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*Instructor's Resource Manual*  
*to accompany*

**Articulatory and Phonological Impairments:  
A Clinical Focus  
Fourth Edition**

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# 1

## Clinical Framework

### BASIC TERMS AND CONCEPTS

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#### LEARNING OBJECTIVES

When you have finished this chapter, you should be able to:

- Define communication, language, and speech.
  - Define phonology, morphology, syntax, semantics, and pragmatics.
  - Define communication disorder, speech disorder, and language disorder.
  - Distinguish between articulation, speech sounds, and articulation disorders.
  - Differentiate between speech sounds and phonemes.
  - Delineate phoneme and allophone.
  - Differentiate between phonology and a phonological disorder.
- 

#### Summary

This chapter introduced the reader to several fundamental terms that are important when assessing and treating articulatory and phonological disorders. Introductory terms such as communication, speech, and language were defined based on their normal processes and what a disorder of each would entail. Language divisions of phonology, morphology, syntax, semantics, and pragmatics provided a further delineation which could aid the reader in understanding these basic concepts. A distinction was made between articulation and speech sounds on the one hand and phonology and phonemes on the other. This distinction becomes important as a further division between articulation and

phonological disorders was generated. Speech sound form versus linguistic function was used to distinguish between articulation, with the speech sound as its basic unit, and phonology, represented by the phoneme. Based on these definitions, a differentiation between articulation disorders and phonological disorders was presented.

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## Emphases

1. Review basic terms and concepts, such as communication, language, and speech. These terms were defined according to their professional usage, for example, as referenced by the American Speech-Language-Hearing Association, and their practical application.
  2. Examine the subdivisions of language: phonology, morphology, syntax, semantics, and pragmatics. Definitions were given as well as the application of these terms to the specific areas of language.
  3. Define the broader term communication disorder as well as speech sound and language disorder. These divisions will be relevant within our clinical practice.
  4. Introduce the concepts of articulation and speech sounds versus phonology and phonemes. This is an important delineation which will be important in the discussion of articulation disorders and phonological disorders.
  5. Define and delineate the phoneme, allophone, phonotactics and minimal pairs as they apply to phonology. This discussion will later be applied to the clinical differentiation between articulatory and phonological disorders.
  6. Distinguish between articulatory and phonological impairments with beginning emphases on assessment information which is needed and how it applies to this differentiation.
- 

## Key Concepts

**Communication** is any act in which information is given to or received from another person concerning that persons needs, desires, perceptions, knowledge, or affective states (p. 1). Communication may be a) intentional or unintentional, b) involve conventional or unconventional signals, c) take linguistic or nonlinguistic forms, and d) occur through spoken or other modes.

**Speech** is the communication or expression of thoughts in spoken words (p. 2). It is oral, verbal communication.



**Language** can be defined as a complex and dynamic system of conventional symbols that is used in various modes for thought and communication (p. 2). It is rule governed, includes variability and change, and can be used to communicate in many different ways. Language is described by at least five linguistic parameters: phonology, morphology, syntax, semantics, and pragmatics.

**Phonology** is the study of the sound system of language, and includes the rules that govern its spoken form (p. 2). Phonology a) analyzes which sound units are within a language, b) examines how these sounds are arranged, their systematic organization and rule system.

**Morphology** studies the structure of words; it analyzes how words are built out of morphemes, the basic unit of morphology (p. 2).

**Morpheme** is the smallest meaningful unit of a language (p. 2).

**Syntax** consists of organizational rules denoting word, phrase, and clause order. It also examines the organization and relationship between words, word classes, and other sentence elements (p. 2-3).

**Semantics** is the study of linguistic meaning and includes the meaning of words, phrases, and sentences (p. 3).

**Pragmatics** is the study of language used to communicate within various situational contexts (p. 3). Pragmatics examines language use in context.

**Communication disorder** is the impairment in the ability to receive, send, process, and comprehend concepts including verbal, nonverbal, and graphic symbol systems (p. 3).

**Speech disorder** indicates oral, verbal communication that is so deviant from the norm that it is noticeable or interferes with communication (p. 3-4). According to the American Speech-Language-Hearing Association, speech disorders are divided into articulation, fluency, and voice disorders.

**Language disorder** refers to impaired comprehension and/or use of spoken, written, and/or other symbol systems (p. 4). A language disorder may involve one or more of the following areas: phonology, morphology, syntax, semantics, and pragmatics.

**Articulation** refers to the totality of motor processes that result in speech (p. 4). It represents a highly complex activity in which - respiratory, phonatory, resonatory, and articulatory mechanisms included - as many as 100 muscles

may be involved. In the articulatory mechanism alone up to 22 muscles may alter their degree of tension many times during the utterance of a simple sentence (Hanson, 1983). The sequencing and timing of speech muscle activity is an integral portion of articulation.

**Speech sounds** represent physical sound realities; they are end products of articulatory motor processes (p. 5).

**Phoneme** is the smallest linguistic unit that is able, when combined with other such units, to establish word meanings and distinguish between them (p. 6). For example, in General American English /p/ and /s/ are phonemes because they function to distinguish between words such as "pat" and "sat". On the other hand, in General American English the aspiration of stop/plosives does not have phonemic relevance. [p<sup>h</sup>it] and [pit], in spite of their differences in production, do not result in two words with different meanings. However, aspiration versus nonaspiration of stop/plosives is phonemically relevant in many languages. For example, in Swahili [pa] is the word for "climb" while [p<sup>h</sup>a], with an aspirated [p], signifies the name for a specific type of antelope. As linguistic units, phonemes characterize how speech sounds function within a language to differentiate word meaning.

In everyday usage, professionals often do not distinguish between the terms speech sound and phoneme. One could hear someone say that they transcribed a particular phoneme, for example. However, theoretical and definitional differences do exist; these terms represent two distinct concepts. While the technical term speech sound stands for the physical reality of sound form, the term phoneme refers exclusively to how these forms function within a given language as linguistic units to differentiate between word meanings.

**Allophones** are variations in phoneme realizations that do not change the meaning of a word when they are produced in differing contexts (p. 6).

**Phonotactics** refers to the description of the allowed combinations of phonemes and in a particular language (p. 7). Both the inventory of phonemes and their possible combinations are unique and vary according to the particular language.

**Phonetic variation** is another label for speech sound (p. 7).

**Minimal pairs** are two words that differ in only one phoneme (p. 7). The words "cat" and "hat" are minimal pairs.

**Articulation disorder** designates difficulties with the motor production aspects of speech, or an inability to produce certain speech sounds (p. 8). This term has

been used historically to denote all children who demonstrated an inability to produce certain speech sounds. However, with the introduction of the term *phonological disorder* a new dimension was added to the categorization of these children. Although many professionals use the two terms interchangeably, or use the newer term phonological disorder to encompass all children with speech sound difficulties, a theoretical and practical differentiation is important.

**Phonological disorder** refers to impaired comprehension of the sound system of a language and the rules that govern the sound combinations (p. 8). Several reports (for example Fey, 1992; Pollack and Rees, 1972) have documented that children with phonological disorders can say the particular sound (thus, they do not have difficulties with the actual speech sound production) but, for some reason, do not understand the pattern of phoneme usage within the language system.

---

## Learning Materials: Answers to Questions from Textbook

### Think Critically (page 11)

The following small speech sample is from Tara, age 4;3.

rabbit	[wæbət]	ready	[wɛdi]
feather	[fɛdə]	arrow	[ɛwə <sup>u</sup> ]
green	[gwin]	toothbrush	[tutbwɛʃ]
this	[ðɪs]	thinking	[θɪŋkɪŋ]
that	[ðæt]	round	[wa <sup>u</sup> nd]
rope	[wə <sup>u</sup> p]	bridge	[brɪdʒ]
rooster	[wʊstə]	street	[stɪt]
bathing	[be <sup>l</sup> dɪŋ]	thin	[θɪn]

nothing [nʌtɪŋ]

them [ðɛm]

bath [bæθ]

breathe [brið]

Which speech sound errors are noted in this sample?

Answer: Sounds in error are [r], [ð], and [θ]

Which sounds are substituted for the sounds in error?

Answer: Substituted sounds are [w] for [r], [d] for [ð], and [t] for [θ]

Can any phonotactic restraints be noted in the correct productions of “th” and “r”?

Answer: The [ð] and [θ] are produced correctly at the beginning of a word, however, [d] and [t] are used as substitutions when the sound is in the middle of a word or at the end of the word. The [w] is used as a substitution for [r] in all positions including in consonant clusters. It should be noted that the central vowel with r-coloring [ə˞] is produced correctly.

Based on this limited information, do you think the child has an articulation or a phonological disorder? Why?

Answer: An articulation disorder

The [r] is a later developing sound and could be an articulation error. The fact that the child can produce the central vowel with r-coloring could support the fact that this sound is gradually appearing in Tara’s speech. Although phonotactic constraints can be noted on the [θ] and [ð] productions, these errors could also be articulation-based. It is an easier task in the speech sound development of

children to produce the sound correctly at the beginning, as opposed to the middle or end of words.

### Test Yourself (page 12):

1. (c)
2. (d)
3. (b)
4. (a)
5. (b)
6. (c)
7. (a)
8. (c)
9. (b)
10. (c)

## Additional Learning Materials

### Discussion Topics and Clinical Applications

1. Discuss how you could use minimal pairs to collect information about the phonemic inventory in the following example: A child substitutes [w] for /j/, /l/, and /r/. Which minimal pairs could you use to test the child's phonemic inventory?
2. What information could be a portion of the phonemic inventory? Discuss how you would gather information about the inventory of phonemes and phonotactic constraints.
3. What type of material could you use to examine the phonotactics of a child's inventory in the following example: A child has difficulties with the production of "s" in consonant clusters. Which words would test the possible phonotactics of s-clusters in American English occurring at the beginning and end of syllables?
4. Based on the results of an articulation test and/or a spontaneous speech sample have the students determine the phonetic inventory, the phonemic inventory, and the phonotactics of a child with an articulatory or phonological impairment. Note any patterns or constraints which are demonstrated.
5. Give one example of what could be assessed within each of the five areas of language (phonology, morphology, syntax, semantics, and pragmatics).
6. The following is a portion of a language sample from Jeannette, age 4;6.  
  
I want some jelly beans and some chocolate.

[ a' wʌn sʌm ʒɛli bins æn sʌm sɔklət]

I don't know.

[a' dɒ'n nɒʊ]

I don't know who that is.

[a' dɒ'n nɒʊ hu dæt ɪs]

Ninja turtles fight the evil Ninjas.

[nɪnʒə tʊtəls fa' t də ivəl nɪnʒəs]

Then Shredder just comes.

[dɛn ʃrɛdə ʒʌst kʌms]

And all of these other things.

[æn ɔl əv dis ʌvə tɪŋs]

- a) Write down the phonemic inventory of Jeanette using both the vowels and consonants that are presented in this small sample.
- b) Note which vowels and consonants that are normally a portion of the American English inventory are not demonstrated in Jeanette's speech sample.
- c) Make a list of the words that Jeanette pronounces differently than would be expected when compared to the adult model of pronunciation.
- d) Note any consistent patterns of substitution of one sound for another.

### Multiple Choice Questions

1. The totality of motor processes involved in the planning and execution of sequences of overlapping gestures which result in speech refers to
  - a) phonology
  - b) phonetics
  - c) articulation
  - d) phonotactics

2. The subdivision of language dealing with the meaning of words, phrases, and sentences is
- morphology
  - syntax
  - semantics
3. The end products of articulatory motor processes that represent physical sound realities are called
- phonetic variations
  - speech sounds
  - allophonic variations
  - all of the above
4. The repertoire of phonemes which are used contrastively by an individual is the
- phonetic inventory
  - phonemic inventory
  - phonotactics of a language
  - allophonic variations of a language
5. The clusters [sk] and [ks] cannot occur in the same word positions in General American English. This is an example of the
- phonetic inventory
  - phonemic inventory
  - phonotactics of a language
  - allophonic variations of a language
6. Minimal pairs are exemplified by which of the following set of words?
- [hit] and [sit]
  - [sit] and [sut]
  - [lun] and [mun]
  - all of the above
7. Which one of the following concepts would be associated with the assessment of a phonological impairment?
- phonemic inventory
  - phonotactics
  - phonotactic constraints
  - all of the above would be important in assessing a phonological impairment
8. Articulation disorders reflect difficulties with
- central linguistic abilities
  - phoneme function

- c) relatively peripheral motor processes
- d) phonemes and phoneme patterns within a particular language

9. Communication disorders include which of the following?

- a) speech disorders
- b) language disorders
- c) hearing disorders
- d) all of the above

10. Which one of the following is *not* a typical phonotactic possibility of General American English?

- a) [sk] at the beginning of a word or syllable
- b) [ŋ] at the end of a word or syllable
- c) [lt] at the beginning of a word or syllable
- d) [mp] at the end of a word or syllable

### True/False Questions

1. Articulation difficulties result from an impairment of central linguistic abilities.
2. Three subdivisions of language include pragmatics, articulation, and syntax.
3. Phonetic variations and allophonic variations are both phonemic realizations.
4. Speech sounds and phonemes represent exactly the same concepts.
5. Impaired comprehension of the sound system of a language and the rules that govern the sound combinations represents a phonological disorders.
6. Speech sounds are transcribed using brackets [ ] while phoneme values are symbolized by slanted lines or so-called virgules / /.
7. The phonemic inventory refers to the inventory of phonemes an individual uses contrastively.
8. Phonology is not related to the other constituents of the language system such as morphology, syntax, semantics, or pragmatics.
9. The phonetic inventory includes all the speech sounds the individual uses including their specific production features.
10. Articulation and phonological disorders never co-occur.



## Short Answer Questions

1. Define communication disorder.
2. Explain why a child with “s” difficulties, might have problems in the area of morphology.
3. Contrast the terms speech sound and phoneme.
4. Contrast the terms articulation disorder versus phonological disorder.
5. Write a brief definition and give an example of each of the following terms: phonology, morphology, syntax, semantics, and pragmatics.

## Essay Questions

1. Discuss how articulation disorders represent difficulties with the physical production aspects of speech sounds. Utilize the terms "articulation", "physical sound realities", and "speech sounds" when developing your discussion.
2. Discuss how phonological disorders represent difficulties with the linguistic function of phonemes. Utilize the terms "phoneme" and "phonology" when developing your discussion.
3. Discuss the differences between a language and a speech disorder. Give specific examples for each type.
4. Articulation errors are referenced by a child's age. Referring to the definition and characteristics of the term “articulation” state why this is a meaningful reference point.
5. Based on the definition of a phonological disorder, state why a child with a phonological impairment may have difficulties with other areas of language such as morphology, syntax, semantics, or pragmatics.



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# 2

## Phonetics – Articulatory Phonetics

### SPEECH SOUND FORM

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#### Learning Objectives

When you have finished this chapter, you should be able to:

- Define phonetics and the branches of phonetics.
  - List the differences in production and function of vowels versus consonants.
  - Identify the three descriptive parameters that are used for vowel articulations, and classify the vowels of American English using those three parameters.
  - Differentiate between the various types of vowels.
  - Identify and define the four parameters that are used to describe the articulation of consonants.
  - Classify the consonants of American English according to their active and passive articulator, manner, and voicing characteristics.
  - Define coarticulation and assimilation, and describe the different types of assimilatory processes.
  - Understand the importance of syllable structure in the assessment process.
-

## Summary

This chapter presented a definition of phonetics and three subdivisions: articulatory, acoustic, and auditory phonetics. Within articulatory phonetics an overview of vowels and consonants was given and the form and function of vowels and consonants of General American English were discussed. Both vowels and consonants were classified according to their articulatory production features and their linguistic functions. Phonetic descriptors were given to provide the clinician with a detailed account of articulatory action during norm production of vowels and consonants. These features can later be contrasted to those noted in the impaired sound realizations of children and adults with articulatory-phonological impairments.

In the second portion of this chapter, coarticulation, assimilation processes, and syllable structure were defined and examined. Coarticulation and resulting assimilatory processes were described as normal articulatory consequences that regularly occur in the speech of individuals. Assimilatory processes were defined according to the type and degree of sound modification. Examples were given of assimilatory processes in children as well as of the possible impact these processes could have on articulation test results. The last section, on syllable structure, defined the parts of the syllable. It was suggested that an analysis of syllable structures could provide the clinician with additional knowledge when evaluating individuals with articulatory-phonological disorders.

---

## Emphases

1. Define phonetics and three subdivisions of phonetics: Articulatory phonetics, acoustic phonetics, and auditory phonetics.
2. Review basic vowel and consonant definitions. Both production aspects and linguistic function are highlighted.
3. Classify the vowels of General American English according to phonetic production parameters. These include the portion of the tongue involved in the vowel articulation (front versus back), the position of the tongue relative to the palate (high versus low), and the degree of lip rounding or unrounding. In addition, the terms tense versus lax and open versus close were used to specify these vowels.
4. Classify the consonants of General American English according to phonetic production parameters. These include the active articulator (organ), the passive articulator (place), the type of constriction established between the active and passive articulators (manner), and the presence or absence of vocal fold vibration (voiced versus voiceless).

5. Describe coarticulation and to identify various types of resulting assimilation processes and the implication for the assessment of children with speech sound disorders
6. Categorize the various parts of a syllable noting the impact syllable structure has on the articulation possibilities of children.

---

## Key Concepts

**Phonetics** is the study of speech emphasizing the description and classification of speech sounds according to their production, transmission *and* perceptual features (p. 15).

**Articulatory phonetics** deals with the production features of speech sounds, their categorization and classification according to specific parameters of their production. Central aspects include how speech sounds are actually articulated, their objective similarities, and their differences (p. 15). The motor processes which result in speech sounds are categorized according to several different parameters. For example, categories may include those speech motor processes which are coupled with vocal fold vibration (voiced sounds) versus those which are not (voiceless sounds), or those speech motor movements which result in a partial or total hindrance within the vocal tract (consonants) versus those which demonstrate a relatively open vocal tract, a vocal tract without significant obstructions (vowels).

**Acoustic phonetics** is the area of study related to speech sound transmission. The frequency, intensity, and duration of speech sounds, for example, are described and categorized (p. 15). The transmission of speech sounds can be exemplified by a display of the acoustic constituents of a particular speech sound. For example, the frequency of a voiced sound, i.e., the number of complete repetitions (cycles) of variations in air pressure occurring within a second's time, is directly related to the opening and closing of the glottis by vocal fold vibration. Or, the intensity of a sound is mirrored by the amplitude of these variations in air pressure.

**Auditory phonetics** pertains to speech sound perception (p. 15). For example, pitch and loudness are terms which are used to describe the perceptual categorization of frequency and intensity, noted parameters in acoustic phonetics. Although pitch and loudness are related to frequency and intensity, equal steps of increasing frequency or intensity do not produce the perceptual effect of equal steps of pitch and loudness. These discrepancies between acoustic facts and their perceptual impressions are typical for studies within

auditory phonetics.

**Vowels** are speech sounds produced without a significant constriction of the oral (and pharyngeal) cavities (p. 16). The airflow from the vocal folds to the oral opening remains relatively unimpeded. Because of this production feature, vowels are often labeled *open* sounds.

**Consonants** are speech sounds produced with a significant constriction within the oral (and pharyngeal) cavities, foremost along the sagittal midline of the oral cavity (p. 16). The sagittal midline is the median plane dividing in this case the vocal tract, into right and left halves. Sagittal midline constriction can be noted when articulating [s], or [l], for example. With [s], the air stream is directed over the tongue tip, while actual contact between the tongue tip and the alveolar ridge can be noted for [l] productions. For both sounds the primary place of constriction is the sagittal midline. Due to these production features consonants are often labeled *constricted* sounds.

**Sonority**, when referring to speech sounds, is the loudness of a particular speech sound relative to others of equal length, stress, and pitch (p. 17). "There is roughly a 700-to-1 range of intensities between the weakest and strongest speech sounds made while speaking at a normal conversational level. The vowels are the strongest sounds but, even among these, there is a three-to-one range. The strongest vowel is the "aw" (as in "talk"), which is usually pronounced at three times the intensity of the weakest vowel, "ee" (as in "see"). The strongest of the consonants, the "r" sound, has about the same intensity as the "ee" vowel, but is two and a half times more intense than "sh" (as in "shout"); six times more intense than "n" (as in "no"); and 200 times greater than the weakest consonant, "θ" (as in "thin")" (Denes and Pinson, 1973, p. 150-151).

**Sonorants** are another name for vowels and diphthongs due to their greater sonority in relationship to consonants (p. 17).

**Sonorant consonants** are a group of consonants which have a relatively open expiratory passageway; they are produced with less obstruction of the air stream (p. 17). Sonorant consonants include the *nasals*, *liquids*, and the *glides*.

**Obstruent consonants** are a group of consonants which are characterized by a complete or narrow constriction between the articulators hindering the expiratory air stream (p. 17). The obstruents include the *stops*, *fricatives*, and the *affricates*.

**Syllabics** are a small group of consonants which can function as the nucleus of the syllable (p. 17). Certain sonorant consonants can be syllabics. For example,

if the second syllable of “button” is reduced and pronounced without the vowel, as in [bʌt̩n̩], [n̩] now becomes the nucleus of the syllable and is termed a syllabic. This also occurs with the second syllable of “bottle” when said as [bɒt̩l̩], [l̩] is a syllabic in this case. Syllabics are indicated by a small line placed under the symbol in question.

**Vowels** of General American English can be described according to the following parameters (p. 18-19):

1) **the portion of the tongue that is involved in the articulation** which is correlated to the phonetic descriptors of *front*, *central*, and *back* vowels;

2) **the tongue’s position relative to the palate** translates phonetically into the labels *high*, *mid*, and *low* vowels (p. 18). These descriptions can be directly related to the vowel quadrilateral (p. 18) with front vowels being at the far left of the quadrilateral, central vowels in the center, and back vowels on the right axis. The high vowels are at the top of the quadrilateral, the mid vowels further down when moving vertically, while the low vowels are at the bottom of the quadrilateral. The last parameter which is used to describe the articulation of vowels is

3) **the degree of lip rounding or unrounding** (p. 18). The high-back vowels, such as [u] and [ʊ] have a relatively high degree of *lip rounding*. As you move down the vowel quadrilateral with the back vowels the lip rounding decreases until [ɑ], which is considered an unrounded vowel. The front vowels are considered to be *unrounded* vowels or those produced with *lip spreading*. The high-front vowels [i] and [ɪ] have a high degree of lip spreading while the low-front vowels have less.

**Tense** and **lax** describe vowels as well (p. 18-19). *Tense* vowels have 1) *relatively more muscle activity* during their production and 2) a *longer duration* than lax vowels. The terms tense and lax are used to refer to similar types of vowels. Thus, the following vowel pairs are usually compared: [i] - [ɪ], [e] - [ɛ], [u] - [ʊ], and [o] - [ɔ]. In each of the vowel pairs the first vowel is considered tense while the second one is lax. Please note that there are variations in the definitions of tense versus lax. According to which definition is used, [ɑ] and [ɔ] are sometimes labeled as tense while in other references they are classified as lax vowels.

**Close** and **open** are used as vowel descriptors (p. 18-19). *Close* vowels are produced with a *relatively small distance between the tongue and the roof of the mouth* while *open* vowels have *more distance*. Again, similar vowel pairs are usually compared, thus, [u] is a close vowel while [ʊ] is an open vowel, for example.

**Monophthongs** are vowels with a relatively constant quality throughout their production (p. 19). Monophthongs are also known as *pure vowels*. The vowel [i] is typically produced as a pure vowel.

**Diphthongs**, on the other hand, are vowels in which the quality changes during their production (p. 19). The term *diphthong*, meaning *having two sounds*, is used to refer to those vowels which vary in quality during the length of their production but are seen as representing one phoneme.

**Onglide** is the initial portion of a diphthong (p. 19).

**Offglide** is the second or end portion of the diphthong (p. 19). Thus, the diphthong that is typically heard in the word *pie*, [paɪ], has [a] as the onglide and [ɪ] as the offglide. Since diphthongs represent one phoneme (and not two), it is important to distinguish their transcription from two distinct vowels which occur one after the other. There are various ways to transcribe this distinction (see page 21).

Note: The transcription of diphthongs varies from text to text and, of course, according to the actual pronunciation. The transcriptions used in this text are those which reflect the pronunciation of the author. Instructors will often have other transcriptions which they use to represent the diphthongs in question.

**Rising diphthongs** are those that the tongue moves from a lower positioned onglide portion to an offglide which has a higher tongue position. Thus, relative to the palate, the tongue moves in a rising motion (p. 20).

**Centering diphthongs** are a special class of diphthongs in which the offglide or less prominent element of the diphthong is a central vowel (p. 21). Depending upon the dialect of the speaker this may be a schwa vowel or a central vowel with r-coloring. Thus *farm* could be pronounced as [fɑəm] or [fɑ̃m].

**Rhotic diphthongs** are centering diphthongs with [ə̃] as their offglide (p. 21).

**Nonphonemic** diphthongs are those that do not demonstrate phonemic value, i.e., the meaning of the word does not change, if the diphthong is reduced to a monophthong with only its onglide portion (p.21). For example, whether one pronounces *cake*, [keɪk] or [kek], the same word meaning will be perceived. The diphthongization of these vowels does not have phonemic value.

**Phonemic** diphthongs are those that do demonstrate phonemic value; the meaning of the word does change, if the diphthong is reduced to a monophthong



with only its onglide portion (p. 21). For example, [ɔɪ] is a phonemic diphthong in that if it is produced as a monophthong, the phonemic value changes. The two words [sɔɪ], *soy*, and [sɔ], *saw* exemplify this, when the diphthong is produced without the offglide, a word with a different meaning results.

**Consonants** can be categorized according to their

- 1) **active articulator** (organ of articulation),
- 2) **passive articulator** (place of articulation),
- 3) **manner** of articulation, and
- 4) **voicing** features (p. 23).

Note: Although most textbooks purport to use only place, manner, and voicing features, often the active articulator is included in the phonetic description (see page 23). There is, however, clinical value in using the somewhat cumbersome but far more exact system of active articulator, passive articulator, manner, and voicing. The phonetic approach (also called the motor or traditional approach) uses this knowledge extensively (see Chapter 9).

**Active articulators** or organs of articulation are parts within the vocal tract which actually move during consonant production (p. 23). The lower lip (known as *labial*) and parts of the tongue (*apical*, *coronal*, *pre-*, *medio-* and *postdorsal*) are active articulators in the production of General American English consonants.

**Passive articulators** or places of articulation are those portions of the vocal tract which do not move during the production of consonants (p. 23). The upper lip (*labial*), teeth (*dental*), parts of the palate (*pre-*, *mediopalatal*), and velum (*velar*) are passive articulators for General American English consonants.

**Manner of articulation** refers to the *type of constriction the active and passive articulators generate* (p. 24-25). This constriction may consist of a complete closure or a relatively wide opening between the articulators.

In General American English, the manners of articulation consist of the **stop-plosives, fricatives, nasals, affricates, glides, laterals, and rhotics**.

**Stop-plosives** ([p, b, t, d, k, g]) are signaled by a complete occlusion between the active and passive articulators (p. 25). This complete closure results in the build-up of air pressure (stop phase) followed by a release phase in which the separation of the articulators allows for a burst of air (plosive phase) (p. 25).

**Fricatives** ([f, v, s, z, ʃ, ʒ, θ, ð]) are the result of a very close approximation between the active and passive articulators, so close in fact that an audible friction-noise results (p. 25).