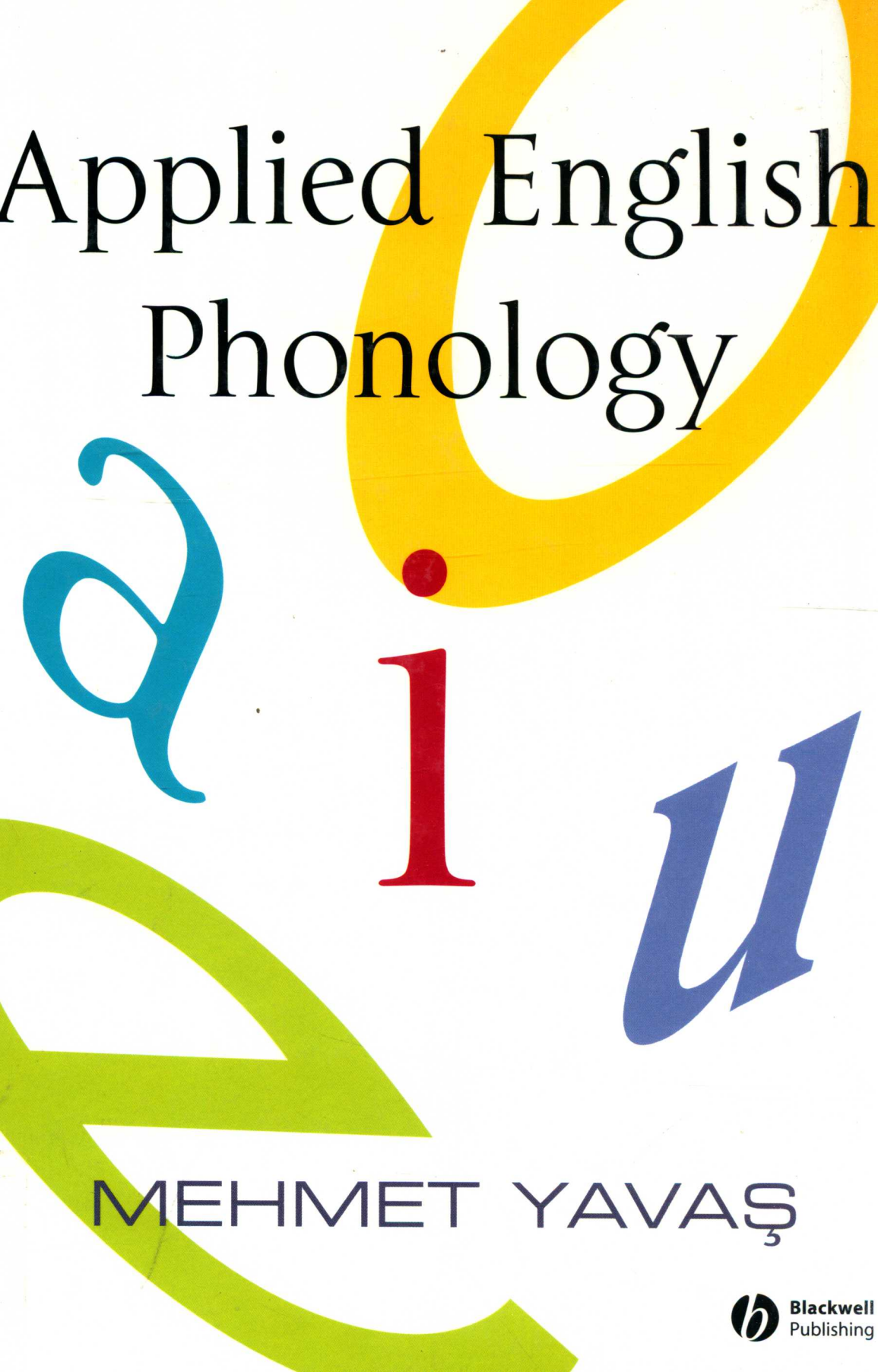
Applied English Phonology



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Mehmet Yavaş

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Preface

It has been widely recognized that professionals working in the field of remediation (teaching/therapy) of sound patterns need to have a good understanding of phonology in order to evaluate the productions of their clients (students/patients), which differ from the norm in a systematic fashion. The aim of this book is to provide material on the sound patterns of American English that is usable by students and professionals in the field of phonological remediation.

During my career, I have had several opportunities to work with individuals from applied fields such as TESOL and Communication Sciences and Disorders. My constant message to them has been that the more linguistic knowledge (phonology in this particular case) they have, the better remediators they can become. This has been based on the well-established principle that any attempt at remediation requires a detailed phonological profile of the client, and the ability to do this can only be gained via good familiarity with the normative sound patterns.

To provide a needed source for the applied fields, one needs to decide carefully the degree of sophistication of the material coming from a technical field such as linguistics. On the one hand, one wants to account for the patterns accurately with no distortions; on the other, one would like to make the material comprehensible and useful to practitioners in remediation. I aimed to strike such a balance with this book, and the greatest help I received in this respect has come from my several years of experience with students from applied fields.

I would like to thank my students who helped me by asking questions and making comments that made me think and rethink about the issues and answers and their relevance to the applied fields. I am also indebted to the reviewers for their comments on the earlier draft; these comments are deeply appreciated. I would like to thank my copy-editor Pandora Kerr Frost for her expert work on my typescript. Finally, sincere thanks are due to Emily Finlan for her assistance in preparing the manuscript and to Sarah Coleman and Ada Brunstein of Blackwell Publishing, who were extremely helpful at every stage of the completion of this text.

M.Y.

Note to the Instructor

The material presented in this book has been, partially or in its entirety, used effectively on different occasions. Instructors who work with a specific student body and/or certain time constraints often have to make adjustments in the inclusion or exclusion of the material found in the texts. There are three chapters that might deserve some comments in this respect. Firstly, chapter 8 ('Structural Factors in Second Language Phonology') may appear to be relevant only to the field of language teaching. However, the increasing participation of individuals from the field of Communication Disorders with respect to issues such as 'bilingual phonology' and 'accent reduction', makes this chapter very relevant to this field too. Secondly, to have a chapter on spectrographic analysis (chapter 5) may appear rather uncommon in a book like this, and it may be skipped depending on time constraints. The experience I have, however, has been very encouraging with respect to its inclusion. Students have repeatedly stated that it has added a valuable new dimension to their understanding of issues. Finally, chapter 9 ('Spelling and Pronunciation') may be of concern. I find the inclusion of this chapter useful, as it enhances the understanding of matches and mismatches between spelling and phonological patterns. As such, it may be read right after chapter 2, relating it to the discussion of Phonemics.

Finally, a few words in relation to the phonetic transcription are in order. I have put passages for phonetic transcription at the end of the chapters with the central theme of history and varieties of the English language. I am aware of the fact that these are not sufficient, and that students need more opportunities to feel comfortable with transcription. However, I did not want to inflate the number of pages in the sections on exercises, because the materials in this text can be, and indeed have always been, used very effectively together with a transcription workbook.

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1 Phonetics

1.1 Introduction

Our aim in this book is to study the sound patterns of English. The understanding of phonological patterns cannot be done without the raw material, phonetics. In order to be able to come up with reliable phonological descriptions, we need to have accurate phonetic data. Thus, students and professionals who deal with the patterns of spoken language in various groups of speakers (linguists, speech therapists, language teachers) need a basic knowledge of phonetics.

Phonetics, which may be described as the study of the sounds of human language, can be approached from three different perspectives. *Articulatory phonetics* deals with the physiological mechanisms of speech production. *Acoustic phonetics* studies the physical properties of sound waves in the message. *Auditory phonetics* is concerned with the perception of speech by the hearer. The coverage in this book will be limited to the first two of these approaches. The exclusion of auditory phonetics is basically due to the practical concerns of the primary readership as well as the little information available about the workings of the brain and speech perception. In this chapter, we will look at the basics of speech production. Acoustic properties, in a limited form of spectrographic analysis, will be the subject of chapter 5.

1.2 Phonetic Transcription

Because we are constantly involved with reading and writing in our daily lives, we tend to be influenced by the orthography when making judgments about the sounds of words. After all, from kindergarten on, the written language has been an integral part of our lives. Thus, it is very common to think that the number of orthographic letters in a word is an accurate reflection of the number of sounds. Indeed, this is the case for many words. If we look at the words pan, form, print, and spirit, for example, we can see the match in the number of letters (graphemes) and the sounds: three, four, five, and six, respectively. However, this match in number of graphemes and sounds is violated in so many

other words. For example, both though and choose have six graphemes but only three sounds. Awesome has seven graphemes and four sounds, while knowledge has nine graphemes and five sounds. This list of non-matches can easily be extended to thousands of other words. These violations, which may be due to 'silent letters' or a sound being represented by a combination of letters, are not the only problem with respect to the inadequacies of orthography in its ability to represent the spoken language. Problems exist even if the number of letters and sounds match. We can outline the discrepancies that exist between the spelling and sounds in the following.

(a) *Same sound is represented by different letters.* In words such as *each, bleed, either, achieve, scene, busy*, we have the same vowel sound represented by different letters, which are underlined. This is not unique to vowels and can be verified with consonants, as in *shop, ocean, machine, sure, conscience, mission, nation.*

(b) *Same letter may represent different sounds.* The letter a in words such as *gate, any, father, above, tall* stands for different sounds. To give an example of a consonantal letter for the same phenomenon, we can look at the letter s, which stands for different sounds in each of the following: *sugar, vision, sale, resume.*

(c) *One sound is represented by a combination of letters.* The underlined portions in each of the following words represent a single sound: *thin, rough, attempt, pharmacy.*

(d) *A single letter may represent more than one sound.* This can be seen in the x of *exit*, the u of *union*, and the h of *human.*

One or more of the above are responsible for the discrepancies between spelling and sounds, and may result in multiple homophones such as rite, right, write, and wright. The lack of consistent relationships between letters and sounds is quite expected if we consider that the alphabet English uses tries to cope with more than forty sounds with its limited twenty-six letters. Since letters can only tell about spelling and cannot be used as reliable tools for pronunciation, the first rule in studying phonetics and phonology is to *ignore spelling* and *focus only on the sounds* of utterances.

To avoid the ambiguities created by the regular orthography and achieve a system that can represent sounds unambiguously, professionals who deal with language (linguists, speech therapists, language teachers, etc.) use a phonetic alphabet that is guided by the principle of a consistent one-to-one relationship between each phonetic symbol and the sound it represents. Over time, several phonetic alphabets have been devised. Probably, the most widespread is the one known as the *International Phonetic Alphabet* (IPA), which was developed in 1888, and has been revised since then. One may encounter some modifications of some symbols in books written by American scholars. In this book, we will basically follow the IPA usage while pointing out common alternatives that are frequently found in the literature. First, we will present the symbols that are relevant for American English (see table 1.1) and later in the chapter

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Table 1.1 English consonant and vowel symbols with key words

Phonetic symbol	Word positions		
	Initial	Medial	Final
Consonants			
p	*p*ack	su*p*er	ma*p*
b	*b*ed	ru*bb*er	ro*b*
t	*t*ea	a*tt*ack	grea*t*
d	*d*ate	a*d*ore	goo*d*
k	*c*atch	pi*ck*ing	loo*k*
g	*g*ate	do*gg*y	ba*g*
f	*f*at	co*ff*ee	loa*f*
v	*v*ery	mo*v*ing	do*v*e
θ	*th*in	ru*th*less	dea*th*
ð	*th*ey	mo*th*er	brea*th*e
s	*s*ad	si*s*ter	bu*s*
z	*z*oom	rai*s*in	buz*z*
ʃ (š)	*sh*ine	ma*ch*ine	ca*sh*
ʒ (ž)	—	vi*s*ion	mas*s*age
h	*h*ead	be*h*ind	—
tʃ (č)	*ch*air	tea*ch*er	whi*ch*
dʒ (ǰ)	*j*ump	lar*g*er	hu*g*e
m	*m*ail	re*m*ind	roo*m*
n	*n*est	te*n*or	bea*n*
ŋ	—	a*n*ger	ki*ng*
j (y)	*y*ard	bey*o*nd	so*y*
w	*w*ay	re*w*ind	lo*w*
ɹ (r, ɻ)	*r*ain	bo*r*ing	fou*r*
l	*l*ight	bu*ll*et	mai*l*
Vowels and diphthongs			
i (ij, iy)	*ea*se	fe*e*t	be*e*
ɪ	*i*t	s*i*t	—
e (ej, ei, ey)	*ei*ght	b*a*ke	s*ay*
ɛ	*e*dge	r*e*d	—
æ	*a*nger	n*a*p	—
ʌ	*o*ven	l*o*ve	—
ə	*a*bove	often	Tampa
ɑ	*a*rch	f*a*ther	spa
ɔ	*a*ll	h*a*ll	s*aw*
o (ow, oʊ)	*o*at	g*o*at	b*ow*
ʊ	—	b*oo*k	—
u (uw)	*oo*ze	l*oo*se	tw*o*
aɪ (aj, ay)	*i*ce	s*i*de	b*uy*
ɔɪ (ɔj, ɔy, oɪ, oj, oy)	*oi*l	v*oi*ce	b*oy*
aʊ (au, aw)	*ou*t	s*ou*nd	h*ow*

we will add some non-English sounds that are found in languages that our readership is likely to come in contact with. The dialectal variations, since they are examined in detail in chapters 3 and 4, will not be dealt with here.

The following should be pointed out to clarify some points about table 1. Firstly, certain positions that are left blank for certain sounds indicate the unavailability of vocabulary items in the language. Secondly, the table does not contain the symbol [ʍ] (or [hw], [w̥]), which may be found in some other books to indicate the voiceless version of the labio-velar glide. This is used to distinguish between pairs such as witch and which, or Wales and whales. Some speakers make a distinction by employing the voiceless glide for the second members in these pairs; others pronounce these words homophonously. Here, we follow the latter pattern. Finally, there is considerable overlap between final /j/ and the ending portion of /i/, /e/, /aɪ/, and /ɔɪ/ on the one hand, and between final /w/ and /o/, /u/, and /aʊ/ on the other. The alternative symbols cited make these relationships rather clear, and this point will be taken up in chapter 4.

1.3 Description and Articulation of Sounds of English

1.3.1 The vocal tract

Our examination of how sounds are made will begin with the vocal organs. The air we use in sound production comes from the lungs, proceeds through the larynx where the vocal cords are situated, and then it is shaped into specific sounds at the vocal tract. In sound production, it is generally the case that the articulators from the lower surface of the vocal tract (lower articulators, i.e. the lower lip, the lower teeth, and the tongue) move toward those that form the upper surface (upper articulators, i.e. the upper lip, the upper teeth, the upper surface of the mouth, and the pharyngeal wall). Figure 1.1 shows the vocal tract.

Starting from the outer extreme, we have the lips and the teeth. In the upper surface, behind the upper teeth, there is a bumpy area (alveolar ridge), which is followed by a larger bony area (hard palate). Further back is a flaccid area, the 'soft palate' (or 'velum') which is unsupported by bone. The soft palate is a movable organ, which opens and closes the velopharyngeal passage (the passage that links the pharynx to the nasal cavity). Finally, at the back, the velum narrows to a long, thin pointed structure that is called the 'uvula'.

In the lower part of the mouth, after the lower lip and the teeth, lies the tongue. The 'tip' (or 'apex') of the tongue is the foremost part. Just behind the tip is the small surface called the 'blade' (or 'lamina'). The so-called 'front' part of the tongue is the area between tip/blade and the center. The hindmost part of the horizontal surface of the tongue is called the 'back' (or 'dorsum'). At the end of the tongue, we have the 'root', which is the vertical surface against the pharyngeal wall. Finally, we have the 'epiglottis', which is a leaf-shaped cartilage that sticks up and back from the larynx.

1 Lips
2 Teeth
3 Alveolar ridge
4 Hard palate
5 Soft palate (velum)
6 Uvula
7 Tip of the tongue
8 Front of the tongue
9 Back of the tongue
10 Root of the tongue
11 Epiglottis
12 Pharynx
13 Larynx
14 Esophagus
15 Trachea

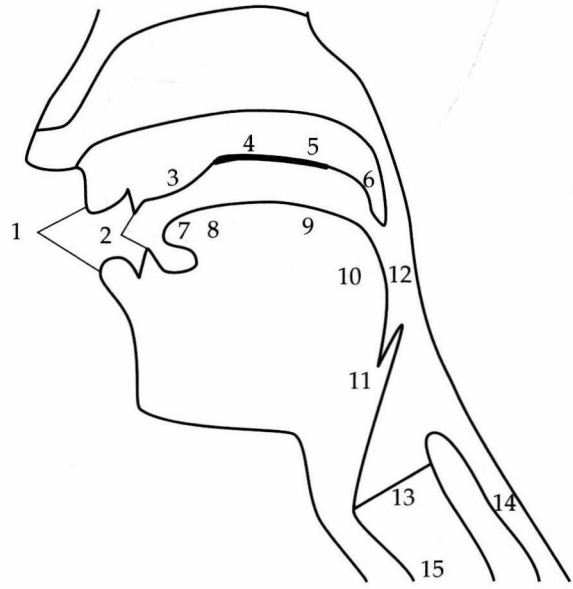
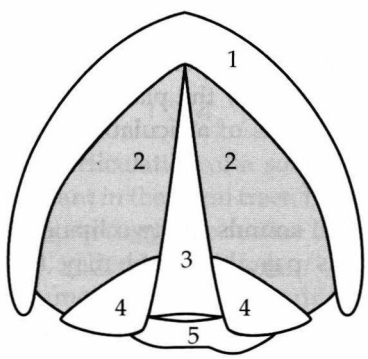


Figure 1.1 The vocal tract

1.3.2 Voicing

The larynx, which sits on top of the trachea, is composed of cartilages held together by ligaments. It houses the vocal cords, which lie horizontally just behind the Adam's apple (see figure 1.2). The space between the vocal cords, which is known as the 'glottis', assumes different configurations for sounds known as 'voiced' and 'voiceless'. When the cords are apart (open), the air passes freely through the glottis. Sounds made with such a configuration of the glottis are called 'voiceless' (see figure 1.3).



1 Thyroid cartilage
2 Vocal cords
3 Glottis
4 Arytenoid cartilages
5 Cricoid cartilage

Figure 1.2 View of larynx, looking down

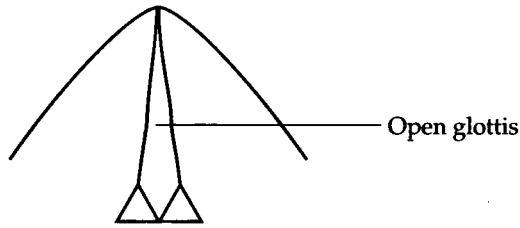


Figure 1.3 Configuration for voiceless sounds

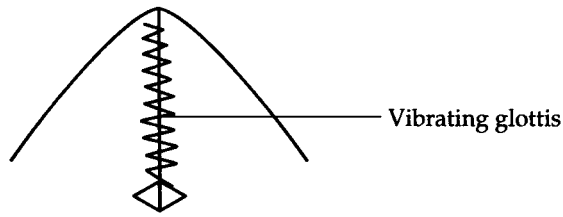


Figure 1.4 Configuration for voiced sounds

If, on the other hand, the vocal cords are brought together, the air passing through creates vibration, and the resulting sounds are 'voiced' (see figure 1.4). It is important to point out that the cord vibration is not a muscular action. When the cords are brought close to one another, the passing air creates a suction effect (Bernoulli principle), and the cords are brought together. As soon as the cords are together, there is no suction effect and the cords move apart. As soon as they are apart the suction is reinitiated, and the cycle repeats itself.

One can easily feel the difference between certain voiced and voiceless sounds. If you pronounce the initial sounds of the word pairs 'sip'–'zip' and 'cheap'–'jeep' and place your index finger on your Adam's apple or place your index fingers in both ears, you could feel the buzz created by the voicing of /z/ and /dʒ/; this effect will not be present in their voiceless counterparts /s/ and /tʃ/.

1.3.3 Places of articulation

The place of articulation of a consonant is the description of where the consonantal obstruction occurs in the vocal tract by the placement of the tongue or by lip configurations. Below are the places of articulation relevant for the consonants of English.

- **Bilabial:** In the production of bilabial sounds the two lips come together. The initial consonants of the words pay, bay, and may exemplify the English bilabials /p, b, m/.
- **Labiodental:** Labiodental sounds of English, /f, v/ (e.g. feel, veal), involve a constriction between the lower lip and the upper teeth. Bilabials and labiodentals together are called 'labials'.

- **Interdental:** /θ/ and /ð/ sounds of English (e.g. thin, that) are made by placing the tip or blade of the tongue between the upper and lower front teeth. For some speakers, the tongue tip/blade just barely touches behind the upper teeth (thus, the term 'dental' used instead in some manuals).
- **Alveolar:** When the active articulator, the tongue tip or blade, goes against the alveolar ridge, we have an alveolar sound. The initial consonants of the words tip, dip, sip, zip, nip, lip exemplify the English alveolars /t, d, s, z, n, l/ respectively.
- **Palato-alveolar:** In the production of palato-alveolar sounds of English, /ʃ, ʒ, tʃ, dʒ/ (exemplified by the final consonants of fish, garage, rich, ridge, respectively), the blade of the tongue moves towards the back of the alveolar ridge (approximates in the case of /ʃ, ʒ/ and touches in the case of /tʃ, dʒ/).
- **Retroflex:** Retroflex sounds are made by curling the tip of the tongue up and back towards the back of the alveolar ridge. The only retroflex in American English is the r-sound (/ɹ/). Although both in retroflex sounds and in palato-alveolars the constriction is at the back of the alveolar ridge, these two groups are not identical; the former is 'apical' (with the tip of the tongue), and the latter is said to be 'laminal' (with the blade of the tongue. It should also be noted that not all speakers use the retroflex r-sound; many speakers have a 'bunched' r-sound by raising the blade of the tongue with the tip turned down.
- **Palatal:** /j/, as in yes, is the only palatal sound of English, which is made with the front of the tongue articulating against the hard palate.
- **Velar:** In the production of English velars, /k, g, ŋ/, exemplified by the final sounds of back, bag, sing, respectively, the back of the tongue articulates against the velum (soft palate).
- **Glottal:** These are sounds formed at the glottis, which include /h/ (e.g. home), and the glottal stop /ʔ/.
- **Labio-velar:** The sound /w/ (e.g. we) is the only consonant that has two places of articulation. In the production of this sound, the lips are rounded (thus, 'labial'), while at the same time the back of the tongue is raised toward the velum (thus, 'velar'). As a result, we place the symbol both in bilabial and velar places and call the sound 'labio-velar'.

1.3.4 Manners of articulation

The manner of articulation of a sound is the degree and the kind of obstruction of a consonant in the vocal tract. For example, if we compare the first sounds of the words tip and sip, we realize that the airflow is obstructed in the same area (alveolar), and in both sounds, /t/ and /s/, the configuration of the vocal cords is the same (voiceless). The difference between the two sounds lies in the type of obstruction of the airflow. While in /t/ we stop the air completely before the release, we simply obstruct (not stop) the airflow with a narrowing created by the articulators in /s/.

- **Stop:** A stop consonant involves a complete closure of the articulators and thus total blockage of airflow. The stops found in English are /p, b, t, d, k, g/.
- **Fricative:** A fricative is a sound that is made with a small opening between the articulators, allowing the air to escape with audible friction. In English /f, v, θ, ð, s, z, ʃ, ʒ, h/ are the fricative sounds. The common denominator of fricatives is partial airflow with a friction noise. Some manuals, adhering strictly to the requirement of turbulent airstream, do not consider /h/ as a fricative. A subgroup of fricatives (alveolars and palato-alveolars), which are more intense and have greater amounts of acoustic energy at higher frequencies, are known as 'sibilants'.
- **Affricate:** In a stop sound, the release of the closure is quick and abrupt; however, in sounds where the closure release is gradual, it creates friction. Such sounds are called affricates. In other words, affricates start like stops (complete closure), and end like fricatives. Both affricates of English, /tʃ, dʒ/, are produced in palato-alveolar place of articulation. The symbols used for these sounds reveal the combination of stops /t/, /d/ with the fricatives /ʃ/, /ʒ/, respectively. An important point to remember is their one-unit (inseparable) status. Unlike consonant clusters (e.g. /sk/, /pl/), which are made up of two separable phonological units, affricates always behave like one unit. For example, in a speech error such as key chain /ki tʃen/ becoming /tʃi ken/, the affricate /tʃ/ is interchanged with a single segment /k/; clusters, on the other hand, are separated in a comparable situation, as illustrated in scotch tape /skʌtʃ tep/ becoming /kʌtʃ step/ and not /tʌtʃ skep/ (see section 3.3 for more on this). Since affricates /tʃ/ and /dʒ/ contain sibilant fricatives in them (/ʃ/, /ʒ/, respectively), they are also sibilants. Stops, fricatives, and affricates, which are produced by a considerable amount of obstruction of the laryngeal airstream in the vocal tract, are collectively known as 'obstruents'.
- **Approximant:** Approximants are consonants with a greater opening in the vocal tract than fricatives, and thus do not create any friction. Identifying a sound as an approximant or a fricative includes acoustic/auditory and aerodynamic considerations as well as articulatory factors. Catford (1977) states that the typical cross-sectional areas of the maximum constriction in a fricative range about 3 to 20 mm^2, while it is greater than 20 mm^2 in an approximant. The sounds /l, ɹ, j, w/ (initial consonants of lay, ray, yes, and week) are the approximants of English. Both fricatives and approximants, because they let the airflow continue in the production, are called 'continuants'. Two of the English approximants, /l, ɹ/, are 'liquids', vowel-like consonants in which voicing energy passes through a vocal tract with a constriction greater than that of vowels. The liquid /l/, which is called the 'lateral' liquid, is produced with the tongue tip creating a closure with the alveolar ridge while maintaining an opening at the sides of the tongue where the air escapes. The non-lateral approximant, /ɹ/, which is described earlier in relation to retroflex place of articulation and is also known as the 'rhotic', will not be repeated here.

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