

B. Repeat this exercise with [n, ŋ, l, r, w, j] learning to produce [ɑŋɑ, ɑŋɑ, ɑjɑ, ɑrɑ, ɑwɑ, ɑjɑ] and similar sequences with other vowels.

C. Make sure that you can differentiate between the English words *whether*, *weather*, *which*, *witch*, even if you do not normally do so.

Say:

[hweðə(r)]

whether

[weðə(r)]

weather

[hwɪtʃ]

which

[wɪtʃ]

witch

D. Learn to produce the following Burmese words. (You may for the moment neglect the tones, indicated by accents above the vowels.)

Voiced nasals

Voiceless nasals

mâ 'lift up'

ṃâ 'from'

nâ 'pain'

ṅâ 'nose'

ṅâ 'fish'

ṅâ 'borrow'

E. Working with a partner, produce and transcribe *several* sets of nonsense words. You should use slightly more complicated sets than previously. Make up your own sets on the basis of the illustrative set given below, including glottal stops, nasal and lateral plosion, and some combinations of English sounds that could not occur in English. Remember to mark the stress.

'kɫanfɔpskweɪdʒ

'ʒɪŋtʃpɔbn

'tsɪʔrbeʔɪdɪ

mbuʔɪŋɪŋ

'wəbrɛʔɪp

F. To increase your memory span in perceiving sounds, include some simpler but longer words in your production-perception exercises. A set of possible words is given below. Words such as the last two, which have eight syllables each, may be too difficult for you at the moment. But try to push your hearing ability to its limit. When you are listening to your partner dictating words, remember to try to (1) look at the articulatory movements; (2) repeat, to yourself, as much as you can immediately afterward; and (3) write down as much as you can, including the stress, as soon as possible.

'kɪpuʔɪpɪkɪtu

'beŋɪgɪde'de'dɪ

'ɪtɪfɪʒɪfɪ'drɪdʒɪ

'ɪle'tole'mənu'dɔʊɪ

'fəθəɪ'vɪ'vɔɪvɪvɪθɪ

4

English Vowels

TRANSCRIPTION AND PHONETIC DICTIONARIES

The vowels of English can be transcribed in many different ways, partly because accents of English differ greatly in the vowels they use, and partly because there is no one right way of transcribing even a single accent of English. The set of symbols used depends on the reason for making the transcription. If one is aiming to reduce English to the smallest possible set of symbols, then *sheep* and *ship*, *lute* and *look*, and all the other pairs of vowels that differ in length could be transcribed using one symbol per pair plus a length mark [ː], as [ʃɪp, ʃɪp], [luːk, lʊk], and so on. In this way one could reduce the number of vowel symbols considerably, but at the expense of making the reader remember that the vowel pairs that differed by the use of the length mark also differed in quality. A different approach would be to emphasize all the differences between English vowels. This would require noting that both length and quality differences occur, making [ʃɪp, ʃɪp] the preferable transcription. Using this kind of transcription would hide the fact that vowel quality and vowel length are linked, and there is no need to mark both. In this book I have chosen to use the transcription that most phonetics instructors prefer and write [ʃɪp, ʃɪp], leaving the reader to infer the difference in length.

Using this simple style of transcription, which was introduced in Chapter 2, carries a small penalty. There are some widely accepted reference books that specify pronunciations in both British and American English, none of which use exactly this style. One is an updated version of the dictionary produced by the English phonetician Daniel Jones, whose acute observations of English dominated British phonetics in the first half of the twentieth century. The current edition, *English Pronouncing Dictionary*, 16th edition (Cambridge: Cambridge University Press, 2003), is familiarly known as EPD 16. It still bears Daniel Jones's name but has been completely revised by the new editors, Peter Roach, James Hartman, and Jane Setter. It now shows both British and American pronunciations. One version

is accompanied by a CD so that you can hear both the British and American pronunciations.

Another authoritative work is the *Longman Pronunciation Dictionary*, 2nd edition (Harlow, U.K.: Pearson, 2000), by John Wells. This dictionary, known as LPD 2, also gives the British and American pronunciations. Professor Wells holds the chair in phonetics at University College, London, that Daniel Jones previously held. He is clearly the leading authority on contemporary English pronunciation in all its forms—British, American, and other variants of the worldwide language. Both these dictionaries, EPD 16 and LPD 2, use transcriptions in which the length differences in vowels are marked, not just the quality differences as in this book. They write [ɪp̄, ʃp̄] where I have [ɪp, ʃp]. A third dictionary, *Oxford Dictionary of Pronunciation for Current English* (Oxford: Oxford University Press, 2003) by Clive Upton, William Kretschmar, and Rafal Konopka, is slightly different from the other two dictionaries in that it gives a wider range of both British and American pronunciations. To show more detail it also uses a larger set of symbols and a more allophonic transcription than either of the other two dictionaries.

Everyone seriously interested in English pronunciation should be using one of these dictionaries. Each of them shows the pronunciations typically used by national newscasters—what we may regard as Standard American Newscaster English and Standard BBC English (often shortened to just American English and British English in this book). Of course, in neither country is there really a standard accent. Some newscasters in both countries have notable local accents. The dictionaries give what would be accepted as reasonable pronunciations for communicating in the two countries. They allow one to compare British and American pronunciations in great detail, noting, for example, that most British speakers pronounce *Caribbean* as [kæɪrɪbiən], with the stress on the third syllable, whereas Americans typically say [kæɪrɪbiən], with the stress on the second syllable.

Ordinary American college dictionaries also provide pronunciations, but the symbols they use are not in accordance with the principles of the IPA and are of little use for comparative phonetic purposes. American dictionary makers sometimes say that they deliberately do not use IPA symbols because their dictionaries are used by speakers with different regional accents, and they want readers to be able to learn how to pronounce an unfamiliar word correctly in their own accent. But, as we have been observing, IPA symbols are often used to represent broad regions of sounds, and there is no reason why dictionary makers should not assign them values in terms of key words, just as they do for their ad hoc symbols.

Two of the three dictionaries we have been discussing, LPD 2 and EPD 16, use virtually the same set of symbols, differing only in the way they transcribe the vowel in American English *bird*: LPD 2 has [ɜː], whereas EPD 16 has [ɜr]. *Oxford Dictionary of Pronunciation for Current English* uses a slightly different

set of symbols, but they are readily interpretable within the IPA tradition. In this book I have kept to the style of transcription used in Wells's LPD 2 except for the omission of the length mark and a simple typographical change. I have used [e] in words such as *head*, *bed* instead of [eː]. In later chapters we will be comparing vowels in other languages such as French and German, and we will need to use both [e] and [eː].

VOWEL QUALITY

In the discussion so far I have deliberately avoided making precise remarks about the quality of the different vowels. This is because, as I said in Chapter 1, the traditional articulatory descriptions of vowels are not very satisfactory. Try asking people who know as much about phonetics as you do to describe where the tongue is at the beginning of the vowel in *boy*, and you will get a variety of responses. Can you describe where your own tongue is in a set of vowels?

It is difficult to describe the tongue position of a vowel in one's own speech. Very often people can only repeat what the books have told them—they cannot determine for themselves where their tongue is. It is quite easy for a book to build up a set of terms that are not really descriptive but are in fact only labels. I started introducing terms of this kind for vowel qualities in Chapters 1 and 2 and will continue with this procedure here. But it is important for you to remember that the terms we are using are simply labels that describe how vowels sound in relation to one another. They are not absolute descriptions of the position of the body of the tongue.

Part of the problem in describing vowels is that there are no distinct boundaries between one type of vowel and another. When talking about consonants the categories are much more distinct. A sound may be a stop or a fricative, or a sequence of the two. But it cannot be halfway between a stop and a fricative. Vowels are different. It is perfectly possible to make a vowel that is halfway between a high vowel and a mid vowel. In theory (as opposed to what a particular individual can do in practice), it is possible to make a vowel at any specified distance between any two other vowels.

In order to appreciate the fact that vowel sounds form a continuum, try gliding from one vowel to another. Say [æ] as in *had* and then try to move gradually to [i] as in *he*. Do not say just [æ-i], but try to spend as long as possible on the sounds in between them. If you do this correctly, you should pass through sounds that are something like [e] as in *head* and [eɪ] as in *hay*. If you have not achieved this effect already, try saying [æ-e-e-i] again, slurring slowly from one vowel to another.

Now do the same in the reverse direction, going slowly and smoothly from [i] as in *he* to [æ] as in *had*. Take as long as possible over the in-between

sounds. You should learn to stop at any point in this continuum so that you can make, for example, a vowel like [e] as in *head*, but slightly closer to [æ] as in *had*.

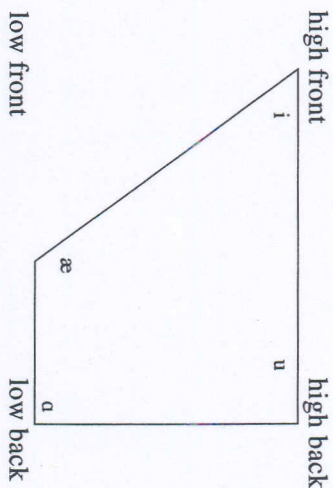
Next, try going from [æ] as in *had* slowly toward [ɑ] as in *father*. When you say [æ-ɑ], you probably will not pass through any other vowel of your own speech. But there is a continuum of possible vowel sounds between these two vowels. You may be able to hear sounds between [æ] and [ɑ] that are more like those used by people with other accents in *had* and *father*. Some forms of Scottish English, for example, do not distinguish between the vowels in these words (or between *can* and *calm*). Speakers with these accents pronounce both *had* and *father* with a vowel about halfway between the usual Midwestern American pronunciation of these two vowels. Some speakers of American English in the Boston area pronounce words such as *car* and *park* with a vowel between the more usual American vowels in *can* and *calm*. They do, however, distinguish the latter two words.

Last, in order to appreciate the notion of a continuum of vowel sounds, glide from [ɑ] as in *father* to [u] as in *who*. In this case, it is difficult to be specific as to the vowels that you will go through on the way, because English accents differ considerably in this respect. But you should be able to hear that the movement from one of these sounds to the other covers a range of vowel qualities that have not been discussed so far in this section.

When you move from one vowel to another, you are changing the auditory quality of the vowel. You are, of course, doing this by moving your tongue and your lips, but, as we have noted, it is very difficult to say exactly how your tongue is moving. Consequently, because phoneticians cannot be very precise about the positions of the vocal organs in the vowels they are describing, they often simply use labels for the auditory qualities of the different vowels. The vowel [i] as in *head* is called high front, meaning, roughly, that the tongue is high and in the front of the mouth but, more precisely, that it has the auditory quality we will call high, and the auditory quality front. Similarly, the vowel [æ] as in *had* has a low tongue position and, more important, an auditory quality that may be called low front. The vowel [e] as in *head* sounds somewhere between [i] and [æ], but a little nearer to [æ], so we call it mid-low front. (Say the series [i, e, æ] and check for yourself that this is true.) The vowel [ɑ] as in *father* has a tongue position that is low and back in the mouth and auditory qualities that we will call low back. Last, the vowel [u] in *who* is a high, fairly back vowel. The four vowels [i, æ, ɑ, u], therefore, give us something like the four corners of a space showing the auditory qualities of vowels, which may be drawn as in Figure 4.1.

None of the vowels has been put in an extreme corner of the space in Figure 4.1. It is possible to make a vowel that sounds more back than the vowel [u] that most people use in *who*. You should be able to find this fully back vowel for yourself. Start by making a long [u], then round and protrude your lips a bit more. Now try to move your tongue back in your mouth, while still keeping it

FIGURE 4.1 The vowel space.



raised toward the soft palate. The result should be a fully back [u]. Another way of making this sound is to whistle the lowest note that you can and then, while retaining the same tongue and lip position, voice this sound. Again, the result will be an [u] sound that is farther back than the vowel in *who*. Try saying [i] as in *head*, [u] as in *who*, and then this new sound, which we may symbolize with an added underline [ū]. If you say the series [i, u, ū], you should be able to hear that [ū] is intermediate between [i] and [u], but—for most speakers—much nearer [ū].

Similarly, it is possible to make vowels with a more extreme quality than the usual English vowels [i, æ, ɑ]. If, for example, while saying [æ] as in *had*, you lower your tongue or open your jaw slightly farther, you will produce a vowel that sounds relatively farther from [i] as in *head*. It will probably also sound a little more like [ɑ] as in *father*.

Given a notion of an auditory vowel space of this kind, we can plot the relative quality of the different vowels. Remember that the labels high-low and front-back should not be taken as descriptions of tongue positions. They are simply indicators of the way one vowel *sounds* relative to another. The labels describe the relative auditory qualities, not the articulations.

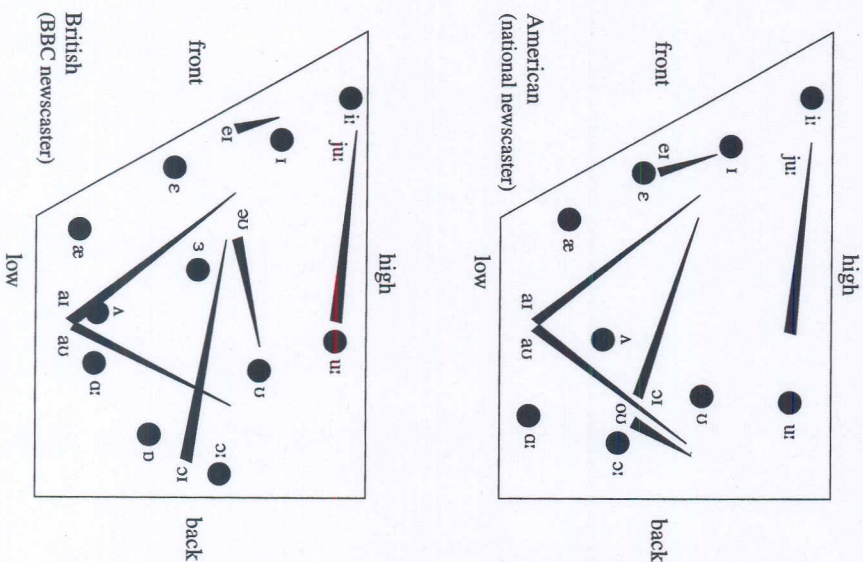
Students of phonetics often ask why we use terms like high, low, back, and front if we are simply labeling auditory qualities and not describing tongue positions. The answer is that it is largely a matter of tradition. For many years phoneticians thought they were describing tongue positions when they used these terms to specify vowel quality. But there is only a rough correspondence between the traditional descriptions in terms of tongue positions and the actual auditory qualities of vowels. If you could take x-ray pictures showing the position of your tongue while you were saying the vowels [i, æ, ɑ, u], you would find that the relative positions were not as indicated in Figure 4.1. But, as we will see in Chapter 8, if you use acoustic phonetic techniques to establish the auditory

qualities, you will find that these vowels do have the relationships indicated in this figure.

At one time I thought of inventing new names to describe the auditory qualities. Other linguists have, in fact, used terms such as acute and grave instead of front and back in the description of vowels. But, for a variety of reasons, these terms did not become widely used. It seems preferable to stick with the old terms high, low, front, and back, even though they are being used to describe auditory qualities rather than tongue positions.

Most of the vowels of a form of Standard American Newscaster English (typical of many Midwestern speakers) are shown in the upper part of Figure 4.2. A comparable diagram of the vowels of British English as spoken by BBC newscasters is shown in the lower part of Figure 4.2. In both diagrams, the solid

FIGURE 4.2 The relative auditory qualities of some of the vowels of Standard American Newscaster English and British (BBC newscaster) English.



points represent the vowels that we are treating as monophthongs, and the lines represent the movements involved in the diphthongs. The symbols labeling the diphthongs are placed near their origins. There is a good scientific basis for placing the vowels as shown here. The positions of both monophthongs and diphthongs are not just the result of my own listening. The data are taken from the acoustic analyses of a number of authorities, a point we will return to in Chapter 8 when we discuss acoustic phonetics. Meanwhile, if you are able to listen to a speaker of Midwestern American English or BBC English, you should be able to hear that the relative vowel qualities are as indicated. Other varieties of English will differ in some respects, but you should find that in most accents the majority of the relationships are the same. We will note the cases in which there are substantial differences as we discuss the individual vowels.

Listen first of all to your pronunciation of the vowels [i, ɪ, e, æ] as in *heed*, *hid*, *head*, *had*. (If you are not a native speaker of English, you can listen to recordings of these words, which are on the CD in Chapter 2.) Do these vowels sound as if they differ by a series of equal steps? Make each vowel about the same length (although in actual words they differ considerably), saying just [i, ɪ, e, æ]. Now say them in pairs, first [i, ɪ], then [ɪ, e], then [e, æ]. In many forms of English, [ɪ] sounds about the same distance from [i] as [ɪ] is from [e], and as [e] is from [æ]. Some Eastern American speakers make a distinct diphthong in *heed* so that their [ɪ] is really a glide starting from almost the same vowel as that in *hid*. Other forms of English, for example as spoken in the Midlands and the North of England, make a lower and more back vowel in *had*, making it sound a little more like the [ɑ] in *father*. This may result in the distance between [e] and [æ] being greater than that between [e] and [ɪ]. But speakers who have a lower [æ] may also have a slightly lower [e], thus keeping the distances between the four vowels [i, ɪ, e, æ] approximately the same.

The remaining front vowel in English is [ɛ] as in *hay*. We will discuss this vowel after we have discussed some of the back vowels. The back vowels vary considerably in different forms of English, but no form of English has them evenly spaced like the front vowels. Say for yourself [ɑ, ɔ, u, ʊ] as in *father*, *author*, *good*, *food*. As before, make each vowel about the same length, and say just [ɑ, ɔ, u, ʊ]. (If, like many Californians, you do not distinguish between the vowels in *father* and *author*, just say the three vowels [ɑ, u, ʊ].) Consider pairs of vowels as you did the front vowels. Estimate the distances between each of these vowels, and compare them with those shown in Figure 4.2.

We noted that many Midwestern and Californian speakers do not distinguish [ɑ] and [ɔ] as in *cot* and *caught*. They usually have a vowel intermediate in quality between the two points shown on the chart but closer to [ɑ]. On the other hand, most speakers of British English have an additional vowel in this area. They distinguish between the vowels [ɑ, ɒ, ɔ] as in *bahn*, *bomb*, *bought*. This results in a different number of vowel qualities, as shown in the lower diagram in Figure 4.2. The additional vowel [ɒ] is more back and slightly more rounded than [ɑ].

The vowels [ɪ, ʊ] as in *good, food* also vary considerably. Many speakers have a very unrounded vowel in *good* and a rounded but central vowel in *food*. Look in a mirror and observe your own lip positions in these two vowels.

Both British and American English speakers have a mid-low central vowel [ʌ] as in *bud*. In many forms of British English, this vowel may be a little lower than in American English. In this way it is distinct from the British English central vowel [ɜ] in *bird*. The vowel in American English *bird* is not shown in the upper part of Figure 4.2 because it is distinguished from the vowel in *bud* by having *r*-coloring, which we will discuss later.

We will now consider the diphthongs shown in Figure 4.2. Each of these sounds involves a change in quality within the one vowel. As a matter of convenience, they can be described as movements from one vowel to another. The first part of the diphthong is usually more prominent than the last. In fact, the last part is often so brief and transitory that it is difficult to determine its exact quality. Furthermore, the diphthongs often do not begin and end with any of the sounds that occur in simple vowels.

As you can see from Figure 4.2, both of the diphthongs [aɪ, au], as in *high, how*, start from more or less the same low central vowel position, midway between [æ] and [ɑ] and, in BBC English, closer to [ʌ] than to any of the other vowels. (The *Oxford Dictionary of Pronunciation for Current English* transcribes our [aɪ] as [aɪ] in British English.) Say the word *eye* very slowly and try to isolate the first part of it. Compare this sound with the vowels [æ, ʌ, ɑ] as in *bad, bud, father*. Now make a long [ɑ] as in *father*, and then say the word *eye* as if it began with this sound. The result should be something like some forms of New York or London Cockney English pronunciation of *eye*. Try some other pronunciations, starting, for example, with the vowel [æ] as in *bad*. In this case, the result is a somewhat affected pronunciation.

The diphthong [aɪ], as in *high, buy*, moves toward a high front vowel, but in most forms of English it does not go much beyond a mid-front vowel. Say a word such as *buy*; making it end with the vowel [e] as in *bed* (as if you were saying [bae]). A diphthong of this kind probably has a smaller change in quality than occurs in your normal pronunciation (unless you are one of the speakers from Texas or elsewhere in the South and Southwest who make such words as *by, die* into long monophthongs—[ba:, da:]). Then say *buy*, deliberately making it end with the vowel [ɪ] as in *bid*. This vowel is usually slightly higher than the ending of this diphthong for many speakers of English. Finally, say *buy* with the vowel [i] as in *heed* at the end. This is a much larger change in quality than normally occurs in this word. But some speakers of Scottish English and Canadian English have a diphthong of this kind in words such as *sight*, which is different from the diphthong that they have in *side*.

The diphthong [aʊ] in *how* usually starts with a quality very similar to that at the beginning of *high*. Try to say *owl* as if it started with [æ] as in *had*, and note the difference from your usual pronunciation. Some speakers of the type of English

spoken around London and the Thames estuary (often called Estuary English) have a complicated movement in this diphthong, making a sequence of qualities like those of [e] as in *bed*, [ʌ] as in *bud*, and [ʊ] as in *food*. Say [e-ʌ-ʊ] in quick succession. Now say the phrase *how now brown cow* using a diphthong of this type.

The diphthong [eɪ] as in *hay* varies considerably in different forms of English. Some American English speakers have a diphthong starting with a vowel very like [e] in *head* (as shown in the upper part of Figure 4.2). Most BBC English speakers and many Midwestern Americans have a smaller diphthong, starting closer to [ɪ] as in *hid*. Estuary English, as described above, has a larger diphthong, so that words such as *mate, take* sound somewhat like *migh, tʏke*. Conversely, others (including many Scots) have a higher vowel, a monophthong that can be written [e]. Check your own pronunciation of *hay* and try to decide how it should be represented on a chart as in Figure 4.2.

The diphthong [ou] as in *hoe* may be regarded as the back counterpart of [eɪ]. For many speakers of American English it is principally a movement in the high-low dimension, but in most forms of British English the movement is more in the front-back dimension, as you can see in Figure 4.2. Some British English speakers make this vowel start near [e] and end a little higher than [ʊ]. Say each part of this diphthong and compare it with other vowels.

The remaining diphthong moving in the upward direction is [ɔɪ] as in *boy*. Again, this diphthong does not end in a very high vowel. It often ends with a vowel similar to that in *bed*. I might well have transcribed *boy* as [boe] if I had not been trying to keep the style of transcription used in this book as similar as possible to other widely used transcriptions.

The last diphthong, [ju] as in *cue*, differs from all the other diphthongs in that the more prominent part occurs at the end. Because it is the only vowel of this kind, many books on English phonetics do not even consider it a diphthong; they treat it as a sequence of a consonant followed by a vowel. I have considered it to be a diphthong because of the way it patterns in English. Historically, it is a vowel, just like the other vowels we have been considering. Furthermore, if it is not a vowel, then we have to say that there is a whole series of consonant clusters in English that can occur before only one vowel. The sounds at the beginning of *pew, beauty, cue, spew, skew* and (for most speakers of British English) *tune, due, sue, Zeus, new, lieu, stew* occur only before /u/. (Note that in British English *do* and *due* are pronounced differently, the one being [du] and the other [dju].) There are no English words beginning with /pie/ or /kjæ/, or any combination of stop plus [j] before any other vowel. In stating the distributional properties of English sounds, it seems much simpler to recognize /ju/ as a diphthong and thus reduce the complexity of the statements one has to make about the English consonant clusters.

The only common stressed vowel of American English not shown in Figure 4.2 is [ɜ] as in *sir, herd, fur*. This vowel does not fit on the chart because it cannot

be described simply in terms of the features high–low, front–back, and rounded–unrounded. The vowel [ɜː] can be said to be **r-colored**. It involves an additional feature called **rhotacization**. Just like high–low and front–back, the feature rhotacization describes an auditory property, the *r*-coloring, of a vowel. When we describe the height of a vowel, we are saying something about how it sounds rather than something about the tongue gesture necessary to produce it. Similarly, when we describe a sound as a rhotacized vowel, we are saying something about how it sounds. In most forms of American English, there are both stressed and unstressed rhotacized vowels. The transcription for the phrase *my sister's bird* in most forms of American English would be [maɪ sɪstəz bɜːd].

Rhotacized vowels are often called retroflex vowels, but there are at least two distinct ways in which the *r*-coloring can be produced. Some speakers have the tip of the tongue raised, as in a retroflex consonant; others keep the tip down and produce a high bunched tongue position. These two gestures produce a very similar auditory effect. X-ray studies of speech have shown that in both these ways of producing a rhotacized quality there is usually a constriction in the pharynx caused by retraction of the part of the tongue below the epiglottis.

The most noticeable difference among accents of English is in whether or not they have *r*-colored vowels. In many forms of American English, rhotacization occurs when vowels are followed by [r], as in *beard*, *bared*, *bard*, *board*, *poor*, *fire*, *hour*. Accents that permit some form of [r] after a vowel are said to be **rhotic**. The rhotacization of the vowel is often not so evident at the beginning of the vowel, and something of the quality of the individual vowel remains. But in *sir*, *herd*, *fur* the whole vowel is rhotacized (which is why I prefer LPD 2 [ɜː] to EPD 16 [ɜr]). Insofar as the quality of this vowel can be described in terms of the features high–low and front–back, it appears to be a mid-central vowel such as [ɜ] with added rhotacization.

Rhotic accents are the norm in most parts of North America. They were prevalent throughout Britain in Shakespeare's time, and still occur in the West Country, Scotland, and other regions distant from London. Shortly after it became fashionable in the Southeast of England to drop post-vocalic /r/, this habit spread to areas of the United States in New England and parts of the South. These regions are now non-rhotic to various degrees. Try to find a speaker of English with an accent that is the opposite of yours—rhotic or non-rhotic as the case may be. Listen to their vowels in words such as *mirror*, *fairer*, *surer*, *poorer*, *purer* and compare them with your own.

Standard BBC English is not rhotic and has diphthongs (not shown in Figure 4.2) going from a vowel near the outside of the vowel space toward the central vowel [ə]. In words such as *here* and *there*, these are transcribed [ɪə] and [eə]. Some speakers have a long [e] instead of [eə], particularly before [r] as in *fairy* and *bearing*. Some people have a centering diphthong [ʊə] in words such as *poor*, but this is probably being replaced by [ɔ] in most non-rhotic accents of British English. We also noticed in Chapter 2 that some speakers have

a centering diphthong (though we did not call it that at the time) in *hire*, *fire*, which are [hae, fae].

As a conclusion to this section we will consider the ways in which the vowels of different accents (or, indeed, of different languages) can differ. Each accent (or language) contrasts a certain number of vowels. The first difference between two accents may be in the number of vowels they contrast. Californian English, for example, differs from many Midwestern accents of English in having lost the contrast between [a] and [ɔ], as in *car* versus *caught*, so there is one less vowel in the Californian system. Similarly, most British English accents have systemic differences from most American English accents in that they have additional vowels, distinguishing *car*, *car*, *court* by vowels that we can represent by /ɑ, ɒ, ɔ/. Another way in which accents can differ is in the vowels that occur in certain words. Both BBC English and American Newscaster English have vowels that can be symbolized by /æ/ and /ɑ/ as in *fat* and *father*, but BBC English has /ɑ/ in *glass* and *last*, while American English has /æ/. An even more pointed comparison of this kind of difference is that between some Standard Northern accents of British English and BBC English. Both these accents have the same number of vowel contrasts (the same vowel systems), but they use /æ/ and /ɑ/ in different words, Standard Northern having /æ/ in *castle*, *glass* and much the same words as this vowel is used in American English. This kind of difference between accents is known as a difference in distribution (of vowel qualities) as opposed to a difference in system (the number of distinct vowels). Finally, some differences between accents are simply a matter of vowel quality. Two accents can have exactly the same vowel systems and the same vowel distributions, but the vowels can differ in quality. Thus Texans and Midwestern Americans have similar vowel systems and distributions but use different ways of distinguishing the vowels in words such as *pie* and the word for 'father', *pa*. Texans are likely to have a long monophthong in each of these words, making them best symbolized as [paɪ] and [paɪ], whereas Midwestern Americans are more likely to say [paɪ] and [paɪ]. Or, to take a British English example, an old-fashioned Cockney English and a modern Estuary English accent may have the same vowel distinctions (the same systems) and use them in the same words (the same distributions), but use different vowel qualities. Cockney will have vowels best represented as [aɪ] and [aɪ] in *mate* and *might*; Estuary English pronounces these words more like [meɪt] and [maɪt].

Try to compare your own accent of English with another accent and say which of the vowel differences are best described as differences in the system of vowels, which are differences of distribution, and which involve just differences in vowel quality. Often all three of these factors—systemic differences, distributional differences, and vowel quality differences—distinguish one accent from another. Nevertheless, considering the three factors provides a useful way of looking at differences between accents.

UNSTRESSED SYLLABLES

In all forms of English, the symbol [ə], not shown in Figure 2.2, may be used to specify a range of mid-central vowel qualities. As we saw in Chapter 2, this vowel occurs in grammatical function words, such as *to*, *the*, *at* [tə, ðə, ət]. It also occurs at the end of the words *sofa*, *China* [ˈsoʊfə, ˈtʃaɪnə], and, for most British speakers, *better*, *farmer* [ˈbeta, ˈfɑːmə]. In American English the vowel at the end of words with the *-er* spelling is usually [ɚ], a very similar quality, but with added *r*-coloring. As the vowel chart in Figure 4.2 represents a kind of auditory space, vowels near the outside of the chart are more distinct from one another than vowels in the middle, and differences in vowel quality become progressively reduced among vowels nearer the center. The symbol [ə] may be used to designate many vowels that have a central, **reduced vowel**, quality.

We will be considering the nature of stress in English in the next chapter, but we can note here that vowels in unstressed syllables do not necessarily have a completely reduced quality. All the English vowels can occur in unstressed syllables in their full, unreduced forms. Many of them can occur in three forms, as shown in Table 4.1. In this table, the vowel to be considered is in the first column. The words in the second column illustrate the full forms of the vowels. The third column gives an example of the same unreduced vowel in an unstressed syllable. The fourth column illustrates the same underlying vowel as a reduced vowel. For many people, the reduced vowels in this last column are all very similar. Some accents have slightly different qualities in some of these words, but all

TABLE 4.1 Examples of vowels in stressed and unstressed syllables and in reduced syllables. The boldface type shows the vowel under consideration.

Vowels	Stressed Syllable	Unstressed Syllable	Reduced Syllable
i	appreciate	creation	deprecate
ɪ	implicit	simplistic	implication
eɪ	explain	chaotic	explanation
e	allege	tempestuous	allegation
æ	emphatic	fantastic	emphasis
ɑː, ɒ	demonstrable	prognosis	demonstration
ɔː	cause	causality	
oʊ, ɔʊ	invoke	vocation	invocation
u	hoodwink	neighborhood	
ʌ	acoustic	acoustician	
ʌ, ɜː, ɝː, ɚ	confront	verbose	confrontation
ai	rectify	citation	recitation
au	devout	outsider	
ɔɪ	exploit	exploitation	
ju	compute	computation	circular

are still within the range of a mid-central vowel that can be symbolized by [ə]. Others have [ɪ] in some of these words, such as *recitation*, or a high-central vowel, which may be symbolized by [ɨ]—a symbol that is sometimes called ‘barred i’. Yet others, particularly speakers of various forms of American English, do not reduce the vowels in the fourth column appreciably, keeping them with much the same vowel quality as in the third column. The transcription of vowels with one symbol or another sometimes disguises the fact that the vowel in question might have an intermediate quality, neither that of the unstressed vowel nor that of a vowel fully reduced to [ə]. Say all the words in Table 4.1 yourself and find out which vowels you have.

There are some widely applicable rules of English relating the pronunciation of the words in the second column to that of the words in the fourth column. Consequently, we are able to say that the same underlying vowels occur in the words in the second and fourth columns. If we were making a high-level phonological transcription, we could transcribe the vowels in the different columns with the same symbols and allow the rules to make it clear that different allophones occurred. Thus we could transcribe *emphatic* as /emfætk/ and *emphasize* as /emfæzɪs/, as long as we also have a rule that assigns the stress and makes /æ/ into [ə] in the second word.

The rules accounting for the allophones are very general in the sense that they account for thousands of similar alternations among English words. But they are also very complicated. They have to account for the blanks in the fourth column, which show that some vowels can be completely reduced but others cannot. There is, for example, a completely reduced vowel in *explanation*, *demonstration*, *recitation*, but not, for most people, in the very similar words *exploitation*, *computation*. As you can also see from an examination of Table 4.1, some vowels, such as [ɔː, ʊ, u, au, ɔɪ], do not fit into this scheme of alternations in the same way as the other vowels. Because the rules are so complicated, we will not use transcriptions showing the underlying forms of English in this elementary textbook. Instead, we will continue to use [ə] or [ɪ] in reduced syllables.

Most British and some American English speakers have a vowel more like [ɪ] in suffixes such as *-ed*, *-(e)s* at the ends of words with alveolar consonants such as *hunted*, *houses* [ˈhaʊntɪd, ˈhaʊzɪz]. For these speakers both vowels in *pitied* [ˈpɪtɪd] have much the same quality. A reduced vowel more like [ʊ] may occur in the suffix *-ful* as in *dreaful* [ˈdrefʊl], but for many people this is just a syllabic [l], [drefdl].

TENSE AND LAX VOWELS

The vowels of English can be divided into what may be called **tense** and **lax** sets. These terms are really just labels used to designate two groups of vowels that behave differently in English words. There are phonetic differences between the two groups, but they are not simply a matter of tenseness versus

laxness. To some extent the differences between the two sets are due to developments in the history of the English language that are still represented in the spelling. The tense vowels occur in the words with a final, so-called silent *e*, in the spelling, e.g., *mate, mete, kite, cute*. The lax vowels occur in the corresponding words without a silent *e*: *mat, met, kit, cut*. In addition, the vowel in *good*, which, for reasons connected with the history of English, has no silent *e* partner, is also a member of the lax set. This spelling-based distinction is, however, only a rough indication of the difference between the two sets. It is better exemplified by the data in Table 4.2.

The difference between the two sets can be discussed in terms of the different kinds of syllables in which they can occur. Table 4.2 shows some of the restrictions for one form of American English. The first column of words illustrates a set of **closed syllables**—those that have a consonant at the end. All of the vowels can occur in these circumstances. The next column shows that in **open syllables**—those without a consonant at the end—only a restricted set of vowels can occur.

None of the vowels [i, e, æ, u, ʌ] as in *bid, bed, bad, good, bud* can appear in stressed open syllables. This is the set of vowels that may be called lax vowels, as opposed to the tense vowels in the other words. To characterize the differences between tense and lax vowels, we can consider some of them in pairs, each pair consisting of a tense vowel and the lax vowel that is nearest to it in

TABLE 4.2 The distribution of tense and lax vowels in stressed syllables in American English.

Tense Vowels	Lax Vowels	Most Closed Syllables	Open Syllables	Syllables Closed By [r]	Syllables Closed By [ŋ]	Syllables Closed By [ʃ]
i	ɪ	beat	bee	beer	sing	(leash)
eɪ	ɛ	bit	bay	bare	sing	wish
	æ	bait		length	hang	crash
		bet		crash		slosh
ɑ		bat	pa	bar	long	(wash)
		hot	saw	bore		
ɔ		bought	low	(boar)		
ou	u	boat	good	push		
		boot	boo	tour		
u	ʌ	but	but	hurr	hung	crush
		bite	buy	fire		
ai		bout	bought	hour		
au		void	boy	coir		
ɔɪ		cue	cue	pure		
ju						

quality. Three pairs of this kind are [i, ɪ] as in *beat, bit; eɪ, ɛ*] as in *bait, bet; and [u, ʌ]* as in *boot, foot*. In each of these pairs, the lax vowel is shorter, lower, and slightly more centralized than the corresponding tense vowel. There are **no** vowels that are very similar in quality to the remaining two lax vowels in most forms of American English, [æ] as in *hat, can* and [ʌ] as in *hut, come*. But both of these low lax vowels are shorter than the low tense vowel [ɑ] as in *spa*. Speakers of most forms of British English have an additional lax vowel. They have the tense vowel [ɑ] as in *calm, car, card* in both open and closed syllables, and they also have a lax vowel [ɒ] as in *cod, common, con* [kɒd, kɒmən, kɒn], which occurs only in closed syllables.

The fifth column in Table 4.2 shows the vowels that can occur in syllables closed by /r/ in American English. In a syllable closed by /r/ there is no contrast in quality between a tense vowel and the lax vowel nearest to it. Consequently, as often happens in contexts in which there is no opposition between two sounds, the actual sound produced is somewhere between the two. (We have already observed another example of this tendency. We saw that after /s/ at the beginning of a word, there is no contrast between /p/ and /b/, or /t/ and /d/, or /k/ and /g/. Consequently, the stops that occur in words such as *spy, sty, sky* are in between the corresponding voiced and voiceless stops; they are unaspirated, but they are never voiced.)

I put the words *boar* and *coir* in parentheses in this column because for many people [ou] and [ɔɪ] do not occur before /r/. The word *coir* [kɔɪr], the only word I have heard pronounced with [ɔɪr], is not in many people's vocabulary, and many people make no difference between *bore* and *boar*. But some speakers do contrast [ɔ] and [ou] in these two words, or in other pairs such as *horse* and *hoarse*.

The next column shows the vowels that occur before [ŋ]. In these circumstances, again, there is no possible contrast between tense and lax vowels. But, generally speaking, it is the lax vowels that occur. However, many younger Americans pronounce *sing* with a vowel closer to that in *scene* rather than that in *sin*. And in some accents, *length* is regularly pronounced with virtually the same vowel as that in *bait* rather than that in *bet*; in others, it is pronounced with the vowel in *bit*. The pronunciation of *long* varies. It is [lɒŋ] or [lɔŋ] in most forms of American English and [lɒŋ] in most forms of British English. Several other changes are true of vowels before all nasals in many forms of American English. For example, [æ] may be considerably raised in *ban, lamb* as compared with *bad, lab*. In many accents, *pin, pen* and *gym, gem* are not distinguished.

The last column shows that there are similar restrictions in the vowels that can occur before [ʃ]. By far the majority of words ending in /ʃ/ have lax vowels for most speakers, although some accents (e.g., that used in parts of Indiana) have [i] in fish (making it like *fiche*) and [u] in *push* and *bush*. In my own speech, the only words containing the tense vowel /i/ before /ʃ/ are *leash, fiche, quiche*. Some speakers have tense vowels in a few new or unusual words such as

creche, gauche, which may be [kreɪʃ, ɡoʊʃ]. The pronunciation of *wash* varies in much the same way as that of *long*. Both [wɔʃ] and [wɔɪʃ] occur in American English.

RULES FOR ENGLISH VOWEL ALLOPHONES

As we did in the previous chapter in discussing consonant allophones, we can conclude this chapter by considering a set of formal statements that apply to vowels. The first concerns vowel length:

- (1) Other things being equal, a given vowel is longest in an open syllable, next longest in a syllable closed by a voiced consonant, and shortest in a syllable closed by a voiceless consonant.

If you compare words such as *sea*, *seed*, *seat* or *sigh*, *side*, *site*, you will hear that the vowel is longest in the first word in each set, next longest in the second, and shortest in the last. You can see an example of part of this statement in Figure 3.3, which showed the waveforms of the words *mar* and *mad*. Because some vowels (particularly the tense vowels) are inherently longer than others (the lax vowels), we have to restrict statement (1) to a vowel of a given quality. Although it is in a syllable closed by a voiced consonant, the lax vowel in *bid* is often shorter than the tense vowel in *beat*, which is a syllable closed by a voiceless consonant. We also have to note “other things being equal” because, as we will see in the next statement, there are other things that affect vowel length.

Even when we are considering the same vowel in syllables with the same consonants, there may be a difference in vowel length. Stressed syllables are longer than the corresponding unstressed syllables. Compare words such as *below* and *billow*. You will find that the vowel [oʊ] in the stressed syllable in the first word is longer than the same vowel in the second word, where it occurs in an unstressed syllable. We will therefore have the following formal statement:

- (2) Other things being equal, vowels are longer in stressed syllables.

We still have to hedge this statement with the phrase “other things being equal” as there are other causes of variation in vowel length. Another kind of length variation is exemplified by sets of words such as *speed*, *speedy*, *speedily*. Here the vowel in the stressed syllable gets progressively shorter as extra syllables are added to the same word. The reasons for this phenomenon will be dealt with in the next chapter. Here we will simply state:

- (3) Other things being equal, vowels are longest in monosyllabic words, next longest in words with two syllables, and shortest in words with more than two syllables.

We should also add a statement about unstressed vowels, which may become voiceless in words such as *potato*, *catastrophe*. For some people, this happens

only if the following syllable begins with a voiceless stop, but for many (including myself), it also happens in a normal conversational style in words such as *permission*, *tomato*, *compare*. In terms of the gestures involved, this is simply a case of the voiceless gesture for the glottis associated with the initial voiceless stops overlapping with the voicing gesture normally associated with the vowels. One wording of an appropriate statement would be:

- (4) A reduced vowel may be voiceless when after a voiceless stop (and before a voiceless stop). The parenthesized phrase could be omitted for many people.

A further extension of this statement would allow for completely voiceless syllables when the unstressed vowel follows a voiceless stop cluster with /r/ as in *preparatory*, *spectrograph*, *introduction*. What about clusters with /l/, such as *replicate* and *complicate*? Some people make some of these syllables voiceless as well.

Other statements can be used to specify the overlapping gesture in some anticipatory coarticulations that affect vowels. The most obvious is that vowels tend to become nasalized before nasal consonants. In a word such as *ban*, the gesture required for lowering the soft palate often occurs considerably before the gesture raising the tongue tip for the alveolar contact. As a result, much of the vowel is nasalized. As we saw in the previous chapter, nasalization is shown by the diacritic [̃] over a symbol. In a narrow transcription, *ban* might be transcribed [bã:n]. We can make the following general statement:

- (5) Vowels are nasalized in syllables closed by a nasal consonant.

The degree of nasalization in a vowel varies extensively. Many people will have the velum lowered throughout a syllable beginning and ending with a nasal, such as *man*, making the vowel fully nasalized.

Finally, we must note the allophones produced when vowels occur in syllables closed by /l/. Compare your pronunciation of /i/ in *heed* and *heel*, of /eɪ/ in *paid* and *pail*, and [æ] in *pad* and *pal*. In each case, you should be able to hear a noticeably different vowel quality before the velarized [ɫ]. All the front vowels become considerably retracted in these circumstances. It is almost as if they became diphthongs with an unrounded form of [u] as the last element. In a narrow transcription, we could transcribe this element so that *peel*, *pail*, *pal* would be [p^hiɪt, p^heɪt, p^hæɪt]. Note that I omitted the usual second element of the diphthong [eɪ] in order to show that in these circumstances the vowel moved from a mid-front to a mid-central rather than to a high-front quality.

Back vowels, as in *haul*, *pull*, *pool*, are usually less affected by the final [ɫ] because they already have a tongue position similar to that of [ɫ]. But there is often a great difference in quality in the vowels in *hoe* and *hole*. As we have seen, many speakers of British English have a fairly front vowel as the first element in the diphthong [əʊ]. This vowel becomes considerably retracted

before /t/ at the end of the syllable. You can observe the change by comparing words such as *holly*, where there is no syllable final [t], and *wholly*, where the first syllable is closed by [t].

The change of vowel quality before [t] is yet another example of overlapping gestures. The exact form of the statement for specifying vowel allophones before [t] will vary from speaker to speaker. But, so that we can include a statement in our set summarizing some of the main allophones of vowels in English, we may say:

(6) Vowels are retracted before syllable final [t].

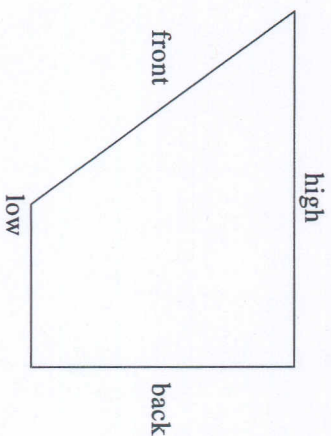
Some speakers have a similar rule that applies to vowels before /r/, as in *hear*, *there*, which might be [hi^r, ðe^r]. Note again how /l, r/ act in similar ways, as we found in the preceding chapter when discussing consonants.

Again, let me emphasize that these statements specify roughly only some of the major aspects of the pronunciation of English. They do not state everything about English vowels that is rule governed, nor are they formulated with complete accuracy. There are problems, for example, in saying exactly what is meant by a word or a syllable, and it is possible to find both exceptions to these statements and additional generalizations that can be made.

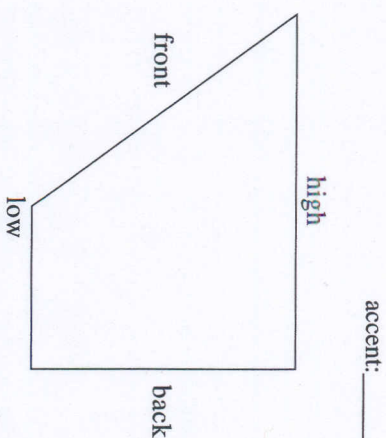
EXERCISES

(Printable versions of all the exercises are available on the CD.)

- A. Put your own vowels in this chart, using a set of words such as that given in Table 2.2. Listen to each vowel carefully and try to judge how it sounds relative to the other vowels. You will probably find it best to say each vowel as the middle vowel of a three-member series, with the vowels in the words above and below forming the first and last vowels in the series. In the case of the diphthongs, you should do this with both the beginning and the ending points.



- B. Try to find a speaker with an accent different from your own (or perhaps a foreigner who speaks English with an accent) and repeat Exercise A, using this blank chart.



- C. List words illustrating the occurrence of vowels in monosyllables closed by /p/. Do not include names or words of recent foreign origin. You will find that some vowels cannot occur in these circumstances.

i
 I
 ei
 e
 æ
 a
 ɔ
 ɒ
 u
 u
 u
 ʌ
 a
 ai
 au
 ɔɪ

- D. Considering only the vowels that *cannot* occur in monosyllables closed by /p/ as in Exercise C, give words, if possible, illustrating their occurrence in syllables closed by the following consonants.

b
 m
 f

t
n
l
s
z
k
g

E. Which vowel occurs before the smallest number of consonants? Also, which class of consonants occurs after the largest number of vowels? (Define the class in terms of the place of articulation at which these consonants are made.)

F. Look at Table 4.1. Find additional examples illustrating the relationship between the words in the second and fourth columns. Transcribe each pair of words as shown below for the vowel /i/.

Vowel	Stressed Syllable	Reduced Syllable
i	secreté [sɛ'krɪt]	secretive [sɪ'krɪtɪv]

l
e
æ
ɑ or ɒ
ou
aɪ

G. Make up and transcribe a sentence containing at least eight different vowels.

H. Give a number of examples for each of statements (1) through (6) by making a transcription of some additional words that fit the rules. Your examples should not include any words that have been transcribed in this book so far. Remember to mark the stress on words of more than one syllable.

(1) three examples (one for each syllable type)

(2) two pairs of examples (each showing words differing principally in stress)

(3) two sets of examples (each containing a one-syllable, a two-syllable, and a three-syllable word, with the first stressed syllable remaining constant)

(4) four examples

(5) four examples (use different vowels and different nasals)

(6) two sets of examples, each containing a contrasting pair of words

I. Transcribe the following sentences as recorded by the British and American speakers on the CD.

- (1) I've called several times, but never found you there.
- (2) Someone, somewhere, wants a letter from you.
- (3) We were away a year ago.
- (4) We all heard a yellow lion roar.
- (5) What did you say before that?
- (6) Never kill a snake with your bare hands.
- (7) It's easy to tell the depth of a well.
- (8) I enjoy the simple life.

As instructors vary in the kinds of transcription exercises they wish to assign, additional exercises will not be given at the end of this and subsequent chapters. Instead, more exercises may be found at the end of the book and on the CD in a special section called **Additional Resources**.

PERFORMANCE EXERCISES

A. Learn to produce only the first part of the vowel [eɪ] as in *hay*. Try saying this sound in place of your normal diphthong in words such as *they came late*. Similarly, learn to produce a mid-high back vowel [o], and say it in words that you have been transcribing with the diphthong [ou], such as *Don't go home*.

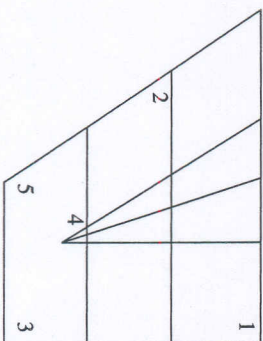
B. Incorporate [e] and [o] in nonsense words for production and perception exercises. These words might also now include the voiceless sounds [p, t, ʃ, w, j]. Remember to practice saying the words by yourself, so that you can say them fluently to your partner. Start with easy words such as:

mɪpɑ
nɛmɛ
ɪdɛ
'moʒi
'ɛle

Then go on to more difficult words like:

hɛ'ɪŋɑŋɛ
ɪnɑmɪnbɛɪ
'spɔʒɛɪnʒɪ
'wɔθjɔ'fɛsɪ
'tɛprɪdʒɪkɪʒ

C. Again working with a partner, write the numbers 1 through 5 somewhere on a vowel chart as, for example, shown here.



Now say vowels corresponding to these numbered positions in nonsense monosyllables, saying, for example, something like [dʌb]. Your partner should try to plot these vowels on a blank chart. When you have pronounced five words, compare notes and then discuss the reasons for any discrepancies between the two charts. Then reverse roles and repeat the exercise.

D. Repeat Exercise C with as many different partners as you can. It is difficult to make perceptual judgments of the differences among vowels, but you should be able to find a rough consensus.

E. In addition to nonsense words of the kind given in Exercise B, continue practicing with words to increase your auditory memory span. Say each word only two or three times. Remember that you should be spending at least one hour a week on production and perception exercises.

θɛ'mɪfɛ'θɪmɛ
'sɛrɑpɔ'sɔpɔfɪ'pɔs
mɔ'prɛtɛplɛtɛki
ŋɑkɔtɔtɑkpɔtɔ
lɔkɪmɪθnɔnɛʒɛ