

# CHAPTER NINE

## German Vowel Articulation

In this chapter we will be concerned with the vowels of German, specifically with their articulatory properties.

It was pointed out in Chapter Eight that the upper part of the vocal tract is a continuum with no clear breaks between the alveolar ridge and the palate, for instance, or between the palate and the velum. Similarly there are no clear breaks between the parts of the tongue. In fact, the entire speech tract from the lungs to the lips is a continuum. This is particularly evident when we are dealing with the vowels. With consonants the tongue either touches another speech organ, which we can **feel** if we put our minds to it, or it comes so close to another that we can locate the constriction fairly easily. With the vowels it is more difficult to locate the tongue because the vowels are those sounds which are produced with relatively **little** obstruction of the passage of air.

The major factor in determining how the different vowels actually sound is the size and shape of the vocal tract, which functions in vowel articulation as a resonance chamber. We all know that if we blow into the mouth of a bottle at the right angle we will get a musical tone. The bottle acts as a resonance chamber and the note we hear is determined by the size of the chamber, i.e. by the amount of air which can vibrate within it. If we add water to the bottle, it reduces the size of the resonance chamber and there is less air to vibrate. The result is a higher tone. A similar principle is at work in the oral tract. We do not add water, of course, but we regulate the size and shape by moving the tongue and lips.

The tongue is by far the most flexible and movable of the vocal organs. The tongue controls the size of the vocal tract by moving up and down and by moving forward and backward. These two areas of movement, **tongue height** and **tongue position** are two of the distinctive features of German vowel articulation.

### **Tongue Height**

Imagine, for the moment, that you are visiting the doctor because of a sore throat. The doctor asks you to open your mouth and say "Ahh". Look in a mirror and say "Ah" ([a]) and notice the position of your tongue. It lies flat or almost flat in the mouth. Doctors ask patients to say [a] for precisely that reason. The tongue lies flat and is therefore out of the way, which allows the doctor a clear view of the back of the patient's throat. If the doctor asked you to say [i] he would see nothing but your teeth and a bit of the top of your tongue. If he asked you to say [e] he would see a bit more of the top of your tongue than for [i], but the tongue would obstruct his view of the back

of your throat. For [i] the tongue is quite high in the mouth, i.e. it is relatively close to the roof of the mouth. For [e] the tongue is lower than for [i] but not as low as for [a]. We can say that for [i] the tongue is in a **high** position, for [e] it is in a **mid** position (between [i] and [a]) and for [a] it is in a **low** position. We can thus say that [i] is a **high** vowel, [e] is a **mid** vowel and [a] is a **low** vowel. [ɪ] is lower than [i] but higher than [e], while [ɛ] is lower than [e] but higher than [a]. Finally, [a] is lower than [ɛ] but higher than [a]. Ranging from the top to the bottom, then, we have:

<b>High</b>		[i]
	<b>mid high</b>	[ɪ]
<b>Mid</b>		[e]
	<b>low mid</b>	[ɛ]
	<b>mid low</b>	[a]
<b>Low</b>		[a]

[i], [ɪ], [e] and [ɛ] are distinguished from [a] and [ɑ] not only by vowel height but also by the fact that that part of the tongue which is higher during the articulation of the former is the **front** part. If the **back** part of the tongue is raised to a height corresponding to the height of the front part of the tongue when [i] is articulated, the result is [u]. [u] is higher than [ʊ], which is higher than [o], which is higher than [ɔ], which is higher than [ɑ]. [i,ɪ,e,ɛ] are thus **front** vowels, distinguished by **tongue position** from [u,ʊ,o,ɔ], which are **back** vowels. Using the two features of articulation which we have so far, namely tongue **height** and tongue **position**, we have a more complete picture like that presented in Figure 9.1. Tongue height is represented from top to bottom, with the highest vowels at the top, the lowest vowels at the bottom. Tongue position is represented from left to right, with front vowels at the left, back vowels at the right. [a] and [ɑ] are neither front nor back, which is represented by putting them in a neutral position between front and back.

	<b>Front</b>	<b>Back</b>
<b>High</b>	[i]	[u]
<b>mid high</b>	[ɪ]	[ʊ]
<b>Mid</b>	[e]	[o]
<b>low mid</b>	[ɛ]	[ɔ]
<b>mid low</b>		[a]
<b>Low</b>		[ɑ]

**Figure 9.1 - Tongue Heights and Positions for 10 German Vowels**

Figure 9.1 does not include all German vowels. There is also the group of vowels usually referred to collectively as the umlauted vowels, namely those written *ü, ö, ä* and *äu*. The last of these is a diphthong and will be dealt with later, when the other diphthongs of German are discussed.

The letter *ä* in the German alphabet actually represents two different sounds. When it represents a short vowel it is [ɛ]. For instance, the two German words *Bäcker* "baker" and *Becker*, as in Boris Becker, are pronounced exactly alike. The first vowels of *älter* "older" and *Eltern* "parents" are pronounced exactly alike. Short *ä* therefore is a different vowel only in the alphabet, i.e. there is more than one way of writing the one vowel [ɛ]. When *ä* represents a long vowel it is either [e:]

or [ɛ:], depending partially on where one lives, but also on whether one is trying to speak "by the book" or not. In any case, it does not represent a new vowel in terms of articulation.

ö and ü are a different story. Each of them represents two different sounds. ö spells the sounds which were listed in Figure 7.2 as [ø] and [œ], and ü spells [y] and [ʏ]. It turns out that [y,ʏ,ø,œ] have exactly the same tongue height and position as [i,ɪ,e,ɛ] respectively. Tongue height and position alone are therefore not sufficient to describe the vowels of German. There must be at least one other distinctive feature.

Native speakers of English frequently have difficulty learning to pronounce the German sounds [y,ʏ,ø,œ] correctly. The reason is, of course, that English does not have these vowels. Return to the mirror and watch yourself pronounce *Mutter* "mother" and then *Mütter* "mothers". You should see no difference in the way your lips are set. Now pronounce *Kissen* "cushion" and then *küssen* "to kiss". This time you should notice a difference. The lips are spread for the [ɪ] of *Kissen* but are rounded for the vowels of the other three words. This is the distinction between [i] and [y], [ɪ] and [ʏ], [e] and [ø], [ɛ] and [œ] respectively. For the first vowel in each pair the lips are spread, i.e. not rounded. For the second the lips are rounded. Rounding the lips not only narrows the aperture through which the air, and therefore the sound, makes its exit from the vocal tract, it also elongates the vocal tract, thus changing the size of the resonance chamber. Both of these factors contribute to the difference in sound quality. [i] and [y] are therefore both high front vowels, but [y] is a high front **round** vowel while [i] is high front non-round.

Look in the mirror while you pronounce *üben*, *üppig*, *mögen*, *möchte*, *Mut*, *Mutter*, *los* and *locker*. You lips should protrude and be rounded in each instance. Now, while watching your lips, pronounce *Miete*, *mit*, *legen*, *lecken*. In no instance should your lips be rounded. Now pronounce *Stadt* and *Staat*. The lips are not rounded for these vowels either. Thus we can state that German back vowels are rounded, that low vowels are not rounded, and that front vowels can be round or non-round. The distinctiveness of the third feature of vowel articulation, **round vs. non-round**, is thus confined to front vowels, since all back vowels are rounded. The low vowels are phonetically neutral with regard to tongue position (front vs. back) and are non-round.

Finally, what is it which distinguishes [i] from [ɪ] in a pair of words like *mieten* "to rent" and *mitten* "in the middle"? We have one answer already, namely tongue height. [i] is higher than [ɪ]. But in these two German words [i] is also phonetically much longer than [ɪ]. In the English words *beaten* and *bitten* the vowels are much closer to each other in terms of vowel length than the vowels of German *bieten* and *bitten*. German long vowels are very long and German short vowels are very short. This is a phonetic point which often escapes native speakers of English when they learn German. We tend to pronounce the German "long" vowels [i,e,a,o,u,y,ø] too short and to make the "short" vowels [ɪ,ɛ,a,ɔ,ʊ,ʏ,œ] too long. This is one of the factors which contributes to an English accent in German.

Length, however, is present only in stressed, i.e. accented, syllables. The German word *Philosophie* [filozofɪ:] , for instance, is stressed on the final syllable and contains four "long" vowels, yet only the final vowel is truly long. The corresponding adjective *philosophisch* [filozofɪʃ] has only one truly long vowel, the third one, but the vowel of the first syllable is still different from the vowel of the final syllable, even though they are the same length. Length is therefore not the distinguishing feature of articulation between [i] and [ɪ]. In physical terms the high part of the tongue is further forward for [i,y] than for [ɪ,ʏ] and for [e,ø] than for [ɛ,œ]. The high part of the tongue is further **back** for [u] than for [ʊ], for [o] than for [ɔ]. Finally, the tongue is flatter for [ɑ] than for [a], i.e. part of the tongue is more elevated for [ɑ] than for [a]. In other words, the "short"

vowels [i,ɛ,a,ɔ,u,y,œ] are articulated more towards the centre of the oral tract and the "long" vowels are all articulated more towards the periphery of the oral tract. Related to this is a difference in the degree of muscular **tension** involved in the articulation of the two sets of vowels. Go back to the mirror and pronounce *bieten*, *bitten*, *beten*, *Betten* and watch the muscles in your throat as you do so. If you are pronouncing these words correctly the muscles in your throat should tense quite perceptibly for *bieten* and *beten* and should be perceptibly more relaxed for *bitten* and *Betten*. The same is true for the other pairs of vowels. This is the genuine difference: **tense vs. lax**.

We now have the four articulatory features necessary to describe the articulation of German stressed vowels. These are:

- 1) Tongue height (high vs. mid vs. low),
- 2) Tongue position (front vs. back),
- 3) Lip rounding (round vs. non-round),
- 4) Tenseness (tense vs. lax).

[i] is therefore a high, front, non-round, tense vowel. [ɪ] is a high, front, non-round, lax vowel. [y] is a high, front, round, tense vowel, while [ʏ] is a high, front, round, lax vowel, and so on. A complete phonetic description would also include the fact that stressed tense vowels are also long and that stressed lax vowels are short. It would also include the fact that the tense vowels are more peripheral and the lax vowels more central, but the four features listed above are adequate to describe the vowels of German.

As with consonants there are natural classes among the vowels, which correlate with the distinctive features of articulation. [i,y,u] are high tense vowels, for instance. [y,ʏ,u,ʊ] are high round vowels, etc.

## Diphthongs

The German diphthongs, which have been represented as [aɪ, aʊ, ɔɪ], are combinations of vowels which exist elsewhere and which require no extensive additional discussion. It will be sufficient to point out that the first member of each diphthong is referred to as the **onset** and the final member is referred to as the **glide**.

There is one additional, very marginal, diphthong, which occurs in only two words, both of them interjections. This is the diphthong of the words *Pfui!* and *Hui!* Phonetically this is [ʊɪ]. Since this diphthong is so marginal we will not consider it part of the German sound system. It would be possible to go for months at a time without ever using *Pfui!* or *Hui!* and hence without ever using [ʊɪ], whereas it would be impossible to go for months without ever using [aɪ, aʊ] or [ɔɪ].

## Unstressed vowels

We have already noted that all unstressed vowels are phonetically short. All German vowels can occur in unstressed syllables, but there are two which occur **only** in unstressed syllables. These are **schwa** [ə], which is spelled "e" and is the unstressed vowel in words like *bitte*, *betreten* (twice), *gesagt*, and a vowel which is represented [ɐ], an inverted lower- case "a". This vowel is spelled "er" and is the unstressed vowel in words like *bitter*, *Vater*, *Schwester* and *wandern*. Phonetically these are both central vowels, i.e. neither front nor back. [ə] is higher than [ɐ], reflected in the fact that the mouth is slightly wider open for [ɐ]. Some speakers of German, notably in the south of the German-speaking area, do not have [ɐ], using instead a sequence of [ə] + [r], where [r]

represents an "r" formed by touching the tongue briefly against the upper teeth. **All** speakers of German distinguish the final syllables of *bitte* and *bitter*. Standard North German speech, which is the variety I have chosen to describe for reasons given earlier, does so by using the vowels [ə] and [ɐ] respectively.

Finally there is a sound which is very similar to [ɐ] and which, in standard North German speech, occurs after tense vowels in words like *der* and *mir*, and after unstressed lax vowels in the prefixes *er-*, *ver-* and *zer-*. This sound is written [ɐ̯], which differs from [ɐ] only by the little curve under it. The curve indicates that this sound is not syllabic. This requires some discussion of the terms syllabic and non-syllabic.

## The Syllable

The syllable as a phonetic unit is very difficult to define. However, we all know what a syllable is. Given a word like *bitte* or *wandern* we have no hesitation in saying that each word has two syllables. We know that *Leberkrankheiten* has five syllables. We know that *der* has one.

Each syllable contains a sound which is its nucleus. This is usually a vowel, although any of the **sonorants** (see Chapter 8) can be the nucleus of a syllable. The nucleus is a **syllabic** sound. Each syllable contains one and only one syllabic sound. All vowels can be syllabic. Some consonants can be syllabic. Some consonants are never syllabic. Some sounds have both syllabic and non-syllabic variants. [ɐ] is a case in point. If no other syllabic sound is present in the same syllable, then [ɐ] is syllabic, e.g. in *Zimmer*. If, however, another syllabic sound is present in the same syllable, then [ɐ] is non-syllabic [ɐ̯], as in *der*. If [ɐ] is preceded by a **tense** vowel it is always non-syllabic [ɐ̯].

## Syllable Division

In phonetic transcription stress is indicated by placing the relevant stress marker ( ' or ) before the syllable which bears the stress. It is therefore necessary to know the basic rules of syllable division.

Let us for the time being use the symbols C (for consonant) and V (vowel). The major problem in dividing syllables is deciding which syllable consonants belong to. If the word only contains one syllable there is no problem. The problems arise when a word contains two syllabic sounds with a consonant or consonants between them. The general rule is: if the sequence VCV occurs, the division is V-CV, i.e. a single consonant between vowels belongs to the second syllable. Thus *geben* is divided [gɛː-bən], *hacken* is divided [ˈha-kən]. If the sequence VC<sub>1</sub>C<sub>2</sub>V occurs, the division is VC<sub>1</sub>-C<sub>2</sub>V, i.e. if two consonants occur between vowels, the syllable division is between the two consonants. One belongs to the first syllable and one belongs to the second. Thus *danke* is divided [ˈdaŋ-kə] and *helfen* is divided [ˈhɛl-fən]. There are special rules for clusters of three and four consonants which need not concern us.

Note that these principles of syllable division refer to the phonetic shape of the word, **not** to the spelling. A similar principle applies in word division in the German spelling system, but it is important to re-emphasise here that German spelling is not phonetic.

## Open and Closed Syllables

A syllable which ends in a vowel is an **open** syllable. A syllable which ends in a consonant is a **closed** syllable. Therefore the first syllable of *geben* and *hacken* is open, whereas the first syllable of *danke* and *helfen* is closed. The final syllables of *geben*, *hacken* and *helfen* are closed; the final syllable of *danke* is open. The distinction between open and closed syllables is very important in German and in language in general. For instance, as we shall see later, any vowel can occur as the final sound of a non-word-final open syllable in German, but only **tense** vowels, [ə] and [ɐ] can occur in open syllable at the ends of words. The distinction between open and closed syllables has also played a significant role in the history of the German language, as we shall see in volume two.