carted *concluded* *divine* *divinity* *serene* *serenity*

Note (i). It can be rather a difficult task, at first, to listen consciously and attentively to the phonetic details of one's own speech while at the same time attempting to speak naturally, as if one were *not* listening; it involves playing a kind of psychological trick on oneself. However, it is possible, with a little practice, to get the hang of it.

Note (ii). Some students will have an [ɹ] (or an [r]) in *carted*, while others will not; transcribe it if you utter it, but do not transcribe it if you do not. We will return to variation with respect to [ɹ] in due course. See too the note under exercise 2, chapter 3.

Carr, P. (1999). English Phonetics & Phonology. Malden, MA: Blackwell.

5

The Phonemic Principle

5.1 Introduction: Linguistic Knowledge

We have been dealing, thus far, with phonetics, that is (as we have defined it), with the study of human speech sounds (although we have dealt exclusively with *English* phonetics, and in particular, exclusively *articulatory* phonetics, ignoring important facts about the acoustic properties of the speech sounds we have been discussing). We will, henceforth, be dealing with *phonology*, as well as phonetics. Phonology, we will claim, is to do with something more than properties of human speech sounds *per se*. Phonology is the study of certain sorts of mental organization. In particular, it is the study of certain types of mental category, mentally stored representations, and generalizations concerning those categories and representations. On this view, phonology is *not* the study of human speech sounds *per se*, although phonetics and phonology are inextricably intertwined. The point of this chapter is to demonstrate what the difference between the two is, and to begin to introduce the reader to the phonology of English. Let us begin by considering some general questions concerning what it is to know a language.

Let us assume that when we say that someone knows a language, in the sense of being a native speaker of that language, he or she is in a certain mental state, or possesses a certain sort of linguistic knowledge. Knowledge of a native language is, apparently, largely unconscious knowledge. It appears to contain semantic knowledge (to do with the meanings of words, phrases and sentences) and syntactic

knowledge (to do with the syntactic categories of words, with the structure of phrases and sentences and with the syntactic relations between words, phrases and clauses). We know that this is so, since speakers are able to make syntactic and semantic judgements, based on that knowledge. For instance, a native speaker of English can judge that *Who did you see Graham with?* is an English sentence, and that *Who did you see Graham and?* is not. The speaker knows, again intuitively, that the difference between the two amounts to more than the difference between the mere presence of the word *and* as opposed to the presence of the word *with*. He or she also knows intuitively (not necessarily fully consciously) in what sense *He told the man who he knew* is ambiguous, and in what sense the two interpretations of that sequence of words differs in structure and meaning from *He told the man how he knew*, over and above the superficial fact that one sequence contains *who* and the other *how*. That knowledge is clearly unconscious knowledge, since we require no instruction to be able to make such judgements, and we can make them in the absence of any conscious knowledge whatsoever of the syntax and semantics of English (one could make such judgements even if one had not the faintest idea of what a noun or a verb might be, or what the syntactic categories of *with*, *and*, *who* and *how* might be).

We will take the view in this book that a speaker's (largely) unconscious knowledge of his or her native language(s) must also contain phonological knowledge. One of the reasons many linguists take this view is that speakers can make judgements which, it is claimed, are in some sense parallel to those made with respect to syntactic states of affairs. For instance, a native speaker of English can tell how many syllables there are in a word without having the faintest idea, consciously, as to what a syllable is. This shows that the native speaker has the ability to recognize syllables, even if the recognition of syllables lies below the level of consciousness. In a similar fashion, it is claimed, a native speaker of English can tell that the sequence of segments [blʌg], considered as an utterance of a word, is an English sequence, whereas the sequence of segments [tʰlʌg] is not, despite the fact that she or he may well never have heard either sequence in her or his life. Let us postulate that, in making such judgements, the native speaker of English gains access to a kind of unconscious knowledge which constitutes 'the phonology of English'.

Our task, in this book, will be to begin to consider, in an elementary way, what form that knowledge takes. The discipline of phonology, under this view, differs from that of phonetics, since it is the study, not of speech sounds *per se*, but of mental abilities and largely unconscious mental states. Clearly, the phonologist must pay close attention to speech sounds and their properties; they will constitute much of the evidence the phonologist brings to bear on his or her hypotheses about speakers' unconscious phonological knowledge, but they do not constitute his or her object of inquiry as such.

5.2 Contrast vs Predictability: The Phoneme

Let us begin by considering voiceless unaspirated and voiceless aspirated stops in English and Korean. Speakers of most accents of English habitually utter both aspirated and unaspirated voiceless stops. The following English data exhibit both of these.[1]

(1) Aspirated and unaspirated voiceless stops in English

(a)	['pʰuːɬ]	'pool'	(b)	[ə'pʰɪə]	'appear'
(c)	['spɜːt]	'spurt'	(d)	[də'speɪt]	'despite'
(e)	['tʰɒp]	'top'	(f)	[ə'tʰæk]	'attack'
(g)	['stɒp]	'stop'	(h)	[də'stɹɔɪ]	'destroy'
(i)	['kʰɪlɪŋ]	'killing'	(j)	[ə'kʰɹuː]	'accrue'
(k)	['skoʊɬd]	'scold'	(l)	[dɪ'skʌvə]	'discover'

The diacritic which precedes certain symbols in these data (the one which precedes the 'p' symbol in ['pʰuːɬ]) indicates the beginning of a stressed syllable. We will assume that it is evident to the reader which syllable in the above words is the stressed syllable (e.g. the first syllable in *killing* and the second syllable in *accrue*).

From these data, it appears that voiceless stops are aspirated when they are at the beginning of a stressed syllable, as in *pit* and *appear*, but unaspirated when preceded by a voiceless alveolar fricative, as in *spurt*. That is, in these data, wherever the unaspirated voiceless stops appear, the aspirated ones do not, and vice versa. Compare the English data with the following data from Korean:

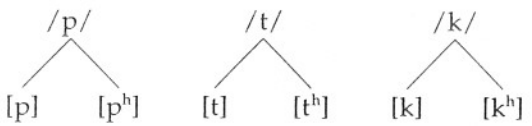
(2) Aspirated and unaspirated voiceless stops in Korean

(a)	[p^{h}ul]	'grass'	(b)	[pul]	'fire'
(c)	[t^{h}al]	'mask'	(d)	[tal]	'moon'
(e)	[k^{h}ɛda]	'dig'	(f)	[kɛda]	'fold'

In these Korean data, aspirated and unaspirated voiceless stops may occur in the same place (at the beginning of a word). The range of places within a word which a given sound may occur in is called its **distribution**. In the English data we have looked at, the distribution of unaspirated and aspirated stops is *mutually exclusive*: where you get one kind of stop, you never get the other. This is called **complementary distribution**.

Furthermore, if we take, say, the stops [t] and [t^h] in the English data, it is clear that they are **phonetically similar**: both are stops, both are voiceless, both are alveolar. And yet, for most speakers of English, the alveolar stops in, say, *still* and *till* sound the same, despite the fact that the former is unaspirated and the latter aspirated. For the English speaker, these two phonetically distinct sounds 'count as the same thing'. We cannot say, without contradiction, that they are simultaneously 'the same sound' and 'not the same sound'. What we will say is that, while they are *phonetically distinct*, they are *phonologically equivalent*. That is, the two types of stop correspond to, are interpreted as belonging to, a single mental category. We will refer to such a category as a **phoneme**. The English speaker interprets the six phonetic segments [p], [p^h], [t], [t^h], [k] and [k^h] in terms of only three phonemes: /p/, /t/ and /k/. We may depict this as follows:

(3) English voiceless stop phonemes



The top line here represents the three voiceless stop phonemes (mental categories) in terms of which the six types of phonetic segment are perceived. The relationship between phonemes and their associated phonetic segments is one of **realization**, so that the

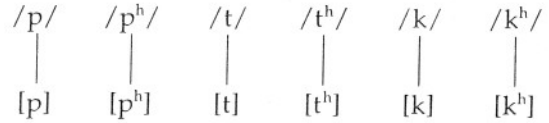
phoneme /p/, for instance, is realized as [p] after a voiceless alveolar fricative, and as [p^h] elsewhere. The most important point is that, on the data we have seen thus far, aspiration or the lack of it is entirely predictable in English: there is a generalization, expressible as a general rule, as to the contexts in which voiceless stops will and will not be aspirated. For most accents of English, this generalization is one that is internalized by children when they acquire English as their native language. The generalization forms part of what native speakers know in knowing their native language, even if that knowledge is largely *unconscious* knowledge. Realizations of a phoneme which are entirely predictable from context are called its **allophones**. We therefore say that [p] and [p^h] are allophones of the /p/ phoneme in most accents of English. We are claiming that native speakers of English possess phonemes (which are mental categories) and phonological generalizations or rules as part of their (largely unconscious) knowledge of their native language, and that native speakers perceive the allophones they hear in terms of those categories and generalizations.

Compare the English situation with the Korean one. It is clear that the distribution of aspirated and unaspirated voiceless stops in Korean is *overlapping*: there is at least one place (at the beginning of words) in which either type of sound may occur. This kind of distribution is referred to as **parallel distribution**, where 'parallel' means 'overlapping to some degree'.

Furthermore, the distinction between aspirated and unaspirated voiceless stops can make a crucial difference in Korean: when the Korean speaker says [p^{h}ul], it does not mean the same thing as [pul]. The difference between the two sounds is said to be semantically **contrastive**. Pairs of words which differ with respect to only one sound are called **minimal pairs**. Their existence is important, since they demonstrate that the two sounds in question are both in parallel distribution and semantically contrastive.

We therefore want to say that, unlike the English speaker, the Korean perceives the six aspirated and unaspirated voiceless stops [p], [p^h], [t], [t^h], [k] and [k^h] in terms of six different mental categories. That is, [p], for instance, is a realization of the /p/ phoneme, whereas [p^h] is a realization of a distinct /p^h/ phoneme. We may depict (part of)[2] the Korean system thus:

(4) Some Korean voiceless stop phonemes



The distinction between aspirated and unaspirated voiceless stops is *phonemic* in Korean but *allophonic* in English. Both English and Korean speakers habitually utter both aspirated and unaspirated voiceless stops. On the phonetic level, the two languages are therefore equivalent as far as bilabial, alveolar and velar voiceless stops are concerned. But at the phonemic level (the mental level), the two languages are quite distinct: the Korean speaker has six mental categories where the English speaker has only three. As far as voiceless stops are concerned, Korean speakers have twice as many phonemic contrasts as English speakers. The difficulty which the English speaker encounters in learning to pronounce and perceive Korean voiceless stops is therefore a *mental* one; it is a *phonological* difficulty, not a purely articulatory one.

This is not to deny that there can be purely articulatory difficulties in learning to speak another language (difficulties in articulating new types of sound which one is not in the habit of articulating). For instance, most speakers of Japanese who are learning to speak English will have to learn to pronounce the sound [l], which they are not in the habit of pronouncing. When learners of a foreign language face this task, they often utter a sound from their native language which is similar to the target sound: in this case, the tap [ɾ] which, like [l], is voiced and alveolar. Similarly, a speaker of French who is trying to master the English sound [ð] will often utter the voiced alveolar fricative [z] or the voiced dental stop [d̪], which she or he is used to uttering in her or his native language. The former is similar to the target sound in being a voiced fricative, while the latter is similar in being a voiced dental sound. Such problems with the pronunciation of foreign languages are widespread. But they are distinct in kind from the kind of problem we have just discussed.

We need not deny either that there may be difficulties in the pronunciation of a foreign language which involve *both* purely

articulatory *and* phonological difficulties. For instance, the English speaker who is learning Korean must learn to articulate a third kind of stop which is distinct from voiced stops, aspirated voiceless stops and unaspirated voiceless stops. These are the voiceless stops of Korean which are articulated with 'glottal tension': during their production, the vocal cords do not vibrate, but nor are the vocal cords spread apart, as they are for the voiceless aspirated stops; rather, the vocal cords are constricted.

The English speaker must also learn to (in a sense) *perceive* the distinction between all three sorts of stop in Korean; since the glottally constricted voiceless stops are a new category of sound, they may seem to the English speaker to sound like stops he or she is more used to hearing (voiced stops, for instance). And that is a phonological difficulty, added to the purely articulatory one which the English speaker also has. However, it is clear from the data we have looked at here that there is a type of difficulty which is exclusively phonological, and it is that kind of difficulty which justifies our making a distinction between the kind of articulatory phonetics discussed in the preceding chapters, which constitutes the study of the articulation of speech sounds in and of themselves, and phonology, the study of the system of mental categories in terms of which we interpret those speech sounds.

In examining the phonological differences between Korean and English voiceless stops, we have adopted what is known as **the phonemic principle**, which consists of two sets of two criteria, as follows:

(5) The phonemic principle

Two or more sounds are realizations of *the same* phoneme if:
(a) they are in complementary distribution

and

(b) they are phonetically similar.

Two or more sounds are realizations of *different* phonemes if:
(a) they are in parallel (overlapping) distribution

and

(b) they serve to signal a semantic contrast.

It is on the basis of the phonemic principle that we say that phonetic differences involving aspiration are allophonic in English but phonemic in Korean.

We have just seen a case where the Korean speaker has more phonemic contrasts than the English speaker. Let us now look at another set of data where the converse is the case. Native speakers of some varieties of Scottish English habitually utter the speech sounds we have represented as '[ɾ]' and '[l]', i.e. the voiced alveolar tap and the voiced lateral alveolar approximant (as in *rip* and *lip*). So do speakers of Korean. Here are some examples of (Scottish) English and Korean words which contain those sounds:

(6) [ɾ] and [l] in Scottish English and Korean

English			*Korean*		
(a)	[læm]	*lamb*	(b)	[mul]	'water'
(c)	[ɾæm]	*ram*	(d)	[mulkama]	'place for water'
(e)	[lɪp]	*lip*	(f)	[muɾe]	'at the water'
(g)	[ɾɪp]	*rip*	(h)	[mal]	'horse'
(i)	[bɛɾi]	*berry*	(j)	[malkama]	'place for horse'
(k)	[bɛli]	*belly*	(l)	[maɾe]	'at the horse'

While speakers of English and Korean habitually utter both sounds, we can predict that many native speakers of Korean who are learning to speak this variety of Scottish English would find the distinction between [l] and [ɾ], when they speak Scottish English, rather difficult to get the hang of. On the face of it, this is puzzling because, as we have just said, Korean speakers have no difficulty in uttering the two sounds, and may well have uttered many thousands of them, long before beginning to learn English. So wherein does the problem reside? One possibility that can be immediately discounted is the suggestion that Korean speakers are encountering some kind of physical, articulatory difficulty: it is clearly *not* the case, as we have seen, that either of the sounds is new to them.

The difficulty is of a *mental* nature, and if one examines the table of data in (6) above, it is clear that, in English, the two sounds may occur in the same places within a word, e.g. at the beginning of words, or between vowels. Furthermore, two words may differ *solely* with respect to the segments [ɾ] and [l]: there are minimal pairs involving

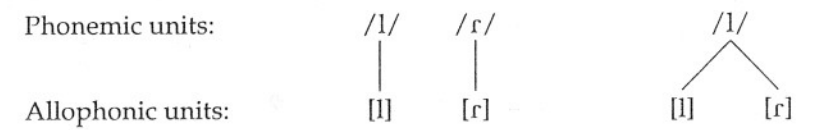
the two sounds ([ɾæm] vs [læm], for instance). In this variety of Scottish English, [ɾ] and [l] are in parallel distribution and can function to signal a semantic contrast. It is important to bear in mind that, when we say that a phonetic difference is contrastive, we refer to a *semantic* contrast, and *not* to a phonetic difference between the sounds.

In Korean, the distinction between [ɾ] and [l] can *never* be contrastive, since [ɾ] and [l] may never occur in the same place. They are in complementary distribution: where one occurs, the other never does, and vice versa. Specifically, [ɾ] in Korean occurs between vowels but nowhere else, whereas [l] *never* occurs between vowels, but may occur elsewhere. Because of this, it is impossible to find minimal pairs involving these two sounds in Korean. The two sounds are also phonetically similar: both are voiced and both entail a closure made between the centre of the tongue blade and the alveolar ridge. Therefore the two sounds are realizations of the same phoneme in Korean.

In this variety of Scottish English, there is a phonemic /ɾ/ vs /l/ contrast. In Korean, on the other hand, there is no such phonemic contrast: whereas this variety of Scottish English has /ɾ/ vs /l/, Korean has only one phoneme: /l/, which has two allophones, [ɾ] and [l]. Put another way, the difference between the sounds [ɾ] and [l] is *phonemic* in English, whereas the difference between [ɾ] and [l] is *allophonic* in Korean. Speakers of this variety of English perceive [ɾ] and [l] in terms of two *distinct* mental categories, whereas Korean speakers perceive them in terms of *a single* mental category. In Korean, the phoneme /l/ is realized as [ɾ] between vowels, and is realized as [l] elsewhere.

We may depict this phonological difference between this variety of Scottish English and Korean as follows:

(7) The phonemic status of [ɾ] and [l] in Scottish English and Korean



We have now shown where the Korean speakers' difficulty resides: at the level of their (largely) unconscious knowledge of their language. As far as these segments are concerned, Korean and this variety of Scottish English do not differ at the allophonic level: both have [ɾ] and [l]. But they *do* differ at the *phonemic* level: the Scottish English speaker has a mental distinction which the Korean speaker lacks; the Korean speakers' problem is thus *mental* (specifically, perceptual) in nature, not articulatory.

We have said that it is entirely predictable which allophone of the Korean /l/ phoneme will occur in a given context. We may say that there is a **phonological generalization** governing the occurrence of the allophones, which the native speakers of Korean have unconsciously grasped, and which forms part of their linguistic knowledge. We may express that generalization in terms of a **phonological rule**, as follows:

(8) /l/ realization in Korean

/l/ is realized as [ɾ] between vowels.

As we will see, the linguistic knowledge of native speakers contains many such generalizations. As far as [ɾ] and [l] are concerned, the phonological knowledge of the Korean speaker and the Scottish English speaker differ in two respects: (a) the Scottish English speaker has a phonological distinction which the Korean speaker lacks, and (b) the Korean speaker possesses a phonological generalization which the Scottish English speaker lacks. Phonological knowledge consists, therefore, of, among other things, phonological categories and phonological generalizations.

In several varieties of English, the /l/ phoneme also has allophones: 'clear l' ([l]) and 'dark l' ([ɬ]).[3] The following data show the typical distribution of these two sounds in those varieties:

(9) English 'clear l' and 'dark l'

(a)	[kʰlɛvə]	clever	(b)	[bɛɬz]	bells
(c)	[pʰleɪn]	plain	(d)	[tɹeɪɬ]	trail
(e)	[lʊk]	look	(f)	[pʰʊɬ]	pull

(g)	[lɔ:]	law	(h)	[bɔ:ɬz]	balls
(i)	[laɪ]	lie	(j)	[pʰaɪɬ]	pile

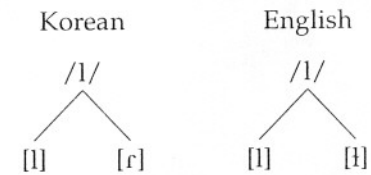
One way of stating the distribution of the allophones is to say that 'clear l' occurs immediately before vowels, whereas 'dark l' occurs immediately after vowels. We may state the relationship between the /l/ phoneme and its clear and dark allophones in terms of the following rule:

(10) /l/ realization in English

/l/ is realized as [ɬ] immediately after a vowel.

We may depict the realizations of Korean /l/ and /l/ in certain varieties of English as follows:

(11) /l/ realizations in Korean and English



5.3 Phonemes, Allophones and Contexts

We have said that the allophones of a phoneme are predictable realizations of that phoneme. We can predict which allophone will occur, given a specific context. The sorts of context we have cited are, in some cases, rather general. For instance, in the Korean data we considered, we saw that aspirated and unaspirated voiceless stops may both occur at the beginning of a word. We also saw, in the Korean data that we looked at, that Korean /l/ is realized as [ɾ] between vowels. 'At the beginning of a word' and 'between vowels' are quite general contexts. So is 'at the end of a word', or 'before a consonant', or 'after a vowel'.

In other cases, the contexts we need to refer to are more specific. For instance, in the English data we looked at, we saw that the unaspirated voiceless stops occurred after a voiceless alveolar fricative. In many cases, there appears to be some kind of phonetic connection between the context in which an allophone occurs and the nature of the allophone itself. Let us consider an example.

In many accents of English, the /ɹ/ phoneme has two realizations: [ɹ] and [ɻ̥] (in which the subscript diacritic denotes voicelessness). The following data exemplify this:[4]

(12) Voiced and voiceless allophones of /ɹ/ in English

(a)	[tʰɻ̥aɪ]	try	(b)	[əɹeɪ]	array
(c)	[pʰɻ̥u:v]	prove	(d)	[gɹoʊ]	grow
(e)	[kʰɻ̥eɪv]	crave	(f)	[bɹeɪk]	break
(g)	[fɻ̥i:]	free	(h)	[dɹɪŋk]	drink
(i)	[θɻ̥i:]	three	(j)	[bæɹoʊ]	barrow

It is clear that the voiced and voiceless alveolar approximants are in complementary distribution: the voiceless one appears only after voiceless consonants, and the voiced one appears elsewhere. The question is whether we should say that there is a voiced alveolar approximant phoneme which is realized as a voiceless allophone after voiceless consonants, or that there is a voiceless alveolar approximant phoneme which is realized as a voiced approximant after voiced consonants and between vowels. We choose the former claim, since it is more phonetically natural: approximants are normally voiced. Additionally, we can make phonetic sense of the claim that a voiced phoneme has a voiceless realization when it follows voiceless consonants: the realization is assimilating to the preceding segment (it is becoming more like an adjacent segment).

Let us consider another case of this sort. In many accents of English, there are stops which are articulated in front of the velar place of articulation, close to the hard palate. The following data exemplify this ([c] and [ɟ] represent a voiceless and a voiced palatal stop, respectively):

(13) Velar and palatal stops in English

(a)	[kʰu:ɬ]	cool	(b)	[cʰi:p]	keep
(c)	[kʰoʊɬ]	coal	(d)	[cʰi:n]	keen
(e)	[kʰɒp]	cop	(f)	[cʰɪt]	kit
(g)	[kʰɑ:t]	cart	(h)	[scɪp]	skip
(i)	[gu:ɬ]	ghoul	(j)	[ɟɹə]	gear
(k)	[goʊɬ]	goal	(l)	[ɟɪɬ]	gill

Once again, the two segment types are in complementary distribution: the advanced, palatal articulations occur before high front vowels, and the velar ones occur elsewhere. We postulate a /k/ phoneme which is 'fundamentally' velar in its place of articulation, but which has a fronted or advanced realization before high front vowels. This makes phonetic sense: high front vowels are palatal articulations (the articulators are the front of the tongue and the hard palate), so we can say that the velar phoneme is assimilating to the following vowel when it is a high front vowel.

We are adopting the view that phonemes often have a kind of 'default' or 'basic' phonetic realization, and that it is this realization which will occur in the absence of specifiable contexts which 'shift' the realization from its default one.

5.4 Summing Up

In this chapter, we have begun to distinguish between phonetics, defined as the study of speech sounds *per se*, and phonology, the study of the system of mental representation, categories and generalizations to which those sounds are related. Native speakers of a language tend to take its phonological system for granted. Speakers of English, for instance, think it perfectly obvious that [ɹ] and [l] are quite distinct, despite the fact that they are, phonetically, very similar. Equally, they cannot easily see that [p] and [pʰ] are different, despite the fact that they are. This chapter has sought to show that what underlies these perceptions is the phonological system of the native language, as distinct from, if intimately related to, the set of

speech sounds uttered by native speakers of the language. What sounds one takes to be 'the same' or 'different' depends to a large extent on the system of mental categories which constitutes one's native language phonology. But it is clear that phonetics and phonology are intimately connected.

The extent to which our mentally stored system of language-specific phonological categories governs our perception of a stream of speech sounds was well expressed by the linguist Edward Sapir, who worked with North American Indian languages in the early twentieth century:

> the unschooled recorder of language, provided he has a good ear and a genuine instinct for language, is often at a great advantage as compared with the minute phonetician, who is apt to be swamped by his mass of observations. I have already employed my experience in teaching Indians to write their own language for its testing value in another connection. It yields equally valuable evidence here. I found that it was difficult or impossible to teach an Indian to make phonetic distinctions that did not correspond to 'points in the pattern of his language', however these differences might strike our objective ear, but that subtle, barely audible, phonetic differences, if only they hit the 'points in the pattern', were easily and voluntarily expressed in writing. In watching my Nootka interpreter write his language, I often had the curious feeling that he was transcribing an ideal flow of phonetic elements which he heard, inadequately from a purely objective standpoint, as the intention of the actual rumble of speech.[5] (Sapir 1921: 56)

One can begin to appreciate the extent to which one's native language phonemic categories affect one's perception when one considers that any normal 6-month-old child, no matter what language he or she is beginning to acquire, can distinguish aspirated and unaspirated voiceless stops. Clearly, then, the aspirated/unaspirated difference is one that could in principle act as the basis for a phonemic distinction, and it clearly does act that way in many human languages. But a child who acquires a language (such as most varieties of English) in which the aspirated/unaspirated distinction is allophonic rather than phonemic will come to ignore that distinction at a certain level of awareness. Acquiring the phonology of one's native language can therefore result in a kind of loss of perceptual discrimination,

but only at one level of awareness: when a speaker of, say, South African English utters unaspirated stops instead of aspirated stops, this will often be noticed by a speaker of, say, RP, even if the RP speaker notices only that there is something different about the speech of the South African English speaker. Indeed, such differences can be quite striking to the speaker of a language in which unaspirated stops never occur word-initially before a stressed vowel. Such speakers, on being suddenly confronted by English spoken with, say, a Greek accent (on arrival, say, at a Greek airport) will typically think that a word such as *Gatwick* (one of the London airports) is being pronounced as [gadwig]. In cases such as this, the English speaker not only perceives the fact that the stops in question are unaspirated, but also assigns them to the category of English voiced stops, because voiced stops in English are unaspirated, and word-initial and word-final voiced stops in English are barely voiced at all.

Both the native speaker and the adult learner of English can begin to develop an awareness of her or his own phonological system, and of the immense influence this has on one's perception of speech sounds, by comparing and contrasting languages which are phonetically identical (or nearly identical), but phonologically distinct, with respect to some set of sounds. The examples given in this chapter are designed to begin to induce this kind of awareness, as are the exercises which follow.

Notes

1 These data do not show the full range of places in which aspirated and unaspirated voiceless stops occur in most English accents. What we will have to say about their phonological status is therefore very much oversimplified. But the data will suffice to illustrate a valid point.

2 Korean has a third phonemic category of stops, which we discuss below.

3 There are also devoiced allophones of /l/; we ignore these here.

4 We indicate these devoiced sounds here, but henceforth we will not transcribe them using the 'voiceless' diacritic in cases where the devoicing phenomenon is irrelevant to the point being made.

5 Edward Sapir (1921), *Language*, New York: Harcourt Brace, p. 56.