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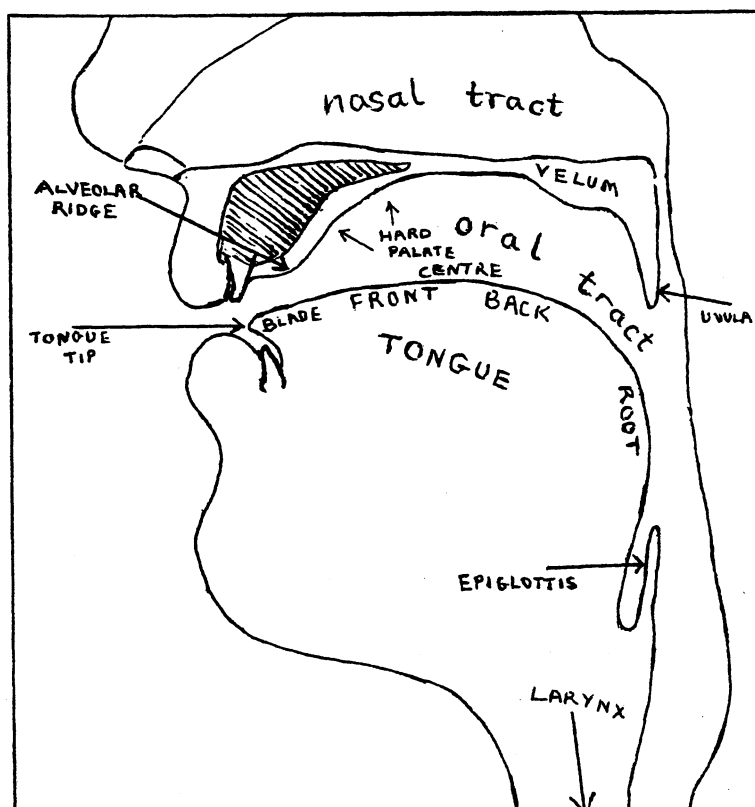
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ARTICULATORY PHONETICS



The source of power for all continuous speech is air from the lungs. This is expelled by means of a series of contractions of the chest muscles (the '**intercostal**' muscles between the ribs); rather than by the big **lateral dorsal** muscle at the base of the lungs, which you would use to blow up a balloon.

Air from the lungs goes up the windpipe, or **trachea**, and into the **larynx**, or 'voice-box'. This is primarily a valve, whose function is to seal off the lungs from the outside air; for their own protection, but also in order to make the rib-cage rigid so as to increase the mechanical efficiency of various muscular movements of the arms. This valve, however, has a secondary function in many animals, including man, in producing sound. If the muscular lips of the valve (known as the **vocal cords**) are adjusted so that there is only a narrow space between them, they will vibrate when air from the lungs passes through. This vibration is due to the **Bernoulli effect** (see p. 50, below) and results in the release of air in a very rapid series of pressure pulses, which are heard as **voice**.

The space between the vocal cords is known as the **glottis**. This can be held open, as in normal breathing, or closed, as for a **glottal stop**. It can also be *narrowed*, so that the vocal cords are not close enough together to vibrate, but are close enough to reduce the rate at which air can escape from the lungs, and at the same time, to produce a soft hissing sound known as a **whisper**.

The air passages above the larynx are known as the **vocal tract**. (See the diagram above). The shape of this is of great importance for the sound quality of the various speech sounds, and the parts of the vocal tract that can be actively used to produce different speech sounds are called **articulators**. In its 'upper reaches' the vocal tract divides into two passages, the **oral tract** and the **nasal tract**.

The most 'active' components of the vocal tract are the tongue and lips; the tongue forms the lower surface of the tract, and can be raised to touch the upper surface. The front part of the upper surface of the tract is backed by bone, and is therefore immovable; this is known as the **hard palate**. But the back part of the oral tract's upper surface, the **soft palate** or **velum**, is a muscle that can be actively raised in a **velic closure** to seal off the nasal tract, or lowered to open it. If you insert a finger into your mouth, and move it backwards over the upper surface of the vocal tract, starting from the front teeth, you should be able to detect the point at which the hard palate gives way to the soft palate.

A soft appendage hanging down from the lower end of the velum, known as the **uvula**, can be adjusted to vibrate in the airstream, so as to produce the 'trilled' or 'rolled' version, [R], of the uvular 'Parisian r'. The part of the vocal tract between the larynx and the uvula is known as the **pharynx**.

The diagram on p. (ii), above, shows the names given to parts of the upper surface of the vocal tract. Just behind the upper teeth, there is a ridge, known as the **alveolar ridge**, which you can feel with the tip of your tongue. Going backwards from this ridge, the upper surface of the mouth rises sharply and then levels out; this is the hard palate. The diagram also shows the names given to various parts of the tongue. The **tip** and **blade** of the tongue are the most mobile parts; behind this there is the main body of the tongue, which is arbitrarily divided, for the purposes of phonetic classification, into the **front**, which in its neutral or 'rest' position lies under the hard palate; the **centre**, which lies partly under the hard palate and partly under the soft, and the **back**, which lies under the soft palate. The **root** of the tongue is the part opposite the back wall of the pharynx.

Articulatory phonetics classifies speech sounds according to the **type of airstream** used to initiate the sound; the **state of the glottis** (voiced or voiceless); and the **place and manner of articulation**.

Continuous speech in all languages makes use of a **pulmonic egressive** airstream; that is to say, an airstream initiated by the lungs, and flowing *out of* the mouth rather than into it. It is possible to speak by drawing in the breath; but only short utterances can be produced in this way. In English, the word *yes* is sometimes produced like this; in most instances this happens when the speaker wishes to acknowledge that something someone else has just said is true, though at the same time he regards it as either trivial or unfortunate. A **glottalic airstream** is used in many languages to produce isolated consonants. The 'implosive /b/' that occurs in some African languages is produced in the following way: with the nasal tract closed off, and the oral tract closed at the lips, the larynx, with the glottis closed, is drawn down the throat by muscular action. The result is to produce low air-pressure in the oral tract; and when the lips are opened, atmospheric air rushes in with a characteristic 'pop' sound. The 'click' sounds found in the Hottentot and Bushman languages of Africa and (probably borrowed from these) in Zulu, rely on a **velaric airstream**; that is, one produced by the tongue itself. The back of the tongue makes contact with the velum, and is moved forward to produce an egressive airstream, or backwards to produce an ingressive one. The high or low air pressure can then be released laterally, or at the tongue tip or blade. These sounds are not used by other languages as *phonemic* elements, but they may occur as interjections. Thus, in English, a click sound may be used to represent disapproval; this is the sound represented in novels by the spelling 'tut, tut' or 'tsk, tsk'. Another click, usually represented by the spelling 'cluck' used to be used, in the days of horse-drawn transport, to encourage horses.

Unless otherwise stated, phonetic descriptions assume a pulmonic egressive airstream. Thus in describing a sound, it is normal to specify only (1) the state of the glottis (voiced or voiceless); (2) the place of articulation and (3) the manner of articulation.

Places of articulation.

Traditionally in phonetics, speech sounds are classified with reference to the **passive articulator** (that is, the part that does not move, such as the upper teeth or hard palate). A description made in these terms often does not do justice to the part played by the active articulator in giving a sound its distinctive quality. For example, the classification of the English [s] sound used in *see* as a (voiceless) 'alveolar fricative', and of the contrasting [ʃ] sound used in *she* as a 'palato-alveolar fricative' ignores crucial role of the shape of the tongue blade in giving these consonants their distinctive sound. Both sounds are *sibilants*, in which the airstream is channeled along a groove formed in the tongue blade, which results in high-pitched and audible friction; but the groove is shallower and wider for [ʃ] than it is for [s]; and it is this difference, just as much as the precise point of the upper surface of the oral tract which is approached by the tongue blade, which is responsible for the characteristic qualities of these two sounds.

Bilabial. (Made with both lips). English and Finnish both have a bilabial stop, [p]. Some languages, like Spanish, have bilabial fricatives as well.

Labio-dental. (Made with the lower lip and upper front teeth). In English, the consonants [f] and [v] involve raising the lower lip until its inner surface comes into contact with the upper teeth. (In most European languages, the teeth bite into the *upper* surface of the lower lip, or into its outside, so that the edges of the teeth are visible). Labio-dental fricatives, [f] and [v], occur in many languages; but the Finnish [v] sound is typically a continuant, rather than a fricative.

Dental. (Tongue tip or blade, and upper front teeth). The English fricatives [θ] and [ð] are dental sounds. Finnish [t̪] is dental.

Alveolar. (Tongue tip or blade, and alveolar ridge). The [t] and [d] stops, and the nasal [n], are alveolar sounds in English. Finnish [d] is alveolar.

Retroflex. These sounds are made by curling the tip of the tongue up and back so that the *underside* touches the alveolar ridge (for a stop) or approaches it (for a fricative). Retroflex versions of [t] and [d] are used in some Indian languages, such Malayalam, but many kinds of English do not have retroflex sounds. Speakers of American accents of English may have retroflex articulations to represent the so-called 'post-vocalic /r/' that occurs in words such as *fourth, floor*.

Palato-alveolar. (Tongue blade and back of the alveolar ridge). The [ʃ] sound used in the English words *ship* and *fish* is a palato-alveolar. Some speakers hold their tongue tip down behind the lower front teeth when producing this sound, while others raise it up to near the alveolar ridge; but the blade of the tongue is always close to the back part of the alveolar ridge.

Palatal. The continuant [j] (as in Finnish *joki* or English *you*) involves raising the front of the tongue up towards the hard palate; but not close enough to cause friction. Palatal fricatives occur in many languages, including German (for example, in *ich*) and in some Scots dialects, in which words such as *night* are pronounced [nɪçt̪] rather than [naɪt] as in most accents of Standard English; the Scots pronunciation is the one repre-

sented in the spelling of such words, which indicates their original, or historical, pronunciation. Palatal stops also occur in some languages.

Velar. The back of the tongue is raised towards the velum. English has the velar stops [k] and [g], and the velar nasal [ŋ]. A velar fricative, [x], occurs in German, in words such as *echo*, and in Standard Scottish English, in words such as *loch*, 'lake'.

Manners of articulation.

Stop. With the velum raised to seal off the nasal tract, an articulator moves to completely close the oral tract, so that no air can escape. English has bilabial, alveolar, and velar stops, in voiced and voiceless versions; Finnish has the voiceless bilabial, dental, and velar stops [p, t, k] and a voiced alveolar stop, [d].

Nasal. These sounds are produced in the same way as stops; but the velum is lowered so that the air from the lungs can escape through the nose, and there is no build-up of pressure. English nasals are the voiced bilabial [m], the alveolar [n], and the velar [ŋ]; this last is the nasal which occurs in English *sing* and Finnish *ongelma*.

Fricative. These sounds involve the close approximation of two articulators, so that the airstream is partially obstructed and turbulent friction is produced, resulting in a hissing sound. English has labio-dental, dental, and alveolar and palato-alveolar fricatives, in both voiced and voiceless form; Scots has voiceless palatal and velar fricatives as well.

Continuant. (Also called 'Approximant'). These consonants involve one articulator approaching another, but not closely enough to produce a turbulent airstream, with the consequent audible friction. Nonetheless these consonants can be 'heard' in the characteristic effect they produce on the sounds of the surrounding vowels. English continuants include [j], [w], and [ɹ], the variety of /r/ used in syllable-initial position, as in *raise*.

Lateral. These sounds involve obstruction of the oral tract at its central point, with the tongue-tip pressed against the teeth or the alveolar ridge; but with one, or both, sides of the tongue lowered so as to allow the air to escape. English laterals are continuants; but Welsh also has a fricative lateral, [ɬ], spelled 'll' in Welsh words such as *llan*, 'church'.

Trill. (Also known as 'roll'). The tongue tip vibrates rapidly in the airstream, striking repeatedly against the alveolar ridge. An example is the 'rolled /r/' [r], which can be used optionally as a variant of /r/ in Finnish and in Standard Scottish English (not to mention Scots dialects). In Parisian French there is a uvular trill.

Flap. (Also known as 'tap'). The tongue tip makes a single tap against the alveolar ridge. In many forms of English, a 'one-flap 'r'' [ɾ] is used to represent intervocalic /r/, in words such as *hurry*. General American uses taps for intervocalic /t/ and /d/, as in *writer*, *rider*.

Affricate. The tongue makes a stop closure, which is then slackened so as to result in a fricative with the same place of articulation. English has the affricates [tʃ] and [dʒ].

English and Finnish consonants contrasted.

English.

	Bilabial	Labio-Dental	Dental	Alveolar	Post-Alveolar	Palato-Alveolar	Palatal	Velar	Glottal
PLOSIVE	p,b			t,d				kg	ʔ
AFFRICATE						tʃ,dʒ			
NASAL	m			n				ŋ	
FLAP				r					
LATERAL				l					
FRICATIVE		f,v	θ,ð	s,z		ʃ,ʒ			h
CONTINUANT	w				ɹ		j		

Finnish.

	Bilabial	Labio-Dental	Dental	Alveolar	Post-Alveolar	Palatal	Velar	Glottal
PLOSIVE	p		t	d			k	ʔ
NASAL	m			n			ŋ	
ROLL				r				
FLAP				r				
LATERAL				l				
FRICATIVE				s				h
CONTINUANT		v			ɹ	j		

Note: Most Scottish accents of English include the 'rolled' 'r' [r], which may optionally be used in place of the fricative and one-flap variants. [w] occurs in Finnish as the variant of [ʊ] which occurs following high rounded back vowels.

Categorical perception.

Most people can discriminate between a very large number of sounds (for example, between some 1200 different pitches). The perception of most speech sounds is continuous. For example, native English speakers can discriminate, not only between [s] and [ʃ] sibilants, but between several intermediate sibilant sounds as well.

Certain speech sounds do not behave in this way. In particular, the perception of the voiced stop consonants, [b], [d], and [g] is **categorical** rather than continuous. A glance at Figure 1, below, should make this clear. The figure shows a series of schematic (artificially drawn, and simplified) spectrograms, which when fed to a speech synthesizer produce sounds which listeners recognize as the syllables [ba], [da], and [ga]. The first vowel formant is constant throughout the series, but the second formant varies progressively from No. 1 to No. 14 in the series. Nos. 1-3 in the series are heard as [ba], Nos. 4-9 as [da] and Nos. 10-14 as [ga]. People discriminate extremely well between these three 'categories', but do not hear the differences within each category (Mattingly et al., 1971). The three [b]'s all sound the same, even though there is continuous change along a single dimension. Between stimuli 3 and 4, listeners perceive a shift from [b] to [d], although physically these signals are no more different than 2 is from 3, or 4 is from 5.

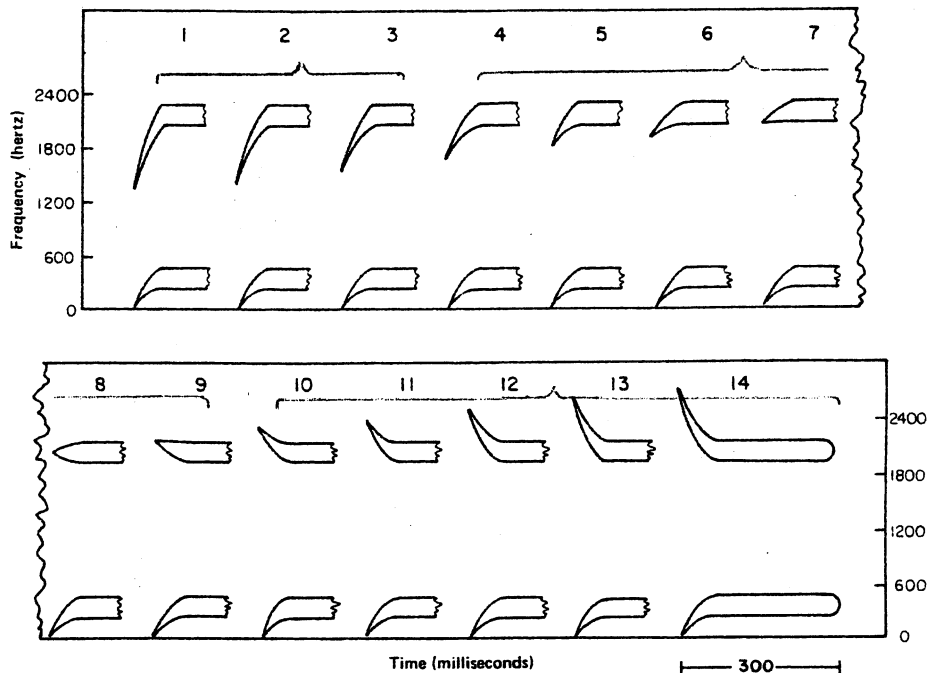


Figure 1. Series of schematic spectrograms producing sounds identified as the syllables [ba], [da], [ga]. Reproduced from Glucksberg and Danks (1975).

Voiced stops are identified through the effect they have on the vowel formants of the surrounding vowel sounds. Figure 2, below, shows spectrographic patterns sufficient to synthesize the syllables [di] and [du]. It is clear that the patterns are quite different; in the case of [di] the 'tip' of the second formant points downwards, while the tip of the [du] second formant points upwards. Both tips, in fact, point towards an imaginary sound at 1800 Hz. A comparison with Figure 1 shows that the [di] pattern resembles the third of the three [ba] patterns more closely than it resembles the [du] pattern. Further, if we progressively clip the second formant of either of the 'd' syllables, starting from the

right, until only the tip is left, there is no point at which we hear [d] without a following vowel. Rather, if only the first 50 msec. (the 'tip') is fed to the synthesizer, what emerges is a 'chirping' (*sirkutus*) sound, that does not sound anything like speech (Mattingly et al., 1971). It seems clear that there is no invariant, **and no discrete**, [d] sound; and that an essential part of the acoustic signal for the [d] sound is transmitted by the vowel sound that follows.

40 2. SPEECH SOUNDS AND SPEECH PERCEPTION

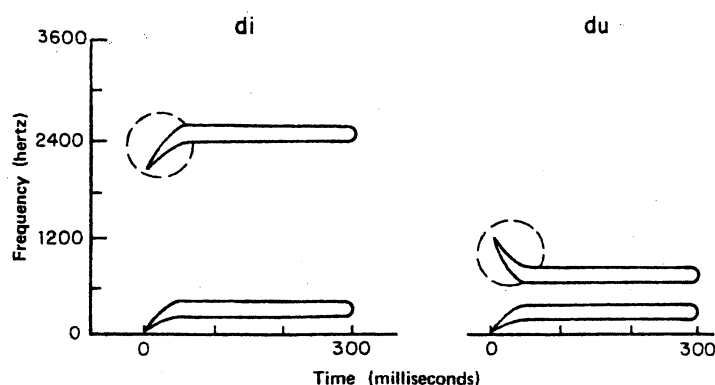


Figure 2. Simplified spectrographic patterns sufficient to synthesize the syllables [di] and [du]. Reproduced from Glucksberg and Danks (1975).

What the various 'd' syllables shown in Figures 1 and 2 **do** have in common, however, is the 'alveolar' articulation (with the tongue tip pressed against the alveolar ridge, and the sides of the tongue raised to prevent lateral escape of air) used to produce them. It is known that infants spend several months in 'babbling' before they learn to talk. It seems reasonable to suppose that during this period, they learn to associate different articulations (for example, labial or alveolar closure) followed by the various vowel sounds they find they can produce, with the characteristic acoustic patterns that result from these combinations. These associations result in a classification of the various acoustic patterns in terms of the articulatory gestures used to produce them.

INTRODUCTION

About this book.

This book is a hybrid. On the one hand, it consists of a set of pronunciation exercises, designed to help advanced Finnish learners of English who need to improve their pronunciation skills. I developed these materials over the course of twenty years, while teaching English pronunciation in the English Department of the University of Jyväskylä in Central Finland; and my reason for doing so was that I was unable to find any ready-made practice material that seemed suitable. Specifically, even the few printed courses I came across, that announced themselves as having been specially written for use in Finland, seemed to me to include too much material directed at areas that simply weren't serious problems for my students. At the same time, the real problem areas received quite insufficient coverage; and often the exercises designed to drill these areas made the mistake of introducing difficult sounds, right from the beginning, in heavy concentration in difficult phonetic environments; no doubt with a view to giving learners plenty of practice.

The exercises in this book are all there because they work—at least, as far as any pronunciation material consisting of traditional drills ever does. In compiling them I drew heavily on BBC radio broadcasts, in order to avoid the unnatural-sounding sentences often found in pronunciation course material. But a glance at the exercises is enough to reveal that they are suitable only for university students, or perhaps for students in their final two years at *lukio*. The vocabulary used is frequently advanced, and the exercises assume a basic familiarity with English spelling conventions.

At the same time, the book is designed to provide some kind of introduction to English articulatory phonetics; or at any rate, to those aspects of it that are relevant to the pronunciation problems that Finnish speakers of English typically have. My reason for mixing theory with practice material in this way is that it reflects my teaching practice. It seems reasonable to assume that adult students of pronunciation will benefit from some sort of theoretical understanding of what it is they are trying to learn. If, for example, native English speakers distinguish between word-final 'voiced' and 'voiceless' consonants primarily on the basis of the length of the preceding vowel (rather than by attending to the phonetic voicing of the final segment of the word, i.e. listening for the presence of glottal vibration during the production of this segment) then students should be told this. Over the years I have found that only a tiny percentage of students are aware of this when they first arrive at the English Department.¹ Otherwise, although the good mimics in a pronunciation class may acquire the native way of making the distinction by imitating a native English-speaking instructor, the bad mimics will be left exactly where they were; and of course it is the bad mimics who really need a pronunciation course. Further, even the good mimics will not be properly equipped to *teach* English, if their abilities are confined to the command of an acceptable English pronunciation unaccompanied by very much insight into what it is that makes their pronunciation acceptable, while that of many other Finns is not.

Further, when I began teaching pronunciation, using printed handouts which included no more than the practice material itself, I found that the supplementary theoretical descriptions which I provided in the form of overhead displays were very much appreciated by my students, who spent a considerable amount of time copying them down. It should

¹ On this question, see also Kari Suomi, *Voicing in Finnish and English Stops* (Turku: Linguistics Department of the University of Turku, 1980).

be remembered that an actual majority of students in English departments at Finnish universities go on to become subject teachers of English. For this reason, they want, as well as need, to acquire a grasp of such theoretical knowledge as is relevant to their teaching; understandably so, since only a fool will embark on a lifetime teaching career without a good understanding of the material he or she has to teach. Much of the descriptive material in this book can be found in my sources; and most particularly, in the ageing, but still excellent books by Peter Ladefoged and by my old teacher, Professor David Abercrombie of Edinburgh University; and in John Laver's more recent, but more technical study. But these books have a more general orientation than suits many language students. Their authors are interested in phonetics as a science; that is to say, as a branch of knowledge to be pursued for its own sake. Future English teachers, on the other hand, usually have a more pragmatic orientation. If they, or their own future students have pronunciation problems, they want to know what these are, and how they can best be cured; and they are anxious to acquire such knowledge of the phonetics and phonology of English as is relevant to attaining these goals.² But in most cases they do not want to study phonetics as pure science. On the other hand, the theoretical information included in most pronunciation coursebooks is usually too meagre to supply the needs of students at university level; and worse, it is typically over-simplified, and frequently inaccurate. I think this is why certain of my old students, now working as English teachers in Finnish schools, have told me that they rely on my monograph for defining the content of their pronunciation instruction; even though many of the drills are unsuitable for their younger pupils. Therein lies the justification for this book.

As far as the practice materials are concerned, this book differs in two important ways from most other coursebooks I have seen.

1. Firstly, it concentrates very largely on the main problem areas, in line with the principle, 'If it ain't broke, don't fix it.' This means that most of the exercises concern the English consonants. Vowels are ignored, with the single exception of the *i/I* (*sheep/ship*) distinction; which is important because it is a feature of every native English accent, and further, carries a very high **functional load** (the 'functional load' of a phonological distinction is the amount of use made of it in the language or accent in which it occurs). Other vowel distinctions, however, are much less important. This is so because, while the standard English language is spoken all over the world with a wide variety of accents (the term **accent** is used here with the meaning 'manner of pronouncing'; a **dialect**, on the other hand, is a version of a standard language that differs from other versions in respect of its vocabulary and grammar, as well as its pronunciation) the differences between these are mainly confined to their vowels. The *consonant* system of English, and the way the consonants are pronounced, is remarkably the same worldwide. A few differences do exist; one of the best known is the use, in General American, of the 'one-flap r' articulation, [ɾ] (the same sound as is used to represent intervocalic /r/ in English *very* and in Spanish *pero*) for intervocalic /t/ and /d/ in words such as *writer* and *rider*. These words are almost homonyms in the speech of many Americans, and distinguished only by the longer sound of the first vowel in *rider*. Another well-known variation is the velar fricative [x] that occurs in the Scots word *loch* ('lake'). Most English people are familiar with the Cockney accent of London, and with the accent of East Kent, both of which use a glottal stop to represent intervocalic /t/, and realize word-final /l/ by means of a high back vowel; so that *bottle* becomes [bɒʔʊ], and *little girl* is [lɪʔʊ ɡɛʊ]. Cockney is

² For a discussion of phonological systems, and their relation to phonetics, see pp. 116-19, below.

further distinguished by the use of [f] and [v] to represent the dental fricatives [θ] and [ð]; with the result that *three* is pronounced in the same way as *free*, while *father* is pronounced [[fɑvə].

But these consonantal variations are as nothing compared to the enormous variety of English vowels. Even without going outside England, some of this variety may be illustrated by a comparison of the RP³ pronunciation of the words *match* and *much* with the way these words are spoken in the North of England:

	‘match’	‘much’
RP	[æ]	[ʌ]
Northern	[ʌ]	[ʊ]

(where [æ] represents a low front vowel, similar to Finnish [ä]; [ʌ] is like Finnish short ‘a’ in *talo* and [ʊ] is like Finnish short ‘u’ in *pulla*).

This is a simple **pronunciation** difference, not a difference in vowel **systems**; since the RP speaker and the Northern speaker both agree that *match* should not be pronounced in the same way as *much*, and they also agree about *which* words should be pronounced like *match*, and which like *much*. But differences in system also exist. For example, RP speakers use different vowels in *pool* and *pull*; but speakers in the North of England, as well as Scots, use the same vowel, [u], in both words. On the other hand, many Scots speakers use different vowels in the words *tide* [tɪɪd] and *tied* [tɪɪd]; in the first word, the diphthong glide starts with a central vowel and moves towards [ɪ]; the glide is short, since the [ɪ] vowel is in any case more central in Scots accents than it is in RP; and very much more central than it is in General American. But in the second word, it starts with a low back vowel, and is also considerably longer. In RP, on the other hand, these two words are homonyms. Then again, RP makes a three-way distinction between the words *Mary*, *merry*, *marry*; but some speakers of General American pronounce two of these words, and others all three of them, in just the same way.

This variation in the way vowels are used in English means that from the foreign learner’s point of view it is a waste of time to worry about precise vowel quality. The only kind of foreign learner who needs to do this is the one who wants to sound exactly like a native English speaker (of whatever accent has been chosen as a model); but why should anyone want to do this, unless they are about to embark on a career as a spy? This brings me to an important point: the goal of the pronunciation exercises in this book, and of the accompanying phonetic descriptions, is to help Finnish learners acquire a pronunciation that is **readily intelligible**, and **pleasant and easy to listen to**. But the aim is not to produce virtual native English speakers. If it were, I would have to change the scheme of the book; since, if one wishes to train spies, every mistake becomes as important as every other mistake. But as it is, most of the emphasis of this book is on the important problem areas. Most writers of pronunciation course books, on the other hand, seem to feel that they have a duty to describe, and include exercises for the practice of every one of the phonemes of the target language, whether it is a problem for learners or not. The

³ For a discussion of this term, see p. 101, above.

result can be a pronunciation course in which a non-problem (such as, for Finns, the RP *pool/pull* distinction, which can easily be 'covered' by using Finnish long and short versions of [u]) is duly allotted its unnecessary lesson, while a corresponding single lesson is provided to practice, for example, the English affricate [tʃ]; the attempted mastery of which can sometimes prove to be the lifelong scourge of a Finnish learner of English.

2. The second distinguishing feature of this book is that it recognizes that (except at the very beginning; if, for example, a student cannot produce a sound such as [ʃ] *at all*) a 'problem' speech sound cannot be treated as an isolated or discrete entity, which the learner can be said to have mastered if he can produce the sound on its own. Speech as it occurs in real life hardly ever consists of sounds such as [ʃ] spoken in isolation. Instead, speech sounds occur as part of an **articulatory program**. Discussing 'tongue slips' (such as *glear plue* for an intended *clear blue*) Laver (1970) noted: '... the preparation and articulation of a speech program is not performed on a sound-by-sound, or even on a word-by-word basis. It is much more likely that neural elements corresponding to much longer stretches of speech are assembled in advance, and then allowed to be articulated as a single continuous program.'⁴ It is known that the production of 'difficult' sounds is likely to be adversely influenced by the proximity of other such sounds; a fact noted by Labov (1972) in his study of the acquisition of the dental fricative [ð] by New Yorkers.⁵

This adverse influence on performance of a difficult phonetic environment is something which I have noted again and again in the course of many years spent teaching English pronunciation to Finns. It is particularly true in connection with the sibilants. On one occasion, I administered a test to students on the Pronunciation course offered by the English Department of Jyväskylä University. In this test (which took place towards the end of the course) more than fifty students were asked to record a number of sentences on tape. One of these sentences was 'She's got a Finnish boyfriend.' When I listened to the tapes, I found that very nearly 90 of the students had pronounced the final [ʃ] of 'Finnish' acceptably (according to my judgment). But another of the test sentences (separated by a considerable interval from the earlier one) was, 'She's got a Jewish boyfriend.' Not even 30% of the students were able to pronounce the final sound of 'Jewish' correctly. The task of producing an authentic English [ʃ] sound so close to the difficult initial [dʒ] of 'Jewish' was just too much for them. And a later repetition of the test, with different sentences, showed that students found it easier to say the initial [ʃ] of 'shook' if it occurred in the sentence 'He shook hands with Bob' than they did if the sentence were 'He shook hands with himself'—though in this case the difference was much less marked, and did not reach statistical significance.

In March, 2000, I was asked to examine the English pronunciation of 16 schoolteachers in a town on the West coast of Finland. These were *ala aste* (primary level) teachers who were not subject teachers of English, but who needed a qualification which would authorize them to teach their own subjects (which might be biology, or mathematics, or history) through the medium of English. The test material I gave them included the word *sensation*, which is difficult for Finns because it includes three sibilant sounds which between them represent the two contrasting ('alveolar' and 'palato-alveolar') English sibilant types. The phonetic environment in which this word occurred in the test, however, was not otherwise difficult. But even though this was so, and even though the

⁴ John Laver, 'The Production of Speech'. In J. Lyons, ed., *New Horizons in Linguistics* (Harmondsworth, England: Penguin, 1970), pp. 53-75.

⁵ William Labov, *Sociolinguistic patterns*. Philadelphia: University of Pennsylvania Press, 1972.

teachers were given plenty of time to read through the test passage before they recorded it, only two of them were able to say *sensation* correctly at the first attempt. In nearly all cases, however, this was not because the others were *unable* to produce the English 'palato-alveolar' [ʃ] sound. Two teachers used the 'alveolar' [s] sound to represent all three of the word's sibilants, and one represented the final sibilant of the word with a sound phonetically intermediate between [ʃ] and [s]. These teachers had problems with their sibilants elsewhere in the test. All the others, however, produced acceptable [ʃ] and [s] sounds. But they were quite unable to sequence these sounds correctly when they occurred in close proximity. Seven teachers reversed the final two sibilants; saying [sɛnʃeɪsn]. The remaining four used broadly acceptable versions of the [ʃ] sound for the last two sibilants, instead of reserving this sound for the final sibilant only.

Findings such as these should perhaps not be surprising if it is remembered that there are some speech programs that even native English speakers find difficult. These are the so-called 'tongue-twisters'; such as *she sells sea shells*, which is difficult because the 'abba' sequence of palato-alveolar and alveolar sibilants is at variance with the 'abab' sequence of the vowel sounds. The lesson for pronunciation to be drawn from facts such as these is that a pronunciation course should not simply teach a 'problem' sound in isolation (this stage of mastery is commonly known as the stage of '**primary acquisition**') and then leave it up to the learners to integrate the new sound into their communicative use of the language; since it is clearly one thing to be able to say [ʃ] in *Finnish*, but quite another to say it in *Jewish* or *sensation*; and another, again, to say it in a phrase such as *Russian speech specialist*.

Indeed, it seems to me that the notion of 'integration', as it applies to pronunciation teaching, should be re-defined. It is a commonplace in the language-teaching business that once a new skill has been mastered in a formal learning situation, it still remains for learners to **integrate** it into their informal communicative performance. This process of integration has usually been understood in a rather 'psychological' way by the pundits of Applied Linguistics; who, following the paradigm developed by Behaviourist psychology, have debated how behaviour learned in one 'stimulus situation' (such as a classroom) might be transferred to another 'situation' (such as using language communicatively in real life). Whatever the difficulties of effecting such 'transfer' may be, it seems clear that for the pronunciation student, it represents no more than a secondary stage of integration. The *primary* stage involves the integration of speech sounds which the learner can initially control only in isolation, or in single monosyllabic words, into increasingly complex phonetic environments.

With this in mind, the exercises in this book, and particularly the sibilant exercises, are graded from 'easy', through 'intermediate' to 'difficult'; although in most cases I have not considered it necessary to provide such labels explicitly.

The fact that speech sounds occur as part of larger articulatory programs has further implications for pronunciation teaching. When one looks closely at the speech production process, it is clear that it involves the parallel operation of a number of muscle groups, or speech sub-systems, closely co-ordinated in the production of utterances which typically extend over a considerable number of 'speech sounds'. The intercostal muscles of the chest, the muscles controlling the action of the larynx, and the muscles of the soft palate and of the tongue and lips are programmed to act in concert, in a performance in which the action of each muscle must be precisely timed in relation to the actions of all the others. In view of this, it seems clear that the traditional notion of the 'speech segment' is to some extent an artificial construct; the invention of linguists predisposed by

their familiarity with alphabetic writing systems to regard speech in just this way. And it is certainly true that the acoustic analysis of speech fails to reveal clear correlates for many of the 'phonemes' of conventional phonological analysis. This is especially so in the case of the so-called 'restructured' sounds, such as syllable-initial /b,d,g/; which are signalled acoustically only by slight modifications of the following vowel formants (these are the 'bands' of sound, occurring at certain characteristic frequencies, which identify the various vowel sounds). These formant patterns are quite different for different vowels; and since it is only by the 'bending' of these formants (and the bending is not even in the same direction for every vowel) when they follow immediately on the release of (for example) a [d] articulation, that the [d] is signalled, it follows that there is no single [d] sound. 'Unrestructured' sounds, such as the sibilants, have a much more constant character, however; and the characteristic bursts of high-frequency sound produced by the [s] and [ʃ] articulations show up clearly in the spectrographic analysis of any stretch of speech where these articulations are used. But even sibilants are affected by their phonetic environments; so that the lip-rounding that accompanies the [ʃ] sound is much more evident (with a corresponding effect on the acoustic pitch of the sound itself, which is noticeably lower) in the case of *shoe*, where the sibilant is followed by a high back rounded vowel, than it is in the case of *she*. English is an 'anticipatory' language, whose speakers program their speech muscles to anticipate such articulatory features as lip-rounding, nasalisation, or back tongue-raising in advance of the speech segments where these features are specified by conventional phonological analysis. Such effects often extend over more than one segment; so that the rounded lip postures used for word-initial [p] or [ʃ] in *plume* or *shrew* are very obviously different from the postures used for *please* or *shriek*. The characteristic realization of an abstract unit of phonological analysis (a 'phoneme') in a specific phonetic environment is known as an **allophone** of that particular phoneme.

Thus the 'speech sounds' which linguists identify as the component parts of complete utterances do not have the invariant character of the letter symbols of a typewriter; where a 'p' is always a 'p', irrespective its environment. But even if they had this invariant character, it would still remain true that learning to speak would involve more than the learning of an inventory of single sounds. Anyone who has undergone a typing course knows that learning to locate individual letters by touch is only the beginning of the typist's skill. Gradually, the typist learns word-habits, and then phrase habits; and it may even be that a skilled typist may hesitate if he is asked to type a single letter, such as x, without looking at his keyboard; although he would be able to type this letter in the context of the phrase *extraordinary circumstances* with no hesitation whatever.

The same is true in pronunciation learning; where the teacher cannot be satisfied with teaching students how to produce 'problem' sounds in isolation. These sounds must, on the contrary, be practiced in a variety of phonetic contexts, of varying degrees of difficulty. Further, it should be remembered that the articulatory programs in which speech sounds occur are usually generated as sequels to the more 'cognitive' elements of the total **speech program**; which begins with ideation (i.e. the speaker decides to say something). As the output of this program, concerned with the activation of the speech muscles, they are **motor skills**, like the ability to throw a javelin or play the piano. Motor skills characteristically require extensive practice before they can be mastered. 'Higher up' the speech program, at the more 'cognitive' grammatical level, a speaker who has been accustomed to saying (for example) **if I will see her, I will tell her* can be taught, in the course of a single lesson, that *will* and *would* should not be used in the 'If' clauses of English conditional sentences. And sometimes this may be all that is required. But if the same speaker cannot produce the English affricate [tʃ], it will be quite another matter,

and a large amount of remedial practice will be required; quite as much as if the same learner were learning the piano, and had to overcome a faulty fingering technique.

Even when the learner has acquired the ability to use 'difficult' sounds in a wide variety of phonetic environments, he is still faced with the task of **integrating** the newly-learned performance into his everyday communicative use of the target language. The problem faced by many Finnish learners of English in this connection is that by the time they have decided to specialize in the language, and have in consequence enrolled themselves in a dedicated pronunciation class, they have become accustomed to speaking English using sounds based on their own native language. Over the years, I have become accustomed to hearing students whom I had heard using perfect 'palato-alveolar' [ʃ] sounds in pronouncing words such as *she* or *special* in my pronunciation class, revert to the use of the 'alveolar' [s] sound when speaking English outside it. The reason for this, no doubt, is that their newly-acquired authentic pronunciation remains difficult for them, requiring careful attention to high-density feedback, whereas their 'old' pronunciation is comparatively effortless and can be accomplished without conscious effort on 'automatic pilot'. In a 'real' situation, all the pressure is for communication, and speakers are reluctant to spend unnecessary effort on the control of their pronunciation. In just the same way, an Olympic swimmer who has recently mastered some new refinement of technique is likely, if he falls suddenly into a river, to use his 'old' technique to swim ashore.

The only remedy for this state of affairs is for learners to practice their 'new' pronunciation to the point where it becomes as natural to them as their old; and this requires more practice than a standard pronunciation course can provide. It follows that the achievement of 'secondary' integration rests in the hands of the learners themselves. But the role of a pronunciation course, it seems to me, is to provide learners with the skills which will give them the *potential* to achieve full integration, should they wish to do so.

The most essential skills.

Experience has convinced me that the pronunciation of the large majority of adult Finnish speakers of English could be dramatically improved if they would pay attention to the way in which they make only six of the major English sound contrasts. These are:

1. The contrast between the two basic English sibilant types; the so-called 'alveolar' or [s] type of sibilant (as in *see*) as distinct from the 'palato-alveolar' or [ʃ] type that occurs in *she*. Learners have also to master the voiced version of this contrast (where *rasor* contrasts with *erasure*) as well as the affricated versions (*cats* contrasted with *catch*, and *heads* with *hedge*).
2. The word-initial contrast between the 'voiceless' stops, /p,t,k/ and the 'voiced' variants /b,d,g/; as in *pea/bee*, *town/down*, *cold/gold*, *try/dry*, *plays/blaze*, *class/glass*.
3. The word-final contrast between 'voiced' and 'voiceless' stops and fricatives; as in *race/raise*, *false/falls*, *once/ones*, *set/said*, *sent/send*, or *colt/cold*.
4. The labial consonants [v] and [w]; as in *overworked*, *very well*.
5. The dental fricatives [θ] and [ð] (as in *thin* and *then*); which must be distinguished from Finnish stop consonants employing the same dental place of articulation.
6. The vowel contrast of [i] with [ɪ] (as in *sheep* contrasted with *ship*).

These six phonological contrasts present very different learning problems. The **sibilants** are the only sounds which present some Finns, at least, with a problem of *primary acquisition*; in the sense that learners may find it difficult to produce English palato-

alveolars even in isolation, or in minimal pairs such as *see/she*. Further, this is the area where providing learners with a *physical description* of the target sound, in articulatory terms, does least good; not surprisingly, since the shape assumed by the tongue blade is of crucial importance here, and speakers cannot see what their tongues are doing. An acoustic description may be more useful in this case: [ʃ] friction is considerably lower in pitch than [s] friction. More usually, the learner *can* produce the [ʃ] sound in isolation, or in simple monosyllabic words; but more extended utterances usually elicit a wide range of pronunciations, ranging from perfect examples to sounds which closely approach the contrasting [s] sound. Very often learners use a sound which is initially heard by a native English-speaking listener as [s], but which turns out, on closer listening (if the sound has been recorded) to be acoustically intermediate between the [s] and [ʃ] positions. Unfortunately, such 'intermediate' sounds tend to be perceived, in the case of the sibilants, as representing the *opposite* category from the one the listener was expecting to hear. Usually it is only in informal situations, outside the language classroom, that Finnish university students use a genuine [s] sound to represent English /ʃ/. 'Classroom' versions of /ʃ/ are usually shifted *some* distance, at least, from the learner's native [s] sound. And by the end of an academic year in which students have attended a weekly pronunciation class, most can produce good palato-alveolars *in the context of sibilant drills* like the ones in this book. But if they have to read a prose passage, like the ones at the end of the book, in which they are simultaneously faced with every one of the problem areas, some sibilant errors will usually reappear in the speech of all except the very best students.

The contrast between **syllable-initial 'voiced' and 'voiceless' stops** is easier to describe to learners; everyone can appreciate the difference between (for example) *bee*, where voicing has begun even while the lips are still opening, and the aspirated stop used in *pea*, where the glottis is already wide open when the lips open, and a rush of air supervenes before the vocal cords can return to the 'voice' position. Further, given an instructor model to imitate, almost all students can produce both words with great accuracy; and this accuracy is typically maintained in the context of laboratory drills dedicated to this particular pronunciation point. This is perhaps surprising, in view of the very small differences in voice onset time on which the distinction depends; but students are helped in this area by the fact that phonetically 'intermediate' sounds are almost always heard as the sound the listener *expects* to hear; although the reverse is the case with the sibilants.

Unfortunately, this virtuoso 'laboratory' performance often does not survive the loss of a model; and if students are asked to record a prose passage, with no model to imitate, almost as many errors are likely to appear in this area as with the sibilants. Further, this distinction seems to be one of the hardest to integrate into learners' informal, communicative use of English; so that those whose pronunciation is otherwise faultless at the segmental level may continue to pronounce *drew* (for example) as *true*.

Finnish difficulties with **word-final consonantal voicing** mainly concern the pronunciation of words ending in 'voiced' fricatives and stops (as *raise, said*). The most typical mistakes are, first, to neglect to lengthen the preceding vowel before a 'voiced' consonant and second, to take the vocal cords out of the 'voice' position (by means of a glottal abduction gesture) somewhat *before* the fricative articulation is formed, or the stop released. The result of this practice, which exposes the final consonant to the full force of subglottal (lung) air pressure, is a too-noisy fricative sound, or the release of a final /d/ into an aspirated [t^h]; which in either case will mark the final consonant as 'voiceless'.

When Finns are told to lengthen the vowels they use before a 'voiced' final consonant, this is something they can do immediately, and hardly need to practice. But it is much harder for them to remember to release final [b,d,g], or to form a final [z] articulation, *at*

the same time as, not later than, they bring their lengthened vowels to an end by opening up the glottis. It is often said, quite accurately, that the main clue which native English speakers use in identifying a word-final consonant as 'voiced' or 'voiceless', is the length of the preceding vowel; and that final 'voiced' consonants are often phonetically partly unvoiced, as the speaker begins to take his vocal cords out of the 'voice' position *during* a [d] closure or a fricative [z] stricture, instead of maintaining voicing until these articulatory gestures have been relaxed or released. But this presupposes that the speaker does **not** abandon the 'voice' position substantially **before** making a stop closure or fricative stricture. If he devoices too early, the resulting noisy fricative, or the aspirated release of a stop consonant, will ensure 'voiceless' identification no matter how long the preceding vowel may have been.

The labials [v] and [w] do not present problems of primary acquisition. Students can easily be taught to produce the English fricative [v], but integrating this sound into their communicative use of English may require some hard work. In fact, [v] is often not audibly fricative in English, but the lower lip approaches closer to the front teeth than is usual in Finnish. Substitution of the Finnish sound is especially noticeable following a back vowel, in words such as *over*; because most Finnish speakers use a rounded glide, resembling English [w], as an allophone of Finnish [v] in this environment, i.e. in words such as *rouva* or *vauva*. The easiest way of teaching English [w] is to tell Finnish learners to think of the sound in terms of their own native [u] vowel, rather than as any sound they may have been accustomed to associate with the symbol 'w' as this is used in Finnish or Swedish orthography. Thus a word such as *week* should be thought of as having the structure /uik/ rather than /wik/, and pronounced more like the first part of Finnish *uikku* than the first part of *viikko*. Doing this will not result in a totally native-like pronunciation, since English [w] used to initiate *week* is more peripheral to the syllable than [u] is in *uikku*; and there is a faster transition to the following vowel.⁶ But the new pronunciation will at any rate be a great improvement on any which uses the Finnish [v] sound; and the beauty of this learning technique is that it is effortless and instantly effective; further, the new performance can be transferred to the learner's informal communicative use of English with comparative ease.

This technique of 'mental re-spelling' is also very efficacious in teaching the 'dark l' (i.e. /l/ produced with back tongue-raising) that occurs post-vocally in English syllables. Once students have learned the trick of thinking of words such as *feel*, in which /l/ occurs post-vocally following a high front vowel, as having the structure /fiʊl/ rather than the structure /fil/, their problems with 'dark l' disappear as if by magic.

The dental fricatives [θ] and [ð] are not normally a problem when they occur in stressed syllables, where there is plenty of time to say them. But in English the voiced version, at least, nearly always occurs in unstressed syllables (and especially in the word *the*); and here there is no time to use the energetic inter-dental production that most Finns have learned at school. In order to avoid breaking the rhythm of English, some speakers are likely to substitute their native dental stop, [t̪].

The English [ɪ] vowel does not usually present a problem of *primary acquisition*. The rare student who cannot avoid substituting Finnish short [i] for this sound should be told to use Finnish short [u] instead. Doing this may make the speaker sound slightly Scottish, since /ɪ/ is a central vowel in Scots accents; but if, on the other hand, he continues to use Finnish short [i] he will sound very foreign. The beauty of this substitution is

⁶ See, for example, Timo Lauttamus, *Distinctive Features and English Consonants* (Joensuu, 1984), p. 63.

that since it involves the use of a native Finnish vowel, it can easily be transferred to the speaker's everyday use of English. On the other hand, the Finnish learner who can produce a real RP [ɪ] in a pronunciation class, but only by paying close attention to high-density feedback is likely to revert to the use of Finnish short [i] in his informal use of English; and this pronunciation is quite unacceptable to native English-speaking ears.

Although the Finnish learner who masters the six areas of English pronunciation detailed above will not sound like a native English speaker, he will command the pronunciation described on p. 3, above; one that is 'readily intelligible, and pleasant and easy to listen to.' This is so since, although many other English phonological contrasts besides the ones described above are important, these are, for the most part, ones that exist in Finnish too; where they are realized in a way sufficiently similar to the English way to ensure that they do not present the learner with a serious learning problem.

Some may not be satisfied with this limited degree of mastery; and of course there are other points that they can pay attention to if they wish. In particular, the six problem areas described above all relate to the 'segmental' level of speech; that is, they deal with single 'speech sounds'. But anyone who wanted to acquire a native-like performance would certainly have to pay attention to suprasegmental features such as rhythm and intonation. Then there is the question of word boundaries, of assimilation and coarticulation, and of the 'weakening' of vowels and consonants in unstressed positions.

Many of these topics are dealt with in this book. But from the point of view of most Finnish high-school graduates, these other areas may be regarded as luxuries, comparatively speaking. Or at least, we can say there is not much point in spending time over them while the learner remains deficient in one or more of the 'big six' areas. This brings me to an important point: virtually **all** Finnish school leavers who enter Finnish universities with English as their major subject of study are deficient to some degree in one or more of the six areas listed above. The sibilant problem is certainly the most widespread. Here, it is not a question of the better students pronouncing their palato-alveolars correctly, while the weaker have problems. Rather, it should be said that almost all learners have a **range** of sounds, extending from [ʃ] to [s], which they use to represent /ʃ/; with the more [ʃ]-sounding variants reserved for the more formal contexts.

How to use this book.

The first six chapters of the book are devoted to each of the 'big six' areas in turn. Each chapter starts with a phonetic description of a particular area, followed by exercises in which problem sounds appear first in simple phonetic environments, but then in more complex ones. The later chapters discuss three major English vowel systems, and go on to deal with rhythm, assimilation, word stress, and the phenomenon of weakening.

The book is **not** designed to be worked through from one end to the other. Learners obviously need to attain some degree of competence in each of the 'big six' areas; while at the same time, some may never succeed in integrating their new performance into the more difficult phonetic environments. Learners should therefore start with one of the six areas, and after short period of practice with the easier exercises, move on to the other areas before moving back to the first. Only when they have tried the easy exercises in **every** area should learners go on to the difficult exercises.

The book follows the usual practice of using square brackets to indicate phonetic units, or **phones**, and forward slashes to indicate abstract phonological units or 'phonemes'. Single quotation marks are used to indicate orthographic symbols (the 'letters' of the written language).

1

The Sibilants

Among the English fricatives, [s] and [ʃ] and their 'voiced' counterparts, [z] and [ʒ] are characterized by very audible high-pitched friction. These sounds are noticeably more 'fricative' than other English fricative sounds such as [f] and [v] or [θ] and [ð], and for this reason are referred to as **sibilants**.

English sibilants are of two basic types. On the one hand, there are the so-called **alveolar sibilants**, [s] and [z], which occur in words such as *see*, *boss*, *zoo*, and *rose*.

On the other hand, there are the **palato-alveolar sibilants** [ʃ] and [ʒ] (as in *she* and *measure*).

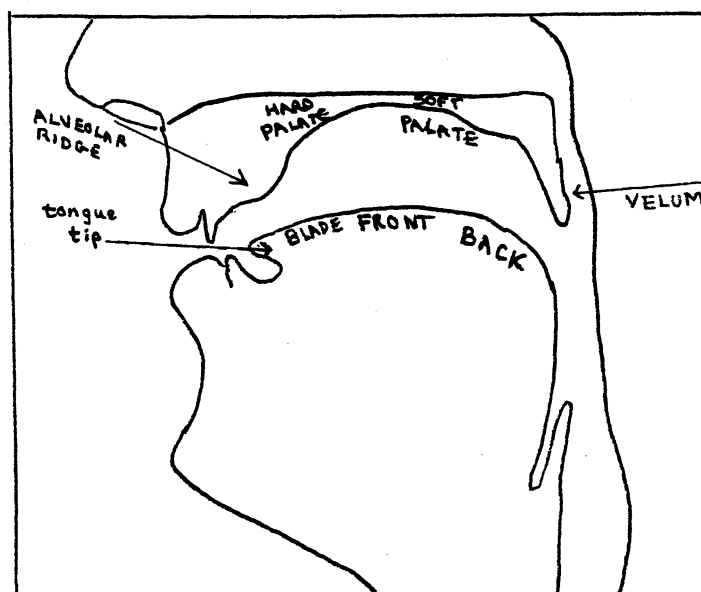
The palato-alveolar variants also occur as integral parts of the **affricates** [tʃ] and [dʒ] (an *affricate* is a stop consonant which released into a fricative) which occur in English words such as *catch*, *much*, *chip*, *church*, *hedge*, *justice*.

The contrast between these two sibilants types carries a high functional load in English, and it is most important to maintain the distinction between them, and to avoid pronouncing (for example) *which* as *wits*, or *hedge* as *heads* or *she* as *see*.

Physical description.

This is complicated by the fact that, in spite of the traditional labelling of these sounds according to place of articulation, it is probably the *shape* of the tongue which is critical in producing the characteristic sibilant sound (of either type). Sibilants are produced by channelling the airstream along a groove that runs down the centre of the blade of the tongue (see the diagram below); and for this reason, these sounds are sometimes termed 'grooved fricatives'.

Further, the 'correctness' of a sibilant of either type is primarily a matter of how it sounds; and different speakers may produce the right sounds by slightly different articulatory means. Some speakers, for example, use the tongue tip to produce their alveolar sibilants; while others use the blade. To produce a palato-alveolar, the blade is always used; but while some speakers may tuck their tongue tips down behind their lower front teeth, others hold the tongue tip up near the alveolar ridge.⁷



⁷ See, for example, Gimson, pp. 7-10 and Ladefoged, pp. 186-89.

It can, however, be said that:

1. Sibilants are fricatives produced by channelling a jet of air along a narrow articulatory constriction onto a downstream obstruction (the teeth). Other fricatives, such as, for example, [f] or [ð] simply rely for their effect on the turbulence created immediately downstream of an articulatory constriction. But fricatives whose turbulence is due to edge effects are usually more strident, or 'sibilant' (which means that they have more energy at high frequencies, and are more audible) than those where the turbulence is due only to the interaction of an airstream with an articulatory constriction.

Alveolar sibilants are produced in the following manner: with the sides of the tongue in firm contact with the side teeth, the airstream is channelled along a narrow groove in the tongue blade. Friction occurs between the tongue blade (or with some speakers, the tip and blade) and a very small area of the alveolar ridge located right behind the speaker's two front teeth.

The tongue blade is *hollowed* for [s], while it is *domed* for the contrasting [ʃ] sound.

With [s], there is usually no free space between the tongue tip and the front teeth; although this may not be true for those speakers who use their tongue tips rather than blades to make this sound.

The articulation involves considerable *muscular tension* in order to maintain the narrow but deep groove in the tongue blade. This is why drunkards may sometimes be heard to substitute [ʃ] for [s] in their attempts at speech, since alcohol serves to relax the muscles generally.

The alveolar sibilant sound is much *higher-pitched* (that is, it includes more high-frequency sound) than the palato-alveolar sound.

In the production of **palato-alveolar** sibilants, the tongue tip is retracted, so that the speaker can easily insert a fingertip between his front teeth and the tongue tip. The tongue blade is raised, and approaches the hard palate approximately at the point where the alveolar ridge merges into the main body of the hard palate. Thus the tongue blade follows the upward rise of the alveolar ridge towards the hard palate (instead of being hollowed, and curving away from it as with [s]).

The channel in the tongue blade is much wider, and also shallower, than is the case with [s]. Air pressure is lower, and the escape of air is more diffuse, with the friction occurring over a wider area of the tongue and the alveolar ridge.

The friction, while still very audible, is considerably lower in pitch than in the case of the [s] sound.

The **front** of the tongue is also raised towards the hard palate; thus the articulation may be described as 'palatal'. It is for this reason that native English speakers usually substitute [ʃ] for [s] when /s/ is immediately followed by the palatal continuant [j], as an effect of assimilation; thus expressions such as *I'll miss you* or *this year* are typically pronounced with palato-alveolar rather than alveolar sibilant sounds.

The palato-alveolar sibilants of some speakers may be accompanied by slight lip-rounding in all positions, while for others this only occurs when the sound is followed by a rounded vowel.

The learning problem.

In the native Finnish system there is only one sibilant, Finnish /s/, to correspond to the English /s/, /z/, /ʃ/, and /ʒ/. This means that the Finnish learner of English has to go from his own less-differentiated native system to a more highly-differentiated one, and is faced with problems of perception and production.

Since there is only one sibilant in Finnish, speakers have a certain amount of freedom in the precise quality they give it; and so Finnish /s/ may sometimes have a more palato-alveolar quality than English /s/ does. Nonetheless, the Finnish sound is broadly acceptable as a token for English /s/; because the empirical facts are that except in rare individual cases, Finns have very little trouble with the English *alveolar* sound. Finnish learners' problems begin when they try to produce the English palato-alveolars [ʃ] and [ʒ] (and, of course, the corresponding affricates [tʃ] and [dʒ]). Finns often have great difficulty in maintaining a consistent 'palato-alveolar' quality, and preventing an 'alveolar' sound from creeping in. But it is much rarer for a Finnish learner's *alveolars* to be spoiled by being too *palato-alveolar*; and when this does happen, it is usually the result of interference from a neighbouring palato-alveolar sound. For example, the learner may pronounce a word such as *position* with the alveolar and palato-alveolar sounds reversed; or produce a sound intermediate in quality between the alveolar and palato-alveolar values, to represent both sibilant sounds.

It might be guessed from the above description of the sibilants, that these sounds are difficult to learn. This is certainly the case. The Russian phonologist Shvachkin, in his well-known 1948 study of the chronological order in which Russian children learned the phonological contrasts of Russian found that out of the twelve stages of learning he identified, control of the contrast between alveolar and palato-alveolar sibilants was almost the last to be mastered; only the contrast between the liquids and glides [l], [r] and [j] proved to be more difficult.⁸

The sibilants, in fact, are the only English consonants that present some Finnish learners of English, at University level, with a problem at the level of **primary acquisition**. That is to say that there are some cases in which learners find it hard to produce acceptable English palato-alveolars *even in isolated words* (for example, if they are asked to read from a word list). Most difficult for them is usually the voiceless palato-alveolar affricate [tʃ]. Many more find it hard to produce good palato-alveolar sibilants, of any type, in the context of sentences read aloud in laboratory drills; even if the sentences are grouped together in lists which focus exclusively on one particular sound (such as [ʃ]). For this reason, the teacher may have to spend time getting such students to produce palato-alveolars in isolation, and then drilling them in the production of minimal pairs (*see/she*, etc.). In the case of the other English consonants, students can usually be taught to produce them (in the 'focus-on' context of the language laboratory) in the course of a single lesson; and thereafter, it is a question of *integrating* them into the students' communicative performance; which initially involves practicing the new sounds in increasingly complex phonetic environments.

⁸ See Clark & Clark, p. 379.

Perception of the sibilants.

With so many articulatory parameters involved, it might be expected that learners attempting to produce accurate alveolar and palato-alveolar sibilants would very often produce sounds intermediate in quality between the two 'polar' types. This is exactly what happens in the case of Finnish learners; whose attempts to produce English palato-alveolars sometimes result in sounds that span the entire acoustic range from [s] to [ʃ].⁹

Sibilants are 'context-independent' speech sounds; which is to say that they are identifiable independently of the speech segments that immediately precede and follow them.¹⁰ It is characteristic of such sounds that they can be perceived 'continuously'. That is to say that the listener can identify, not only the 'pure' polar types, but a large number of intermediate variants as well. In this respect, the perception of the sibilants differs from that of 'context-dependent' speech parameters such as syllable-initial consonantal 'voicing'; where perception tends to be 'categorical'.¹¹

But while the sibilants may be perceived 'continuously' when they are heard in isolation (that is, the listener is presented with a series of sounds ranging from [s] to [ʃ], presented on their own) the perception even of 'context-independent' sounds is never completely 'continuous' if these sounds are presented in context. The more closely this approaches the communicative context of everyday life, the more 'categorical' the perception of sibilant sounds becomes; until in a real communicative situation, one hears the speaker as having pronounced (for example) the word *she* either correctly as [ʃi], or incorrectly as [si]. This is a natural consequence of the shift of attention from sound to meaning; in a communicative situation the listener will not be willing to give much attention to individual speech segments, and attention is likely to be reduced to the minimum necessary to secure the successful identification of more extended stretches of speech.

Listening to students' palato-alveolar sibilants in the context of practice sentences produced in a language laboratory, I have found that I can easily detect deviations from the 'textbook' palato-alveolar quality, provided that the deviant sibilant remains closer to the palato-alveolar than to the alveolar sound. But if, as often happens, a student produces a sound intermediate in its phonetic quality between the palato-alveolar and alveolar values, then I am likely to hear this as a **flawless** example of the contrasting alveolar category. But the 'intermediate' quality of such a 'halfway' sound is immediately revealed if I change my perceptual 'set', and make myself *expect* an 'alveolar' variant. (For example, if the expected palato-alveolar is the middle sound of *partial* in the test sentence, *it's only a partial service*, I can replay the tape, this time imagining that the student is trying to say *it's only a parcel service*). As soon as this is done, I can hear that the intermediate sound is no more acceptable as an alveolar than it was as a palato-alveolar sibilant.

In the context of a laboratory drill specifically focussed on the sibilant area, it is rare (unless the phonetic environment is a very difficult one) to find a learner producing a

⁹ In a few exceptional cases, learners attempting palato-alveolar sibilants will produce sounds intermediate between these, and the dental fricatives [θ] and [ð]. Such learners, instead of moving in the direction of Finnish [s] by making the channel or 'cup' in the blade of the tongue too narrow, make it too wide, with the tongue blade too flat.

¹⁰ See, for instance, Cole & Scott, 1974. Quoted in Clark & Clark, p. 197.

¹¹ Thus, in distinguishing between syllables such as 'pie' and 'buy', native-speaking listeners will, as one would expect, hear 'buy' if the VOT is at its 'textbook' value of zero. But if VOT (that is, the delay between release of the articulatory closure, and the onset of voicing) is progressively increased, listeners continue to hear 'buy' until a 'cutoff point' of .03 or at most, .04 seconds is reached; after which they suddenly hear 'pie'. See Clark & Clark, pp. 197-201.

'pure' phonetic [s]¹² to represent [ʃ]. This phenomenon is very often met with in real communicative contexts; but in the laboratory it is much more common to find that the speaker whose palato-alveolar sibilants sound 'alveolar' is, in fact, producing one of the 'halfway' sounds. Even the poorest performers make some attempt to differentiate the two sound types; and although such a performer may appear to have produced an 'alveolar' sibilant for *she*, further listening will usually show that when he has to say *see*, the sound he produces is even more 'alveolar'.

When, however, the laboratory drill is ostensibly concerned with some other area of pronunciation (such as the dental fricatives, or word-final voicing) then it may sometimes happen that if the practice material should include a palato-alveolar sibilant, a totally 'alveolar' sound will be used to represent it. The interesting point to note here is that the culprits in these cases are by no means always the poor performers who cannot say [ʃ] properly under any circumstances, but may include learners who can produce the most impeccable palato-alveolars in the context of *sibilant* drills.

This phenomenon may easily be explained if we suppose that the 'intermediate' sound, on the one hand; and the 'pure' or phonetic (as opposed to merely perceived) [s], used to represent [ʃ], on the other, have different psychological bases. The 'intermediate' sound, we may suppose, represents a 'bad try' at the palato-alveolar target. But the true, or totally 'alveolar' [s] represents an abandonment of this target in favour of a *reversion* to the native Finnish sibilant sound; in effect, collapsing the two classes of sibilant into one. The reason for such abandonment is clear: [ʃ] is a 'difficult' foreign sound, and maintaining its quality requires careful attention to high-density feedback. But if the speaker is willing to substitute his native Finnish sound, then he has more attention to spare for the overall structure of his discourse, and to such things as grammar and the selection of vocabulary (or else, in the context of a pronunciation course, he is free to pay attention to *other* difficult foreign sounds).

The effect of the phonetic environment.

So long as the 'palato-alveolar' target remains difficult to realize, requiring effort on the part of the speaker, reversion to the native sound for pragmatic reasons is always likely to occur whenever correctness in pronunciation is not felt to be a priority. The only cure for this problem is continual practice of palato-alveolars until their production becomes easy and automatic; and such practice cannot be offered by a weekly pronunciation course, pursued for no more than a single academic year. A pronunciation course can, however, provide the learners with the basic skill, and the confidence which will enable them to undertake integration of their best 'laboratory' performance into their everyday use of English for themselves, should they wish to do this.

When planning a pronunciation course, it should be borne in mind that the sibilants, the most difficult sounds for most Finnish learners to master, are acutely sensitive to the phonetic environment. Learners who can pronounce the English termination -TION (for example) perfectly well in a word such as *ration* may find it much harder to do so in *position*—which they may render with the alveolar and palato-alveolar sounds reversed, or with 'intermediate' sounds used to realize *both* sibilant sounds. It follows that sibilant drills should begin by presenting the target sounds in easy phonetic environments.

¹² That is to say, a totally 'alveolar' [s] of 'textbook' quality; as opposed to a sound intermediate between [s] and [ʃ] that may be heard as /s/ by a listener who is expecting to hear [ʃ].

[ʃ]

Advice to learners.

Remember that the *s/f* contrast is one of the major phonological contrasts of English. Acquiring authentic-sounding palato-alveolar sibilants is far more important than remembering to use liaison at word boundaries, or using native-sounding vowels or intonation patterns. Start by practicing your palato-alveolars in isolation. Get your instructor to listen to you to make sure you have got them right. Practicing faulty sounds in laboratory exercises will only make matters worse.

If you have difficulty in producing an authentic-sounding [ʃ] you should check these points:

1. [ʃ] is a more *retracted* sound than [s]. If you start by saying [s] and then move to [ʃ] you should be able to feel the tip of your tongue slide back up the gum ridge, from its [s]-position just behind the front teeth to a more retracted position on the steeply-rising part of the ridge, where it goes up towards the hard palate. Check that when you say [ʃ] you can insert a finger behind your two front teeth, without touching the retracted tongue tip.
2. The [ʃ] sound is typically produced with a marked protrusion, or pouting-out of the lips. Check your degree of lip-rounding using a mirror. You may find that using more rounding helps move your [ʃ] sound from 'terävä-s' to 'suhu-s'.
3. The [ʃ] sound is produced with the whole 'front' of the tongue raised towards the hard palate, as if you were saying [j] at the same time. You may find it easier to produce [ʃ] if it is immediately followed by [j]; as in these sequences:

<i>wash your hair</i>	<i>wish you were here</i>	<i>fresh young thing</i>
<i>push you around</i>	<i>a rush yesterday</i>	<i>fresh yesterday</i>
<i>posh yellow dress</i>	<i>Finnish year</i>	<i>cash your cheque</i>
<i>fresh yoghurt</i>	<i>finish using it</i>	<i>rush you around</i>

4. If all else fails you can probably force a 'hushing' sound by clamping your jaws together when you say [ʃ] or at any rate, bringing them closer together than you usually do in the course of speech. If you do this, you are forced to draw in your tongue tip and sides to prevent their being bitten. With the whole area of the tongue blade drawn inside the area bounded by the teeth, the channel down the centre of the tongue must necessarily be larger and looser than it is for [s]; since the small, 'tight' channel used for [s] only requires a limited area of tongue surface, and leaves the edges overlapping the edges of the teeth. An extensive, wider channel results in lower air pressure and a more 'hushing' sibilant sound.

How to recognize the [ʃ] sound in written texts.

In many cases, [ʃ] comes from Old English [ʃ]. Words of this kind are *ship, shadow, bishop, fish, English*.

Alternatively, it may come from Old French palatalized [sʃ]; as in *cushion, cash, finish*.

In both these cases, the spelling is the familiar 'sh'.

But in other cases, the sound comes from a coalescence (running together) of [s] with following [j] or [i]. Words of this kind include *sure, sugar, ambition, ocean, special, patient, pension*. Here the spelling is more various, and includes 's' or 'ss' before 'u'; and also *ti, si, sci, ci, and ce*.

The coalescing process was completed in the 17th century. But there has since been some reversion; so that many words which are now pronounced with [sʃu] or [su] (such as *suit* [sut]; *assume* [əsjum]; *supreme* [sʊprim]) were pronounced with [ʃ] in the eighteenth century, as [ʃut, əʃum, ʃuprim].

Finally, [ʃ] comes from French [ʃ] in words borrowed after earlier French [tʃ] had given way to [ʃ]. Words of this kind include *machine, champagne, chic, and moustache*; and the spelling is *ch*.

Typical spellings of [ʃ].

word-initial	word-medial	word-final
sh <i>shoe, shell</i>	sh <i>bishop, cushion</i>	sh <i>Finnish, wish</i>
	ti <i>nation, partial, patient</i>	
su <i>sugar, sure</i>	ci <i>special, spacious, efficient</i>	
ch (French loan-words)	sci <i>conscience, luscious</i>	Also note che
Also note sch in <i>schedule</i> (pronounced [sk] in the US but typically [ʃ] in Britain).	ssi <i>mission, Russian</i>	in French loans such as <i>douche</i>
	n + si <i>pension, expansion</i>	
	ss + u <i>pressure, assure</i>	
	ce <i>ocean</i>	
	si <i>version, conversion</i>	
	ch <i>machine</i> (a French loan)	
	Note that x in words such as <i>luxury</i> and <i>anxious</i> is [kʃ]	

s/f practice with minimal pairs

sea	she	mass	mash	least	leashed	parcel	partial
sock	shock	lease	leash	cost	coshed	person	Persian
so	show	ass	ash	fist	fished	presser	pressure
soul	shoal	plus	plush	massed	mashed	leasing	leashing
sin	shin	Paris	parish	crust	crushed	missing	mission
sip	ship	else	Welsh	rust	rushed	spacers	spacious
sore	shore	puss	push	pulsed	welshed	loosen	solution
sealed	shield	mess	mesh	post	pushed	icing	ocean

handsome/mansion, facile/special, monsoon/mention, ransome/expansion

Phrases with [ʃ]. (Note the variety in the spelling)

Spanish eyes	sugar and spice [ʃʊgə]	ship of the line
Russian roulette	toothbrush moustache	car insurance [ɪnʃʊərəns]
Asian queen	way of all flesh	fighting finish
English tea	fish for supper	moon mission
Persian prince	sold for hard cash	special mention
Finnish nation	an anxious moment [æŋkʃəs]	a luxury hotel [lʌkʃəri]
Swedish show	rational solution	efficient machine
slow but sure [ʃʊə]	the Swedish version	national pride
patient work	a partial answer	shaking hands
shadow boxing	mounting pressure	efficient service
a guilty conscience	spacious surroundings	sugar ration

s/ʃ sentence pairs

1. It's only a parcel service
It's only a partial service
2. He's the parish priest
He's the Paris priest
3. A person came to sew [SOʊ] it
A Persian came to show it
4. The Mission people saved their heads
The missing people shaved their heads
5. The rest was all crust
The rest was all crushed
6. Rust away in the rain
Rushed away in the rain
7. A person came to show it
A Persian came to sew it
8. The Press has [pɪɛsɔːz] always been like that
The pressure's always been like that
9. The Seaman's Mission sells them shoes
The Seaman's Mission shells them Sue's
10. We always try to suit [sut] our customers
We always try to shoot our customers
11. It's hard to save sinners
It's hard to shave sinners
12. So many people have gone
Show me the people who've gone
13. The missing people saved their heads
The Mission people shaved their heads
14. The missing people shaved their heads
The Mission people saved their heads

List 1: [ʃ] with minimal sibilant load

1. Shooting to kill.
2. They always demand cash.
3. A rush to pay money for gold.
4. They were there at the finish.
5. Show me where you can get one.
6. I'm sure [ʃʊə] to have done it by then.
7. I shouted to him to be careful.
8. He really ought to be ashamed.
9. She told me it had to be mended.
10. They had to share it out.
11. Shopping around for bargains. [bɑ:ɹgənz]
12. You'll be in the Finnish team.

List 2: [ʃ] with minimal sibilant load

1. The whole American nation.
2. They were using it as a cushion.
3. A day of celebration for you.
4. The people in the opposition party.
5. Additional money was required.
6. The pension they pay me on Fridays.
7. The new Italian machines.
8. They made only a partial recovery.
9. Please can I have your attention?
10. They made a full contribution.
11. A matter of national pride.
12. A controversial program on TV.

List 3: [ʃ] with [s], [z].

1. Sugar [ʃʊɡə] and spice.
2. Sheltering from the storm.
3. Action as the program requires.
4. The need to confront all the issues.
5. Anxiously [æŋkʃəsli] awaiting the result.
6. A potential cause of failure.
7. The pressure [pɹɛʃə] is bound to increase.
8. The new girl's certainly efficient.
9. She said you aren't really to blame.
10. Your mission is to entertain people.
11. It was an anxious moment.
12. It certainly saves us time.

List 4: [ʒ] with [s], [z].

1. Birds of sea and shore.
2. It's not on my conscience.
3. The scissors [sɪzəz] seem to be missing.
4. The police have special powers.
5. Additional copies can be made.
6. It's in the national interest.
7. Finding a special name for it.
8. It had to be the solution.
9. You can't really blame the Russians.
10. I can assure [əʃʊə] you of our support.
11. A potential cause of trouble.
12. She said it had always been like that.

List 5: [ʃ] with multiple occurrence

1. Expressionless sheet-glass windows.
2. The condition of democracy in Greece.
3. That's only the English version.
4. Racial tension in the inner city.
5. A loose federation of Black and White states.
6. Treat it as a special case.
7. The initial shock was severe.
8. Shopping around to find the best prices.
9. The Community fishing regulations.
10. That's always been my impression.
11. She was most anxious to know.
12. No independent confirmation of the attacks.

List 6: [ʃ] with multiple occurrence

1. My sister sells kisses to sailors.
2. She says it's in the national interest.
3. Say it in Swedish.
4. It's really a special case.
5. They had some initial successes.
6. The recent rise in share prices.
7. The national pollution problem.
8. Further disruption of the talks seems likely.
9. The machine is in pieces.
10. Its condition is atrocious.
11. The champagne [ʃæmpɛɪn] was delicious.
12. He shook hands with himself.

List 7. [] with multiple occurrence

1. A counter-inflationary monetary squeeze.
2. The Swedish solution to the credit crisis.
3. It's sure to attract some attention.
4. But it's only a partial solution.
5. A new election this spring seems certain.
6. Regulation of air pollution.
7. Arms limitation talks.
8. A sound social rights policy.
9. Bad housing conditions in British cities.
10. Transmission on Saturdays starts at seven.
11. You never mentioned his contribution.
12. The position of American diplomats.
13. Sit still and be patient.
14. She's really a special case.
15. The new shop's self-service.
16. A suspension of the discussion.
17. She's sure to have seen it already.
18. Reversion seems certain to happen.
19. The cost of the insurance gave me a shock.
20. She's sure she's seen him before.
21. She said she was certain she had one.
22. She's certainly had her share of bad luck.

List 8: Heavy concentration of [ʃ] with [s], [z]

1. English for special purposes.
2. An extensive commercial information service.
3. A show of military force in south-east Asia. [eɪʃə]
4. Greater attention to the Presidential person.
5. Ministry officials have another interpretation.
6. That's the official version.
7. The interpretation made by senior officials.
8. Pressure to make a full declaration of interest.
9. She's a real professional.
10. Strong support from sections of the national leadership.
11. Negotiations¹ on certain security issues.²
12. British Airways will issue a fresh ultimatum.
13. The Building Societies³ Association⁴ says so.
14. They're in rather a difficult position.
15. She's sure⁵ to have heard about it.
16. They've gone to see a specialist.
17. The cash flow is sure to have eased by Saturday.
18. Real leather shoes are in short supply.
19. Reduced participation in recent elections.
20. American regulations on fuel emission levels.

1. [nəgəʊʃiəɪnɪz] or [nəgəʊsiəɪnɪz]. 2. [ɪʃu]. [ɪʃju] is an 'over-careful' form.
 3. [səsaɪətɪz] 4. [əʊʃiəɪnɪz] or [əʊsiəɪnɪz]. The palato-alveolar [ʃiəɪ] or [ʃiɪɪ]
 pronunciation of the third syllable is less likely here than it would be in the word *associate*, due to the
 presence of the final [ʃ] of [nɪz]. 5. [ʃʊə]

List 9: [f] in very heavy concentration

1. The crucial issue of power sharing.
2. She's the Russian specialist.
3. She's almost sure to mention it.
4. The session was sensational.
5. What's his official position?
6. The probable disruption of arms limitation talks.
7. She says she's got a Swedish boss.
8. An essential contribution to the national quota.
9. Suspension of all essential public services.
10. Their international obligations under United Nations agreements.
11. She's in a special position.
12. Racial discrimination in the inner city.

List 10: [f] in very heavy concentration

1. Six essential elements of official policy.
2. She certainly seems to be making a success of it.
3. The Swedish Sailors' Association says so.
4. My sister says she's a pessimist.
5. She needs the attention of a specialist.
6. Contributions to the special services program.
7. A passionate crusade against Euro-socialism.
8. It certainly showed us the Russians are real professionals.
9. A high concentration of Russian sibilant sounds.
10. She should certainly appreciate your position.
11. Seventy percent of his success is simply showmanship.
12. That's the most rational solution.

List 11: [ʃ], [s] and the labials

1. The expulsions were viewed as provocative.
2. The initial reaction of Soviet sources.
3. Brazil's transition to civilian rule.
4. Women voting in favour of industrial action.
5. British policy on weapons exports has varied.
6. Programmes involving the work of live musicians.
7. The show with live musicians providing the music.
8. A more decisive move by the Finnish delegation.
9. Racial discrimination has been driven underground.
10. The advanced version of the game.
11. Disruption was at its worst last week.
12. The cumulative effect of very small variations.

List 12: [ʃ], [s] and the labials

1. The extravagant villains of Shakespeare.
2. Spanish police found the drivers shot dead.
3. Action as the Constitution provides.
4. A resumption of dialogue to improve foreign relations.
5. The drive to cover the Scottish hills with sheep.
6. The driver-only operation of various Welsh trains.
7. Further disruption of rail services seems inevitable.
8. Willingness to provoke national strike action.
9. Victims of racial violence in South Shields.
10. The worst versions were never hard to avoid.
11. Working together, we should succeed in resolving the crisis.
12. A section of the Black population that advocates violence.
13. She says she wants to work overtime.

[ʒ]

This sound is the voiced counterpart of [ʃ].

If you can say [ʃ], you can achieve [ʒ] by starting off with [ʃ] and 'switching on' your voice during production. Practice saying [ʃʃʃʃ ʒʒʒʒ ʃʃʃʃ ʒʒʒʒ ʃʃʃʃ ʒʒʒʒ].

Distribution is limited to word-medial position, except in the case of a small number of (mainly French) loan words, such as *prestige*, *beige*, *rouge*, *barrage*, *collage*, where the sound occurs word-finally. It occurs word-initially in the Italian loan-word *gigolo*.

Sources.

(1). Coalescence of [z] with [i] or [j]. This process has occurred with words such as *occasion*, *decision*, *pleasure*. The process was completed in the 17th century, but for a long time afterwards, [ʒ] was considered a foreign sound.

[juʒvə] → [juʒvə] [əkeɪzɪənəli] → [əkeɪʒənəli]

(2) From French [ʒ] in words borrowed from French after French [dʒ] had given way to [ʒ]. Examples are *prestige*, *rouge*.

These words still have a foreign flavour; unless, like *garage*, they have become anglicized, with [dʒ] replacing [ʒ]. The history of *garage* illustrates the Anglicization process:

[gavɑʒ] → [gəvɑʒ] → [gævɑʒ] → [gæradʒ] → [gæridʒ]

1 2 3 4 5

The original French word (1), first loses its uvular /r/ sound [ʁ], which is replaced by a flap in (2). There may also be a change in the quality of the unstressed first vowel. Then the stress is shifted to the first syllable, in (3). Then the sibilant [ʒ] becomes affricated, in (4). Finally, as a result of the heavy English stress on the first syllable, the vowel of the second syllable is reduced to [ɪ] in (5). This final stage has only been reached in certain popular accents, such as Cockney. In Received Pronunciation, versions (3) and (4) are current at the present time. But version (2) was used by RP speakers until quite recently, and is still employed by a few of the more conservative.

Spelling. When the sound occurs word-finally in a French loan word, the spelling is *ge*, as in French. Otherwise, the spelling to look for is the following:

1. 'si' occurring in the sequence -SION in words such as *decision*, *occasion*, *conclusion*, *collusion*, *erosion*, *delusion*, *explosion*, *evasion*, *invasion*; *fusion* and its compounds *confusion*, *infusion*, *suffusion*, *diffusion*, *profusion*; *vision* and its compounds *provision*, *division*, *revision*, *supervision*. Note however that the -SION sequence often represents [ʃn]; for example following /n/, as in *pension*, *expansion*, *mansion*; and in the speech of some speakers, in *version* and its compounds *conversion*, *inversion*, *perversion*, *subversion*. The sequence -SSION always represents [ʃn].
2. 'su' or 'zu' in the sequences -SURE, -ZURE, in words like *closure*, *exposure*, *erasure*, *pleasure*, *measure*, *leisure*, *seizure*.
3. 'su' in the sequence -SUAL in *usual*, *casual*, *visual*.

Phrases with [ʒ].

All occurrences of [ʒ] are circled.

a double exposure
 it's not my decision
 revising our prices
 a casual revision
 a measure of success
 the closure of British Airways
 provision for the workers
 the prestige of the President
 a satisfactory conclusion
 the Scottish division
 illusions of power
 we revise it occasionally

the cost of conversion*
 the revised version*
 a famous occasion
 leisure activities
 the pleasure's mine
 increasing confusion
 business as usual
 a casual re-appraisal
 it was all a delusion
 a profusion of wealth
 a three-way division
 a Russian invasion

*In spite of the -SION spelling, *version* and its compounds are pronounced with [ʒ] by many speakers

Many of the words featuring [ʒ] are Abstract nouns derived from verbs which do not themselves have this sound. Consider the following examples:

1. That's the closing price Incomplete closure	8. Dividing the prize-money A three-way division
2. Exposing the fault Total exposure	9. It diffused through the room A general diffusion
3. Erasing the mistake Complete erasure	10. He used my money The practice of usury
4. Providing for everyone Adequate provision	11. The man seemed confused There was instant confusion
5. Revising our prices A thorough revision	12. She's deluding herself It was all a delusion
6. Deciding what to do A sensible decision	13. Eroding public confidence The erosion of trust
7. Concluding your business A satisfactory conclusion	14. A televised report A report on television

[3] in the context of [] In these sentences, you have to maintain the quality of [] while producing [3] in the same sentence. All instances of [3] are circled.

1. a television commercial
2. Russian revisionism
3. I shop there occasionally
4. She had visions of you losing it
5. Assessing the new regime
6. Not on one famous occasion
7. The administration has decided on closure
8. There was no special provision for it
9. That seems a reasonable decision
10. The most casual assurances were given
11. The rations were substantial
12. A revision of the additional figures
13. New measures will be taken by the administration
14. The most casual appraisal of the situation
15. Finnish people go there occasionally
16. It was business as usual
17. I had the impression she owned a shoe shop
18. A Scottish Second Division team
19. The usual pre-election revision of the estimates
20. It's a special version of it
21. The Russians usually impose a cash limit
22. The provision of a rational solution

List 13: [ʒ], [ʃ], [z] and the labials

1. Measurement under controlled conditions.
2. A television production with something for everyone.
3. Yesterday's disclosure of heavy trading losses.
4. The British decision to back these operations.
5. The growing application of protectionist measures.
6. The erosion of public confidence in Monetarist policies.
7. Restrictive measures limiting overseas trade.
8. Over-exposure to foreign news media.
9. The inclusion of growing numbers of foreign troops.
10. Corrosion of the pressure dome was unusually bad.
11. A productivity measure involving the removal of guards.
12. The Scottish divisions of two British firms.

List 14: [ʒ], [ʃ], [z] and the labials

1. Swedish participation in the decision-making process.
2. The inclusion of British troops in the peace-keeping force.
3. An upward revision of the estimates.
4. A commercial decision to market the advanced version.
5. There's sure to be some sort of provision for them.
6. Closure's hard to visualize.
7. Previous attempts to provide efficient supervision.
8. I can assure you the usual measures have all been taken.
9. Heavy Russian casualties in two world wars.
10. Not on one famous occasion.
11. An unusual conclusion to the productivity talks.
12. There's some circumstantial evidence of evasion.
13. Measures designed to limit overseas trade.
14. The arrival of Spanish police at the visitor's centre.

List 15: [ʒ], [ʃ] and the labials

1. The usual official denial of Government involvement.
2. Working for improved diplomatic relations.
3. Widespread expectations of increased power sharing.
4. The initial reaction of many Western governments.
5. Commercial relations have been severely strained.
6. An essential part of the British Liberal tradition.
7. The Board have widened their productivity measures.
8. We have never given in to Western demands.
9. A potential invasion by foreign reserves.
10. Dismissals usually provoke further walk-outs.
11. Aviation specialists have reconstructed the crash.
12. Direct involvement of the European Commission.

List 16: [ʒ], [ʃ] and the labials

1. The visual effect was the worst drawback.
2. A certain degree of confusion in voters' minds.
3. Very severe displeasure at the British action.
4. Bomb explosions in several Western states.
5. Acts of violence to further political ends.
6. An advanced version of the Russian weapon.
7. The upward revision of winter heating costs.
8. Growing impatience with the worst effects of the war.
9. Exposure to advanced versions of the game.
10. Movements involving the disclosure of Allied positions.
11. Collective decision-making to avoid policy mistakes.
12. Measures designed to ensure wider exposure.

[tʃ]

Sources. 1. Early Old English palatal stop [c] (*child, chin, kitchen, teach, church*).

The change to [tʃ] was completed by the late OE period.

2. Old French [tʃ] (*chief, chair, chamber, choice, merchant, branch*).

3. Word-medial coalescence of [t] with [j] or [i] (*nature, virtue, question, creature*).

This change did not become general until the early 18th century. A number of 18th century coalesced forms have now reverted to a stop plus [j] (e.g. *piteous; bestial*).

Spelling. In words derived from the first two sources, spelling is with 'ch' or 'tch'.

But the spelling of the coalesced forms is more complex, involving the letter sequences:

1. -TURE, (-TURAL, -TURY). (*adventure, adventurous, capture, century, culture, cultural, departure, feature, fixture, fracture, furniture, future, gesture, lecture, literature, mixture, nature, natural, pasture, picture, posture, postural, signature, structure, structural, venture*—this list is by no means exhaustive).
2. -TUE. (*statue, virtue*).
3. -TUAL (-TUALLY) (*actual, actually, eventual, eventually, factual, habitual, ritual*).
4. -TUNE (-TUNATE) (*fortune, fortunate, fortunately, unfortunately, importune*).
5. -TUATE (-TUATION) (*actuate, fluctuate, situate, situation*).
6. -TEOUS (*righteous*).
7. -TION preceded by /s/ (*Christian, question, suggestion*).
8. -TUTE (-TUTION) (*constitute, constitution, institute, institution, statute, statutory, substitute, substitution*).
9. -TUDE (*amplitude, altitude, attitude, multitude, vissicitude*).

Words in frequent use are much more likely than rarer words to be pronounced as coalesced forms. Thus, while almost everyone uses coalesced forms of *situation* or *actually*—that is, they say [tʃu] rather than [tʃju]—some speakers would use a non-coalesced form in their production of *actuary* (an *actuary* is someone who compiles statistics of mortality or accidents for an insurance company, and calculates insurance risks and premiums). Everyone uses the coalesced forms of *question* and *suggestion*, but many would prefer the non-coalesced form of *bastion*.

The words listed above, however, are pronounced in their coalesced forms by almost everyone in informal speech; with the exception, perhaps, of the -TUDE words listed at (9). But there are some of these words which are rendered in their uncoalesced forms by many people as citation forms (that is, when the words are being *mentioned* rather than *used*); as well as in formal contexts. On BBC broadcasts, for instance, one can often hear uncoalesced versions of *statue, Christian, actually, situation*, together with all the words in the -TUTE list (No. 8); although the authors of these forms would almost certainly use the coalesced forms in a less formal context. It may be that uncoalesced forms are used by broadcasters and public speakers in interests of clarity; but there also seems to be the belief that they are somehow more 'correct' than their coalesced versions. It is worth noting that it is only *some* of the words listed above to which this applies; and it is difficult to imagine anyone using uncoalesced versions of *question* or *suggestion*, no matter how formal the context. In the case of these (and many other) words, the coalesced forms

have evidently become so well established that the connection with the pre-coalesced 'ancestral' form has been forgotten.

Those who would use the uncoalesced forms of (for example) *Christian* or *institution* in formal contexts will nonetheless readily admit (in most cases) to the existence, and even the legitimacy, of the coalesced forms of these and other words in popular speech. The -TUDE words listed at (9) are an exception to this rule. Many people refuse to admit to the legitimacy of the coalesced forms of these words under any circumstances. But careful listening to the speech of those who take this view will often reveal that they themselves use the coalesced forms of -TUDE words in practice. When this is pointed out to them, they are likely either to deny that they use such forms, or, if the evidence against them is too strong, condemn their own speech as 'incorrect'.

Speakers of regional accents, who are often less concerned than RP speakers with the question of 'correctness' in speech, may often be more aware than 'high-status' speakers of what they actually say. A joke told by a London taxi-driver in a café (televised by the BBC in December, 1983) will serve to illustrate this point. The taxi-driver was a speaker of Cockney, an accent in which word-initial /h/ is typically not pronounced. His joke was about a man, a civil servant with social pretensions, whose bowler hat was blown off into the garden of his neighbour; who like the narrator, was a Cockney taxi-driver. Before the hat could be rescued, it was chewed and badly damaged by the taxi-driver's dog. The civil servant demanded compensation, but the taxi-driver denied liability for the damage caused by his dog. The civil servant said angrily, 'I don't like your attitude'; to which the taxi-driver replied, 'I thought it was your 'at 'e chewed'.

Dictionaries are of limited use in establishing the realities of speech since they are often conservative and in any case may limit themselves to quoting citation forms. In this respect, however, Webster is much more progressive than the OED. The OED cites every one of the coalesced words listed above in its uncoalesced form. In the cases of *adventure*, *future*, *mixture*, *natural*, *signature*, *stature*, *structural*, *structure*—all from the -TURE group—it allows the coalesced versions as alternatives. Outside the -TURE group, however, it admits the existence of alternative coalesced versions only of *question*, *righteous*, and *suggestion*. Even in the case of *actually*—for which Webster allows [æksjəli] in addition to [æktʃwəli] and [æktʃəli]—it cites only the uncoalesced form.

By contrast, Webster (1971 edition) cites ONLY the coalesced versions. Only in the -TUTE and -TUDE groups is this not true; however, many American accents do not feature a palatalized /u/ following /t/ ('tude' being [tud] rather than [tjud]) and so it may be that there is nothing for [t] to coalesce with and [tj] does not occur in the American pronunciation of these words. Outside these two groups, Webster admits the existence of an alternative uncoalesced version only in the cases of *Christian* and *bestial*. As Britons almost all use coalesced forms (of the words listed above) in their everyday speech, these differences cannot be explained as reflecting transatlantic variation in usage.

Advice to foreign learners. [tʃ] involves releasing a stop into a fricative. But bear in mind that the initial [t] involved is the English alveolar [t] and not the Finnish dental version. If you start from the Finnish stop, you are liable to produce an 'alveolar' sound—that is, something more like [ts] than [tʃ]. The tongue position of Finnish [d] provides a better starting-point.

You should also try to avoid too much lip-spread and/or too much palatalization; habits which result in a [tç] kind of sound. Form your [tʃ] sounds slowly at first, prolonging the fricative phase, and checking that this is a good [tʃ].

Word List: [tʃ]

china	matching	cats/catch	cash/catch	cats/cash/catch
chip	richer	mutts/much	mush/much	mutts/mush/much
cheap	butcher	wits/which	wish/which	wits/wish/which
choose	teacher	bats/batch	bash/batch	bats/bash/batch
cheese	culture	huts/hutch	hush/hutch	huts/hush/hutch
chin	kitchen	mats/match	mash/match	mats/mash/match
check	reaches	hats/hatch	hash/hatch	hats/hash/hatch
chest	rancher	arts/arch	harsh/arch	arts/harsh/arch

Note: you should take care to ensure you have a **short** vowel before syllable-final [tʃ].

Now try these phrases, taking care to pronounce the fricative phase of **both** affricates:

Dutch cheese	rich chick	reach China
much chance	each child	teach children
beach chair	much choice	catch chickenpox
fetch Charles	which chicken	French champion

Further phrases with [tʃ]:

chasing the dollar	not much to tell
time to catch up	teaching the kids
choose which you like	too much to pay
time off in China	parts of the beach
matching the colours	check that it works
his political future	fish and chips
reaching the others	frighten the French
which do you want?	chess championship

List 17: [ts] and [tʃ]

1. The cats never catch them
2. On some parts of the beach.
3. Each man eats his own.
4. The Ritz is reserved for the rich.
5. Sitting on mats to see the match.
6. The bats are in this batch.
7. The silly bitch has got it in bits.
8. Which of the cats is mine?
9. Parts of it I didn't catch.
10. It costs far too much.
11. The rats got the cheese.
12. Pat's catch saved the match.

List 18: [ʃ] and [tʃ]

1. Cashing a cheque.
2. Catching the rush hour.
3. Fish and chips for tea.
4. The shoe shop's in Chambers Street.
5. They're sure to catch up.
6. Choosing her shoes.
7. Plenty of shoes to choose from.
8. She's off to see the match.
9. A wish for each day.
10. Show me which one.
11. Should I pay him so much?
12. Catching the rush hour.
13. English cheddar cheese.
14. Reaching a wider audience.

List 19: permutations of [ts] and [tʃ]

1. Chicken and chips.
2. The cats never catch them.
3. On some parts of the beach.
4. It costs far too much.
5. Catch Pat's cats.
6. No match for Pat's.
7. No mats for Patch.
8. Pat's cats are no match.
9. Pat's catch laid out on mats.
10. Patch cats match costing cuts.

List 20: [tʃ] and [ʃ]

1. She bought matching sets.
2. Not much to choose between them.
3. Reaching a wider audience.
4. There's not much chance of that happening.
5. Such a lot of fuss about nothing.
6. She's gone into the kitchen.
7. Choose which you like, but don't mix them.
8. The one which she sold you.
9. Too much talk of revision.
10. Research into the practical applications.
11. Your chances of reaching the final round.
12. Game ranching is good for the bush.
13. More effective checks are needed.
14. Chairman of the Liverpool branch.
15. That's surely not her signature. [sɪgnətʃə]

List 21: coalesced [tʃ]

The [tʃ] sounds in the words in this list came into being in seventeenth-century England, as a result of the *coalescence*, or running together, of [t] with following [j] or [i].

Note that the spelling of [tʃ] in these words is very different from the familiar 'ch' or 'tch' used in words derived from Anglo-Saxon or Old French.

Although the coalesced forms of all these words are almost universal in informal speech, some of them may still be heard in their uncoalesced form (that is, pronounced with [tj] or [ti] rather than with [tʃ]) in slow, careful speech. This applies particularly to words which end in -TUTE or -TUTION (as in *substitute*, *institute*, *constitution*).

1. The future of British Telecom.
2. A mixture of many different styles.
3. The nature of overlearned skills.
4. The President's departure from the White House.
5. The cultural event of the century.
6. They tell me the structure's quite safe.
7. She's had an adventurous life.
8. That's not my signature.
9. The furniture's going to be moved.
10. It's actually very easy.
11. She did do it eventually.
12. Making a virtue of necessity.
13. Unfortunately I can't be there.
14. It's a difficult situation.
15. That's a very good question.
16. Not many Christians would agree with him.
17. It's only a suggestion.
18. The American Constitution.
19. There's no substitute for learning at first hand.
20. The Women's Institute has offices in South Street.

Pronunciation

-TURE	[tʃə]
-TUROUS	[tʃərəs]
-TURAL	[tʃərəl]
-TUAL	[tʃʊəl], [tʃəl]
-TUE	[tʃu]
-TUNE	[tʃən]*
-TION	[ʃn]
-STION	[stʃn], [ʃtʃn]
-TUTION	[tʃʊʃn]

*-TUNE is [tʃun] in *fortune* but usually in unstressed position, as in *(un)fortunate(ly)*, it is [tʃən].

List 22: [tʃ] with [ʃ] and [ʒ]. [ʒ] is circled.

1. That's not my usual choice.
2. The chances of a national strike are now much greater.
3. Making a fortune from tax evasion.
4. The much-discussed reaction of Union members.
5. The index-linked structure [stɪŋktʃə] of teachers' pay.
6. The Chinese decision to dismiss striking sailors.
7. The creative role of natural selection.
8. The richer nations will probably opt for closure.
9. The British position on arms sales to China.
10. A remarkable achievement in switching styles.
11. Regular checks for corrosion of the pressure dome.

List 23. [tʃ] and other sibilants with the labials [v] and [w]

1. An undercover mission to watch Rainbow Warrior.
2. French action on various central issues. [ɪfʊz]
3. Patches of sunshine followed by heavy showers.
4. Some matches will not be televised.
5. A return to normal working by Friday lunchtime.
6. The special charm of this Victorian house.
7. Industrial action stretching into the winter.
8. This is a vital match for both teams.
9. Watch you don't receive an official warning.
10. Torches carried in procession to honour the victims.
11. Preventing an adverse reaction to Tuesday's speech.
12. Avoiding using the ones which were chosen first.
13. An attempt to achieve wider recognition.
14. Chairman of the World Council of Churches.

List 24: [tʃ] and the sibilants with labials in heavy concentration.

1. Action as the Constitution provides.
2. Matching the Chinese offer of fresh talks.
3. Ignoring the casualties stretched out on the floor.
4. Research into the improved use of safety checks.
5. They stand to lose much valuable revenue.
6. Fractures sustained by yesterday's crash victims.
7. The chances of reconciliation with the Czech [tʃɛk] leadership.
8. The future of such communities hangs in the balance.
9. These are the issues on which the House is divided.
10. The constitutional structures are virtually all absent.
11. Union chiefs received no such consideration.
12. Involved in the painstaking search for new ideas.
13. Launching a study of acid rain pollution.
14. The shareholder's right of individual choice.
15. Making the switch from cattle to game ranching.
16. A picture of the way evolution actually occurred.
17. Confronting the issues before he actually takes office.
18. Which of the available channels to actually use.
19. They achieved dramatic advances in output.
20. Cooking by gas is always so much cheaper.
21. The great Chinese Cultural [kʌltʃərəl] Revolution.
22. Not many countries have such rich literature. [lɪtʃərə]
23. Reduced chances of reaching an agreement.
24. Working away to achieve various goals.

[dʒ]

This is the voiced counterpart of [tʃ]

- Sources:** 1. Early Old English [j] (a voiced palatal fricative) in words like *edge*, *bridge*; this change was completed by the early OE period.
2. Old French [dʒ] for words such as *judge*, *major*, *age*, *village*, *change*.
3. Coalescence of [d] with following [j] as in *grandeur*, *verdure*, *soldier*. This change was not completed till the early eighteenth century. A number of 18th century coalesced forms have now reverted to a stop plus [j] or [i] (e.g. *tedious*, *odious*).

Spelling.

Word-initial	word-medial	word-final
j <i>jug, joke, jail</i>	j <i>major, enjoy, object</i>	ge <i>age, huge, range</i>
g + e, i, y <i>German, gin, gyroscope</i>	g + e, i, y <i>agent, danger, orgy engine, fragile</i>	dge <i>ridge, edge</i>
Also note <i>gaol</i>	gg <i>suggest</i>	
	dg <i>midget, badger</i>	
	dj <i>adjacent</i>	
	di <i>soldier</i>	
	dure, deur <i>verdure, grandeur</i>	

In addition, there are many words spelled with 'd' followed by 'u' which are pronounced [dʒ] by speakers of British accents in rapid speech. These include: *due*, *dual/duel*, *endure*, *endurance*, *induce*, *reduce*, *residual*, *duty*, *dutiful*, *dune*.

The difference between these words, and the words spelled with 'tu' and pronounced with [tʃ] which we noted above, is that the coalesced pronunciation of the 'tu' words is better established. Even the very conservative OED cites the [tʃ] pronunciation of words such as *future*, *structure*, *signature*, *natural*, *question*, *suggestion*. Further, while most educated British speakers will readily admit to the 'coalesced' pronunciation of these words in everyday speech, they typically condemn as 'incorrect' the use of coalesced forms of the 'du'-spelled words. Such condemnation, however, does not prevent them from unconsciously using the condemned forms in their own informal speech, and it may happen that the same person who has just condemned the pronunciation of *due* or *duel as Jew* or *jewel* will be observed to use this pronunciation himself a few moments later, in phrases such as *due in five minutes* or *Duel in the Sun*.¹³

¹³ On BBC World Service short-wave radio, where broadcasters often use over-correct, uncoalesced versions of words such as *Christian*, I have heard a program presenter pronounce *duly* with an initial [dʒ].

Advice to foreign learners. This sound is quieter than [tʃ]. Remember to voice it intervocally, and to start the onset of voice as early as you can word-initially, so that *joke* (for example) does not sound like *choke*. The degree of lip-rounding varies with context (more for *choose* than for *cheese*); but in any case, Finnish learners usually have too little. Above all, make sure that [d] is released into [ʒ] and not into [z].

Word list: [dʒ]

general	badger ledger major	seeds/seige
gin	urgent adjacent bulges	raids/rage
gene	danger ranger suggest	heads/hedge
jug	object ginger soldier	rids/ridge
jewel	magic arrange agile	leads/liege
justice	engine orgy pages	fords/forge
jar	enjoy stringent agent	builds/bilge

Now try these phrases, taking care to pronounce the fricative phase of **both** affricates:

large jar	sledge journey	arrange jointly
dodge jail	plunge joyfully	orange juice
Reg Jackson	large gentleman	huge giant
Judge Jeffreys	sage justice	sponge gently

Further phrases with [dʒ]:

a major disaster	January sales	gin and tonic
signs of old age	cause for rejoicing	stranger in town
rough justice	staying out of jail	a journey to France
it's only a suggestion	red badge of courage	a generous man
over in Germany	a large room	I've got it just right
enjoy your holiday	jobs and housing	something to arrange
a huge down-payment	a national stoppage	original sin
an old soldier	the adjoining room	show it to George
electrical engineer	there will be changes	judge for yourself

The expressions in the left-hand column, below, contain **alveolar sibilants** followed by [j]. Native speakers usually assimilate alveolar sibilants to a following palatal consonant; in effect, pronouncing them as palato-alveolar sibilants. '*This year*', for example, is usually pronounced [ðɪj jɜ] in informal speech. This means that you are free to pronounce such sibilants as either alveolars or as palato-alveolars, or as anything in between the two sounds.

The expressions in the right-hand column contain **palato-alveolar sibilants** followed by [j]. These palato-alveolars must be pronounced as such. But you may find it easier to maintain good palato-alveolar quality in the context of the following palatal sound.

nice yellow dress	posh yellow dress
pass your exams	wash your hair
I couldn't face yesterday	they were fresh yesterday
I'm going to miss you	I wish you were here
nice young thing	fresh young thing
unless you're out	a rush yesterday
face your problems	cash your cheque
mess you around	rush you away
what's your name?	Watch your tongue
cats you know	catch you out
the Ritz youth club	the rich youth club
he fits your description	a rich young man
I hope it meets your needs	I didn't catch your name
Pete's used to be the best	peach used to be the best
Pat's use soap to clean it	patch used clothes
wits you may need	which you may need
heads yesterday's report	hedge yesterday's report
rids you of the nuisance	ridge you have to climb
aids your digestion	age your whiskey
the seeds used to last longer	the seige used to last longer
funds you need urgently	plunge you into despair
she knows your father	prestige you can do without
it allows you a break	beige used to be favoured

List 25: [dʒ] in simple contexts.

1. A gentleman in black.
2. One of the jet set.
3. He was jailed for three years.
4. That's just what I told her.
5. It's a very strange name.
6. It was all the rage then.
7. Do you think you can manage?
8. The message was for me.
9. It dates back to the Ice Age.
10. It was no joke getting here.
11. The meeting was adjourned.
12. What do you suggest?

List 26: [dʒ] in simple contexts.

1. The magic mountain.
2. A narrow profit margin.
3. A journey to France.
4. Her luggage got lost at the airport.
5. She was obliged to go back for it.
6. He's a package-tour operator.
7. It's the largest in the country.
8. It's largely a matter of luck.
9. The entire time he's on stage.
10. They were found damaging the door.
11. She was sent by the agency
12. They generally sleep outside.

List 27: [dʒ] and [ʃ]

1. Jazz in traditional style.
2. She caught it just in time.
3. She's got a German boyfriend.
4. Showing to the best advantage.
5. The engine's in good condition.
6. He's a genius with machines.
7. It was simply a matter of adjustment.
8. Show jumping doesn't interest me.
9. I reject it as a solution.
10. A rush to buy 'C' registration cars.
11. What has emerged from the peace talks?
12. Discrimination in housing and jobs.

List 28: [dʒ] with [ʃ] and [ʒ]

1. Jumping to conclusions.
2. Management by intimidation.
3. Objections to holding unofficial talks.
4. Emergency measures to prevent strike action.
5. They were injured in the explosion.
6. The decision to renew official pledges.
7. One of the six regions especially affected.
8. The justification for India's new position.
9. The legitimate aspirations of Black workers.
10. A whole new range of preventive measures.
11. Recent legislation to reduce custodial sentences.
12. Structural damage caused by corrosion.
13. The Latin-American school of magic realism.
14. The German division will take a different view.

List 29: [dʒ] and the labials

1. A voyage round the world.
2. We encourage the workers to travel.
3. Jobs in local government.
4. The horses jumped over the wall.
5. She told me the pay was just average.
6. That's just the way of the world.
7. The manager told me to leave it.
8. I enjoy working with animals.
9. The victims will undergo surgery.
10. The people who live in the village.
11. A visit must be arranged.
12. It generally works very well.

List 30: [dʒ] and the labials

1. One of the great world religions.
2. It's never been generally available.
3. A generous government improvement grant.
4. That's really quite an advantage.
5. There's no suggestion [sədʒɛstʃən] or [sədʒɛ[tʃən] of it.
6. There was never any suggestion of a veto.
7. The well-intentioned views of local magistrates.
8. A letter from area managers in South Wales.
9. Acts of violence to further political objectives.
10. A real and just share of the wealth they produce.
11. The courage of the individuals involved in the war.
12. The Board has widened its appeals procedure. [pɹæsɪdʒə]

List 31: [dʒ] and [tʃ]

1. Charming his way past all objections.
2. Such an original man.
3. Much more effective management.
4. The other man was not even charged.
5. I managed to chase them away.
6. The chairman acknowledged that times were hard.
7. The situation has now changed.
8. His departure [də'pɑ:tʃə] last week was cause for rejoicing.
9. The adaptive function of most conspicuous changes.
10. Choosing the option which offers the biggest advantage.
11. It was only a suggestion. [sədʒestʃən] or [sədʒɛʃtʃən]
12. A general knowledge question. [kwɛstʃən] or [kwɛʃtʃən]

List 32: [dʒ] and [tʃ]

1. Cheap multi-function digital watches.
2. How much has emerged from the talks?
3. Structural [stɹʌktʃərəl] damage caused by corrosion.
4. A forced change of direction.
5. Attached to the General's headquarters.
6. They allegedly held five men for questioning.
7. The intellectual challenge of the 1960s.
8. We suggest you keep in touch.
9. Such an arrangement would ensure French success.
10. The exchange rate against the dollar.
11. He will have to legitimize his position.
12. Objections to radical change.

List 33: multiple occurrences of [dʒ]

1. A huge railway bridge at Saltash.
2. A commercial drilling company was engaged.
3. Did you have an enjoyable journey?
4. The Government's largest engineering projects.
5. How much of the damage was due to negligence?
6. Just imagine living in East Cheam.
7. A gesture of support for the Jordanian king.
8. Wide consequences of small genetic changes.
9. The courage of the average man.
10. A general increase in job-related benefits.
11. A major national strike at a later stage.
12. The Institute for Strategic Studies.
13. The pressure was just average.
14. Taking advantage of better exchange rates.
15. A wide range of major currencies.
16. Management's objections to regional peace talks.
17. An emergency operation to salvage the equipment.
18. The German divisions of two chemical giants.
19. Standard procedure [pɹə'sɪdʒə] for measuring high voltage.
20. A joint declaration to mark the 10th anniversary.
21. There's no-one left to challenge him.
22. A general exchange of prisoners of war.

2

Word-initial and word-medial voiced and voiceless stop consonants

A major difference between the phonological systems of English and Finnish is the distinction made in the English system between 'voiced' and 'voiceless' consonants. The English 'voiceless' stops, /p,t,k/ contrast with their 'voiced' opposites, /b,d,g/. Similarly, /tʃ/ contrasts with /dʒ/, /s/ contrasts with /z/, /ʃ/ contrasts with /ʒ/, /f/ contrasts with /v/ and /θ/ contrasts with /ð/.

But the phonetic means used to make these distinctions is not always the presence of absence of voicing (if 'voicing' means the presence of glottal vibration). The English 'voiced' stops /b,d,g/, for example, may sometimes be unvoiced, both at the beginning and at the end of a word. This is particularly likely to happen when these consonants occur at the beginning or at the end of a complete utterance, and not just at the beginning and end of a word (for example, the consonant [g] in the utterance *Give me that bag*).

And so the terms 'voiced' and 'voiceless', used to refer to the above-mentioned English phonological classes, do not always have a precise *phonetic* significance. But they serve as convenient labels with which to refer to two contrasting consonant types.

Indeed, Hyman goes so far as to claim that:

English is in the process of losing its voice contrast in consonants (note the loss of the t/d contrast in most intervocal positions): the final voice contrast is being replaced with a length contrast and the initial contrast is being replaced with an aspiration contrast.¹⁴

The basis of voicing.

Ladefoged describes voicing in these terms:

Air from the lungs goes up the windpipe (the trachea, to use the more technical term) and into the larynx, at which point it must pass between two small muscular folds called the vocal cords. If the vocal cords are apart, as they normally are when breathing out, the air from the lungs will have a relatively free passage into the pharynx and the mouth. But if the vocal cords are adjusted so that there is only a narrow passage between them, the pressure of the airstream will cause them to vibrate. Sounds produced when the vocal cords are vibrating are said to be **voiced**, as opposed to those in which the vocal cords are apart, which are said to be **voiceless**.¹⁵

The basis of voicing is the **Bernoulli effect**. Bernoulli (1700-1782) discovered that when a gas flows through a pipe with a marked constriction (narrowing) along part of its length, there is a reduction in the air pressure in the pipe at a point very soon after the constriction (in the direction of the airflow). This pressure reduction has a sucking effect which tends to pull the opposite walls of the pipe together and close the pipe at this point.

If the vocal cords are held in the 'voicing-ready' position (that is to say, close together, but not quite touching) then as soon as air from the lungs is pushed through them, they will be sucked together, and close. (More accurately, the normal atmospheric pressure on the outside of the speaker's throat, and pervading the surrounding tissues, will push the vocal cords together when the pressure between them is reduced). But as soon as they are closed, the air stops flowing and the low pressure between them disappears. The muscular tension which the speaker maintains in the vocal cords causes them to spring apart; whereupon the airflow starts again, and gives rise to low pressure, which sucks them together again, so that the cycle is repeated. The result is that air is released in a series of pulses or pressure waves, which is heard as voicing.

¹⁴ L. Hyman, *Phonology: Theory and Analysis* (New York: Holt, Rinehart and Winston, 1975), p. 173.

¹⁵ Peter Ladefoged, *A Course in Phonetics* (New York: Harcourt Brace Jovanovich, 1975), p. 1.

The Finnish stops /p,t,k/.

Kari Suomi points out that these sounds are (typically) ‘natural’ **voiceless unaspirated stops**.¹⁴ That is to say, producing these sounds in Finnish does not require any adjustment to the glottis (the **glottis** is the space between the vocal cords). The vocal cords are allowed to remain in the same ‘voicing-ready’ position as they have for the surrounding vowels; and the only ‘active’ (that is, neurologically programmed) process involved is the making of the articulatory closure for [p], [t] or [k].

Suppose you want to say the Finnish word *aapa*. You put your vocal cords in the ‘voicing-ready’ position and, with your tongue and lips in the right position for the [ɑɑ] vowel sound (tongue flat and low down, lips spread) you push air from your lungs past the vocal cords, which start to vibrate.

Then you close your lips for [p]. As soon as you do this, air pressure begins to build up in the space between your lips and your vocal cords. (This space between the articulatory closure and the glottis is called the *intra-oral cavity*). As soon as this pressure reaches the same level as the air pressure in your throat and lungs *below* the glottis, the airflow through the glottis stops, and there is no more voicing.

Then you open your lips again. The high-pressure air flows out of your mouth and the air pressure in the intra-oral cavity rapidly falls below that in your lungs. As a result, air from the lungs starts to flow through the vocal cords once more, and voicing begins again.

The same process occurs when you say [aataa] or [aakaa]; except that, since the distance between the articulatory closure and the glottis is shorter in these cases (especially so in the case of [k]) the **voice offset time**—that is to say, the time taken for voicing to die away after the articulatory closure has been made—is now shorter.

Notice that to produce [p,t,k] in these cases, you did not have to make any adjustments at the glottis to stop the voicing. Your vocal cords remained in the ‘voicing-ready’ position all the time, and all you had to do was to make the articulatory closures. Once you had done this, voicing was very quickly stopped by the rise in air pressure.

This is all very well for Finnish; but when you speak English you have to distinguish between words such as *harper* [hɑ:pə] and *harbour* [hɑ:bə]; *appraisive* and *abrasive*; *loco* and *logo*. If you speak British English you have to distinguish *writer* from *rider* (the t/d distinction is neutralised word-medially in most American accents, with a voiced [d] used in both words). And word-initially, you have to distinguish *pea* from *bee*; *town* from *down*; and *coat* from *goat*. To make /p,t,k/ sound different from /b,d,g/ in these words it is not enough simply to make the articulatory closures. Some glottal adjustment is needed as well, to prevent the ‘voiced’ and ‘voiceless’ sounds all sounding the same.

The English ‘voiceless’ series, /p,t,k/.

To distinguish these sounds from their ‘voiced’ opposites, English employs the device of **aspiration**. Production involves a **glottal abduction gesture**. That is to say, the vocal cords are ‘actively’ (i.e. by neuromotor command) taken out of the ‘voicing-ready’ position, and held open. Suomi points out (pp. 70-71) that the fact that voice offset times are always about the same (for a given speaker and context), regardless of whether the consonant is [p] or [t] or [k] suggests that the gesture is made at the same time as the stop articulation itself. Thus the vocal cord vibrations are directly stopped by means of glottal

¹⁴ Kari Suomi, *Voicing in Finnish and English Stops* (Turku: Linguistics Department of the University of Turku, 1980), pp. 70-71.

abduction, and not simply as a result of aerodynamic factors (the stopping of the air-flow as a result of pressure build-up when the articulatory closure is made).

The glottal abduction gesture is maintained throughout the period of the [p], [t], or [k] closure, and may even extend beyond it. When the closure is released, voicing cannot start again until the vocal cords have been returned to the 'voicing ready' position. This means that there is a voiceless interval between the release of the stop and the beginning of voicing; this interval is known as **voice onset time** or V.O.T. The presence of the glottal abduction gesture means that air pressure in the intra-oral cavity rises to the full sub-glottal level almost immediately after the closure for [p], [t], or [k] has been made. And so when the closure is released, the full subglottal pressure is there; and the result is turbulence and accompanying fricative noise; followed by a longer 'breathy' interval. The fricative noise and following breathy interval are together known as 'aspiration'.

Aspiration is less noticeable when a word-initial or word-medial voiceless stop is followed by another consonant, such as [l] or [r] (as in *pray, plays, try, crew, clue*). This is because the [l] or [r] articulation (which will immediately follow the release of [t], and is likely to be already in place when [p] or [k] are released) restricts the flow of air out of the mouth. But in all these cases, the /l/ or /r/ consonant is voiceless, with glottal vibration delayed until after the consonant has finished. (Finnish speakers of English are likely to overlook this point, and to start voicing too soon after they have released the initial stops of these words; with the result that they may be perceived as having said *bray, blaze, dry, grew, and glue*). Finally, it should be mentioned that (p,t,k) are not aspirated following /s/ (as in *spin, stone, or skin*).

The English 'voiced' series, /b,d,g/.

Word-medially, these are usually fully voiced. After an articulatory closure has been made, it is possible to keep the voice going for a longer period than occurs with 'natural' unaspirated stops, by expanding the walls of the pharynx above the vocal cords or by drawing the vocal cords down and so increasing the size of the intra-oral cavity.

Word-initially, it is frequently claimed that /b,d,g/ are phonetically unvoiced in English.¹⁷ This is certainly very often the case, though Suomi's study seemed to show that there can be a substantial amount of variation between individual speakers.¹⁸

But if English word-initial /b,d,g/ occur in a 'voiced' environment (as in *'Mary knows Bill'*; where the initial [b] of *Bill* is preceded by the voiced sequence [nɒʊz]) then they can be distinguished from voiceless unaspirated stops of the Finnish type by their much greater **voice offset times**—that is to say, the length of time voicing persists once the stop closure has been made.¹⁹

In 'voiceless' environments (that is, when there are no voiced sounds immediately preceding an initial 'voiced' stop) there is, of course, no voice offset time. Under these circumstances, English word-initial /b,d,g/ may sometimes be phonetically unvoiced throughout the closure period. However, voicing typically begins almost immediately the closure is released. By contrast, many Finnish speakers delay longer, after the release of Finnish word-initial /p,t,k/, before starting voicing. (Remember that in a *voiceless* envi-

¹⁷ See, for example, Gillian Brown, *Listening to Spoken English* (London: Longmans, 1977), pp. 25-33. But Brown admits that certain English accents, such as that of Yorkshire, may employ fully voiced word-initial stops, of the type always found in French or Spanish.

¹⁸ Suomi, pp. 71-72.

¹⁹ See Suomi, pp. 66-67. In the case of the Finnish stops, voicing does not usually persist much beyond 10 msecs. once an articulatory closure has been made. But for the English /b,d,g/ series, Suomi obtained average values of 74-84 msecs. in the word-initial position; depending on whether the closure was labial, alveolar, or velar.

ronment, the Finnish speaker's vocal cords will *not* be in the 'voicing-ready' position, and ready to generate voice immediately the speaker releases his articulatory closure).

As a result of their transfer of this Finnish habit to English, Finnish speakers may often mis-pronounce English word-initial 'voiced' stops by delaying voice onset too long after the release of the closure. Thus, '*sat down*' may sound to an English listener like '*sat town*'. This is particularly likely to happen if the initial 'voiced' stop is followed by [l] or [r]. Finnish productions of words such as *brick, blaze, dry, ground, glass* are quite often heard by native English-speaking listeners as *prick, plays, try, crowned, class*.

The perception of word-initial 'voicing'.

It has often been claimed that the perception of word-initial voicing is 'categorical'; at any rate in the case of stop consonants. That is to say, the listener hears (for example) either /p/ or /b/; but does not hear intermediate sounds. Thus Lisker and Abramson (1970), and Pisoni (1973) found that in distinguishing between word-initial /pa] and /ba/, the timing of voice onset following the consonantal 'burst' (the noise of the consonantal release) was crucial. If the time interval between the burst and the beginning of voicing was less than 0,03 seconds, native listeners heard /ba/; but immediately the interval reached the level of 0,04 seconds, /pa/ was heard.²⁰ By contrast, many other speech sounds can be perceived 'continuously'. That is to say, the listener can identify, not only [s] and [ʃ], but a number of intermediate sounds as well.

But Lisker and Abramson's data (later re-evaluated by Pisoni) were computer-generated. The sound of a bilabial stop being released was followed, at intervals varying from - 0,15 to + 0,15 seconds, by an [a] vowel of unvarying quality. But when [ba] is produced by a human being, with zero or near-zero VOT, the consonantal constriction always has the effect of distorting the first part of the following vowel. (In technical terms, the vowel *formants*, as these appear on a sound spectrogram, are 'bent' in the vicinity of the consonantal release). Investigating children's perception of the English k/g contrast, in the minimal pair *coat/goat*, Fourcin found that, while 3-year-olds attended only to VOT information, and ignored the shape of the vowel formants, 14-year-olds only gave certain /g/ classification to stimuli which combined low VOT with an initially-rising first formant.²¹ If the VOT value were high, they always heard /k/; but if it were low, even if it were zero, then so long as the vowel formants were flat they were uncertain how to classify the stimulus word. (Fourcin, like Pisoni, used computer-generated speech; the combination of flat formants with zero VOT cannot be produced naturally).

When listening to data produced by Finnish students who were asked to read aloud 'minimal sentence pairs' (for example, *he'll have to try it first/he'll have to dry it first*) I have sometimes found that if the students were told to produce only one member of the pair, without however telling me which they had chosen, I was sometimes quite unable to decide, on later listening, which member of the pair had been intended. This finding has been corroborated by other native English speakers I have asked to judge the data. I have found, further, that if I arbitrarily assigned a 'voicing' value to such doubtful cases—representing them as being (for example) either *try* or *dry*--native-speaking listeners would nearly always accept what they heard as an allowable pronunciation of what I had led them to believe they were about to hear. It was only when, having identified a

²⁰ See Herbert H. Clark and Eve V. Clark, *Psychology and Language* (New York: Harcourt Brace, 1977), pp. 197-205.

²¹ A.J. Fourcin, 'Acoustic Patterns and Speech Acquisition.' In Waterson and Snow, eds., *The Development of Communication* (New York: Wiley, 1978), pp. 47-75.

sound with confidence as either voiced or voiceless, I presented it to these judges as an example of the *opposite* voicing category, that they would hear a mistake.

It appears, then, that the 'intermediate' sound is a psychological reality. However, it seems that the perception of the 'voicedness' of stops may be called 'categorical' in the sense that phonetically intermediate variants are accepted as tokens for whatever variant the listener has been led by the context to expect. This state of affairs is quite different from the one noted on p. 15, above, as characterizing the perception of sibilants; where any 'alveolar' quality in a foreign learner's version of [ʃ] is likely to be noticed; and a sound that is phonetically intermediate between [s] and [ʃ] is likely to be heard as falling into the **opposite** category from the one the listener expects to hear.

This broad acceptance of 'borderline' sounds as representatives for whatever category of voicing the speaker intends, is compatible with Suomi's finding that native English speakers occasionally produce voiceless unaspirated stops, of the kind which characterize Finnish, as tokens for *both* the two English types.²² It seems, then, that Finnish versions of (for example) *dry* or *down* that are heard by native English speakers as *try* or *town* are not phonetically intermediate, but involve V.O.T. values that stray far into the English 'voiceless' area. It should be remembered that when word-initial stops occur in a 'voiceless' environment (i.e. at the beginning of an utterance, or following a voiceless consonant) the speaker's glottis must necessarily start off in the abducted state; so that until the vocal cords are restored to the 'voicing ready' position there will be no automatic resumption of voice when the stop is released, such as occurs in sequences such as [aapaa] or [aakaa]. Since Finnish does not have a consonantal voicing contrast, it seems reasonable to suppose that Finnish is much more tolerant than English of variations in voice onset time.

Advice to learners.

Intervocally, the contrast between voiced and voiceless stops carries a low functional load and is not a matter of much concern for learners. If Finns have any problem here, it is with keeping the voice going when the voiced series /b,d,g/ appears word-medially. The problem is most likely to arise with [g]; since in the case of a velar stop the intra-oral cavity is small and so pressure will rise to sub-glottal level (thereby stopping the voice) very soon after the articulatory closure has been made, unless the speaker actively prevents this. Learners have to make sure that in words such as *agreement*, voicing is maintained throughout production of the word.

Word-initially, learners must remember that when the closure for the voiceless series [p,t,k] is released, the glottis must be open (as for [h]); so that a breathy rush of air follows, with audible friction, before the start of the following vowel. Although Pisoni was able to show that a V.O.T. of only 0,04 seconds is enough to secure 'voiceless' identification, native speakers (except perhaps in very rapid speech) typically employ V.O.T. periods of around 0,06 seconds; and sometimes the V.O.T. is very much longer than this. **If /p,t,k/ are followed by /l/ or /r/, then these consonants, equally with /p,t,k/ are voiceless.** Learners should remember that when they pronounce words such as *pray*, *plea*, *try*, *cry*, *clue*, they should wait until after they have finished with the [r] or [l] consonant before they initiate voicing.

With regard to the [b,d,g] series, learners should take care to ensure that the onset of voice occurs at the same time as, or earlier than, release of the articulatory closure.

²² Suomi, pp. 86-89.

Unlike palato-alveolar sibilants, which some students find difficult even in the simplest contexts, word-initial voiced and voiceless stops pose an 'integration' problem, rather than a problem of primary acquisition. This is probably due to the fact that Finnish learners already possess the required sounds, together with unacceptable variants, as part of their native repertoire; but their problem is to 'split' this native repertoire into 'acceptable' and 'unacceptable' components. A teacher can usually elicit excellent word-initial stops in the context of a laboratory drill focussed specifically on this area; but students' problems begin when they try to transfer their 'laboratory' performance into more general contexts, and more particularly, into their everyday communicative use of the language.

Practice with minimal pairs

pie buy	two do	core gore
pole bowl	tile dial	coal goal
pin bin	town down	cane gain
palm balm	time dime	came game
praise braise	try dry	crow grow
plays blaze		close glows

When /p,t,k/ occur intervocalically, they should be aspirated. When /b,d,g/ occur in this position, you should maintain voicing during the period of articulatory closure.

oppose	obey	appeal	abandon
properly	probably	apparent	ability
dependence/abundance		impress	embrace
oppressed	abreast	importance	imbalance
approve	abrupt	appraisive	abrasive
applied	obliged	impassive	imbalance
prepare	probation	ample	amble
camper	member	oppressive	upbringing
attract	address	intended	indented
entirely	indifferent	distend	disdain
citation	addition	protected	predicted
recourse	regain	decant	began
across	agreement	decree	degree
recording	regarding	increasing	degrading

Word-initial voiced and voiceless stops

1. You ought to try it first You ought to dry it first	11. The class was really bad The glass was really bad
2. The cock is still crowing The cock is still growing	12. She's proud of her curls She's proud of her girls
3. He'll do it for a time He'll do it for a dime	13. The crime was terrible The grime was terrible
4. It's a very good pie It's a very good buy	14. I think she's on the pill I think she's on the bill
5. Her voice was appraisive Her voice was abrasive	15. The tiles were covered in dust The dials were covered in dust
6. Who's got the clue? Who's got the glue?	16. It's the kind that close It's the kind that glows
7. It's a beautiful plume It's a beautiful bloom	17. I really wanted to increase I really wanted to in Greece
8. The man's name is Kray The man's name is Grey	18. A long time for training them A long time for draining them
9. It's a pity about the plays It's a pity about the blaze	19. Ours close only on Tuesdays Ours glows only on Tuesdays
10. She wanted to tie it She wanted to dye it	20. She didn't want to praise it She didn't want to braise it

If a word-initial stop occurs in a monosyllabic word closed with another stop, then the 'voicing' value (voiced or voiceless) of the second stop may sometimes make it difficult to produce the right degree of voicing on the word-initial stop. If both stops have the same voicing value (as with *pack, bag*) the word may be easier to pronounce than if the values are 'mixed' (as with *back, peg*). Practice:

21. Put it in the pack Put it in the back	23. It felt like a prick It felt like a brick
22. Put it on the peg Put it in the bag	24. She looked like a prig She looked like a brig

Syllable-initial 'voiced' and 'voiceless' stops.

1.	The class was crowned in Preston The glass was ground in Brest
2.	The coal was too expensive to dry The goal was too expensive to try
3.	The crater still glows in the evenings The greater still close in the evenings
4.	The crate was cleaned specially for training The grate was cleaned specially for draining
5.	The 'Post' reported the blaze was drying it out. The boast reported the players were trying it out.
6.	The appraisive tone of the glass-blowers' leader The abrasive tone of the class players' leader
7.	She's trying to attract the most promising recruits She's going to address the most brilliant new groups
8.	The chaps are impressed with the cold The Japs are in Brest with the gold
9.	A new process for trying out blanks A new process for drying out planks
10.	The bride was granted a decree The bride was granted a degree
11.	The purser wanted to impress the drivers The bursar wanted to embrace the trainers
12.	Trying to assess the importance of the process A drive to redress the imbalance in the process
13.	Drying the grain was part of the agreement Trying the crane was part of the agreement
14.	The plays annoyed the bursar The blaze annoyed the purser

'Voiced' and 'voiceless' word-initial stops**List 1.**

1. She improved enough to get a degree at Bristol.
2. Putting together a better rescue package.
3. The company concluded the agreement last week.
4. The truck-drivers' case will be put to the Board.
5. The growing crisis in Sino-Soviet relations.
6. They made it plain how the plan was regarded at home.
7. Trusting the drivers to keep to the agreed limits.
8. It's reflected as far as possible in banking practice.
9. The shifting public perception of mental health problems.
10. He brushed aside the question of a possible back-down.
11. The Government's plans were attacked in both places.
12. Bringing direct access to other professions.

List 2.

1. Sit down if the music is driving you crazy.
2. He groaned when they brought him the bill for the drugs.
3. Dealing direct with the client in certain cases.
4. He drew his conclusions regarding travel costs.
5. Disagreement between the profession's two branches.
6. Growers will face a supply crisis at Christmas.
7. Talks between branches have led to a firm agreement.
8. Police blocked off a road to the shipyard gates.
9. Bringing grain prices within Community limits.
10. An interesting glimpse of life in Classical times.
11. The compromise plan on increasing arms exports.
12. Granting the increase is going to cost money.

List 3.

1. Toning down the terms of the agreement.
2. Unemployment will bring prices down.
3. A glimmer of hope for some of the claimants.
4. The rapidly-improving standard of British play.
5. The progress of British players in the competition.
6. There are double the number of brokers in well-paid work.
7. The explosion was caused by leaking coal gas.
8. The blast of the explosion blew the garage roof off.
9. The million poorest recipients of Government grants.
10. The ultimate cost of the agreement in dollar terms.
11. Interest expressed by two opposing groups.
12. The drastic re-training of peace-keeping troops.

List 4.

1. A crisis in the Greater London Council.
2. Training the drivers to keep to computerized routes.
3. Bribing officials to present the Government's case.
4. The tough new Government attitude towards drunken driving.
5. The plastic commercial glitter of modern Christmas.
6. A United Nations blacklist of ten British players.
7. The train-driver's union is currently in disgrace.
8. A grain curb should cut back on imports.
9. A new police crackdown on drug abuse.
10. A dollar-a-barrel cut in the spot price of crude.
11. The deeply-ingrained practice of taking bribes.
12. Growing competition for ground-based processes.
13. A blanket prohibition on the placement of new orders.
14. Tribal divisions remain as deep as ever.

List 5.

1. Breaking the record for Wall Street closing prices.
2. Truck drivers involved in the pay process.
3. Within a week the truck had broken down.
4. A long line of traffic built up at the junction.
5. He regrets the defensive form of modern cricket.
6. I recall him addressing the Bedser twins.
7. Concluding an agreement on world sugar prices.
8. Breaking the terms of the agreement on foreign oil.
9. The girl's parents were prevented from bringing a case.
10. The current ban on beer sales at matches.
11. Granada television will broadcast the President's appeal.
12. The climate of opinion on building the glass factory.

List 6.

1. The industry was criticized as primitive.
2. The criticism obliged the boss to answer some questions.
3. Interest expressed by several British companies.
4. Machine tools for producing agricultural components.
5. They drew up a plan for upgrading the equipment.
6. Prices came down to a record low level.
7. Pressure was brought to bear on both groups.
8. An abundance of life in the most unexpected places.
9. My brother's inclined to blame the climate.
10. He regarded the closed book absently.
11. Improved production methods will bring prices down.
12. A growing tendency to play down the cash crisis.
13. He groaned when they showed him the bill for damages.
14. The Government is sure to clamp down on private borrowing.

3

**The word-final consonantal ‘voicing’
contrast.**

Word-final 'voicing'; physical description.

In the word-final environment the traditional notion of a consonantal 'voicing' contrast (that is, a contrast between 'voiceless' consonants such as [t] or [s] and their 'voiced' counterparts [d], [z]) does not accurately reflect phonetic reality.

This is so because in modern English, voicing (in the physical, or phonetic sense) has been at least partly replaced by length as a means of making the contrast between words such as *white* and *wide*, or between *race* and *raise*. It is probably true to say that native English speakers now distinguish between these words mainly by listening to the **length of the vowel that precedes the final consonant itself**.²³

According to the traditional description, the distinction between (for example) *race* and *raise* is a matter of the presence or absence of voicing (that is, glottal vibration) during the production of the final alveolar sibilant; *race* is said to end in the voiceless alveolar sibilant sound [s], while *raise* on the other hand ends in the voiced alveolar sibilant [z]. In phonological terms, *race* has the structure /reɪs/ while *raise* is /reɪz/.

But the phonetic reality is rather different (and considerably more complicated). In the case of *race*, the [eɪ] diphthong is shortened; being much shorter than it is in either *raise* or *ray*. It is followed by a vigorous **glottal abduction gesture** which opens up the glottis, so that the full sub-glottal (lung) air-pressure is available during the production of the following [s]; making this sound very audible. And it is also **long**.

In the case of *raise*, the [eɪ] diphthong is 80%²⁴ longer than it is in *race*; and it is not immediately followed by a glottal abduction gesture. If *raise* is followed by another voiced sound (as in *I'll raise your pay*) there will be no glottal abduction at all, and the /z/ sibilant will be realized as a fully-voiced [z]. If *raise* occurs at the end of the utterance, on the other hand (as in *I'll give you a raise*) the vocal cords are likely to be taken slowly out of the 'voice' position during the production of the final sibilant; so that [z]

²³ It should be noted that dictionaries are of little use in this area, since they always represent the 'traditional' view of the 'voicing' distinction. The Oxford English Dictionary, for instance, represents 'race' as /reɪs/, and 'raise' as /reɪz/. This is not simply a matter of conservatism. Dictionaries have to be comprehensible to their users, most of whom are not professional linguists; and for this reason they almost always represent pronunciation by means of what is known as a **simple phonemic transcription**. Such a transcription employs one symbol for every 'phoneme' or 'phonological unit'. (For a discussion of phonology and its relation to phonetics, see pp. 116-119, below). Traditionally, languages have been described as possessing an inventory of 'lower-level' **phonological units** (/a/, /o/, /t/, /l/, etc.) which do not in themselves mean anything, but which may be combined in sequence into 'higher-level' **lexical units** (such as the Finnish word *talo*) which do mean something. This theory has serious inadequacies when it comes to accounting for the raw data of phonetics, and for the neurological programs which underlie speech; but it has the advantage of simplicity; and it forms the basis of alphabetical writing systems.

Some dictionaries try to provide a more accurate account of the pronunciation of (for example) *race* and *raise*, by indicating the different lengths of the vowels used in these words. Such descriptions, however, are likely to mislead readers into believing that vowel length is phonemic in English, as it is in Finnish; whereas the truth is that variations in vowel length are used in English to identify the 'voicing' value of word-final consonants, but are not primarily involved in establishing the identity of the vowel itself.

²⁴ The degree of lengthening varies with different vowels. The so-called 'short' vowels, /i, e, d, ʌ, u/ lengthen by approximately 50% before a final 'voiced' consonant. The 'long' vowels /i, u, ɜ:/, and the diphthongs, lengthen by between 60% and 100%. Thus the contrast is greater between *niece* and *knees*, or between *lice* and *lies*, than it is between *since* and *sins* or between *set* and *said*.

gradually gives way to [s]. But the initial phase of the sibilant will be voiced, or at least, whispered; and since the sibilant is also rather short, the fully open state of the glottis will not be reached during the course of its production. This means that the air-flow will be restricted, and the sibilant sound will therefore be much quieter than is the case with *race*.

Phonetically, the so-called word-final 'voicing' distinction is something like this:

'race' [ɹeɪs:] 'raise' [ɹeɪ : z] or [ɹeɪ : zɪ]

When final 'voiced' consonants are immediately preceded by nasals or laterals rather than by vowels, it is these sounds, rather than the vowels, that are lengthened in order to indicate the theoretically 'voiced' nature of the final consonant. Thus:

'false' [fɔːls:] 'falls' [fɔːlz]

'once' [wʌns:] 'ones' [wʌnːz]

The distinction between the word-final voiceless stops /p,t,k/ and the contrasting 'voiced' series /b,d,g/ is made in very much the same way as for the fricatives. The vowel that precedes a **voiceless** stop is short and (particularly in front of /t/) it may be terminated by means of a glottal stop which immediately precedes the [t] closure itself, and gives a 'tight' or 'creaky' quality to the vowel. (But there is no need for a foreign learner to make a glottal stop; the important point is that the vowel must be much shorter than the one that occurs in front of /b,d,g/).

At the same time as he makes the [p,t,k] closure, the speaker makes a glottal abduction gesture. The [p], [t], or [k] closure itself is held for a relatively long time; with the result that when the closure is finally released, the glottis has had time to open fully. And so the full sub-glottal air pressure is available on release, and air from the lungs rushes through the open glottis into a noisy 'aspirated' [p^h], [t^h] or [k^h].

By contrast, the vowels used immediately preceding the **voiced series** /b,d,g/ are much longer. A glottal abduction gesture will not be made following the release of these consonants if they are immediately followed by a voiced sound (such as follows /d/ in *I had none*). But if /b,d,g/ are followed by a voiceless consonant, and particularly if they occur utterance-finally, a glottal abduction gesture will be made. But this will not be made until half-way through the short consonantal closure, or even later. This means that when [b,d,g] are released, the vocal cords are still very close to the 'voice' position, and may actually still be in this position. In consequence, there is not the noisy, aspirated release into [p^h],[t^h] [k^h] that occurs with the /p,t,k/ series.

This is illustrated in Figure 1, below; which shows the EMG (electromyographic) curves measured for the speech muscles of a speaker of General American English during the production of the syllables /əpɪp/ and /əpɪb/. The lowest of the four graphs shows the action of the posterior cricoarytenoid muscle which is responsible for glottal abduction; that is, for taking the glottis out of the 'voice' position. The solid line, representing /əpɪp/, shows glottal abduction beginning less than 100 msec. after the onset of the short [ɪ] vowel, and (as comparison with the top graph shows) while the second (word-final)

[p] closure was still being formed. It is evident that glottal abduction terminated the [i] vowel; and that when the word-final [p] closure was released, the glottis would have been fully open. The dotted line, representing /əpɪb/, shows glottal abduction delayed until approximately 100 msec. after the [b] closure had been formed, and some time after the (much longer) [i] vowel sound had been terminated; it is evident that this vowel must have been terminated by rising pressure in the intra-oral cavity rather than by glottal abduction. It seems clear that when the [b] closure was released, the glottis would have only just begun to open, and might even have still been in the 'voice' position; thus there would have been no aspiration.

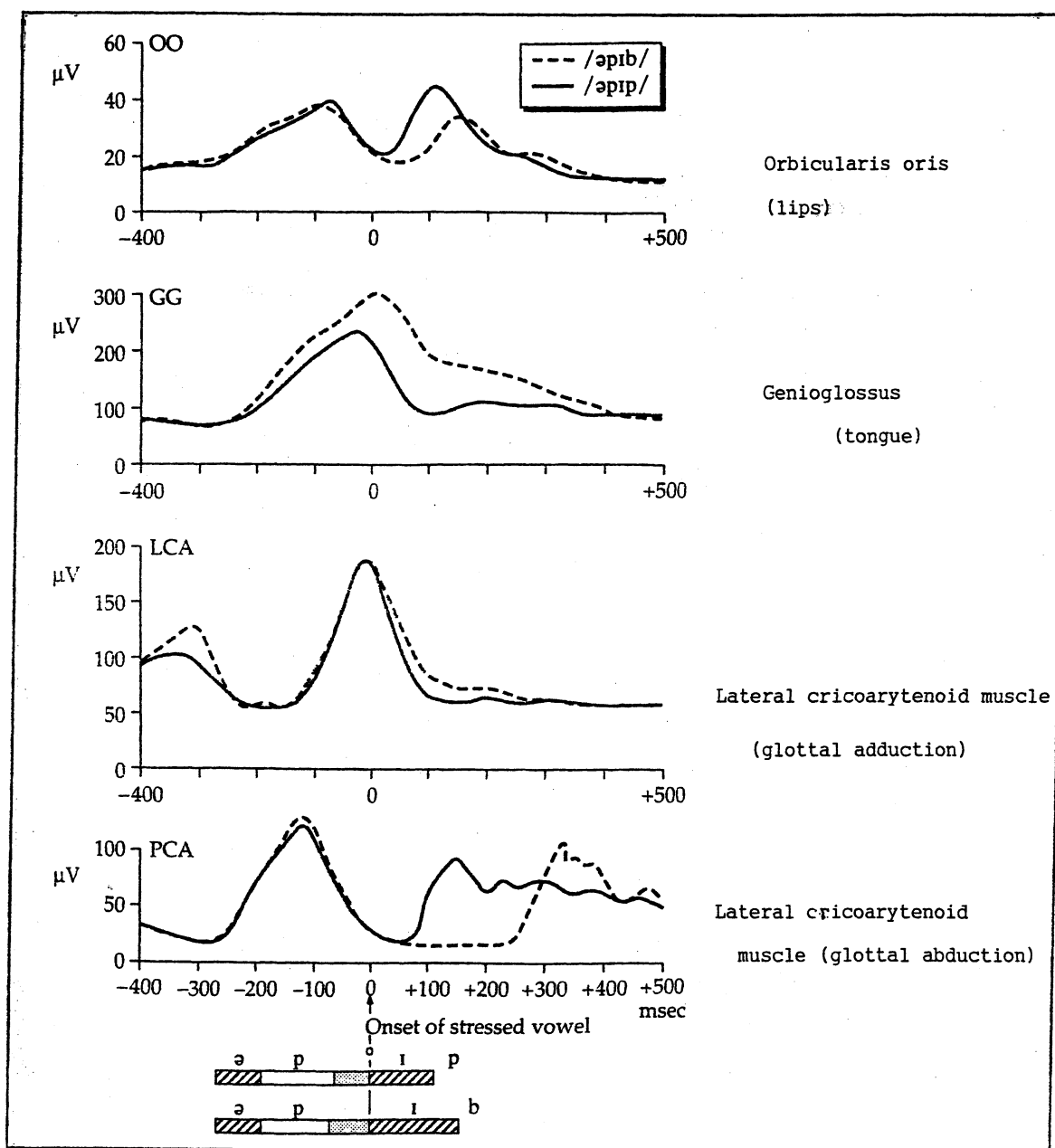


Figure 1. Averaged EMG curves of orbicularis oris, genioglossus, lateral and posterior cricoarytenoid muscles in the utterances /əpɪp/ /əpɪb/ produced in isolation by an American subject. The line-up point is the acoustic onset of /i/ (from Hirose & Gay, 1972).

Advice to learners.

Finnish learners of English are likely to make either, or both, of two mistakes in the way they realize the word-final consonantal 'voicing' distinction.

1. Many learners make no adjustment to the length of the preceding vowel. This means that the vowels they use in front of word-final 'voiceless' consonants are too long, while those they use in front of final 'voiced' consonants are too short. Learners should realize that, particularly in front of word-final /p,t,k/, vowels should be drastically shortened.

This mistake, however, is one that is easily overcome, at any rate at the initial learning stage of *primary acquisition*. In the context of laboratory drills, and provided with a model to imitate, nearly all Finnish learners find it easy to use longer vowels in front of the 'voiced' stops /b,d,g/, the 'voiced' fricatives /z,v,ʒ,ð/ and the 'voiced' affricate /dʒ/ (in words such as *cab, bad, bag, was, love, prestige, breathe, bridge*). After all, their native language has sensitized them to vowel length as an important parameter. It is true that they find it more difficult to lengthen their vowels *proportionately* (that is, to lengthen short vowels by 50% or so, but long ones by 80%) in the native English manner; but this does not really matter. It goes without saying, however, that a performance which can be mastered easily in the context of a laboratory drill, where the learner is willing to pay close attention to high-density feedback, still has to be integrated into his informal communicative speech. But if the learner is willing to rehearse his new 'laboratory' skill, it will soon enough become automatic, and easily integrated into his everyday speech habits.

2. Many learners have the habit of taking their vocal cords out of the 'voicing' position by means of a vigorous glottal abduction gesture made at the same time as they make a word-final /b,d,g/ closure or /z/ fricative stricture. In the case of the stops, the result of this habit is that when the stop is released, the glottis is fully open; so that the full sub-glottal (lung) air pressure is present on release, and release is into a noisy aspirated [p^h], [t^h], or [k^h]. Such sounds are always identified by native speakers as 'voiceless' consonants, **irrespective of the length of the preceding vowel**. Similarly, in the case of a 'voiced' fricative, an early glottal abduction gesture, resulting in an open glottis during a substantial part of the fricative's production results in very noisy friction (due to the high air pressure available to power the sound) which, again, always secures 'voiceless' identification.

This second mistake is very much harder to correct than the first one.

In view of what was said, on p. 62, above, about the length of the preceding vowel being the clue customarily used by native speakers in identifying a word-final consonant as either 'voiced' or 'voiceless', it may seem surprising that this clue can be so easily 'overruled' by the phonetic nature of the consonant itself; so that an aspirated stop, or a noisy voiceless fricative will always be heard as 'voiceless', no matter how long the preceding vowel may have been. But the reason for the importance of the vowel-length clue is that in native speech it is very often, and particularly in the case of the stops, the only clue available. Utterance-finally, a speaker may not release his word-final stop at all (within a reasonable length of time following the end of the utterance); so that when he has said (for example), *Take a cab* or *Take off the cap*, his lips may simply remain closed; giving no opportunity for the signalling of word-final /p/ by means of an aspirated [p^h]. Even if he does release the [p] of *cap*, it may be that he has preceded this labial closure with a glottal stop, which he has allowed to remain in place for longer than the period of the [p] closure itself. A glottal stop would effectually seal off the lungs

from the intra-oral cavity, with the result that when [p] was released there would be very little outflow of air. This would have the effect of making the release almost inaudible, and certainly quieter than the quiet release of the final [b] of *cab*; where the glottis, just beginning to open from the 'voicing' position, allows a modest outflow of air from the lungs into the vocal tract. Under these circumstances, almost the only clue his hearer would have as to whether /p/, or /b/ had been intended would be the length of the preceding vowel, and the possible presence of 'creaky voice' that would announce the early termination of this vowel by means of a glottal stop.

Utterance-medially, the release phase of English word-final consonants is often masked by the **anticipatory coarticulation** of all or part of the initial consonant of the following word. English is what is called an **anticipatory** language; which means that certain articulatory gestures may be specified in the speech program in advance of the point where their presence is indicated by conventional segmental phonological analysis. (For example, the version of /k/ used in saying *clue* is accompanied by substantial lip-rounding, a required feature of the following [u] vowel; whereas a completely unrounded kind of /k/ is used in *clean*). Word-final /d/, for example, is usually assimilated to the place of articulation of a following consonant; so that *good boy*, *good girl* are usually rendered [gʊbbɔɪ, gʊggɜl], i.e. with a single labial or velar closure. Similarly, *good man* is [gʊbmæn]; and in rapid speech at least, *good fortune* is likely to be pronounced [gʊbfɔtjʊn]. No assimilation is necessary in the phrases *for that reason*, *with good reason*, since [t], [d] and [ʃ] share a common alveolar place of articulation; but usually neither of these alveolar stops will be released, but will give way smoothly to the [ʃ] stricture; thus once again, the preceding vowel provides the only *phonetic* clue to the theoretical 'voicing' value of the stops. Labial and velar stops do not assimilate in the manner of alveolars; but in the production of phrases such as *top twenty*, *cab driver*, *sick boy* or *rag trade*, the labial or velar stop that ends the first word of the pair will not be released until **after** the initial stop of the second word has been formed; which means that its release will be virtually inaudible. Similarly, in phrases such as *sack full* and *bag full*, the prior formation of the [f] stricture, before the release of the velar stop that ends the first word of each pair will effectively mask the release phase of these stops; and the listener will identify the /k/ of *sack* by the short [æ] vowel and the relatively long silent interval before the initial [f] of *full* is heard; while in the case of *bag full* there is a long [æ] vowel, and only a short period of silence caused by the [g] closure.

Thus the removal of the 'release' clue from the speech of native speakers, as a means of identifying the 'voicing' value of word-final consonants forces the listener to rely on the secondary clues of vowel length and the duration of word-boundaries. But very few Finnish speakers of English practice anticipatory co-articulation; so that while a native English speaker will pronounce the phrase *it was sold quickly* as [ɪpwəz sɔʊlg kwɪkli], a Finn is likely to produce, and release, both the [t] of *it* and the [d] of *sold*. And whenever the 'old' primary clue provided by the release phase (aspirated or unaspirated) of a final stop is available, native English-speaking listeners will immediately respond to it. The point here is not that Finnish learners should learn to practice anticipatory coarticulation, but rather that in producing unassimilated versions of phrases such as *sold quickly*, they should take care not to make a glottal abduction gesture much in advance of their release of the [d] closure.

The words in **bold type** in the sentences below end in the ‘voiced’ stops /b,d,g/. If you release these stops, make sure that you delay your glottal abduction gesture (that is, taking the vocal cords out of the ‘voice’ position) until you are on the point of releasing the stop. If glottal abduction is begun too early (for example, at or before the time you *make* the /b,d,g/ closure) then when /b,d,g/ are *released*, your glottis will be wide open; so that the /b,d,g/ closures will be holding back all the air in your lungs. The result will be release into a heavily-aspirated [p^h], [t^h], or [k^h]. This will make your speech sound very foreign; further, you may be misunderstood (for example, as having said *hat* rather than *had*).²⁵

1. It was the only one that I **had**.
2. Put them back in the **bag**.
3. The house was **sold** quickly.
4. The car had been **sold** before I got there.
5. Take a **cab** to the station.
6. It sounds like a **big** deal.
7. The place where the body was **found**.
8. He shouted it in a **loud** voice.
9. The same old **sad** story.
10. Give it a **rub** down.
11. I see there’s a **leg** broken.
12. She **said** that we **had** to be careful.
13. Like a **red rag** to a bull.
14. I told you the house had been **sold**.
15. A blue **bag** full of money.
16. The **bag** was full of **gold** coins.
17. ‘It’s all in the **mind**’, she **said**.
18. The reason why teeth are important.
19. The reason white teeth are important.
20. The reason **wide** teeth are important.

²⁵This problem is by no means confined to **Finnish** speakers of English. Many years ago I was presented with a vivid example of this, while returning to Finland by train from Leningrad (as St. Petersburg was called in the days of the Soviet Union). At the border, the train was examined by Soviet officials who had to prevent their citizens from escaping from the Socialist paradise, and also to prevent the smuggling out of Russian art treasures. I was wearing a long overcoat, which made one of the Russians suspicious. He opened the conversation by asking, ‘Are you colt?’ I did not understand the question, and so he repeated it, more loudly. ‘Colt’ is the English for *varsa*, and I replied, still very puzzled, that I was a human being. The Russian became quite angry, and said, ‘In this colt, it is quite hot. But you have a big coat. Are you COLT? Then at last I understood that he had been trying to ask me whether I was COLD.

Word-final 'voiced' and 'voiceless' fricatives.

1. So you wanted a race So you wanted a raise	13. It's good for my niece It's good for my knees
2. It was there in the ice It was there in the eyes	14. I didn't like the price I didn't like the prize
3. The rice was excellent The rise was excellent	15. They sent us a wreath It was difficult to breathe
4. The report was false Victoria Falls	16. I've told you once They are the ones
5. The pace is increasing It pays very well	17. As a matter of course It was in a good cause
6. I've heard of her since I've heard of her sins	18. Good dentists are scarce I took them downstairs
7. It was up on the roof They're trying to improve	19. The juice was amazing The Jews were amazing
8. When you give it a rinse Then the colour runs	20. A tense moment Tens of thousands
9. It's a very long leaf It's a very long leave	21. A dense forest Dens of iniquity
10. They always want proof It's impossible to prove	22. That's my belief It's so hard to believe
11. It's a wonderful safe It's a wonderful save	23. Preserving the peace Preserving the peas
12. It looks terribly fierce It confirms my worst fears	24. The lice were just terrible The lies were just terrible

Anticipatory co-articulation

The phrases below all feature word-final stop consonants followed by some other consonant. Read them aloud; taking care not to release any of the word-final stops until you have the articulation for the initial consonant of the following word in place.

Two homorganic stops are realized as a single long closure; so that *'right time'* is pronounced [ɹaɪttaɪm]. Native English speakers often assimilate alveolar stops or nasals to the place of articulation of the following consonant; so that *sad girl* becomes [sæggɜːl], *right place* becomes [ɹaɪppleɪs] and *not willing* is [nɒpwɪlɪŋ]. But for foreign learners, assimilations of this kind are entirely optional.

I don't believe it I had Bill's number the top position	the bank paid me sip brandy not blaming you	a big payment the cat pushed it she had plenty of time
stop doing that don't do that don't tell me	cab driver big deal rub down	she sat down slack time rib-tickling
a red curtain big game lab coat white kitten	a fast car take care strict conditions I'm not going	a sad girl top gear back garden the top came off
the right number top nation	some bad news pack nothing	it's big news stop nagging
ship money a bad master	black market a sick monkey	good measure a white man
rope ladder bad luck	lack-lustre not likely	good-looking take the first left
pick raspberries the cab-rank	not really the tap-room	right round the corner the rat-race
shop for tomatoes bag full of gold	bad for my eyes speak for yourself	tub full of water it's not fun anymore
the lock was broken the cab was waiting	the dog was sleeping the top was off	the cat went upstairs the red one is missing

Word-final 'voiced' and 'voiceless' stops

Word-finally, 'voiceless' variants are distinguished by a **very short preceding vowel**.

Some people make a glottal stop at the same time as, or shortly before, the voiceless stop itself. The tightening of the vocal cords which this causes results in the 'tight' or 'creaky' quality of the voice often heard in English before 'voiceless' stops. For foreign learners, however, a glottal stop is unnecessary. But you **must make your vowel short**.

If the 'voiceless' variants are released, they are released into a very audible [p^h], [t^h], or [k^h]. But the release of the 'voiced' variants is very much quieter, since the glottis is either in the 'voice' position, or only just coming out of this position. If you find it difficult to do this quiet release of word-final [b,d,g] then you can either **not release them** if they occur utterance-finally or before a pause, or else make sure you release them into a **voiced schwa**. And if they are immediately followed by another word, then form the beginning consonant of this word **before** you release your word-final [b], [d], or [g].

1. She was let down the cliff She was led down the cliff	11. White teeth are a problem Why teeth are a problem
2. Send it back to the factory Send a bag to the factory	12. Right round the town A ride round the town
3. That's what she set That's what she said	13. It was raced yesterday It was raised yesterday
4. We needed the seat We needed the seed	14. The sack's in the middle The sag's in the middle
5. That's what she wrote That's what she rode	15. The lock was a problem The log was a problem
6. She said it was her right She said it was her ride	16. A leak of information The League of Nations
7. The hand of Fate We wanted it to fade	17. We malt all the good stuff We mauled all the good stuff
8. Dried in the racks Wrapped up in rags	18. I know it for a fact I felt terribly fagged
9. It gave me a fright I wanted it fried	19. That's the one we sent That's the one we send
10. It must be faced out It must be phased out	20. The road was too white The road was too wide

'Clear' and 'dark' [l]

[l] is called a 'lateral' consonant because the passage of air is stopped in the centre by the tip of the tongue being placed against the teeth ridge; but air is allowed to escape freely over one or both sides of the tongue. (Different speakers may lower one or the other side. If you breathe in while producing your normal [l], as in *light* or *lamp*, you should be able to discover which side of the tongue you lower—it will feel colder).

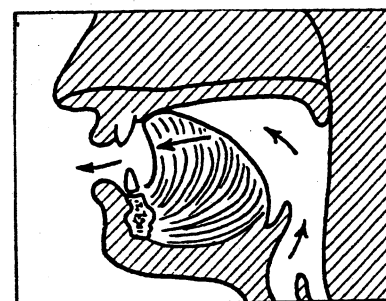
The English lateral consonant is typically produced with no audible friction. And laterals in most languages are usually presumed to be continuants rather than fricatives (and to be voiced rather than voiceless) unless the contrary is stated.²⁶

Because plenty of air can escape over the sides of the tongue during its production, /l/ is the most **sonorous** (vowel-like) of the English consonants. Indeed, although traditionally it is classed as a consonant (and in **articulatory** terms, this is what it is; after all, the primary articulation consists of a firm contact between the tongue tip and the alveolar ridge) in **acoustic** terms /l/ is more of a vowel than a consonant. And the **kind** of vowel it is depends on the shape of the tongue during production. Especially in British English, there are two, quite distinct varieties of /l/.

1. In the case of **palatalized** /l/, usually called 'clear' /l/, the whole 'front' of the tongue is raised towards the hard palate; just as it if you were about to produce the high front vowel [i]. The result is to give this kind of /l/ a front-vowel quality; though this is less true of American English than it is of most British variants.

'Clear' /l/ occurs in front of vowels, as in *leaf* or *lose*.

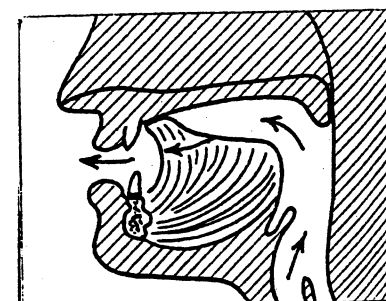
The symbol for 'clear' /l/ is [l̟].



2. In the case of **velarized** /l/, usually called 'dark' /l/, the back of the tongue is raised towards the soft palate, as if the speaker were about to say [u] or [o]. The result is to give this kind of /l/ a back-vowel quality, as if you were saying [u] at the same time as [l]. And in fact you are doing just this, although there is not much lip-rounding.

'Dark' /l/ is used post-vocally by both British and American speakers, in words such as *pool*, *fall* or *feel*.

The symbol for 'dark' /l/ is [ɫ].



²⁶ But if voicing is broken off during a lateral articulation, by means of a glottal abduction gesture, the result will probably be a voiceless **fricative** lateral. Without voicing, air flows through the glottis more rapidly; and a lateral constriction which was not close enough to cause friction with the reduced 'voiced' airstream, is close enough to cause it when the airflow is speeded up.

A non-fricative **voiceless** lateral is possible if the side of the tongue is moved further away from the teeth. And if it is moved closer, a **voiced fricative** lateral is also possible. Thus laterals may be voiced or voiceless, and fricative or continuant.

There is no language which makes contrastive (phonemic) use of the difference between the two VOICELESS variants.

But Zulu makes a three-way distinction between the voiced fricative and continuant variants, and the voiceless fricative: as in:

[lɔnda] 'preserve'; [ɫu ɫa] 'roam loose'; [ɬoɬa] 'prod'.

Voiced fricative laterals occur in Welsh; as in [ɬa n] 'church'

	voiceless	voiced
Continuant	[l̟]	[l]
Fricative	[ɬ]	[ɫ]

Some British speakers produce 'dark' /l/ with the tongue drawn up and back towards the soft palate, but with no tongue-tip contact at all. In this case, the articulation can only be described in terms of its velarization (which was regarded as 'secondary' articulation in cases where tongue-tip contact was made). Thus in describing the Cockney accent of English, in which 'dark' /l/ is often realized as [ʊ] (so that *little girl* may be pronounced [lɪʔʊ ɡɛʊ]) we are obliged to say that the 'consonantal' /l/ phoneme has both a consonant and a vowel allophone.

In cases where syllable-final /l/ follows a back vowel (in words such as *fall*, *cool*, *cold*, etc.) the lateral consonant and vowel share the same tongue shape and so there is, of course, no question of an assimilatory effect. (But in rapid speech there may be co-articulation of vowel and consonant; so that *call* (for example) may be rendered [kʌ] rather than [kɔʔ]; in which case the quality of [ɔ] will necessarily be affected).

But when /l/ follows a front vowel, there is necessarily some assimilatory effect (and in English, assimilation tends to be anticipatory rather than perseverative). This effect is most obvious in the case of the 'short' front vowels [ɪ] and [ɛ]; where a following /l/ induces the use of markedly central variants of these vowels in words such as *pill* or *bell*.

Partly because of this central quality, and partly because of the short duration of these vowels and the following laterals, diphthongization, caused by the progressive backwards movement of the tongue to a velarized position, is not very noticeable when one hears these words. Rather, the impression is of a relatively pure short vowel, followed by (or in rapid speech, accompanied by) an [l] sound.

In the case of the long, diphthongized front vowels [ɪʲ] and [eɪ], and the diphthong [aɪ], the effect of a following lateral is rather different. Listening to words such as *feel*, *sail*, or *mile*, one hears two successive vowels; an initial [i], [eɪ], or [aɪ] followed by [ʊ] or [ɔ]; so that the speaker appears to have said [seɪɔ] or [fiʊ]. And in fact this is what he has said; except that the alveolar contact has been made before the second vowel element has been started. The second vowel element, in other words, is the /l/ itself; and for this reason a more accurate transcription of these words is [seɪ ʔ], [fi ʔ].

The learning problem.

In Finnish, /l/ is generally clear. But it is dark following a back vowel, in words such as *koulu* or *kuulo*, as the natural effect of assimilation.

This means that Finnish speakers have no problem with English 'clear' /l/. But they often make the mistake of not using the 'dark' variant in post-vocalic position. If a syllable closed with /l/ has a back vowel, then a Finnish speaker will use a 'dark' /l/, just as he would in Finnish. But speakers often forget that **even if the vowel is a front one**, the tongue still has to be moved into back-vowel position for the lateral segment.

In those cases where post-vocalic /l/ is immediately followed by a 'voiced' word-final consonant (as in *field*, *swelled*, *feels*, *failed*, etc.) the lateral element is prolonged, as a means of signalling the theoretically 'voiced' status of the following final consonant. Under these circumstances, a 'clear' version of the lateral is very noticeable to English-speaking listeners, and makes the speaker sound very foreign.

There is also sometimes a problem with the [ɪ] vowel in front of /l/, in words such as *bill*, *fill*, etc. Many Finnish speakers have difficulty with this vowel in any case, and use too 'high' a version, close to Finnish 'short' /i/. But it often happens that a Finnish speaker's version of English /ɪ/ that is low and central enough to be heard by native English speakers as /ɪ/ rather than /i/ in all other environments, is not accepted as /ɪ/ in front of /l/, where natives use a particularly central version of this vowel.

Advice to learners.

Learners should think of words in which the English [i] vowel is followed by /l/, as including an additional [ʊ] vowel ([ʊ] as in Finnish *pulla*) immediately in front of the /l/. Thus a word like *feel* should be thought of as having the phonological structure /fiʊl/ rather than the structure /fi:l/. Words to which this 'mental re-spelling' should be applied include: *appeal, deal, feel, congeal, heel, keel, meal, kneel, peel/peal, real, seal, steel/steal, squeal, wheel, wield, yield, zeal*.

Similarly, words in which the [eɪ] diphthong is followed by /l/, should be thought of as including an [ʊ] immediately in front of the /l/. Thus, *sail* should be thought of as /seɪʊl/. The same mental re-spelling should be applied to *bail, dale, fail, gale, hail, jail/gaol, mail/male, nail, pale, quail, rail, snail, stale, shale, tail/tale, trail, vale, whale*.

Words in which the [aɪ] diphthong is followed by /l/ should be thought of in the same way; so that *style* (for example) should be 'mentally re-spelled' /staɪʊl/. The same mental re-spelling should be applied to: *awhile, bile, dial, file, guile, mile, Nile, pile, smile, style, tile, trial, vile, while*.

The short high vowels /ɪ/ and /ɛ/ should be given a more central position than usual. And in the case of [ɪ], learners who find it difficult to make this sound central enough in front of /l/ might like to consider substituting with Finnish [ʊ].²⁷ It is true that they will then risk confusing *pill* with *pull*; but the I/ʊ contrast carries a very low functional load; whereas the functional load of the i/I contrast is very high.

Practice:	'fail'	[feɪʊl]	'pail'	[peɪʊl]				
	'file'	[faɪʊl]		'pile'	[paɪʊl]			
	'feel'	[fiʊl]			'peel'	[piʊl]		
	'field'	[fiʊld]				'peeled'	[piʊld]	
	'fill'	[fɪɹ]					'fell'	[fɛɹ]
	'filled'	[fɪɹd]						'felled'

²⁷ In Edinburgh Scots, a pronunciation not far from this is, in fact, used for [ɪ] when it is followed by [l]. At the end of the 1960s in Edinburgh, a dispute arose between the University, and the conservative Edinburgh Corporation, about whether the University Health Service should make contraceptive pills available to unmarried female students on request, free of charge. At the time, the student newspaper was controlled predominantly by English, rather than Scots, students. A cartoon appearing in the paper satirized the conservative attitude of the Corporation by depicting a councillor objecting to 'a PULL centre for students'. 'Pull' was how the English cartoonist heard the Scottish pronunciation of *pill*. Scots accents do not have the RP distinction between /u/ and /ʊ/; and so the words *pool* and *pull* are both pronounced the same way, [pul]. This means that the sound used for /ɪ/ (which is in any case much more central in Scots than in RP) can move closer towards a back-vowel position without risk of its being confused with any other Scots vowel.

[l] following 'long' [i], [eɪ], [aɪ] and 'short' [ɪ], [ɛ], [ɒ].

1. It's still expected to steal the show.
2. Stealing the cash from the till.
3. The girl's voice rose and fell.
4. The sound of the sea swelled and failed.
5. It's all done in traditional style.
6. He was washing piles of plates meanwhile.
7. A three-year-old colt.
8. Outside it's so terribly cold.
9. Apparently that's what it's called.
10. In a few moments the field was filled.
11. The ship has already sailed.
12. She had a sad tale to tell.
13. The prisoner's appeal was upheld.
14. The mild winter enabled the dogs to run wild.
15. The real owner was killed in the war.
16. They told me the heat-shield failed.
17. At any rate, that's what I was told.
18. It wouldn't hurt you to smile.
19. He feels that he's over the hill.
20. It came right off the rails.
21. She was dressed up to kill.
22. She's as sound as a bell.

Word-final 'voiced' and 'voiceless' consonants

1. The coolness in the manse ice.¹
2. The coolness in the man's eyes.
3. She looked composed and self-assured.
4. After the race, he asked me for a raise.
5. I'm waiting for the noise to end outside.
6. It's all in the mind, she said.
7. It's known as 'red-point' climbing.²
8. They use dogs at the docks to find the drugs.
9. They told me it was terribly cold.
10. Just throw your bags in the back.
11. I've taken them downstairs, she said.
12. I know how it feels not to be believed.

¹ A *manse* is the house assigned to a Prebyterian, that is, Church of Scotland, priest or 'minister'.

Manse ice is produced with a short [æ] and [n] in *manse* and a short [aɪ] in *ice*. Since the sibilant at the end of each of these words is the voiceless alveolar /s/, there is a glottal abduction gesture before each sound which makes the full sub-glottal pressure available, and consequently each word ends in a very audible [S]sound.

In the case of *man's eyes*, on the other hand, each word ends in the 'voiced' sibilant /z/. This means that the [n] in *man* is long, to signal the 'voiced' identity of the following sibilant. And since *man's* is immediately followed by the vowel of *eyes*, there is no de-voicing, and the /z/ sibilant really is voiced throughout. Since the voicing prevents the air-pressure in the intra-oral cavity from reaching the full sub-glottal level, this means that this sibilant is rather quiet. The sibilant at the end of *eyes*, on the other hand, is partly de-voiced, since it is followed by silence. But because voicing is continued much longer in the case of *eyes* than in the case of *ice*, there is no time for air pressure in the intra-oral cavity to build up to the sub-glottal level; and so this sibilant, too, even though it may be phonetically [s] rather than [z], will be much quieter (as well as shorter) than the one which ended *ice*.

'*manse ice*' [mæns:aɪs:] *man's eyes* [mæn:zaɪ:s]

² That is, climbing without artificial aids. In the native pronunciation, the alveolar stop of *red* is assimilated to the following labial stop; so that a single, prolonged labial closure is made, with substantial voice offset time, but with a glottal abduction gesture before release, so that there is also substantial voice onset time, or aspiration.

As a non-native speaker you need not assimilate if you don't want to; but if you don't it is a good idea to delay the release of the [d] closure of *red* until *after* you have formed the [p] closure of *point*. If you don't do this, either, you should at least make sure that the vowel of *red* ends naturally (by means of the build-up of air in the intra-oral cavity) and that there is no glottal abduction gesture. A glottal abduction gesture would cause the release of the [d] of *red* into a noisy [tʰ]; which natives would hear as /t/.

'Voiced' and 'voiceless' stops word-initially and word-finally

If a monosyllabic English word ends in a voiced stop, some Finns may find it difficult to initiate it with a *voiceless* stop, if this is what is required.²⁸ To a lesser extent, 'voiced' initial stops exert the same influence; so that if a word begins with a voiced stop there is a tendency to close it the same way.

1. Put it in the pack Put it on the peg	11. Nobody liked the colt Nobody liked the cold
2. Put it in the back Put it in the bag	12. It felt like a prick She looked like a prig ²⁹
3. We must keep it in sight We must keep it inside	13. It felt like a brick She looked like a brig ³⁰
4. That's a nice coat They sent it in code	14. That's how much they spent That's how much they spend
5. We wanted a goat It was used as a goad	15. You never sent him one You never send him one
6. It was tied very tight That's how it was tied	16. She gets them from Crete It's part of her creed
7. Concealed by the ropes Concealed by the robes	17. New friends to greet It's due to his greed
8. That's how they built it That's how they build it	18. He bought himself a pup He bought himself a pub
9. You really need a pick You really need a pig	19. He bought me a pint It's all in the mind
10. Lend me your Bic They made it too big	20. There's a bag in the back Put it back in the bag

²⁸ This effect was also noted by Suomi (1980). Examining the English pronunciation of his ten Finnish informants, he found that 'In many cases where a 'voicing' mistake has been made, there seem to be interconnections between stops in the same word. Thus *peck* and *beck* may cause no problems; but if the final consonant is /g/, then *peg* and *beg* may both be rendered *beg*. It seems there is a 'long component' of VOICE; so that stops in the same word tend to become either exclusively voiceless or exclusively voiced.'

²⁹ prig; a self-righteously correct or moralistic person.

³⁰ brig; a two-masted square-rigged sailing ship.

4

**The labio-dental fricatives [f] and [v]
and the labial continuant [w]**

Physical description.

1. The English [f] and [v] consonants are **labio-dental fricatives**.

To make these sounds, the upper teeth bite into the soft *inside* of the lower lip, so that the bottom edges of the teeth are hidden. (In most European languages, the upper teeth bite either into the top, or into the outside of the lower lip; and the bottom edges of the teeth are clearly visible).³¹

[f] is more strongly fricative than [v] (which, in fact, is very often not accompanied by audible friction); and it is always voiceless. [v] is voiced between vowels, and by some people, syllable-initially. Syllable-finally its voicing depends on that of the following sound; utterance-finally it is quite likely to be unvoiced.

2. English [w] is a **rounded labial continuant**.³² It can be described as a **strongly-rounded [u]**; the lips are rounded, and the back of the tongue raised as for [u]. But the [u] phase is short; and the sound really consists of a **glide** from the [u] position to the following vowel.

The learning problem.

Although it has no counterpart in the Finnish consonant system, English [f] is not usually a problem for Finnish learners. Perhaps this is because, even though [f] is not a Finnish sound, it occurs so often in foreign loanwords (such as *filmi*, *filosofia*, and *fossiili*) that in practice even monolingual Finnish speakers make frequent use of it. But this does not explain why [f] retains its (approximately) English form in these words. It seems likely that the absence of voicing, and the highly fricative nature of this sound make it easy for Finns to distinguish it from their native [v].

The problem many Finnish learners have is with English [v] and [w]. **Concerning [v]**, the characteristic Finnish fault is to substitute their native [v], which is a continuant and is likely to be heard *by native listeners as expecting to hear [v] as /w/*, even if the lack of lip-rounding might prevent such identification if [w] were the sound expected. **Concerning [w]**, the characteristic Finnish fault is to substitute a labio-dental articulation; or if a bilabial articulation is employed, to have insufficient lip-rounding, or sometimes none at all. Such articulations are usually heard as /v/ by native English speakers who are expecting [w]; even if the lack of friction would prevent their accepting the sound as a good /v/ if /v/ were what they were *expecting* to hear.

Not all Finns who have problems in this area have both these faults. But those who do are, in effect, coalescing the two English phonemes into one; which they realize by means of an **unrounded labio-dental continuant, [v]**. That they should do this is understandable, since Finnish /v/ is most typically realized in just this way. It is natural that Finns should show a tendency to identify both the English sounds with their own native [v]; since, with the exception of the labial stop [p] (which is quite clearly different), [v] is the only labial in the Finnish consonant system. In articulatory terms, [v] has the (ap-

³¹ See Brown, p. 20.

³² **Continuants** are sounds produced without audible friction, since the articulatory organs are not brought close enough together to produce this. In purely phonetic terms, continuants are more like vowels than they are like consonants. For this reason, they are sometimes referred to as 'semi-vowels'. But they owe their consonantal classification to the fact that they *function* as consonants. They have a marginal position in the syllable; which they serve to *introduce*. Unlike vowels, they do not carry the main weight of the syllable.

proximate) **place of articulation** of English [v], but the **manner of articulation** (as a continuant rather than a fricative) of English [w]. In acoustic terms, it combines the labio-dental, unrounded sound of [v] with the vowel-like sound of [w]. Further, in conventional orthography it is represented, just like English [v], by the symbol 'v'; except in the case of certain Swedish loanwords, where it is represented by 'w'; which is, of course, the symbol most often used to represent English [w] in written English.

To complete the confusion, the Finnish sound can sometimes be fricative (when it introduces a syllable which the speaker particularly wishes to emphasize); while on other occasions it can approach to [w].³³ (The second is likely to happen as an effect of assimilation when the sound occurs following [u], in words such as *rouva* or *vauva*; in these cases the speaker has adopted lip-rounding and back-tongue raising in order to represent the [u] vowel, and these articulatory postures naturally tend to persist during the production of the following /v/. Thus in effect, [v] and [w] exist in Finnish as allophones of /v/; and this makes it hard for Finns to separate the two English sounds, psychologically. They have learned to ignore the differences in place of articulation, lip-posture, and friction, that make [v] and [w] sound so different to English ears.

The existence of the [w] allophone in the speech of many Finns following a rounded back vowel explains why Finnish renderings of English [v] often sound particularly bad in words such as *over*. A Finn who uses his native [v] in saying (for example) *available* may be heard as having a somewhat [w]-sounding /v/. But if he uses the allophone [w] in his production of *overestimate* or *overdue*, the /w/ interpretation will be irresistible; not surprisingly, since [w] is what he has actually said.

Remedial training.

The traditional view has been that remedial treatment should take the form of practice in which the two English sounds are presented in contrast to each other, in the same speech program. Thus, Lehtonen, Sajavaara and May insist on the need for learners to build up a firm auditory and acoustic image of both sounds; and they suggest that since the mistake Finns make with both English sounds is to confuse them with each other, the best way to build up such images is to define each sound with reference to other, in contrastive drills. In giving this advice, Lehtonen et al. recognize that /v/ and /w/ do not present Finns with a problem at the level of primary acquisition. Rather, the problem is a 'phonological' one; since the [v] and [w] sounds have to take on firm, and separate, identities in the learner's mind.

While I agree with contrastive practice, I have found that a useful 'short cut' to providing /v/ and /w/ with separate identities is to encourage learners to 'mentally re-spell' English /w/ as Finnish /u/. When I first encountered the Finnish language I was struck by the phonetic similarity between the English sound-sequence [wi] (as in *we*, *week*, *weep*, *wheat*, *wheel*, etc.) and the Finnish sequence [ui] (as in *uida* and its various derivatives). When I began teaching English pronunciation, I found that a certain number of students seemed to have difficulty with word-initial [w]; pronouncing words such as *we*, *wine*, *winter* in a manner to suggest *vee*, *vine*, *vinter*. I tried to teach these students to produce the English [w] sound by modelling the sound for them and telling them to go home and use a mirror to make sure that their lips were assuming the correct rounded posture, and to make sure that their teeth were **never** involved in the articulation. But it was hard work; students could usually manage to produce [w] in isolation, or in the context of sin-

³³ See Lehtonen, Sajavaara, and May, p. 142.

gle words; but in any more extended phonological context, Finnish [ʊ] was likely to be substituted. Then it occurred to me that these students might be helped if they could be brought to associate the English sound not with their native /v/, but rather with their native /u/. I told them to think of English words such as *week* or *wine* as having the phonological structures /uik, uain/ (rather than /wik, wain/). This strategy proved very useful. The students could now maintain broadly acceptable versions of /w/ in their pronunciation drills (even though, as a result of long habit, [ʊ] might return to their speech outside the language laboratory); and nobody needed mirrors to monitor the position of their lips. I realized then that this particular pronunciation problem was really a phonological one; the problem was not so much getting the sound right, as knowing *what* sound to produce.³⁴

This teaching aid is of most use in those cases where /w/ is followed by an unrounded front vowel. In these cases, native English speakers use the back-to-front glide of the tongue (for example, from [u] to [i] in *week*) to suggest the contrast between /w/ and the following vowel; and so the Finnish learner who thinks of (for example) *week* as [uik], or *when* as [uɛn], and pronounces them accordingly, will actually make a very close approximation to the authentic native English pronunciation.

If /w/ is followed by [ɔ], [ɔ̃], or [ʌ] (as in *wash, war, one*) then the downglide of the tongue from the [u] position is barely enough to suggest /w/; and natives tend to start with lip-rounding that goes beyond the normal [u] position. But if you ask Finns to pronounce sequences such as /uont/, /uoo/, /uan/, as if they were reading Finnish words, the result is a very believable rendering of English *want, war, one*. Thus [uo] glide is, in point of fact, enough to indicate /w/ and the following vowel in words such as *want* or *wash*; while [uoo] is enough for *war, warn, or wall*, and [uan] is enough for *one*.

It is only when the main vowel of the syllable is [u] or [ʊ] (as in *wound, wool, would, wood*) that a preposed [u] offers no contrast at all with the following vowel, and so cannot be used to represent word-initial [w]. In these cases, the foreign learner is obliged to learn the exaggerated lip-rounding used by native English speakers to suggest the initial /w/ of such words.

It will be seen that this teaching aid works by identifying the two target English sounds with **two** items in the Finnish phonological system, rather than one. Once this has been done, Finnish learners are no longer tempted to confuse the target sounds. With the phonological problem disposed of, there remains the phonetic problem of drilling the differences between the Finnish and English sounds. But (except when /w/ is immediately followed by [u] or [ʊ]) Finnish [u] is a good enough match for English [w] that practice might only be necessary in the case of [v] (which is typically much more fricative than its Finnish counterpart); were it not that learners, if they have a problem in this area, have usually acquired the habit of an unrounded, labio-dental pronunciation of /w/, which requires correction.

Advice to learners.

³⁴ In fact, the Finnish sequence /ui/ (as in *uittaa*) does **not** sound quite the same as the English sequence /wi/ (as in *week*). The transition from [w] to [i] in English is faster than that from [u] to [i] in Finnish; where [u] carries more of the weight of the syllable. On the other hand, the [ui] pronunciation is a great improvement on [ʊi].

Advice to learners.

1. To check that you have enough friction in your [v], try producing an extended labio-dental fricative while alternately switching your voice on and off. In other words, say:

[vvvvffffvvvvffffvvvvffff]

Whenever you stop voicing, you should be able to hear the fricative hiss of [f]. (**Remember that English [v] can be thought of as '[f] + voice'**). If you can't hear any friction, this means that your lower lip is not pressed hard enough against your front teeth. In this case, you should **start** from [f] and add voicing to get [v].

2. As regards your [w], you can help yourself considerably by 're-thinking' it as [u]. Try 'mentally re-spelling' words such as *we, week, wheel, win, winter, well, west, wet, went, wine, wide*, as /ui/ (as in Finnish *uida*), /uik/, /uiə/, /uin/, /uirtə/, /uəl/, /uest/, uet/, /uent/, /uain/, /uaid/.

This will give you a good native-sounding pronunciation in all cases except those in which the vowel following [w] is [u] or [ʊ] (as *wound, would*). To pronounce these words, produce a Finnish [u] and **exaggerate the lip-rounding**, so that there is a contrast between this sound and the following vowel.

Many learners find it particularly difficult to pronounce English words like *word, world, worse*, in which the initial /w/ consonant is followed by the central vowel [ɜ]. This is probably because these learners have been taught not to use Finnish [ö] in these words; and they find it difficult to produce heavy lip-rounding immediately in front of a vowel which they have to monitor carefully to make sure that it is *unrounded*. But such learners should remember that except in the case of the i/I distinction, precise vowel quality does not matter much in English (unless you want to be a professional spy). But consonant quality does. Learners should not hesitate to substitute Finnish [ö] for English [ɜ] if this makes it easier for them to pronounce these words.

Distribution. [w] does not occur word-finally and so there is no contrast with [v] in this position. Syllable-finally, [v] is weak, and sometimes only suggested; and so learners do not have to worry about maintaining friction in this position.

Note that [w] often occurs syllable-initially in consonant clusters. It can follow syllable-initial [t], [k], [s], or [sk] in stressed syllables (as in *twice, queen, swim, squash*; which Finnish learners should 'mentally re-spell' as /tuais/, /kuin/, /swirn/, /skuoʃ/). It may follow unstressed /p,t,k/ (as in *upward, outward, equal*). In these environments, it does not contrast with /v/.

Distribution of [w]

Word-initial	following /t/ or /k/	following /sk/	following fricatives	intervocalic or after vcd. consonant	following unstressed /p,t,k/
west	twig queen	square	thwart	away	upward
weed	twenty quick	squeeze	swim	always	outward
winter	twist quite	squash	swear	language	equal
worn	twin quiet	squalor	swerve	inward	equitable
once	twine acquire	squirrel	swift	dwarf	
want	twelve equation	squire	suite	penguin	

Distribution of [v]

Initial	word-medial		word-final clusters ³⁵		
vice	ever	cover	/v/	receive	/lv/ solve
vine	over	available	/vd/	loved	/lvz/ solves
voice	silver	advance	/vz/	loaves	/lvd/ solved
[vj] view	galvanize	adventure	/vn/	oven	
veteran	canvas	advantage	/vnz/	ovens	

Phrases with /v/ and /w/

Squire Western [skwɪə]	twice visited	winter wheat
the world over	dwarf vine	revised upward
always reversed	wise advice	an equal voice
over-awareness	always welcome	an away win
Swanee river	never satisfied	way of the world
over-square	over the limit	overworked
the advanced version	the worst verse	reverse the worst
squeeze over	never welcome	have we room?
votes for women	always wanted	white vest
the worst version	it's never working	silver wedding
over the worst	canvas wings	winter visit
white woman	woman novelist	rave reviews
the Western view	sweet white wine	vile winter
vast acquaintance	quite worthless	penguins swim
outward advance	ergative language	never available
a wedding anniversary	overwhelming	twenty-five

³⁵ In English accents which pronounce post-vocalic /r/, /v/ also occurs following /r/, as in *serve*.

List 1: [v] and [w] contrasted

1. Five of the winning entries.
2. It simply wasn't available.
3. It's quite an advance on the old one.
4. He went away at once.
5. The visitors were all women.
6. Equal weight on seven sides.
7. I always wanted a red one.
8. That's the advanced version.
9. We wanted to investigate at once.
10. Waiting for the men to arrive.
11. Is there ever a vacancy?
12. The winners have all gone away.

List 2: [v] and [w] contrasted

1. The best ones are never available.
2. It happened when we were away.
3. Venice is wonderful in winter.
4. She was wearing white canvas trousers.
5. That's the value of winning one.
6. I never wanted a rival.
7. The advancement of women's rights.
8. It's never available on Wednesdays.
9. They've voted to continue the action.
10. It's the worst I've ever seen.
11. They've gone to welcome the visitors.
12. The weekend was wonderful.
13. There was red canvas all over it.
14. Public awareness of recent worldwide events.

1. Seven votes short of winning.
2. They gave us the worst available.
3. The mid-Victorian mystery novel.
4. The upward movement of prices.
5. An unbelievable revelation.
6. I'd be willing to review the worst ones.
7. We're waiting for the word to arrive.
8. It works when the going gets tough.
9. Those are reserved for the visitors.
10. They've received no weapons training.
11. She never really wanted one.
12. Western women are the worst critics.

List 4: [v] and [w] contrasted

1. We won without knowing it.
2. It's as well to be aware of it.
3. It happened when we were away.
4. We've been avoiding it all winter.
5. Variety is always welcome.
6. Tell me whenever you want one.
7. I can never remember the name of it.
8. The war had not even been won.
9. I wanted to learn the worst at once.
10. The advanced version of the game.
11. That's nothing whatever to do with it.
12. Making more valuable investments.
13. Silver shares have risen this week.
14. The evolution of a disordered universe

List 5: [v] following [oʊ] and [u]

1. Finding a four-leafed clover.
2. Overtaken by events.
3. Moving in the best circles.
4. Improving the standard of play.
5. Viewing a supernova explosion.
6. Removing the ban on vehicle access.
7. The evidence was overwhelming.
8. You overwork that word.
9. It provoked no overt response.
10. You must leave it to them to come over.
11. The upward movement of share prices.
12. Coming over to the revolutionary viewpoint.

List 6: [w] followed by [ɜ]

1. Voting in the World Council.
2. I gave him my word.
3. Even a worm will turn.
4. She was squirming with embarrassment.
5. An obvious case of bully worship.
6. The worsening price of silver shares.
7. They gave us the worst available.
8. I only wish they were.
9. I had to swerve to avoid him.
10. We were waiting for the word to arrive.
11. It's all wasted work.
12. It's worse than ever now.
13. It's spreading all over the world.

5

The dental fricatives [θ] and [ð]

Physical description.

The voiceless dental fricative [θ], and its 'voiced' counterpart, [ð] are produced with the tip and rims of the tongue making light contact with the edge and inner surface of the upper incisors, and firmer contact with the upper side teeth; so that air can escape between the forward surface of the tongue and the incisors, causing friction.³⁶ [θ] is always voiceless; while the quieter, less fricative [ð] is fully voiced in the intervocalic position, and (typically) partially voiced (that is, voiced towards the end of the sound) word-initially. Word finally, the voicing of [ð], like that of other 'voiced' fricatives, depends on the phonetic environment; it will be voiced if it is followed by a voiced sound, but followed by a voiceless sound, or utterance-finally, it is likely to be devoiced.

The learning problem.

Gimson (pp. 184-5) points out that most learners can produce these sounds in isolation; but that the difficulty comes when they are combined with other fricatives, especially with the sibilants (as in *this thing, his thumb, sixth, pass the salt, is this it, Smith's there, fifths, I want it with sugar, clothes*). He therefore recommends drills that practice these combinations. But (as he himself admits) native speakers often elide dental fricatives in these circumstances; so that *with sugar* may be rendered as [wɪʃʊgə], *clothes* as [kloʊz], and *months* as [mʌns] or [mʌnts]. In more careful speech, however, native speakers will often make a gesture towards the dental fricative articulation when saying a word such as *clothes*; with the tongue moving some way towards the [ð] target. Even though the target is abandoned before the tongue gets close enough to cause audible friction, the articulatory gesture sometimes has an effect on the waveform of the preceding vowel; so that the fricative consonant is suggested to the listener, and *clothes* often does, in fact, sound slightly different from the same speaker's rendering of *close* (as in 'Close the door').

Nonetheless, the existence of the totally elided form means that learning to produce dental fricative-sibilant combinations (which are difficult even for native speakers) is not a high priority for foreign learners.

The learner's real problem is how to maintain good dental fricatives in **unstressed syllables**. The trouble here is that almost always, Finnish speakers have been taught the energetic, interdental production of [θ] and [ð], in which there is a large forward movement of the tongue, with the tongue tip actually showing between the teeth. This articulation results in an authentic [θ] or (when combined with voicing) [ð] sound. It works very well when there is time for it; which means when [θ] or [ð] occur syllable-initially in stressed syllables, or when they occur utterance-finally. But by far the most frequent occurrence of dental fricatives is in words such as *the, that, this, these, then, with*, etc.; and these words are nearly always unstressed. Under these circumstances, there is no time to use the interdental articulation without destroying the rhythm of the language; and native speakers use a more retracted articulation, in which the tongue tip lightly touches the back of the front teeth, but not firmly enough to stop the airstream. The resulting very brief fricative articulation resembles the 'substandard stops' which characterize native speakers' production of /p/ or /k/ in rapid speech; where (as described by Brown,

³⁶ See Gimson, p. 183.

Chapter 2) *sacking* may be pronounced as [sæxɪŋ] or *cup of coffee* as [kʌfəkoʊfi]; the stops having degenerated into homorganic fricative sounds.

The 'lazy' native-speaker's version of θ/ð is particularly required when *the, that*, etc. occur in a string of unstressed syllables separating two stressed syllables. In these environments, the stress-timed rhythm of English ('stress-timed' means that the **stressed** syllables are produced at approximately equal intervals of time) requires very rapid production of unstressed syllables.

Take David Abercrombie's example, 'This is the house that Jack built.' In this sentence, the stressed syllables are **This, house, Jack, and built**. If these are pronounced isochronously (that is, at equal time intervals) as the rhythm of English demands, then the speaker has no more time available for saying *this is the* than he has for saying *Jack*:

'This is the	'house that	'Jack	'built
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In circumstances like these, the Finnish learner who tries to imitate the rhythm of the model given to him by a native-speaking teacher is forced to abandon his slow, interdental version of [ð], and is likely to substitute his native Finnish dental stop, [t]. This fault is very hard to correct; because the teacher who tries to comment on it necessarily has to *mention* the mispronounced lexical item; and this involves taking it out of its rhythmical context, and producing it as a stressed syllable. In this new, stressed context, the learner can very easily produce a fricative version of [ð], using his interdental articulation; and the teacher cannot very well object to it, since the resulting sound is fully authentic. But of course the fault is likely to re-appear as soon as the learner tries once more to incorporate his 'good' version of /ð/ in a natural context.

In this connection, it should be noted that for speakers who find it hard to produce good dental fricatives, [t] and [d], or [s] and [z], are bad choices for substitute sounds. Acceptable substitutes are [f] and [v]; which is because the phonemic opposition between the dental fricatives and /f,v/ carries a very low functional load. In fact, [f] and [v] often *are* substituted for dental fricatives in popular London speech; so that a Cockney may say (for example): 'Faver! Vere's free men here ter see yer!' (for 'Father! There's three men here to see you!'). On the other hand, there are various popular jokes about foreign speakers who substitute t/d; as the one about the German who, when asked how old he was, replied, 'I am dirty, and my wife is dirty too.'

When [ð] occurs in the environment of a stop consonant (particularly an alveolar stop; as in *It will improve with time*; or *She said the ones we wanted had gone*) care must be taken not to assimilate [ð] to the stop.

Distribution.

[θ] occurs word-initially as in *thief, thick, thatch, thumb*; word-finally as in *smith, cloth, earth, fourth*; medially in *ethics, lethal, method, author, lengthy, atheist, athletic, worthless*. It occurs word-initially in clusters as in *three, thwart, throw*, and word-finally as in *earthed, depths, fifths, sixths, warmth, month, lengths, earthen*.

[ð] occurs word-initially as in *this, these, that, then, there, though*, and finally as in *seethe, with, soothe, clothe, breathe*. It occurs medially as in *breathing, leather, father, other, southern, although, worthy, either*. It occurs in clusters word-finally as in *rhythm, clothes, seethed*.

Rhythmic practice of [ð]

1. In a string of two unstressed syllables separating stressed syllables:

She's 'older than 'Henry
 He's 'better than 'David
 It's 'cheaper than 'butter
 My 'father's in 'London
 They 'fetch the best 'prices
 The 'man with the 'glasses
 The 'one that you 'wanted
 The 'sound of the 'Sixties

2. In a string of three unstressed syllables separating stressed syllables.

The 'money's on the 'table
 'What about the 'others?
 'He's the one that 'Anne likes
 'These are from the 'fruit shop
 They 'need them for the 'meeting
 They're 'better than the 'others

3. Multiple strings.

The 'ones that the 'thieves got a'way with
 They're 'thicker than 'most of the 'others
 She 'looked at the 'name on the 'door
 Is there 'anyone 'here that you 'know?
 'Is there a 'clock in the 'room?
 'Think of the 'things they can 'do with it.

List 1: [θ] and [ð]

1. The music stopped at the same moment.
2. This is the end of the road.
3. That's another thing altogether.
4. There's sure to be another one somewhere.
5. The others were resting their elbows on it.
6. Is there anything here that they want?
7. My father thought the theory was worthless.
8. Put the other one on the stove.
9. They were both sure they'd seen the last of it.
10. The girls that were at the party.
11. It's obvious there are two of them.
12. Those that want to can go to the theatre.
13. It doesn't help to tell them that.
14. It's useful to the people that use them.
15. They've got other things there too.
16. That's nothing whatever to do with it.

List 2: [ð] in the environment of stop consonants.

1. It was good that you came.
2. Would those ones be any good?
3. But the ones with glass doors cost so much.
4. He looked at her with great curiosity.
5. She said the ones we wanted had gone.
6. It will improve with time.
7. It'll grow all right with proper care.
8. She said that she'd seen him with Tom.
9. It's sad that he mixed up the names.

6

[i] and [I]

Physical description.

[i] is a high front vowel, similar to Finnish [i]. [ɪ] is lower and more central. Its height (or 'closeness'), and the degree to which it is centralized, vary considerably in different English accents. This is shown in the vowel charts on pp. 104-106, below, which describe the vowels typically used in three 'reference' English accents: **RP**; **Scottish Standard English (SSE)**; and **General American**. It will be seen that in both RP and General American, [ɪ] is considerably nearer to Cardinal [e] than it is to Cardinal [i] in terms of its closeness (which means, in this case, nearer to the height of Finnish [e] than to that of Finnish [i]); and that it is halfway to being a central vowel in RP, but only slightly centred in General American. In SSE, however, it is fully as low as [e], and fully central.

Thus, except perhaps in General American, [ɪ] cannot be regarded as a 'front' vowel. Describing the vowel in RP, Gimson says (p. 101): 'the short RP vowel /ɪ/ is pronounced with a part of the tongue **nearer to centre than to front**' (my emphasis) 'raised just above the half-close position. ... The quality is that of a centralized cardinal [e].' He further points out (p. 101) that:

The degree of closeness and centralization varies according to the accentual force falling upon the vowel and its position in the word (cf. the realizations of /ɪ/ in the word *visibility*, those of syllables 1 and 3 being near to the sound described above, those of syllables 2 and 4 being somewhat more centralized, and that of the last syllable often having a tongue position lower than half-close.

[ɪ] is the second most frequent vowel in colloquial RP, with a frequency of more than 8%. Only [ə] is more frequent, at nearly 11%.³⁷ This means that learners who cannot command a good version of [ɪ] necessarily make a lot of mistakes. Further, the *i*/*ɪ* distinction is **made by all native English accents**, and it carries a **very high functional load**. For this reason, learners need to be able to make this distinction adequately, whatever their other English vowels may be like.

Difficulty of acquiring [ɪ].

[ɪ] falls on the phoneme boundary between the Finnish [i] and [e] vowels. For this reason, it is difficult for Finns either to identify, or to produce reliably. In Kalevi Wiik's listening tests, Finnish schoolchildren who had learned to write their own language, but had not yet studied English, were asked to listen to a series of isolated, monosyllabic [ɪ] words, spoken by an RP speaker, and write down what they heard, using their normal Finnish spelling. Wiik found that [ɪ] was sometimes identified as /i/, but almost as often as /e/.³⁸

The Finnish difficulty with this vowel is shared by many, if not most, foreign learners; particularly those whose native language includes a limited number of vowel phonemes (in the case of Japanese or Swahili, no more than the five vowels of the classical Roman alphabet, while Italian has only two more than these).

³⁷ D.B. Fry, 'The Frequency of Occurrence of Speech Sounds in Southern English,' *Archives Neerlandaises de Phonetique Experimentale*, XX (1947), pp. 103-06.

³⁸ Kalevi Wiik, *Finnish and English vowels*. Annales Universitatis Turkuensis, B 94. Turku: Turun Yliopisto, 1965.

It is unfortunate that the characteristic English spelling of [ɪ] with the symbol 'i' encourages foreign learners to identify the vowel with the [i] vowel of their native language. But this identification is the worst that they could make. The very high functional load carried by the i/I distinction, and its universality throughout all native accents of English makes native English speakers intolerant of any version of /ɪ/ that approaches too closely to [i]; and the tendency of Italians, in particular, to make this substitution is frequently parodied in jokes in which an Italian, offered a slice of cake, replies 'Just geeva me so leetle, leetle, beeta!'

Finnish learners, however, face an additional difficulty in learning this vowel; a difficulty which arises from the native Finnish system of contrasting long and short vowels.

Although English [i] is sometimes classed as a 'long' vowel, it is not always long in modern English; and certainly not as long as [ɜ] or [ʊ]. In Scots in particular, a shortened version of [i] tends to be used; but even in RP, the vowel is drastically abbreviated immediately preceding a 'voiceless' consonant. Nonetheless in open syllables, or in those closed by 'voiced' consonants, /i/ is typically long; often it is diphthongized, and may start from the [i] position and close as [j]. In any event, *in the same phonetic environment* it is regularly longer than /ɪ/; even though, when followed by a voiceless consonant, it may be shorter than /ɪ/ followed by a **voiced** consonant. If numbers are used to indicate vowel lengths, with (1) denoting the shortest lengths and (3) the longest, the situation regarding the length of [i] and [ɪ] in RP is approximately as follows:

<i>bit</i> (1)	<i>bid</i> (2)
<i>beat</i> (2)	<i>bead</i> (3)

Finnish learners of English quickly notice this length difference between /i/ and /ɪ/, and identify them with /ii/ and /i/ in their own language. Indeed, listening tests carried out by Raimo and Suomi in 1977 suggest that Finnish listeners are typically **unable** to hear **qualitative** differences between English i/I, ɒ/ɔ, and u/ʊ unless all differences in **quantity** (that is, length) have first been neutralized (as in the pair *beat/bid*).³⁹

But the substitution of Finnish long and short /i/ vowels for English i/I is unacceptable to English listeners; who are accustomed to identifying vowels on the basis of **quality**. Quantitative differences may also be physically present; but these tend to be treated as redundant information; since the chief function of vowel **quantity** in English is to indicate the theoretically 'voiced' or 'voiceless' nature of following consonants, but not to identify the vowel itself. For this reason, even a very short [i], used to indicate /ɪ/, will be heard as /i/ by English-speaking listeners if the context permits (and experienced as very irritating, if the wider context makes it clear that /ɪ/ is the vowel intended). Natives are, in fact, much more tolerant of other, more central sounds which may be substituted for [ɪ]; such as [ə] or [ʊ].⁴⁰

³⁹ I. Raimo and K. Suomi, 'Kontrastiivisia synteesisitukimuksia'. In *Fonetiikan Paperit*: Joensuu, 1977.

⁴⁰ SSE [ɪ] is, in fact, not very far from RP [ʊ] in terms of closeness and centrality. Scots has no [ʊ] vowel, and Scots [o] is a pure back vowel, quite different from RP [əʊ] (which starts from a central position). This means that a central version of [ɪ] can be used in Scots without any risk of confusion with other central vowels.

In view of this, it is most unfortunate that in the past, the /i/ɪ distinction has been treated by the Daniel Jones English Pronouncing Dictionary as a matter of length. In editions before 1978, the EPD transcription of *ship* was [ʃip], while that of *sheep* was [ʃi:p]. The prestige of the EPD has meant that other dictionaries have unfortunately followed this practice; the more willingly, as publishers try to cut their costs by avoiding exotic symbols so far as possible. But the effect in this case has been to seriously mislead foreign learners with regard to a very important feature of English pronunciation.

[ɪ] preceding laterals.

Syllable-finally, /l/ in English is always 'dark', that is to say, produced with back tongue-raising. When the front vowels /i, ɪ, eɪ, ε/ are followed by /l/ they tend to assimilate to the back tongue position of [ɪ]. Thus, RP /i/ may often be realized as [ɪ], while /ɪ/ is realized as a very central vowel, as in Scots (see p. 105, below). But in this environment the behaviour of the 'long' vowels, /i/ and /eɪ/, is rather different from that of the 'short' vowels /ɪ/ and /ε/. When the long vowels are followed by /l/ there is a noticeable front-to-back vowel glide; so that words like *feel* or *sail* sound like [fiə], [seɪə]. And in fact this is what the speaker really has said; except that the tongue-tip contact is usually already in place, so that the [ə] element is the [ɪ] itself. For this reason, more accurate transcriptions are [fiɰ], [seɪɰ] ([ɰ] is the symbol for 'dark' /l/, which may be said to consist of a mid-rounded mid-close back vowel accompanied by contact of the tongue tip and the alveolar ridge).

When the short vowels, /ɪ/ and /ε/ are followed by /l/, there is no front-to-back vowel glide. Instead, the whole vowel is shifted backwards, towards a central position. In Scots, where the [ɪ] vowel is central in any case, it tends in this environment to take on the quality of RP [ʊ]; so that the Scottish pronunciation of words such as *fill* or *pill* is very close to RP *full*, *pull*.⁴¹

Advice to learners.

Practice material should include minimal pairs such as *beat/bid*, in which the length difference between [i] and [ɪ] is neutralized. It should also include the [ɪ] vowel in unstressed syllables (typically, words like *in*, *him*, *his* are unstressed) since these are often not carefully monitored; so that a learner who pronounces (for example) *winter* with an impeccable [ɪ] vowel, may nonetheless substitute Finnish short /i/ in unstressed words.

Controlling [ɪ] can be a problem for some learners. The sound can be like the dog that bites the postman's leg; so long as the learner is attending to it, it can be maintained; but the moment his attention is switched elsewhere, Finnish short /i/ re-appears. Learners who have a persistent problem with /ɪ/ should consider substituting Finnish [ʊ] (as in *pulla*). This is **much** more acceptable as a substitution than Finnish short [i]. It is true

⁴¹ In the Spring of 1970, the Student Health Service of Edinburgh University decided to make available free birth-control pills to female students on demand, subject to the approval of a University doctor. This service was strongly criticized by the Edinburgh Corporation (or City Council) on the grounds that it would encourage 'immorality' among students. The student body of Edinburgh University includes English and Scottish students in about equal numbers; and at this particular time, the editorial staff of the student newspaper happened to be almost entirely English. A cartoon appeared in the newspaper, in which two aged members of the Corporation were shown bewailing a projected 'Pull centre' for students. 'Pull' represented these English students' perception of the Edinburgh pronunciation of 'Pill'.

that making this substitution means that they will now confuse *pill* and *pull*; but this does not really matter, since the I/U contrast carries a very low functional load in English.

List 1: [ɪ] in unstressed positions.

When words such as *he, she, we* occur in front of a stressed syllable (as in *We 'heard him 'talking to him 'self*) the [ɪ] vowel may be reduced to [ɪ]. Such reduction is optional for foreign learners.

In the sentences below, try to maintain the stress-timed rhythm of English. This means that the stressed syllables (each preceded by the stress mark, ') should be pronounced at approximately equal time intervals.

In Sentence 5, the first word is followed by a marker of **silent stress**. This simply denotes an interval of time equal to what there would be if the following word, *it*, were stressed; even though this word is **not** stressed. In other words, the time interval between *Lim* and *six* is twice as long as that between *six* and *case*.

1. 'Pete's got it 'back in his 'car.
2. 'This is a 'beach 'party.
3. He was 'wearing his 'Minister's 'clothes.
4. She 'heard him 'singing in his 'bath.
5. 'Limiting \wedge it to 'six 'cases.
6. 'This is his 'best-known 'work.
7. They 'gave him a 'stiff 'whiskey.
8. He's 'already 'eaten his 'biscuits.
9. She's 'off on a 'business 'trip.
10. He's 'in with a 'good 'chance.
11. 'Give it a 'week to slim 'down.
12. The 'visitors 'think it's in 'England.
13. 'This is his 'fifth 'winter.
14. My 'sister went 'into his 'office.
15. The 'minimum 'payment is 'fifty-six 'quid.
16. We will 'have to sit 'still and be 'patient.
17. They 'told him it's 'still 'missing.
18. We 'wanted to 'give him a 'big 'welcome.

List 2: [i] and [I] with the length difference neutralized.

1. A meeting at midnight.
2. Pigeons on the beaches.
3. I won't repeat what they did.
4. His name is the least likely.
5. A business meeting.
6. You'll never beat that bid.
7. He wore the wig for a week.
8. The police say it's his.
9. The pig's in peak condition.
10. That's peak condition for a pig.
11. They hid from the heat.
12. Eating the ones the kid brought.
13. Just within reach of the ridge.
14. Meet me tonight in King Street.
15. Pressure from the East has eased.
16. It's a relief that they'll live.
17. I'd like you to meet Sid.
18. The leak was in *his* section.

List 3: [i] and [ɪ] before laterals.

1. Thrills and spills.
2. Meals on wheels.
3. The building was far from ideal.
4. It's an overlearned skill.
5. It's still expected to steal the show.
6. She was dressed up to kill.
7. Where there's a will there's a way.
8. The response to the Chairman's appeal.
9. He was billed as a magician.
10. She stood suddenly very still.
11. I feel the requirements have all been filled.
12. Eating them made me feel quite ill.
13. I appeal to you to keep still.
14. The real problem has still to be faced.
15. It's run-of-the-mill business, I feel.
16. I still hope we can conclude the deal.
17. The Royal seal attached to the bill.
18. Stealing the cash from the till.

Phrases with multiple occurrence of [ɪ]

easy visibility	orange is [ɒrɪndʒɪz] ridiculous
Mississippi wind	women in the [wɪmɪnɪnðə] business
we need the missing pieces [pɪsɪz]	a building in the village [vɪlɪdʒ]
a wicked institution [wɪkɪdɪnstɪtʃuʃn]	his mission is a mystery
sovereign [sɒvɪn] immunity	isn't it a pity?
a military meeting	visiting the sick

Pretty village women.⁴²

‘If you want to speak to Mr. Skinner, I’ll go and round him up,’ said Mr. Peel, making motions as if he might get up. ‘He may be in the milk house, and he may be sitting in his shack this time of day.’ It was drawing towards five o’clock. ‘I’ll give him a shout.’

‘Oh, well, there ain’t no special hurry,’ said Mr. Mills. ‘I’ve been wanting to speak to him for a good long spell now, and I guess a few minutes more won’t make no difference. I just wanted to locate him. That’s all.’

Mr. Peel stopped beginning to stand up, and unbuttoned one more button of his shirt, and said: ‘Well, he’s here, and he’s this kind of man, that if he had any business with you he’d like to get it over. He don’t sit still much, that’s one thing you can say for him.’

Mr. Mills appeared to sulk a little at these words. He wiped his face with his bandana and opened his mouth to speak, when round the corner of the house there came the music of Mr. Skinner’s harmonica. Mr. Peel raised a finger. ‘There he is,’ said Mr. Peel. ‘Now’s your time.’

Mr. Mills cocked an ear towards the east side of the house and listened for a few seconds, a very strange expression on his face.

‘I know that tune like I know the palm of my own hand,’ said Mr. Peel, ‘but I never heard Mr. Skinner say what it was.’

‘It’s a kind of drinking song,’ said Mr. Mills. ‘They call it ‘Pretty village women.’

Remember to use a retracted version of [ɪ] in the name *Mills*. If in doubt, pronounce it [mʊlz].

Peel, on the other hand, requires a fully-front [i] followed by a backward vowel glide to approximately the [ʊ] position on the ‘dark’ final /l/. If in doubt, pronounce the name [piəl] or [piʊl].

⁴² The standard RP pronunciation of this title is [pɹɪti vɪlɪdʒ wɪmɪn]. Note the variety in the spelling of [ɪ]; the five [ɪ] vowels are spelled, in sequence, with the symbols ‘e, i, a, o, e’. Some speakers would also use [ɪ] for the last vowel of *pretty*, which is spelled with the symbol ‘y’.

7

Vowels

The Standard English language is spoken around the world with a variety of accents. 'Accent' is used here with the meaning 'manner of pronunciation'; the term 'dialect', on the other hand, denotes a variety of a language which differs from the 'standard' form in respect of vocabulary and grammar, as well as pronunciation. A 'standard' form of a language is simply a dialect which has become widely-used, and acquired prestige and official recognition.

Since the consonant system of English is relatively stable throughout the English-speaking world, differences between English accents predominantly involve differences in vowel systems, and in the phonetic realization of vowel phonemes. There is also a broad division between accents which, like Scots or General American, or most native accents of the West Country in England, pronounce post-vocalic 'r' (in words such as *fourth*, *floor*) and those which, like RP and other Southern English accents, and most accents of the American South, do not.

The term "post-vocalic 'r'" is potentially misleading, since non-'r'-pronouncing accents, such as RP, certainly pronounce /r/ in words such as *very* or *hurry*; but here the /r/ belongs to the following syllable. Non-'r'-pronouncing accents, however, ignore /r/ in syllable rhymes. In RP, for example, *ma* and *pa* rhyme with *mar* and *par*; *balmy* rhymes with *barmy*; *flaw* with *floor*, *fought* with *fort* and *saw* with *sore*. But these words do not rhyme in 'r'-pronouncing accents; in which the second member of each pair is distinguished by some form of consonantal [r] constriction. An alternative term to "'r'-pronouncing" which may be used to describe accents that take account of /r/ in syllable rhymes is *rhotic* (from the Greek *rho*, meaning 'r').

Non-rhotic accents are those which pronounced post-vocalic /r/ historically, but have since lost it. Orthographic 'r' (that is, the written 'r' symbol used in the spelling of a word) is usually an accurate guide to the historical pronunciation, since the English spelling system was formalized at a time when all English dialects were rhotic.⁴³

In fact, most non-rhotic accents do pronounce post-vocalic /r/ when it is immediately followed by a vowel. Thus in RP, *far* is pronounced [fɑ] in the phrase 'far distant'; but 'far away' is pronounced [fɑrəweɪ]. The presence of /r/ in environments like these is often termed 'linking /r/'; but it would be more accurate to say that RP has never lost its historical post-vocalic /r/ in these environments.

There is considerable variety in the ways in which post-vocalic /r/ is realized in rhotic accents. In most Scots accents, it takes the form of a light tap with the tongue tip or blade; but more generally it is a frictionless continuant. This usually involves some degree of tongue-tip curl or high bunching of the tongue blade. Uvular /r/ is attested in one Scottish accent, and also in the North of England.⁴⁴ Many American accents have an /r/-coloured vowel (or 'rhotacized vowel') in words such as *sir*, *her*, *fur*. That is to say, the entire vowel is accompanied by r-colouring, and not just the final part of the vowel. Rhotacization is produced in two quite different ways by different American speakers; some have the tongue-tip raised, as in a retroflex consonant, while others keep the tip down and bunch up the blade and front of the tongue; but the auditory effect is very similar in either case.⁴⁵

The loss of historical /r/ in the post-vocalic position leaves its mark on the vowel system of the accent from which it is lost; either in the lengthening of a preceding non-high

⁴³ John Harris, *English Sound Structure* (Oxford: Blackwell, 1994), p. 231.

⁴⁴ Harris, p. 232.

⁴⁵ Ladefoged, p. 71.

vowel, as in RP [kɑ:d] (*card*) or [dɔ:] (*door*), or as a post vocalic-glide; this is usually of the in-gliding type, as in RP [fiə] (*fear*) or Southern American [dʊə] (*door*).⁴⁶

This section will discuss three English vowel systems: those of Received Pronunciation (RP), Scottish Standard English (SSE), and General American (GA). These accents may be regarded as 'standard' in the sense that they are all three widespread in their respective countries; and all three used by speakers of Standard English (as this is spoken in England, Scotland, and the US), rather than by speakers of non-standard regional dialects. Standard English is, of course, also spoken in many parts of the world with other accents than these three.

Received Pronunciation (RP).

This is unusual in not being a **regional** accent (except in the sense that it is an accent of England). It originated in the south-east of England, but was spread by the great English 'public schools', and by the end of the 19th century had become the accent of the upper and upper-middle classes. (Hence, the description 'received'; meaning 'accepted in the best society'). By contrast, although it is true of the standard languages of most, if not all, nations, that some accents have more prestige than others, these generally remain regional accents. In France, for example, the accent of Paris has prestige; but it still remains the accent of Paris.

Up until the middle of the twentieth century at least, RP enjoyed immense prestige in England; to the extent that it was an essential pre-requisite for entry into many professions. In the Army, for instance, the phrase 'officer-like qualities' was assumed to include an RP accent. This prestige was enjoyed principally vis-à-vis other accents of English spoken in **England** (which were considered to be 'lower class'); since Scots, or Americans, or others from outside England might still speak in their own way without fear of being stigmatized.⁴⁷ Since the middle of the century, the prestige of RP has declined considerably; and it is now fully acceptable (and perhaps in some circumstances, even preferable) for professional people and 'Establishment' figures to speak a so-called 'educated' variety of one or other of the regional accents. At the same time, the definition of RP has been expanded, so as to include other accents which adopt the RP vowel **system**; although the precise quality of some of their vowel phonemes may differ from those described at the beginning of the century by Daniel Jones. And for that matter, most Southern English accents have always had vowel systems very similar to that of RP.

R.P. has a large inventory of vowels and diphthongs: 20 items in all. Partly, this is due to the fact that it is **non-rhotic**; which means that words such as *fear*, *there*, and *tour* employ the centering diphthongs [fiə], [ðɛə] and [tʊə] (instead of being pronounced [fir, ðer, tur] as in Scots). But it also has a large number of 'pure' vowel contrasts; such as those between *pool* and *pull*, and between *cat*, *cut*, *caught*, and *cart*; and it has the long central vowel [ɜ], which has no counterpart in the native vowel system of most foreign learners. For this reason is by no means the easiest of English accents to learn. Further, it tends to be resented by speakers of other British English accents. However, it remains the choice of most learners of English who opt for British English, rather than American. This situation will probably not change, since RP has been more extensively described than any other British English accent; and teaching materials, recorded tapes, and teachers themselves are usually designed to teach it.

⁴⁶ Harris, p. 233.

⁴⁷ At worst, they might be regarded as comic; but not as 'lower class'.

Scottish Standard English (SSE).

This is the name given to the version of the Standard English language spoken in Scotland, and should not be confused with the Scots **dialects** spoken in the non-Gaelic areas. Scots dialects are dialects of English that differ from Standard English in respect of both vocabulary and grammar. SSE differs very little from other versions of Standard English in these respects; but its vowel system is strikingly different from that of RP and other Southern English accents. A glance at the vowel chart on p.105 should make this clear. Instead of the twelve 'pure' vowels and eight diphthongs of RP, SSE has ten 'pure' vowels and only three diphthongs, [aɪ], [ɔɪ], and [aʊ].

The reduction in the number of diphthongs comes about partly because SSE is a **rhotic** accent in which words such as *fear*, *there*, and *tour* employ 'pure' vowels followed by an /r/ constriction; which in the case of Scots, takes the form of a light tap of the tongue tip or blade against the alveolar ridge; although 'rolled' or trilled [r] (of the same kind as occurs in Finnish) is sometimes used instead by speakers who want to lend especial emphasis to a particular word. Then again, the [eɪ] and [əʊ] diphthongs of RP, used in words such as *gate*, *road*, are pure vowels in SSE. But SSE also lacks many of the vowel contrasts of RP.

In the first place, SSE lacks the central vowel [ɜ]. This vowel came about in Southern English accents due to the coalescing of the vowels [ɪ], [ʌ] and [ɛ] formerly used before post-vocalic /r/ in words such as *bird*, *world*, and *serve*; these are pronounced [bɪrd], [wʌrld], and [sɛrv] in SSE.⁴⁸ Further, SSE does not have the æ/ɑ contrast between *Sam* and *psalm*. (Many of the RP [ɑ] words, such as *cart*, *hard*, *park*, etc. involve post-vocalic /r/ in Scots; and this distinguishes them from *cat*, *had*, *pack*). SSE also lacks the u/ʊ (*pool/pull*) and ɒ/ɔ (*cot/caught*) contrasts of RP.⁴⁹

This reduced vowel inventory makes SSE potentially a much better choice than RP for the foreign learner, if only teaching materials and teachers were available to teach it. The absence of [ɜ] from the system is a decided point in its favour; but even better is the very central position of the 'problem' vowel [ɪ], which probably follows from the absence from the Scottish system of [ʊ], and the fact that [ə] is employed in SSE only as the 'reduced' vowel which occurs in English in unstressed syllables; SSE /o/ is a pure back vowel, rather than the RP [əʊ] glide. This means that Scots /ɪ/ is a considerable distance from the contrasting /i/ vowel, and unlikely to be confused with it. From the point of view of Finnish learners, the fact that [i] in SSE is no longer than [ɪ]⁵⁰ (contrary to the situation in RP) means that it is easier for them to hear the distinctive qualities of the two vowels.

Further, SSE, like RP, is internationally intelligible. And unlike RP, there is nowhere any substantial prejudice against it.

⁴⁸ However, Giegerich points out that the SSE phonemes [ɪ], [ʌ] and [ɛ] are unstable before /r/. Some SSE speakers use [ʌ] in both *bird* and *world*, but [ɛ] in *serve*; while others use [ɜ] in *bird*, *world*, and *serve*; thus introducing an additional item, /ɜ/, into the SSE system. See Heinz J. Giegerich, *English Phonology* (Cambridge: Cambridge University Press, 1992), p. 63.

⁴⁹ But Giegerich points out (p. 57) that some SSE speakers, 'especially middle-class speakers from Edinburgh and Glasgow' have some, or all three, of these last-mentioned phonemic contrasts.

⁵⁰ See Giegerich, p. 53.

General American (GA).

'General American' is a term used for American accents which do not have the marked regional characteristics of the speech of New York City and New England, on the one hand, or of the American South, on the other. GA accents, taken together, cover by far the largest area of the US, in geographical terms; and GA is the accent most commonly used in the television networks covering the whole of the US. GA accents vary slightly in the way in which individual vowel phonemes are realized; for example, in parts of the inter-mountain region, there are people who pronounce *pen* to rhyme with *pin*, and *barn* to rhyme with *born*; but in general the vowel system is homogenous.

GA is a rhotic accent and so has no need of the centering diphthongs used by RP in *fear, there, tour*. Otherwise it has all the diphthongs of RP; but the 'o' diphthong used in words such as *road, go* is realized as [oʊ] and does not start from the half-central position of RP [əʊ].

The GA system has all the vowels of the RP system except for [ɒ]. The RP [ɒ] words are distributed among the GA [ɔ] and [ɑ] phonemes. Giegerich observes (p. 61):

The phonemic contrast of /ɔ/ and /ɑ/ is not as clear-cut in GA as the other contrasts in the vowel system are. With some speakers, the lexical incidence of /ɔ/ and /ɑ/ varies; other speakers do not have the contrast at all.

Variations of the lexical incidence of the two phonemes is not governed by a general rule of geographical distribution or even by obvious tendencies. But here are some examples. *Dog* has generally /ɔ/ but *cog* generally /ɑ/. Similar words, such as *fog, log, hog* etc. tend to have /ɑ/ in the North and /ɔ/ in the Midlands of the United States, and the same holds for *ma* and *pa*. *Water* has /ɑ/ in the South and /ɔ/elsewhere.

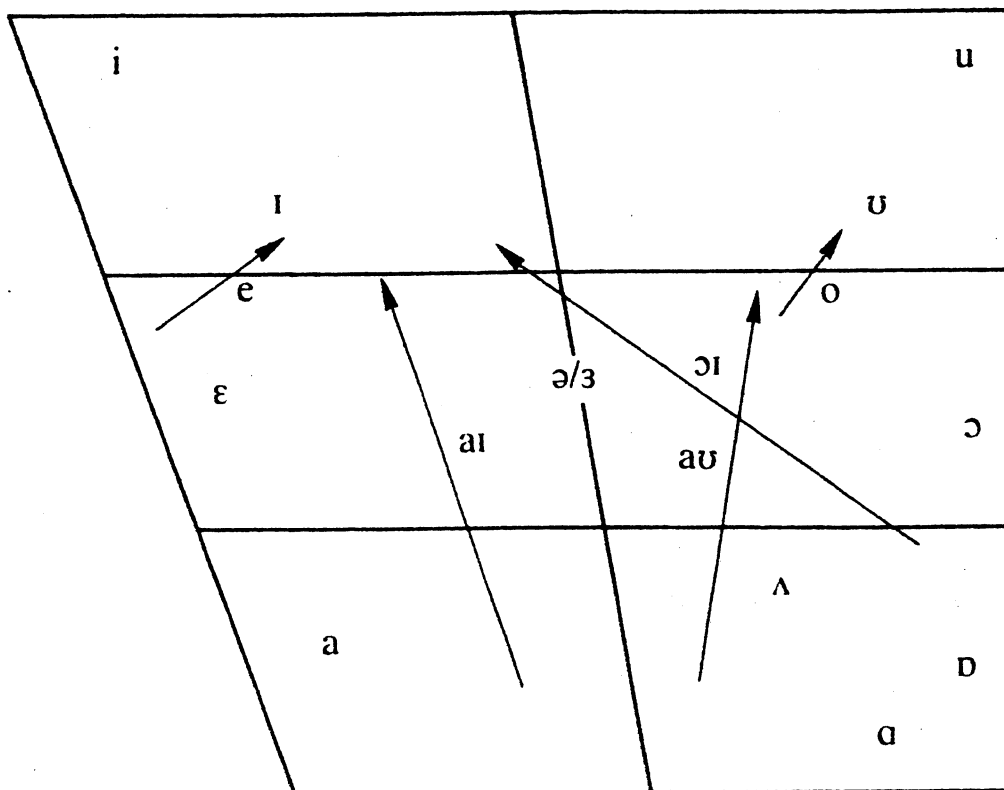
Post-vocalic /r/ is realized by a continuant, rather than by a tongue-tip tap as in Scots accents. Especially following [ɜ], the vowel and the /r/ are often combined into a single segment, the so-called rhotacized or ('r-coloured') vowel.

General American is the variety of American pronunciation most generally taught to foreign learners of American English. Many learners find the rhotacized /r/ difficult to pronounce in a native-like manner; but this does not really matter. Finnish learners of General American, for example, could very well use their Finnish version of /r/ in the post-vocalic position.

The vowel diagrams below are adapted from Giegerich (1992). They employ the standard vowel chart originally devised by Daniel Jones and based on his system of 'Cardinal vowels'; for details see Laver, *Principles of Phonetics* (CUP, 1994), pp. 272-74 and Abercrombie, *Elements of General Phonetics* (Edinburgh University Press, 1967), pp. 151-162.

1. Typical values of Received Pronunciation vowel phonemes.

(The 'centering' diphthongs [ɛə], [ɪə], and [ʊə] are not shown).



RP is a non-rhotic accent and has twelve 'pure' vowels and eight diphthongs, or 20 vowel items in all. This is as almost as many as any accent of English; exceeded only by the accent of Georgia, in the Southern United States, which has a total of 23 items.

Vowels.

/i/	'beat, bee, seem'
/ɪ/	'bit, pill, tin'
/ɛ/	'bet, bed'
/æ/	'bat, Sam'
/ɑ/	'part, path, car, psalm'

/ɜ/	'bird, world, heard, serve, fur'
/ə/	' <u>custom</u> '
/ʌ/	'but, cut, some, done'

/u/	'pool, Luke, fruit, shoe'
/ʊ/	'pull, look, put'
/ɔ/	'bought, caught, dawn, short, sport, shore, saw'
/ɒ/	'cot, don, lock, stop, cough, dog'

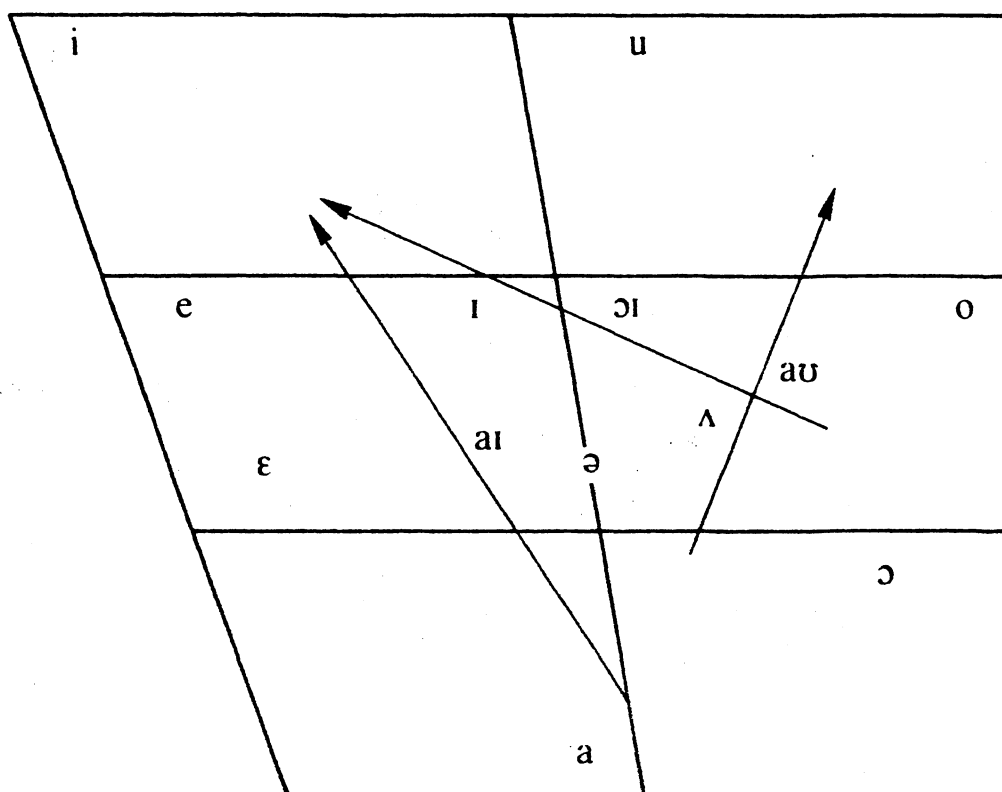
Diphthongs.

/eɪ/	'bait, made, day, pale'
/əʊ/	'road, rode, both, show, go'
/aɪ/	'sky, high, ride'
/aʊ/	'cow, loud'
/ɔɪ/	'boy, noise'

/ɪə/	'here, fear, beer, clear, idea'
/ɛə/	'there, bear, hair, stare'
/ʊə/	'sure, gourd'

2. Typical values of Scottish Standard English vowel phonemes.

Note the central positions of [u] and [ɪ].



SSE is a rhotic accent and has ten 'pure' vowels and three diphthongs: 13 items in all.

Words such as *fear*, *there*, and *sure* are pronounced [fɪr], [ðer], [ʃur] instead of [fɪə], [ðɛə], [ʃʊə] as in RP. Words of this kind in the examples below are italicized.

SSE does not have the central vowel [ɜ] found in RP and other Southern English accents. Words which have this vowel in RP have [ɪ], [ɛ], or [ʌ] in SSE, followed by an /r/ constriction. Words of this kind in the examples below are printed in bold type. SSE also lacks the æ/ɑ, ɒ/ɔ, and u/ʊ contrasts of RP.

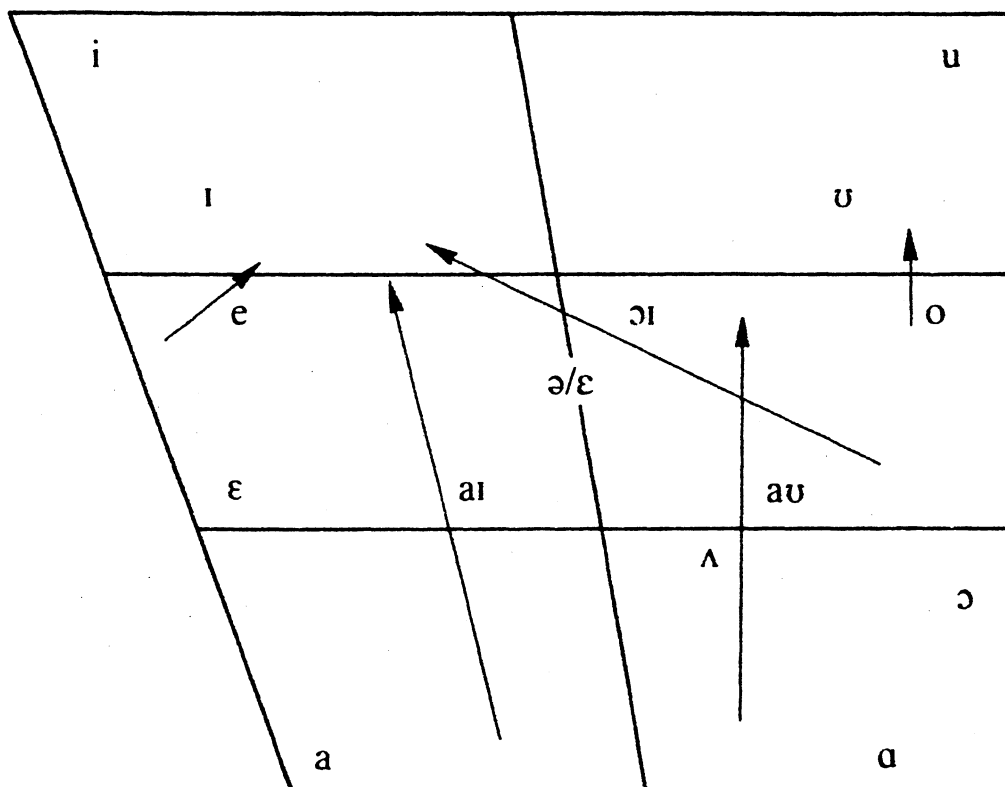
Vowels.

/i/	'beat, bee, seem, <i>here, fear, beer</i> '
/ɪ/	'bit, pill, tin, bird '
/e/	'bait, day, made, pale, <i>there, bear, hair</i> '
/ɛ/	'bet, bed, heard, serve '
/a/	'bat, Sam, psalm, path, car'
/ə/	' <u>custom</u> '
/ʌ/	'but, cut, some, done, world, fur '
/u/	'pool, pull, Luke, look, fruit, put, shoe, <i>sure</i> '
/o/	'road, rode, both, show, go, shore, sport'
/ɔ/	'caught, cot, dawn, don, cough, short, saw'

Diphthongs.

/aɪ/	'sky, high, ride'
/aʊ/	'cow, loud, down'
/ɔɪ/	'boy, noise'

3. Typical values of General American vowel phonemes.



GA is a rhotic accent and has eleven 'pure' vowels and five diphthongs, or 16 items in all. It lacks the 'centering' diphthongs used in non-rhotic accents (such as RP, or some accents of the American South), in words such as *fear, there, sure*.

Otherwise it has all the vowel contrasts of RP and other accents of the South of England, with the exception of the [ɒ] vowel used in RP for words such as *cot, stop, dog, cough*. These words have either [ɔ] or [ɑ] in GA; examples below are in bold type.

Although the GA vowel inventory is similar to that of RP, the distribution of individual words across the items of the system is not always the same. Thus, both systems have the æ/ɑ distinction; but words such as *path* and *bath* have [æ] in GA, but [ɑ] in RP.

Vowels.

/i/ 'beat, bee, seem, here, fear, beer'

/ɪ/ 'bit, pill, tin'

/ɛ/ 'bet, bed, there, bear, hair'

/æ/ 'bat, Sam, path'

/ɑ/ 'car, psalm, **cot, stop, don**;

/ɜ/ 'bird, world, heard, serve, fur'

/ə/ 'custom'

/ʌ/ 'but, cut, some, done'

/u/ 'pool, Luke, fruit, shoe, sure'

/ʊ/ 'pull, look, put'

/ɔ/ 'caught, dawn, short, **cough, dog, saw**'

Diphthongs.

/eɪ/ 'bate, made, day, pale'

/oʊ/ 'road, rode, both, show, go, sport'

/aɪ/ 'sky, high, ride'

/aʊ/ 'cow, loud, down'

/ɔɪ/ 'boy, noise'

8

Rhythm

Laver (1994:156) refers to 'a tenacious but controversial view of rhythm in speech' which 'suggests that all speech tends to be performed in an **isochronous** way, that is, with given units of speech recurring on a regular basis.' He continues:

When a language shows a tendency for every syllable to be heard as lasting very approximately for the same amount of time (at a given rate of speaking), it is said to exploit a **syllable-based rhythm**. An example of such a language is said to be Spanish. When a language shows a rhythmic patterning perceived as based on the intervals between stressed syllables tending to sound approximately equal, it is said to use a **stress-based rhythm**. English is often said to use a stress-based rhythm, and a typical consequence for unstressed syllables following a stressed syllable within the rhythmic unit in English is for these unstressed syllables to be compressed in time, more or less in proportion to the number of syllables in the rhythmic unit (the 'foot'). This compression can be facilitated by ... mechanisms of **vowel reduction** (making the pronunciation of a vowel shorter, less loud, lower in pitch and more central in quality). In some languages the perception of rhythm is said to be constrained by considerations of syllable weight, rather than stress. Such languages are said to show a **mora-based rhythm**, and an often-cited example is Japanese.

This comment by Laver employs the terms **syllable**, **stressed syllable**, **syllable weight**, and **mora-based rhythm**. These are all discussed in the Appendix section at the end of this book; but a few words of explanation seem called for at this point.

The importance of the **syllable** as a linguistic unit is suggested by the history of writing; the first writing systems were syllabic, employing one symbol per syllable, as Chinese does today. The *alphabetic* writing system, on the other hand, has only been invented once, by the Greeks around 4000 years ago.⁵¹ Nearly everyone can identify syllables in their own language, but it has proved very difficult to devise an objective procedure for establishing how many syllables there are in a given word or phrase. There have been attempts to relate the syllable to the properties of the **sounds** involved; for example, to peaks in the **sonority** of speech (the sonority of a sound is its loudness relative to that of other sounds with the same stress and pitch and of the same length). Thus, it has been claimed, *divide* can be recognized as a two-syllable word because it includes two 'peaks' of sonority, in its [ɪ] and [aɪ] vowels, which are separated by the lesser sonority of the intervening [v] consonant. But this theory does not cover every case; for example, the word *spy* has two peaks of sonority, since its initial sibilant and its [aɪ] vowel are both louder than the intervening [p] closure; yet native English speakers confidently identify it as a one-syllable word.

Other theories of the syllable have tried to relate it to the **activities of the speaker**; for example, it has been claimed that a syllable is based on a single movement of the muscles of the rib-cage (electromyographic research has shown that the airstream used in connected speech is produced in a series of puffs, produced by a succession of small contractions of the intercostal muscles between the ribs). But electromyography has also shown that, though the syllables identified by native speakers typically correlate well with the contractions of the speaker's intercostal muscles, as recorded by electromyography, the correlation is by no means perfect.

It may be the case that syllables are units that belong to some 'higher level' in the speech program; at an intervening stage between the selection of lexical items and the programming of the speech muscles. Some evidence for this comes from tongue slips (for example, 'You have hissed all my mystery lectures' instead of the intended 'You have missed all my history lectures'); which typically involve an interchange, not of *any* two speech sounds, but of two syllable-initial consonants.

⁵¹ See Ladefoged, p. 217.

A **stressed syllable** is produced with greater energy than an unstressed one. Usually this involves an extra-strong contraction of the intercostal muscles, pushing more air out of the lungs; but there may also be greater muscular tension at the larynx (which causes a rise in pitch) and more vigorous articulatory movements. Stress involves one or more of the parameters of **duration, loudness, pitch, and quality** (i.e. whether a vowel demands a large excursion from the neutral or 'rest' position, or whether it is reduced). But not one of these features is *invariably* present in a stressed syllable. Stressed syllables are often louder than unstressed, but do not have to be; for example, in the utterance 'Thank you' the first syllable may be unvoiced, even though it is stressed, and in this case it will be much quieter than the following 'you'. They are often longer than unstressed syllables, but do not have to be. (Compare *Take Grey to London* with *Take Greater London*; the segment [gʌɪ] is stressed in both cases, but only in the first is it particularly long). Their pitch may be higher than that of the surrounding unstressed syllables, but this is not invariably true. They typically have unreduced vowels, but this rule is not invariable, either. Brown, however (p. 45) considers length to be the single most reliable indicator of stress. She suggests that students of English would do well to practice pronouncing English stressed syllables with a count of *two*, as against a count of *one* for unstressed syllables.

The concept of **syllable weight** is employed to describe languages such as Japanese in which the rhythm is based on syllable length, rather than on syllable stress. 'Heavy' syllables have either a long vowel, or a short vowel followed by a long consonant or by two or more consonants; and 'light' syllables are those which do not fulfil these conditions. Japanese syllables typically have a simple CV structure, as in *kawasaki*. But it is also possible for a syllable to be closed by a nasal or other consonant. Syllables of this kind are illustrated in the sentence *atashi ga hon o yomru*, 'I (female speaker) SUBJECT; book OBJECT; read-PRESENT, 'I'm reading a book'. In this sentence, the syllables *hon* 'book' and *yom* 'read' are 'heavy' syllables, and each has twice the length of 'light' syllables (such as the three syllables in *atashi*, /).

To return to the notion of syllable-based and stress-based languages; Abercrombie (1967) was a strong proponent of the view that all languages fall into one or the other of these two categories; though he used the more traditional terms **stress-timed** and **syllable-timed**. He considered that in a stress-timed language, such as English, sentences such as *This is the house that Jack built* could be divided for metrical purposes into 'feet'; each consisting of a stressed syllable, and any unstressed syllables that might follow it before the next stressed syllable occurred. Thus:

' This is the	' house that	' Jack	' built
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He noted that if this sentence were pronounced by a native speaker who tapped with his foot on every stressed syllable, the taps would prove to be approximately isochronous; that is, they would occur at equal time intervals. But if the speaker were to tap on every **syllable**, the taps would no longer be isochronous. Stress-timed rhythm, he pointed out, had important consequences for syllable length; because if the interval between the stressed syllables *this* and *house* were approximately equal to that between *Jack* and *built*, then **none** of the syllables *This, is, the* could be as long as the syllable *Jack*.

Ladefoged (pp. 102-3) identifies several processes that act together to maintain the stress-timed nature of English:

1. Sometimes words that might have been stressed are pronounced without stress in order to prevent too many stresses coming close together. Ladefoged points out that the first syllables of *Mary, younger, brother, wanted, fifty, chocolate, peanuts* are always stressed when these words are spoken in isolation; and sometimes when they occur in utterances, too. But a sentence such as *Mary's younger brother wanted fifty chocolate peanuts* may very well be pronounced:

¹ Mary's younger ¹ brother wanted ¹ fifty chocolate ¹ peanuts

In this rendering, the first syllables of *younger, wanted, chocolate* are pronounced without stress (although with their full vowel qualities).

2. To avoid having stresses too close together, the stress in a polysyllabic word may be on one syllable in one utterance, and on another in another. For example, someone may say *He had a **clarinet** solo* (the stressed syllables are in bold type) but *He **plays** the **clarinet***. Similarly, a man may be introduced as *Vice-president Jones*, but referred to as *Jones, the vice-president*.

3. When one word is derived from another by means of morphological processes involving the adding-on of extra morphemes, the root word usually undergoes a reduction in length, so as to minimize the length difference between the root and the derived form. Thus the vowel in *speed* is longer than that in *speedy*; which in turn is longer than that in *speedily*.

Ladefoged comments, however, that these processes are not strong enough to completely overcome the irregularities caused by variations in the number of unstressed syllables within the stress group, and the type of vowel and number of consonants these unstressed syllables have. Thus in a sentence such as *The red bird flew speedily home*, the interval between *red* and *bird* will, in fact, be substantially shorter than that between *speed* and *home*.

The notion of stress-timing provides a neat explanation of the 'acoustic blur' that occurs in English when a large number of unstressed syllables are sandwiched between two stressed syllables; in sentences such as *Jim and Mary were at a party last night* (the stressed syllables are shown in bold type). In this case, the 'blurring' of the unstressed syllables *were at a* goes far beyond the 'weakening' involved in the pronunciation of these words as [wəɪətə] rather than as their 'citation' forms [wɜ], [æt], [eɪ]. The pronunciation, in fact, is likely to be indescribable in terms of conventional articulatory speech-segment categories; due to the speaker's having abandoned the target for each segment in turn in favour of the next, before it has any chance of being realized. Such pronunciation cannot be transcribed, unless the symbols used are first re-defined; and it is intelligible only because native-speaking listeners are able to use their knowledge of their language to re-construct the missing segments on the basis of the surrounding stressed syllables. No doubt acoustic blurs of this kind occur in all languages in the course of rapid speech; but the point about English is that in sentences such as the above, blurring is likely even in slow, careful speech; such as is used in a political broadcast. I find it

hard to imagine a similar degree of 'blurring' taking place in a French party political broadcast; but the blurring in English is understandable on the theory that the speaker is *mentally* (even if he cannot quite achieve this physically) fitting these unstressed words into a time-slot the same size as that which he allots to the stressed syllables *last* and *night*.

The notion of stress-timing also explains the way in which foreign learners of English handle certain English word boundaries. In the course of many years of administering exams in English pronunciation to Finnish learners, I have occasionally come across students who not only pronounced their English consonants faultlessly, but also had a native-like intonation pattern. Usually these were students who had spent some time during their schooldays in Britain or the United States as exchange students. Nonetheless, I found that such students were always recognizable as foreign speakers; and as often as not, they were given away by their treatment of word boundaries. In producing a sentence such as *He's right round the corner* (to take one example from a pronunciation exam text), where the stressed syllables are *right*, *round*, *cor*, even the best Finnish students exploded the /t/ of *right* into a voiceless schwa before articulating the following /r/, which a native would not do; but they also made the [t] closure itself too short. Similarly, in *She's never there at the right time* (the stresses are on *nev*, *there*, *right*, *time*) every student could be relied on to make the [t] closure of *right* too short; pronouncing 'right time' as [ɹaɪtaɪm] rather than [ɹaɪt::aɪm].

It seems clear that the case of *right* in these examples is similar to that of *Jack* in *This is the house that Jack built*. Both words are stressed syllables immediately followed by another stressed syllable. If we assume that the speaker is trying to maintain stress-timed rhythm, then he will *attempt* to spend as long over these words as he did over *This is the* and *there at the*. But he will not be able to make this attempt by lengthening the vowels; because both words end in voiceless stops, and English vowels are always drastically shortened in this environment. The only solution is to end each word in a long consonantal closure, which the speaker holds until it is 'time' to say the next syllable. Finns may think they have a 'double /t/' in a word such as *matto* (pronounced in Finnish with a 'long' or 'geminated' consonantal closure, which contrasts with the short closure period used in *mato*); but if the native English pronunciation of 'right time', as it occurs in the above context, were to be written down according to the conventions of Finnish orthography, it would have to be written 'raitttaim' or even 'raittttaim'.

Abercrombie considered rhythm to be so important that it should, he maintained, be formally taught to speakers of syllable-timed languages who wanted to learn English. But since rhythm was an aspect of speech not readily amenable to conscious control, he thought that such teaching would only be really effective with children. Teaching materials, he thought, should have the stresses clearly marked; and learners should be encouraged to make some kind of extraneous muscular movement (such as tapping with a finger or foot) in time with the stressed syllables of the exercise.

One thing which makes the selection of teaching materials for children difficult is the phenomenon of **silent stress**; which is a pervasive feature of all natural English speech, and as much a feature of verse as it is of prose. Silent stress in the interpolation of time intervals equal to those which would be demanded by stressed syllables, in the absence of any such stressed syllables. As an example, Abercrombie cites a line from Hamlet's soliloquy:

To 'be or	'not to be,	^	'that is the	'question.
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In this famous line, as in most of Shakespeare's, there are five 'feet'. There are, however, only four stressed syllables. The extra foot is supplied by the presence, after the second (and unstressed) *be*, of an interval of time equal to what would be demanded if this second *be* were stressed.

Note that the term 'silent stress' does not *necessarily* mean that the interval is totally silent. In the above example, the speaker's voice may well continue, in a kind of low growl, prolonging the vowel of the unstressed *be* throughout the silent stress period—here marked, following Abercrombie, with an inverted V.

Children, however, find silent stress difficult to handle. In fact, young children who try to speak or read verse nearly always make the mistake of stressing words like the second *be* in the above example. As native English speakers, they recognize the number of feet that there are in any particular example of verse; and they also have a good (though subconscious) understanding that English feet are based on stressed syllables. And so they stress as many syllables as they find necessary to justify the number of feet they perceive to be present in a particular piece of verse.

To overcome this difficulty, Abercrombie suggested the use of nursery rhymes. These are traditional children's verses which have survived as such precisely because (among their other qualities) they avoid silent stress. Thus, 'This is the house that Jack built' can be built up, line by line, from its basic line to the final form:

This is the cock that crowed in the morn, that waked the priest all shaven and shorn, that married the man all tattered and torn, that kissed the maiden all forlorn, that milked the cow with the twisted horn, that tossed the dog that chased the cat that killed the rat that ate the malt that lay in the house that Jack built.

Later, Abercrombie suggested, learners could move on to limericks; which include silent stress, but only in predictable places, at the end of the first, second, and fifth lines. These silent stresses should be clearly marked in the text, and learners should be encouraged to produce some extraneous syllable (such as 'Bang!') to accompany them.

The exercises below are examples of the kind of teaching materials that might be used. Note the variability of lexical stress in English: the words *old* and *washed* would probably be stressed in the utterances, 'An old man' and 'He washed his face'; but in the verse about the old man called Mack, both words are unstressed; although they retain their full vowel qualities. The same applies to other words; for example, to *young* in the limericks about the unfortunate young men named Edser and Hammer.

Rhythm practice: The house that Jack built.

'This is the 'house that 'Jack 'built.

'This is the 'malt that 'lay in the 'house that 'Jack 'built.

'This is the 'cat that 'killed the 'rat that 'ate the 'malt that 'lay in the 'house that 'Jack 'built.

'This is the 'dog that 'chased the 'cat that 'killed the 'rat that 'ate the 'malt that 'lay in the 'house that 'Jack 'built.

'This is the 'cow with the 'twisted 'horn, that 'tossed the 'dog that 'chased the 'cat that 'killed the 'rat that 'ate the 'malt that 'lay in the 'house that 'Jack 'built.

'This is the 'maiden 'all for 'lorn, that 'milked the 'cow with the 'twisted 'horn, that 'tossed the 'dog that 'chased the 'cat that 'killed the 'rat that 'ate the 'malt that 'lay in the 'house that 'Jack 'built.

'This is the 'man all 'tattered and 'torn, that 'kissed the 'maiden 'all for 'lorn, that 'milked the 'cow with the 'twisted 'horn, that 'tossed the 'dog that 'chased the 'cat that 'killed the 'rat that 'ate the 'malt that 'lay in the 'house that 'Jack 'built.

'This is the 'priest all 'shaven and 'shorn, that 'married the 'man all 'tattered and 'torn, that 'kissed the 'maiden all for 'lorn, that 'milked the 'cow with the 'twisted 'horn, that 'tossed the 'dog that 'chased the 'cat that 'killed the 'rat that 'ate the 'malt that 'lay in the 'house that 'Jack 'built.

'This is the 'cock that 'crowed in the 'morn, that 'waked the 'priest all 'shaven and 'shorn, that 'married the 'man all 'tattered and 'torn, that 'kissed the 'maiden 'all for 'lorn, that 'milked the 'cow with the

'twisted 'horn, that 'tossed the 'dog that 'chased the 'cat that
 'killed the 'rat that 'ate the 'malt that 'lay in the 'house that 'Jack
 'built.

Rhythm practice: Bill and Mack.

There 'was an old 'man whose 'name was 'Bill.

And he 'lived at the 'top of a 'bloody great 'hill.

He's 'never had a 'bath, and he 'never 'will.

'Ssh! 'Ssh! 'Dirty old 'Bill!

There 'was an old 'man whose 'name was 'Mack.

And he 'lived in the 'middle of a 'dirty great 'shack.

He 'never washed his 'face, and he 'can't reach his 'back,

'Ssh! 'Ssh! 'Filthy old 'Mack!

Limericks are also available:

There 'was a young 'soldier named 'Edser ^

Who when 'wanted was 'always in 'bed, sir. ^

One 'morning at 'one

They 'fired a 'gun,

And 'Edser, in 'bed, sir, was 'dead, sir. ^

There 'was a young 'fellow named 'Hammer ^

Who was 'cursed with a 'terrible 'stammer. ^

'The 'b- bane of my 'life'

Said he, 'is m-my 'wife

D-d 'd-d-d 'd-d-d 'damn her.' ^

9

Assimilation

In its broadest sense, the term **assimilation** is used to describe the way in which the sounds used in spoken language are influenced by their phonological context; that is to say, how they become more *similar* to the sounds that precede and follow them.⁵² This influence is apparent within words; in English, for example, the /k/ sound used in front of a high front vowel, as in *key*, is rather different from that used in front of a back vowel, as in *caw*; since in the first case, the point of contact (between the back of the tongue and the soft palate) is made considerably further forward in the mouth than it is in the second. This phenomenon is usually referred to as **coarticulation**. The influence is also apparent across word-boundaries; for example, in the pronunciation of *ten boys* as [tɛm bɔɪz]. In this case the descriptive term generally used is **juxtapositional assimilation** or more simply, **assimilation**.

Phonetics and phonology.

Before proceeding with a description of assimilation, it will be as well to say something about the relationship of phonetics to phonology; since descriptions of assimilatory processes are usually made partly in terms of the phonological units (or 'phonemes') of linguistic description; and not purely in terms of general phonetic principles.

Traditionally, linguists have recognized two (at least) different levels of analysis in their descriptions of languages. At the 'lower level' of **phonology**, languages have been said to possess a number of phonological units, (or 'phonemes'). Thus Finnish is considered to have, among its many other phonemes, the voiceless stops, /p,t,k/, the corresponding nasals /m,n,ŋ/, the lateral /l/, the fricative /s/, and a number of vowel phonemes, such as /a,o,i/, etc. These units are not considered to have any meaning in themselves; but according to phonemic theory, they can be combined in sequence to form morphemes and words at the 'higher level' of **lexis**. Thus, the Finnish phonological units /a,o,l,t,s/ mean nothing in themselves; but when combined in sequences such as *talo*, *-ssa*, *talossa*, they *do* mean something. (*talo* is a word consisting of the single morpheme {*talo*}; {*ssa*} is a morpheme, but not a word, since it cannot exist on its own; *talossa* is a word consisting of two morphemes).

Although they are associated with certain characteristic articulations and 'speech sounds', which can be described by the sciences of acoustic and articulatory **phonetics**, phonological units are in principle quite abstract. When you read the word 'talo', for instance, you are not listening to sounds; you are looking at a series of four written symbols. These symbols could in principle take quite other forms; the phonological units of Finnish or of English could, for instance, be represented by colours, one for each unit. Human beings can easily distinguish between enough colours to 'cover' the phonological inventories of either of these languages. Once the association between colours and phonological units had been decided upon, *Seitsemän Veljestä* (and for that matter, the whole of Finnish literature) could be represented chromatically. Or the representation might be made by means of a series of metal strips, each at a different temperature; say,

⁵² The sounds that immediately precede and follow a speech sound are its **phonetic**, rather than its **phonological**, context. But structural factors (such as the position of a sound segment within the syllable) also play a role. For example, in English there is much less accommodation of a *syllable-final* stop to the quality of the vowel sound of the syllable, than there is in the case of a *syllable-initial* stop. English is an 'anticipatory' language, in which the speech organs are made to anticipate the postures of the sounds which follow them; rather than, like Italian or French, a 'perseverative' language. But this cannot be explained in terms of general phonetic principles. This is why the term 'phonological context' is preferred here.

20° Celcius for /a/, but 21° for /k/. It would be difficult for Finns to read *Seitsemän Veljestä* if it were represented in this way, because the human sense of touch is not precise enough to discriminate between 20° and 21°, but perhaps a robot could be built that could do this; and in any case, the text of the novel would be preserved on the metal strips (provided their temperature were carefully maintained) and might be converted back into written symbols or sequences of sounds at some future date.

The Swiss linguist Ferdinand de Saussure used the analogy of chess to illustrate this abstract quality of the units of language. He pointed out that in chess, the form taken by the chessmen is not important, provided that the pieces are readily distinguishable. The rules of chess are abstract, and remain the same whether the chessmen have their traditional form, or are designed to represent (for instance) historical figures from the American Civil War. For that matter, there is no need to use chess 'men' at all; it would be quite possible to play chess using numbered discs (dark for Black, and lighter for White); perhaps using the number One for the King, two for the Queen, three for the Rooks, and so on. Every one of the classic games of the past could be replayed using a set of chess 'chips' of this kind; and essentially, every one of these games would remain the same.

Phonological units, then, are not **phonetic** units; they are units of **system**. The phonological units of any language, when it is spoken, are *each* represented by a number of different *phonetic* units, with the choice of unit depending on the phonetic context. Thus, the English phonological unit /k/ is represented by different articulations (and consequently, sounds) depending on whether it occurs before a high front vowel, as in *key*, or a low back vowel, as in *car*, or before a rounded back vowel, as in *cool*. It is different again syllable-finally, as in *sick*; and it is unaspirated syllable-initially following /s/, as in *school*. Commenting on the /k/ sounds at the beginning of RP *kit* and *cat*, Abercrombie writes (1967:85): 'It can be said at once that the two segments would not receive the same general phonetic description: the stricture of complete closure is further forward in the mouth for *kit* than for *cat* (to different degrees in different accents of English) and their auditory quality is quite different. They are, in fact, different segments.' Abercrombie continues:

Every language contains a very large number—hundreds, perhaps—of segments ... which, from the point of view of general phonetic taxonomy, are different, and are auditorily distinguishable even without special training. There are many more such segments than it would be convenient to have as terms in [phonological] systems. Phoneme theory relates a great deal of the variation in the phonetic quality of segments to their environment, and thereby reduces the amount of phonetic detail that is phonologically relevant. It thus reconciles the extensive variety of segments with a limited size of systems. ... It is possible, in any language, to formulate rules by which the phonetic quality of any segment can be accounted for (a) by saying what phoneme it represents and (b) by saying what its environment is.

The versions of [k] used in *kit*, *car*, *cool*, *school* and *sick* (we can say, k1, k2, k3, k4, and k5) each occur *only* in a particular phonetic environment (the 'environment' of a segment means the sounds that occur before and after it, and also its place in the structure of the syllable, as initial, medial, or final). Thus these segments do not contrast. They are said to be in 'complementary distribution'; and although native speakers can usually recognize the differences in auditory quality when these are pointed out to them, they consider that these differences 'do not matter'. Such a set of segments in complementary distribution, representing a particular phoneme (in this case, /k/) are said to be **allophones** of that phoneme. But an important part of phoneme theory is that two segments can be in complementary distribution in one language, but in parallel distribution (that is, contrasting with each other) in another. In the second case, they represent different phonemes; and in

this case, the physical differences between them (for example, between *k*₁ and *k*₂ in English *kit* and *car*) will certainly, as Abercrombie puts it, 'seem to matter'.

The phoneme theory underlies all **alphabetic writing systems**. Alphabetic writing was the brilliant invention of the Greeks some 4000 years ago. Before this, writing systems were syllabic (as is still the case with Chinese and Japanese).⁵³

There remains the question of how accurate the phoneme theory is, in the sense of corresponding to the neurological processes actually used in speech. To people accustomed to an alphabetic writing system, it seems quite obvious that a word such as *kit* (for example) is made up of an initial [k] sound, followed by a mid-high front vowel, followed by a [t] sound. This seems much less obvious, however, to users of syllabic writing systems. Nevertheless, it is significant that all languages, whether or not they have a writing system, can be transcribed alphabetically; that is to say, phonemically.

If the phonological systems which underlie alphabetic writing are claimed to represent the neurological programs actually used in speech in some way, then the articulatory movements used in speech must be related to the abstract units of phonological analysis according to some definable principle. Thus the disparity between the limited phoneme inventory, and the much larger number of speech sounds might perhaps be explained as a merely mechanical effect, resulting from the inability of a large, heavy muscle like the tongue to move instantaneously to the various positions required by a rapid series of abstract phonological units. For example, it might be claimed that the forward closure position of /k/ in *key* arises because, before the closure is actually completed, in response to the 'k-command' issued by the brain, the tongue has already received the 'i-command' for the following front vowel; and this pulls the tongue forward. But the 'k' command itself (it might be claimed) is always the same, and is thus accurately represented by a single unit in the phoneme inventory.

But even if such an explanation might account for the allophonic variation observed in the case of *kit* and *cat*, it cannot account for the other /k/ allophones. The unaspirated versions of /k/ that occur following /s/, in words such as *skill* or *school*, cannot be due to mechanical effects; and neither can the [k] sound used syllable-finally, as in *sick* (a syllable-final /k/ is longer than an initial /k/; it is often accompanied by a glottal stop, and unlike a syllable-initial /k/, it is not followed by a burst of aspiration). It seems clear that these differences are neurologically programmed. This is also true of the lip-rounding that accompanies the [k] sound used in *cool*. It might be argued that this results from the 'u-command' being given at almost the same time as the 'k-command', so as to have the lip-rounding which is an essential part of the [u] vowel fully realized when the [k] consonant is released. But the fact is that the lip-rounding needed for a [u] vowel is anticipated not only in the /k/ of *cool*, but also in the versions of /k/ used in *clue*, *sack Lou*, and even *tackle Lou*.⁵⁴ In these cases, it is only the *lip-rounding* of the [u] vowel that is anticipated, not its high back tongue-raising ('Lou' requires a 'clear' /l/, with *front* tongue-raising). Thus the lip-rounding and tongue-raising components of [u] are evidently under independent control; so that there cannot be a unified 'u-command'.

⁵³ Strictly speaking, Chinese script is *logographic*, with each character representing a morpheme (a unit of meaning) rather than a unit of sound (whether segment-size or syllable-size) as in *phonographic* script. Thus two Chinese syllables can share the same pronunciation, but be represented by quite different characters. But Chinese morphemes each consist of a single syllable; in this, Chinese is unlike English or Finnish, where a single morpheme can sometimes involve two syllables, or a single syllable can include two morphemes. Like any other language, Chinese has thousands of morphemes; it therefore has a correspondingly large number of written characters; of which the average literate person can recognize perhaps four thousand. Thus literacy in Chinese is a far greater achievement than it is in Finnish or English. Since Chinese is an 'isolating' language, there is also a high degree of correlation between morphemes and words.

⁵⁴ See Ladefoged, p. 52.

Indeed, if one considers the mechanics of speech, it is immediately clear that it requires a number of different systems to operate *in parallel*. Quite apart from the movements of the tongue and lips, the chest muscles must move to produce the airstream necessary to generate speech; the glottis has to open so as to allow free passage to the air, or else close to produce voicing, whispering, or glottal stops; and the velum must move to allow nasalisation. It seems unlikely that the neurological programs necessary to produce and co-ordinate the various activities of these systems would operate on the segmental basis suggested by the phoneme theory. It might be, however, that phonological units, even though not directly representing the neuro-motor commands used to set the speech organs in motion, have some kind of reality at a 'higher level' in the speech programme. 'Talking backwards', the (very rare) ability to pronounce words spontaneously and at high speed in reverse, appears to involve the re-arrangement of phoneme-sized units; further, diphthongs are preserved; so that 'ironic' is reversed as [kɪNDɪrɪ] (in the speech of a General American speaker) rather than [kɪNDɪrɪə].⁵⁵ Further, tongue slips such as *the flea of my cat* (for 'the key of my flat') involve the interchange of phoneme-size units, which appear to have been pre-selected, and laid out in some kind of interim assembly. Sometimes, it is 'distinctive features', rather than phonemes, that are exchanged in these slips; as in *glear plue sky* (for 'clear blue sky'), which involves the removal of the 'distinctive feature' of voicing to a different place in the speech programme. Usually, too, it is the initial segments of syllables that are involved in tongue slips; suggesting that the syllables, phonemes, and 'distinctive features' proposed by linguists as units of linguistic analysis may all three have some kind of psychological reality.

One area of English pronunciation where the phoneme theory clearly provides an unsatisfactory account of what actually goes on is the syllable-final 'voicing' contrast. Contrasting pairs such as *race* and *raise* are represented in phonological terms as /reɪs, reɪz/ (for RP; in the case of Scots the representation would be /res, rez/). This representation suggests that the contrast involves only the final consonants of these words, and only the 'distinctive feature' of voicing. But as we have already seen, on p. 62, above, this particular contrast is signalled principally by the length of the *vowels* used in these words. A secondary cue is the degree of friction of the final sibilant sound; /s/ is more fricative, and hence, more audible, than /z/. And it is also *longer* than /z/. But as far as phonetic voicing is concerned (the only relevant factor, according to the phoneme theory) the most that can be said is that, while /s/ is invariably voiceless, /z/ may be voiced if it is followed by a voiced sound, but is likely to be at least partly devoiced otherwise.

Coarticulation.

This term is used to describe the way in which speech sounds are affected by their phonological and phonetic environments *within words*. The phenomenon has also been called *similitude* (Jones, 1918; Abercrombie, 1967). It occurs in all languages; thus Laver (1994:376) writes that 'accommodation of at least some of the articulatory characteristics of any segment to those of its contextual neighbours is so universal a phenomenon in the languages of the world that it is reasonable to suppose that it reflects inherent principles of strategic neuromuscular control.' Ladefoged points out (1975:49) that in English, coarticulation is usually **anticipatory**; that is, the sounds of speech take on certain features of the sounds which will follow them later on in the utterances in which they occur. We have already noted, above, Ladefoged's claim that 'in the phrase *tackle Lou*, the lip-rounding for the final [u] starts in the [k], which is separated from it by two seg-

⁵⁵ *Scientific American*, July 1980.

ments and a word boundary.' But there is no corresponding perseverative effect: and Gay (1978: quoted in Laver 1994:378) states that the lip-rounding in *cool* is normally fading by the onset of /l/. Some other languages, such as French or Italian, are **perseverative**, in that the articulation of one sound tends to persevere, or continue, into the following sound.

Coarticulation in English has already been illustrated in the discussion of the allophones of /k/, above. Most of the differences between these allophones are clearly programmed to occur by the neuromuscular control system. However, Ladefoged, while conceding this, considers the differences between the /k/ sounds used before front and back vowels to be the result of a simple mechanical effect. He writes (p. 51):

We can now see why the positions for [k] in 'key' and 'caw' are different. In each case there is the same target; but you do not necessarily hit the target for which you aimed. Even while the back of the tongue is aiming at the target for [k], other parts of the tongue are already moving toward their targets for the following vowel.

It is much more likely, however, that even the /k/ variation seen in 'key' and 'caw' is neurologically programmed. Abercrombie, for example, notes (p. 87) that this variation in English is largely anticipatory; since in most accents of English there is no comparable adjustment of the point of articulation of /k/ in *peak* compared to *park*; although adjustment here would be just as 'natural' (and does in fact occur in French, in the pronunciation of *pique* and *Pâques*). He comments that 'allophones are not grouped into phonemes by nature, but by the phonology of a particular language'. Similarly, Robins (1956; quoted in Laver 1994:379) claims that the variation among the /k/ allophones of Sundanese, brought about by the nature of the preceding or following vowel, is substantially greater than that which occurs in English. Since the vocal apparatus of Sundanese and English speakers is identical, this variation cannot be mechanical in origin. For the same reason, the variation noted by Ladefoged between languages like English, in which coarticulation tends to be anticipatory, and those in which it is typically perseverative cannot have a mechanical explanation.

If coarticulation were to be due to mechanical factors (that is, the inertial mass of the speech organs) it might be expected that it would resemble other inertial effects in being predominantly perseverative rather than anticipatory. Anyone who has sailed a nine-metre yacht (or other sailing boat with a deep keel) knows that when the helmsman alters course, the boat does not immediately take on the new course, as it might do if it were on rails. For a second or so, the boat's course is a compromise between the old course, and the new course set by the helmsman. But no sailing boat has ever been known to accommodate itself to a change of course which the helmsman is *about* to make; but which for the moment exists only in his mind. In making his claim that the *anticipatory* forward point of tongue contact used to represent the /k/ sound in *key* is a purely mechanical effect, Ladefoged gets round this difficulty by supposing that in this case, the neuromotor command for the front [i] vowel, even though *following* the command for [k], is given before the [k] command has been fully *carried out*; that is, before contact with the soft palate has been made. The tongue, therefore, is operating under the influence of two commands at once. This sounds plausible in the case of *key*; but it is most unlikely that such an effect could extend over more than one segment, so as to account for the lip-rounded [k] which Ladefoged has observed in the phrase *tackle Lou*; neither does Ladefoged suggest that this second effect has a mechanical explanation.

If co-articulation is (very largely) neurologically programmed, then this has certain implications for phonetic description. In the first place, phoneticians have usually distin-

guished *coarticulation*, on the one hand, from, on the other, the *juxtapositional assimilation* that sometimes takes place at word boundaries: for example, the pronunciation of *I'm going* as [aɪŋɡoʊɪŋ] rather than [aɪmɡoʊɪŋ]. *Juxtapositional* assimilation is clearly programmed. In this example, the labial closure required for the nasal that normally occurs at the end of *I'm* cannot possibly be affected by anything the *tongue* is doing to produce *going*; and so its omission is certainly not a mechanical effect. The speaker deploys a speech programme that cuts out /m/, and makes the velar closure required for the /g/ of *going* serve for the nasal at the end of *I'm* as well; in this way reducing the number of articulatory movements he has to make.

If coarticulation is, similarly, something that is programmed to occur, then it is not very different from juxtapositional assimilation in general phonetic terms. The difference is apparent only when the two processes are described in terms of phonological theory; when it appears that unlike juxtapositional assimilation, coarticulation does not involve any change in phonological structure (for example, the various different kinds of [k] used in different environments all equally represent the phoneme /k/). But in general phonetic terms, both phenomena bring about a reduction in the amount of articulatory activity the speaker has to carry out. By using a fronted version of /k/ in *key*, the speaker reduces the distance his tongue has to travel in order to realize the following vowel; while by abandoning the labial closure needed if *I'm* is pronounced [aɪm], he saves himself the trouble of moving his lips to make it. In passing, it may be observed that most accounts of assimilation cite the economy of articulatory effort achieved, as the reason for practicing it; but perhaps the most important consideration is the increase in the rate of speaking that it makes possible. If allophonic variation were forbidden; and if the theoretical quality of every phoneme had to be fully realized before the speaker was allowed to pass on to the next, then speech would be a very slow and tedious affair.

Secondly, accounts of coarticulation usually describe it as a *process*; a term which suggests change, or movement. An 'ideal' version of /k/ (for example) is said to be *modified*, owing to the influence of adjacent sounds. If coarticulation were the result of purely mechanical factors, then such a view of it would be justified; descriptions would trace the chain of events from an invariant /k/ command, to the variety of [k] sounds that resulted when this command was received by articulatory muscles already in motion as a result of earlier commands. But if coarticulation is neurologically programmed, it is more difficult to see what 'process' is involved. To be sure, descriptions of the various /k/ allophones can show how these differ from some 'ideal' realization of the /k/ phoneme; but if this phoneme is a linguistic fiction, and not really involved in the neurological speech programme, then no 'process' has taken place; not, at any rate, in the domain of the measurable physical processes with which phonetics deals.

It is worth noting that the number of speech segments typically involved in coarticulatory 'setting' varies with the kind of articulation involved. The effect of *tongue position* is usually confined to a single syllable (as with the *kit/cat* example). *Nasality*, however, may sometimes exercise its effect over syllable boundaries. But it is coarticulatory *labial* settings that apparently have the largest span; as Ladefoged's example of *tackle Lou* suggests.

Laver (1994:382) suggests that coarticulatory settings 'may have important perceptual benefits.' Anticipatory coarticulation, he says, may provide auditory cues which a listener can use to predict segments before the speaker has produced them; while perseverative co-articulation may give 'carry-over' cues which add to the perceptual redundancy of speech.

Juxtapositional assimilation.

The most common kind of assimilation in English involves movements of the tongue and lips. It is usually anticipatory; thus, the final /d/ of *red* is typically assimilated to following labial or velar places of articulation in phrases such as *red car*, *red planet*, *red money* [ɹɛɡkɑ, ɹɛbplænɪt, ɹɛbmʌni]; but there is no corresponding perseverative assimilation of /d/ in *sick dog* or *top dog*. These examples also show that alveolars are more vulnerable to assimilatory effects than velar or labial articulations; since the final consonants of *sick* and *top* are not assimilated to *alveolar* positions in the context of a following /d/.

The assimilation of the alveolar consonants [t, d, n] to a following labial or dental position happens very readily, so that it can often be observed in quite slow, careful speech. The assimilation of labial consonants to following velars happens less readily; so that pronunciations such as [sʌŋkeɪsɪz] (for 'some cases') or [tɒkkləs] (for 'top class') are usually only heard in rapid speech. However, assimilation is always more likely to occur in phrases in common use; so that the pronunciation of *I'm going* as [aɪŋɡoʊɪŋ] is by no means confined to rapid speech. Velar consonants assimilate least readily of all.

Although labial and velar consonants do not assimilate to following alveolars, this does not mean that a labial or velar stop, in particular, that is immediately followed by an alveolar stop will be pronounced in the same way as it would be utterance-finally, or followed by a vowel. In these environments such stops would normally be exploded; but in expressions like *laptop*, *ragtime*, *cab-driver*, *top dog*, *sick dog*, etc., the [p, b, k, g] closures, once made, are not released until *after* the following [t] or [d] closure has been made. The release phase of these stops is therefore almost inaudible, since the presence of the alveolar closure prevents any release of air from the mouth. However, the first articulatory closure can still be detected in these cases, and correctly identified, from the effect it has on the formants of preceding vowel. The same thing occurs when a word-final velar stop is followed by word-initial labial stop, or vice-versa (examples are *sick boy*; *lab-coat*); except in the rare cases when a labial stop assimilates to a following velar.

Even though English is an 'anticipatory' language, perseverative assimilation of voicelessness commonly occurs in pronunciations involving reduced forms of *is* and *has*. The final voiced sibilant that occurs in these two words is devoiced in expressions such as *it's happened* and *Jack's here*, under the influence of the preceding voiceless [t] and [k] sounds.

A very common phenomenon in English is **partial assimilation to voicelessness**. (A 'partial' assimilation is one that does not result in two separate positions of an articulatory organ—in this case, the glottis—being combined into one). The assimilated segments are always fricatives or plosives. To take an example cited by Abercrombie, *his* in the phrase *his daughter* ends in a voiced sibilant, [z]; but in *his son* this sound is likely to be whispered, or voiced at the start and whispered or voiceless at its end. But as Abercrombie points out, it is not fully voiceless; as a comparison with the final sound of *this* in *this son* will show. Such partial assimilations to voicelessness are very common in English at the end of utterances (in this case the assimilation is to silence).

Some common juxtapositional assimilations in English (RP)

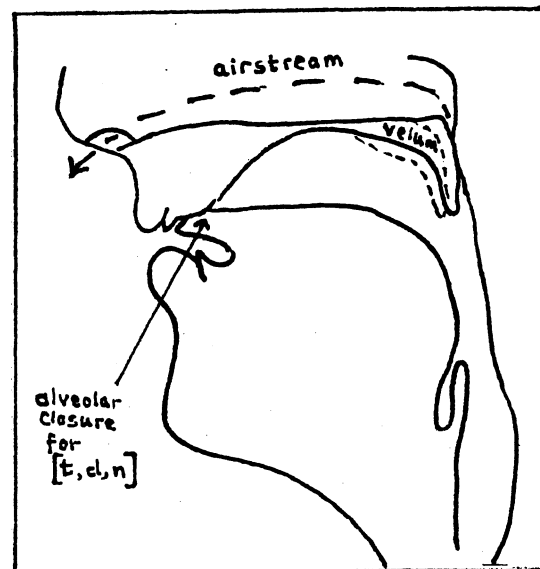
that boy [ðæpbɔɪ]	she's not coming [nɒkkʌmɪŋ]
that man [ðæpmæn]	he's not pleased [nɒplɪzd]
that woman [ðæpwʊmən]	it's not much [nɒpmʌtʃ]
at that point [ətðæppɔɪnt]	I don't believe it [dɒʊmpbəlɪvɪt]
that car [ðækkɑ]	send me some [sɛmbɪmi] [semmi]
that girl [ðækgɜl]	she won't play [wɒʊmp pleɪ]
ten policemen [tɛmpəlɪsmən]	she can't come [kən kʌm]
ten boys [tɛmbɔɪz]	I don't care [dɒʊŋk keə]
ten men [tɛmmɛn]	is she alright? [ɪʒfi]
ten women [tɛnwɪmɪn]	she's shown me [ʃɪʒʃɔʊmmi]
ten cars [tɛŋkɑz]	this year [ðɪʃjɜ]
ten girls [tɛŋgɜlz]	we'll miss you [miʃju]
sad boys [sæbbɔɪz]	she was sure to [wʊzʃʊə tu]
a glad man [glæbmæn]	she's met you before [mɛtʃu]
a red car [rɛgkɑ]	I had your number [hædʒɔ]
sad girls [sæggɜlz]	I bet you don't [bɛtʃu]
it will improve with age [ɪpwɪl]	he said you'd come [sɛdʒʊd]
it can be difficult [ɪkkæmbɪ]	I'm going [aɪŋgɔʊɪŋ]
it could be hard [ɪkkʊbbɪ]	*in some cases [sʊŋkeɪsɪz]
it might prove useful [ɪpmɑɪppɹʊv]	*a top-class job [tɒkklas]
he might come [maɪkkʌm]	*I'm not sure [aɪnɒt]
I should care [ʃʊgkeə]	*I'm never there [aɪnnɛvə]
she can cancel [ʃikən kænsəl]	*I'm tired of it [aɪntaɪəd]

Note that assimilations are not 'compulsory': and especially not for non-native speakers. Most native speakers assimilate in normal speech. But *some cases* and *top class* occur mainly in rapid speech. Note that the last three examples, *I'm not*, *I'm never*, *I'm tired* show assimilation of a labial to a following *alveolar*. This happens in the case of *I'm* (for some speakers) but is otherwise rare.

Lateral and nasal plosion.

A very common coarticulation in English is known as ‘nasal plosion’ (meaning, ‘release through the nose’). When alveolar stops—that is, [t] and [d]—are followed by [n] in the same word, in words such as *cotton*, *hidden*, *sudden*, they are not released orally, in the usual way, but released through the nose instead.

A glance at the diagram on the right should make this clear. Suppose the speaker wants to say the word ‘hidden’. He produces the [hɪ] sequence in the usual way; and then his tongue tip rises to make contact with the alveolar ridge (with the sides of the tongue making contact with the gum ridge along the sides of the mouth) for the [d] closure. Air pressure begins to build up in his mouth; just as it would if he were saying ‘hid’. Then, he lowers his velum, to the position shown by the dotted line, and allows the high-pressure air to escape through his nose. What he has said could be transcribed as [hɪd̥n̩]. (In a detailed, or ‘narrow’ transcription, a stroke would be made under the ‘n’ symbol to indicate that [n] forms the whole syllable, instead of merely ending it). No *vowel* occurs in the second syllables of *hidden*, *sudden*, or *kitten*.



It is clear that this pronunciation results in a saving of effort, compared with what would be necessary if he had said, instead, [hɪdən]. (This is a pronunciation used by young children, who have not learned how to do nasal plosion, and by some foreign speakers of English). To say [hɪd̥n̩], the speaker must first raise his tongue for the alveolar [d] closure, and then lower it for the [ɪ] vowel, and then raise it to the [d] position a **second time** (at the same time, lowering the velum so that the air from the lungs can go straight out of the nose) for the [n].

Nasal plosion is also employed when [t] is followed by [n], in words such as *kitten*, *cotton* or *forgotten*. (But note that some speakers do not have [t] at all in these words. They use a glottal stop instead; saying [kɪʔn̩] or [kɒʔn̩].

In principle, nasal plosion is not confined to sequences of [t,d] and [n]; since it is obvious that any stop may be released nasally rather than orally. But in many kinds of English there are no words in which [p] or [b] are followed by [m], or [k] or [g] by [ŋ]. In rapid speech, however, some people pronounce *open* as [ɒp̥m̩]; this is particularly likely to happen if the next word begins with [m], as in ‘keep an open mind’. Similarly, *captain* may be pronounced [kæp̥m̩], *something* as [sʌmp̥m̩], and *bacon* as [berk̥ŋ̩].

A phenomenon similar to nasal plosion occurs when [t] or [d] are followed by the homorganic (meaning ‘involving the same articulation’) lateral, [l]. In words such as *little* or *middle*, the air pressure built up by the [t] or [d] closure is released by lowering the sides of the tongue, to produce [l]; without releasing the contact between the tongue tip

and alveolar ridge. These pronunciations can be transcribed [lɪt̪l̪], [mɪd̪l̪]. The phenomenon is known as **lateral plosion**.

The speakers who use a glottal stop in *kitten* and *cotton* are likely to do the same for *little* and *bottle*. In popular London speech, where syllable-final /l/ is produced without any tongue-tip contact at all, these words are pronounced [lɪʔʊ], [bɒʔʊ]. The phrase 'little girl' is realized in Cockney as [lɪʔʊ ɡɛɒ].

The only native speakers who use a vowel between [t] or [d] and a following [l], apart from small children, are speakers of popular London accents who suddenly find themselves in a formal situation and consider that they have to change their speech to suit it. Usually, this involves change in the direction of RP. Such speakers may sometimes be heard to say [lɪtəl] or [bɒtəl].

Many Americans pronounce *little* and *bottle* with a [d], as [lɪd̪l̪], [bɒd̪l̪]. There is a general rule in American English that when [t] occurs after a stressed vowel and before an unstressed syllable, it is changed into a voiced sound.⁵⁶ In the case of *little*, this voiced sound is the stop [d]. But in words such as *writer*, *rider*, *city*, *better*, the sound used is a 'one-flap r'; a quick tap in which the tongue tip is thrown against the alveolar ridge. This is the same sound as is used in RP for words like *hurry*, *very* and in Spanish for *pero*, 'but'. The IPA symbol for this sound is [ɾ]. In this kind of speech, *writer* is pronounced in just the same way as *rider*; except that some speakers may use a longer [aɪ] diphthong in the second case.

Warning.

Although your English will sound slightly better if you use nasal and lateral plosion than if you don't, the advantage you gain by doing so is very small. As a non-native speaker, your pronunciation will probably sound slightly 'foreign' to natives in any case; and if you don't practice nasal plosion, not many people are likely to notice.

Although young English-speaking children often don't practice lateral or nasal plosion, Finnish speakers of English need not fear that not using this kind of pronunciation will make them sound childish. It won't. What *does* make the English speech of some Finns sound childish is the inability to distinguish between the two basic (alveolar and palato-alveolar) *sibilant* types; and the inability to pronounce [v] and [w] properly.

If, however, you decide to practice nasal and lateral plosion, it is essential that you remember to **delay lowering your velum (or lowering the side of your tongue); until some time AFTER you have made the preceding alveolar stop**. If you are saying (for example), *shouldn't*, you should raise your tongue tip (and sides) for the [d] stop, and **let the air pressure build up in your mouth** before you release it through your nose. Otherwise, you will say [n] rather than [dn]; and consequently, [ʃʌnt] rather than [ʃʌdnt].

Over the years, I have had many students who found it hard to do this. They went straight from their 'baby' pronunciation of *shouldn't* as [ʃʌdɒnt] to a new (and **totally unacceptable**) pronunciation as [ʃʌnt]. Needless to say, they would have done much better to keep the 'baby' pronunciation.

⁵⁶ Ladefoged, p. 48

Nasal plosion

1. I didn't [dɪdnt] know the Russians made one.
2. You couldn't [kʊdnt] tell the French had used it.
3. They wouldn't [wʊdnt] tell me where they'd been.
4. I shouldn't [ʃʊdnt] think it's very easy.
5. You mustn't [mʌsnt] ever tell her that.
6. It wouldn't be the first time. [wʊdnt bi] or [wʊbrɪp bi]
7. It didn't cost so much last year. [dɪdnt kɒst] or [dɪŋk kɒst]
8. The cat and dog were sharing the rug. [kætŋ dɒg]
9. A sudden change in the weather. [sʌdŋ]
10. I've written to him many times. [ɪtŋ]
11. She says she's [sɛʒ ʃɪz] certain he's the man. [sɜtŋ], [sɜʔŋ]
12. The red and blue ones cost so much. [ɹɛdŋ blu], [ɹɛbrɪ blu]
13. The dead and alive ones both look the same. [dɛdŋ]
14. The carpet will deaden the sound of the fall. [dɛdŋ]
15. The white kitten has eaten my passport and visa
[waɪk kɪtŋ], [waɪk kɪʔŋ]; [ɪtŋ], [ɪʔŋ]; [pɑspɔtŋ]

Lateral plosion

1. The cattle eat it/the cat'll eat it. [kæt|]
2. I'll arrive a little later. [ɪt|]
3. What'll your father say? [wɒt|]
4. The metal ones are always better. [mɛt|]
5. A Model 'T' Ford. [mɒd|]
6. I'm in the middle of a phone call. [mɪd|]
7. The handle's come off again. [hænd|]
8. Stick the candle in a bottle. [kænd|] [bɒt|]

Linking 'r'

'Non-rhotic' accents are those which, like RP or Southern American, have lost historical /r/ in the so-called 'post-vocalic' position, in words such as *fourth*, *floor*.

However, these accents still pronounce 'post-vocalic r' when a word which ends in 'historical' /r/ (a word like *floor*, *here*, *for*, *car*) is followed by another word beginning with a vowel. Thus in RP, *for* is pronounced [fɔ] in 'What's it for?'; but in 'It's for a party', *for a* is pronounced [fəɹə]. In RP, the version of /r/ used here is the 'one-flap' variety, as in RP *very* and Spanish *pero*; a quick tap in which the tongue tip is thrown against the alveolar ridge. The IPA symbol for this is [ɹ].

1. The dress was for a party. [fəɹə]
2. There are some people to see you. [ðəɹə]
3. Only for a limited time.
4. Is there a clock in the room? [ɪzðəɹə]
5. Is there any tea left? [ɪzðəɹɛni]
6. A dollar a time. [dɒləɹə taɪm]
7. It's her own opinion. [həɹəʊn]
8. Time for a tea break.
9. He was looking for a job.
10. Searching far and wide. [fɑɹən waɪd]
11. Promise to take good care of it. [kɛəɹəvɪt]
12. That's more or less true. [mɔɹləs]
13. A year or two later. [jɛɹɔtɹ]
14. The people that were at the meeting. [ðəɹpweɹətðə]
15. The others are in Paris. [ði ʌðə zəɹɪm ɹæɹɪs]

A related phenomenon to assimilation is the **re-organization of phonemic structure** that typically occurs in polysyllabic words in informal speech. Like assimilation, this has the effect of reducing the number or extent of the movements the speech-producing organs have to make. This is illustrated in the following set of progressively informal versions of *actually*, pronounced by RP speakers (reproduced from Laver, p. 67):

/æktʃʊəli/ → /æktʃʊəli/ → /æktʃʊli/ → /æktʃəli/ → /æktʃli/ → /æktʃli/ → /æfli/

A characteristic feature of English is that **phonetic boundaries** do not always coincide with **morphological boundaries**. Thus in the phrase *kicked out*, the phonological structure is /kɪk t̩ʌʊt/; the first /t/ belongs to *kick*, because it represents the PAST TENSE morpheme here used to mark *kick*. But the pronunciation is quite likely to sound more like [kɪk t̩ʌʊt], with the final /t/ of *kick* transferred to the following syllable.

This is particularly likely to happen when an unstressed syllable is followed by a stressed one that begins with a vowel; as in *doctor's office*. But this is not a necessary condition. I can remember giving a dictation to first-year Finnish students, which described one of the voyages of the English navigator Captain Cook, and included the phrase *the immense Pacific*. Students who knew English well got this right, but the weaker ones couldn't identify the words and wrote things like 'the eminent specific'. I had to give them credit for their listening abilities, because this was what I had actually said.

Practice with word boundaries

- | | | |
|-----|-------------------------------|------------------------|
| 1. | I got it at an auction. | [ˈgɒtɪtətə ˈnɔːkʃn] |
| 2. | It's a difficult issue. | [ˈdɪfɪkəl ˈɪʃu] |
| 3. | They're better than ever. | [ˈbetədɔː ˈnevə] |
| 4. | kicked out of school. | [ˈkɪk ˈtaʊtəv ˈskul] |
| 5. | I made my preparations early. | [ˈprepə ˈjeɪʃn ˈzɛli] |
| 6. | mixed ribbons | [ˈmɪk ˈstɪbənz] |
| 7. | doctor's office | [ˈdɒktə ˈzɒfɪs] |
| 8. | her own position | [hə ˈroʊnpə ˈzɪʃn] |
| 9. | a bent rail | [ˈbɛn ˈteɪl] |
| 10. | let's ask them to come | [lɛt ˈsɑːskəmtə ˈkʌm] |
| 11. | is it raining | [ɪzɪ ˈteɪnɪŋ] |
| 12. | the immense Pacific | [ðə ɪmˈɛnt spə ˈsɪfɪk] |
| 13. | they're all going | [ðə ˈɔːl ˈɡoʊɪŋ] |
| 14. | mixed reactions | [ˈmɪk stɪ ˈækʃnz] |

[ə ˈhɔːsli tɒʊtsə ˈɡoʊtli tɒʊtsən ˈɪt ˈlæmzi ˈtaɪvi]

[ə ˈkɪdli ˈtaɪvi ˈtu ˈwʊdŋ ˈtʃu] (Explanation on p. 130).

10

Word stress

Stress is a *suprasegmental* feature of utterances, since it applies to whole syllables rather than to vowels or consonants. A stressed syllable is pronounced with more energy than an unstressed syllable.

In many languages, the position of the stress is fixed in relation to the word. In Finnish, as also in Czech, the stress is nearly always on the first syllable, irrespective of the number of syllables in the word. In Swahili and in Polish, the stress is usually on the last syllable but one; that is, the **penultimate** syllable. In French, stress is a property of the phrase, rather than the word; it falls on the last syllable of the phrase.

Ladefoged observes (p. 222) that variations in stress cause different languages to have different rhythms. He points out that English, and other Germanic languages, make far more use of differences in stress than most of the world's languages. We have already noted, on p. 110, above, some of his observations on the way in which English word stress can be varied so as to help maintain the characteristic stress-timed rhythm of English. By contrast, he notes that 'In French there is great evenness to the rhythm, since only the last syllable in a phrase is different from any other.'

Unlike Finnish or Swahili, English lacks any *general* rule for the placement of word stress. As we have seen, there are circumstances in which English word-stress is variable; further, the same word may be stressed on a different syllable on different sides of the Atlantic. Recently, there has been a shifting of word stress from the first to the second syllable on words such as *formidable*, *exquisite*, *hospitable*, *controversy*. And even native speakers sometimes wonder whether they should say 'kilometre or ki'lometre.

Moreover, English stress is characteristically heavy; and this, combined with the tendency to maintain stress-timed rhythm, means that unstressed syllables tend to be 'reduced'; that is, to feature centralized vowels which, because they do not require the tongue and lips to move very far from their 'neutral' positions, do not take much time to say. Note the way in which the vowel qualities of *photograph* (which is stressed on the first syllable) differ from those of *photography*, which is stressed on its second syllable:

photograph [ˈfɒtəˌɡrɑːf]

photography [fəˈtɒɡrəfi]

Variations as great as these, combined with the lack of rules of a general kind for stress placement (and the resulting uncertainty even of native speakers about words like *kilometre*) would be likely, it might be thought, to mean that the attempts of non-natives to speak English would sometimes be quite unintelligible to native-speaking listeners. In the course of mis-placing lexical stress, and adjusting their vowels accordingly, foreign learners might be expected to produce utterances like *an impotent disco*, *very* for an intended 'an important discovery', or *an inter-terrible pozzy shun* for 'an intolerable position'. In practice this does not happen; because in reality rules of a kind relating to stress do exist, though they lack the generality of the Finnish or Czech rules. Mistakes of the kind imagined above do not occur because, in the first place, non-native speakers soon learn (from their high frequency in the language) the function of the *-y* and *-tion* terminations in forming nouns from verbs. Thus a *position* is something that has been posited or placed (Latin *positus*, *-a*, *-um* from *ponere*, 'to place') and a *discovery* is something that has been discovered; and learners soon notice that neither termination is stressed. Then again, learners quickly learn to distinguish between the Latin prefixes *in* and *inter*, and they note that the stress usually falls on the syllable that follows these prefixes.

(From p. 128): A horse'll eat oats, a goat'll eat oats; and little lambs eat ivy. A kid'll eat ivy, too; wouldn't you?
Hevonen syö kauraa, vuohi syö kauraa, ja pienet karitsat syövät murattia. Myös kili syö murattia; etkö sinä?

1. Certain endings are always stressed. These include:

- 'ation imagination, industrialization, information, frustration, operation.

There are similar **-tion** endings with spellings in **e, i, o, u**, as in *discretion, pollution, solution, position, condition, promotion*.

- 'bility ability, reliability, impossibility.
- 'ivity activity, passivity, declivity
- 'idity validity, solidity, humidity
- 'atic/ 'etic pragmatic, erratic, aesthetic
- 'astic enthusiastic, scholastic, fantastic
- 'ality finality, tonality, modality

2. There are other endings which, although they are not stressed, attract stress. A word which is stressed on the first syllable in its basic form may be stressed on the second or third when a specific ending is added; as with *'commerce* compared with *com 'mercial*. Some examples are:

'advertise	ad 'vertisement	'industry	in 'dustrious
'alternate ⁵⁷	al 'ternative	'injury	in 'jurious
'atom	a 'tomic	'monotone	mo 'notonous
'benefit	be 'neficent	'origin	o 'riginal
'catholic	ca 'tholicism	'person	per 'sonify
'commerce	com 'mercial	'photograph	pho 'tography
'commune	com 'munity	'politics	po 'litical
'constitute	con 'stituent	'potent	po 'tential
'courage	cou 'rageous	'precipice	pre 'cipitous
'cylinder	cy 'lindrical	'prudent	pru 'dential
'democrat	de 'mocracy	'rhapsody	rhap 'sodic
'demonstrate	de 'monstrative	'ridicule	ri 'diculous
'execute	ex 'ecutive	'solid	so 'lidity, so 'lidify
'fluid	flu 'idity	'triangle	tri 'angular
'history	his 'torical	'vehicle	ve 'hicular

Two exceptions are: *contemplate* (the derived form may be either *'contemplative* or *con 'templative*); *illustrate* (*'illustrative* is the most common derived form).

3. **Prefixes.** When a two-syllable word begins with a prefix, the second syllable is usually stressed, as in:

ex 'plore in 'tend re 'new per 'vert pro 'vide un 'do

⁵⁷ That is, used as a verb. As an adjective, it is stressed on the 2nd syllable, as in *on al ternate Sundays*.

3. In the case of two-syllable words which function both as nouns (or as nouns used as adjectives, as in *an export permit*; c.f. *French exports*) and as verbs (or as derived forms functioning as adjectives: c.f. *to export*; *exported goods*; *to increase*, *an increasing number*) the word is usually stressed on the first syllable when it functions as a noun, and on the second when it is a verb.

French 'exports, an 'export permit; to ex'port, ex'ported goods.

Practice.

1. After a concerted effort, the **convicts** escaped.
The man was convicted of not attending the **concert**.
2. It was I who perfected the **present transport** system.
He presented a **perfect** solution, which enabled us to transport it.
3. There has been an **accented decrease** in **proceeds**.
The **accent** must be on decreasing his income, so that he can't proceed.
4. Some **progress** has been made on that particular **project**.
We **projected** a silent film today; next week we **progress** to sound films.
5. His **import permit** has been contested, you know.
He is **permitted** to **import** the new Ford 'Contest' sports car.
6. I was **absent** from the meeting. Was he really so **insulted** he **refused** to attend?
After I had **absented** myself, he delivered an **insult**; comparing my garden to a **refuse** heap.
7. I **suspect** that he will **object** to a **survey** of the **exploit**.
The man **surveyed** the **object**. From that moment on, he began to regard himself as a **suspect**, liable to be **exploited**.
8. His **comment** on the **increase** should be contrasted with the Board's view.
I should like to **comment** on the **increasing contrast** noticeable in recent years.
9. 'Will you **desert** me, you tormenting **escort**?' she said.
He **escorted** her to the edge of the **desert** and left her. What a **torment**!
10. Have you any **record** of this **conflict**?
He **recorded** a song for E.M.I, which **conflicted** with the terms of his contract.
11. The **rebel** was finally **converted**, despite the **protests** of his **allies**.
He **protested** by allying himself with the **converts** who had **rebelled**.
12. The **invalid** attended the hospital on **alternate** Fridays.
Their claim that we would benefit from using **alternating current** is **invalid**.

11

Weak forms

Some examples of weak forms.

The term 'weakening' describes the vowel 'reduction' that typically occurs in unstressed syllables. Such syllables usually employ the central vowel [ə], or the centralized [ɪ], and a neutral tongue position, neither rounded nor strongly spread; this means that the tongue and lips do not have to move far from their neutral or 'rest' positions, and so the syllable can be 'passed over' quickly. Such unstressed syllables, in addition to featuring a reduced vowel, are short, and have the same pitch as the stressed syllable which preceded them; that is to say, there is no pitch change.

Some smaller 'grammatical' words, such as *and*, *him*, *to*, *for*, are nearly always unstressed when they occur in normal speech, and in these circumstances are always produced with a reduced vowel. Thus *and* usually occurs in the forms [ənd], [ən] and [n]; not to mention the assimilated forms, [m] and [ŋ]. [ənd] would be the most likely form to occur in front of a vowel at the beginning of a phrase; as in *I didn't like it, and I told him so*. [n] might be used in '*and you told him so*'; but some speakers might use [ənd] here, too. [n] is the most likely variant in *fish and chips*, [m] in *eggs and bacon*, [ŋ] in *tea and coffee* or *coffee and cake*. These forms are known as the **weak forms of and**. The 'strong' form of the word, [ænd], is only used for special emphasis; as in '*I asked you to bring tea and coffee; not tea or coffee.*' Apart from this, it is used when a word is being *mentioned*, rather than *used*; and for this reason is called the 'citation form'.

In the examples below, *cf.* means the citation form and *wf.*, the weak form or forms.

he	cf. [hi] wf. [hɪ], [ɪ]	John said he was coming. Is he bringing Mary? He only said <i>he</i> was coming.	[sɛdɪwəz] [ɪzi] [hiounli/hɪounlɪ, hi]
she	cf. [ʃi], wf. [ʃɪ]	Did she go?	[dɪdʃɪ]
him	cf. [hɪm] wf. [ɪm]	I hope Mary comes with him. I asked him to bring her. Yes, but you know <i>him</i> .	[wɪðɪm] [ɑ:stɪm] [hɪm]
her	cf. [hɜ: wf. [ɜ:], [ə]	I'd like to see her again. I met her brother yesterday. Did he mention <i>her</i> ?	[ˈsiərə ˈgeɪn] [mɛtɜ:], [mɛtə] [hɜ:]
his	cf. [hɪz], wf. [ɪz]	He said his sister was in London.	[ˈsɛdɪz]
himself	cf. [hɪmsɛlf] wf. [ɪmsɛlf]	John must be coming by himself. Yes, if he doesn't lose himself.	[baɪ ɪmˈsɛlf] [ˈluzɪmsɛlf]
herself	c.f. [hɜ:sɛlf] wf. [əɛlf]	Mary can take care of herself. She prides herself on it.	[ˈkeərəvɜ: ˈsɛlf] [ˈpraɪdzəɛlf]

them	cf. [ðɛm] wf. [ðəm, əm, m]	I like them both. Yes, I like them too.	[aɪlaɪkəm] [laɪkəm], [laɪkðəm]
us	cf. [ʌs] wf. [əs], [s]	I want us to go and see them. Let's ask them to come here. I think <i>they</i> should ask <i>us</i> .	[ˈwɒntəstə ˈɡoʊən ˈsiəm] [lɛt ˈsɑːskəm] [ʌs]
you	cf. [ju], wf. [jʊ]	You know it's up to you	[ju], [jʊ]
the	cf. [ði], wf. [ðə]	The apples are on the table.	[ðɪæpəlz] [ðə teɪbəl]
some	cf. [sʌm] wf. [səm], [sɪ]	Will you have some more tea? I think there's still some left.	[səmmɔː] [sʌm]
who	cf. [hu] wf. [u]	That's the man who helped me. Who's that with him, I wonder?	[u] [hu]
that	cf. [ðæt], wf. [ðət]	This is the house that Jack built.	[ðæt]
there	cf. [ðɛə] wf. [ðə]	Is there a clock in the room? I don't want to go there.	[ˈɪzðɛə?] [ðɛə]
till	cf. [tɪl] wf. [tɪ]	Can't you stay till Sunday? Till I get a letter, I don't know.	[tɪ] [tɪl]
and	cf. [ænd] wf. [ənd], [ən], [ŋ]	You and I are the same age. The cat and dog were sharing it.	[juənərɪ] [kætŋ dɒg]
as	cf. [æz] wf. [əz]	She's as tall as you are. As to that, I don't know.	[ʃɪzəz] [æz]
than	cf. [ðæn] wf. [ðən, ðəm, ðəŋ]	She's taller than you. Taller than me, thinner than Kim.	[ðən] [ðəm], [ðəŋ]
at	cf. [æt] wf. [ət]	I'll expect you at eight. Yes; at, or just after eight.	[ə ˈteɪt], [ət ˈteɪt] [æt]
for	cf. [fɔ] wf. [fə]	Will you stay for a meal? I'll be too late for that. What's all the hurry for?	[fərə] [fə] [fɔ]
from	cf. [fɹɒm] wf. [fɹəm]	I shall be there from two till six. It's difficult to get away from.	[fɹəm] [fɹɒm]

of	cf. [ɒv], wf. [əv]	A lot of things to think of	[əv], [ɒv]
to	cf. [tu] wf. [tʊ], [tə]	Shall we go to London? Yes, I'd like to. Can David come, too?	[tə] [tʊ] [tu]
do	cf. [du] wf. [dʊ], [d]	D'you live in London? Yes, I do.	[dʒʊlɪvɪn] [dʒəlɪvɪn] [du]
does	cf. [dʌz] wf. [dəz]	Where does he live? Does he live in London? Yes, he does.	[dəzi] [dʌzi], [dəzi] [dʌz]
am	cf. [æm] wf. [əm], [m], [ŋ]	I'm going home. So am I. Am I very late?	[aɪŋ ɡoʊɪŋ] [əm] [æm]
are	cf. [ɑ] wf. [ə]	The boys are at school. So they are.	[bɔɪzəreɪt] [ɑ]
was	cf. [wɒz] wf. [wəz]	It was my birthday yesterday. Was it?	[ɪpwəzmaɪ] [wɒzɪt]
were	cf. [wɜ] wf. [wə]	They were friends of mine. Oh, were they?	[ðeɪwə 'fɛnzəv 'maɪn] [wɜ]
has	cf. [hæz] wf. [həz], [z]	Has anyone seen Liisa? She's been arrested on drugs charges. Oh, has she?	[hæz] [z] [hæzʃɪ]
must	cf. [mʌst] wf. [mʌs], [məs]	We must try to get there early. Yes, we must.	[məs] [mʌst]
should	cf. [ʃʊd] wf. [ʃəd]	What should I do with the key? I shouldn't like to lose it.	[ʃədəɪ] [ʃʊdnɪt]
would	cf. [wʊd] wf. [əd], [d]	My father would like to meet you. I'd like to meet him, too. Would you?	[fɑðərəd] [d] [wʊd]
can	cf. [kæn] wf. [kən]	You can carry this. I will if I can.	[kæn] [kən]
could	cf. [kʊd], wf. [kəd]	You could do that, could you?	[kəd], [kʊd]

12

Reading passages

‘Give your evidence,’ said the King; ‘and don’t be nervous, or I’ll have you executed on the spot.’

This did not seem to encourage the witness at all: he kept shifting from one foot to the other, looking uneasily at the Queen, and in his confusion he bit a large piece out of his teacup instead of the bread-and-butter.

Just at this moment Alice felt a very curious sensation, which puzzled her a good deal until she made out what it was: she was beginning to grow larger again, and she thought at first she would have to leave the court; but on second thoughts she decided to remain where she was as long as there was room for her.

‘I wish you wouldn’t squeeze so,’ said the Dormouse, who was sitting next to her. ‘I can hardly breathe.’

‘I can’t help it,’ said Alice very meekly: ‘I’m growing.’

‘You’ve no right to grow *here*,’ said the Dormouse.

‘Don’t talk nonsense,’ said Alice more boldly, ‘you know you’re growing too.’

‘Yes, but *I* grow at a reasonable pace,’ said the Dormouse: ‘not in that ridiculous fashion.’ And he got up very sulkily and crossed over to the other side of the court.

All this time the Queen had never left off staring at the Hatter, and, just as the Dormouse crossed the court, she said, to one of the officers of the court, ‘Bring me the list of the singers in the last concert!’ on which the wretched Hatter trembled so, that he shook off both his shoes.

‘Give your evidence,’ the King repeated angrily, ‘or I’ll have you executed, whether you are nervous or not.’

Lewis Carroll, *Alice in Wonderland*.

‘There’s more evidence to come yet, please your Majesty,’ said the White Rabbit, jumping up in a great hurry: ‘this paper has just been picked up.’

‘What’s in it?’ said the Queen.

‘I haven’t opened it yet,’ said the White Rabbit, ‘but it seems to be a letter, written by the prisoner to—to somebody.’

‘It must have been that,’ said the King, ‘unless it was written to nobody, which isn’t usual, you know.’

‘Who is it directed to?’ said one of the jurymen.

‘It isn’t directed at all,’ said the White Rabbit; ‘in fact, there’s nothing written on the *outside*.’ He unfolded the paper as he spoke, and added ‘It isn’t a letter, after all: it’s a set of verses.’

‘Are they in the prisoner’s handwriting?’ asked another of the jurymen.

‘No, they’re not,’ said the White Rabbit, ‘and that’s the queerest thing about it.’ (The jury all looked puzzled.)

‘He must have imitated somebody else’s hand,’ said the King. (The jury all brightened up again.)

‘Please your Majesty,’ said the Knave, ‘I didn’t write it, and they can’t prove I did: there’s no name signed at the end.’

‘If you didn’t sign it,’ said the King, ‘that only makes the matter worse. You *must* have meant some mischief, or you’d have signed your name like an honest man.’

There was a general clapping of hands at this: it was the first really clever thing the King had said that day.

‘That *proves* his guilt,’ said the Queen.

‘It proves nothing of the sort!’ said Alice. ‘Why, you don’t even know what they’re about!’

There was a table set out under a tree in front of the house, and the March Hare and the Hatter were having tea at it: a Dormouse was sitting between them, fast asleep, and the other two were using it as a cushion, resting their elbows on it, and talking over its head. 'Very uncomfortable for the Dormouse,' thought Alice, 'only, as it's asleep, I suppose it doesn't mind.'

The table was a large one, but the three were all crowded together at one corner of it. 'No room! No room!' they cried out when they saw Alice coming.

'There's plenty of room!' said Alice indignantly, and she sat down in a large arm-chair at one end of the table.

'Have some wine,' the March Hare said in an encouraging tone.

Alice looked all round the table, but there was nothing on it but tea. 'I don't see any wine,' she remarked.

'There isn't any,' said the March Hare.

'Then it wasn't very civil of you to offer it,' said Alice angrily.

'It wasn't very civil of you to sit down without being invited,' said the March Hare.

'I didn't know it was *your* table,' said Alice: 'it's laid for a great many more than three.'

'Your hair wants cutting,' said the Hatter. He had been looking at Alice for some time with great curiosity, and this was his first speech.

'You should learn not to make personal remarks,' Alice said with some severity: 'It's very rude.'

The Hatter opened his eyes very wide on hearing this; but all he *said* was, 'Why is a raven like a writing-desk?'

'Come, we shall have some fun now!' thought Alice. 'I'm glad they've begun asking riddles.—I believe I can guess that,' she added aloud.

Lewis Carroll, *Alice in Wonderland*.

So she set the little creature down, and felt quite relieved to see it trot away quietly into the wood. ‘If it had grown up,’ she said to herself, ‘it would have made a dreadfully ugly child: but it makes rather a handsome pig, I think.’ And she began thinking over other children she knew, who might do very well as pigs, and was just saying to herself, ‘if one only knew the right way to change them’—when she was a little startled by seeing the Cheshire Cat sitting on a branch of a tree a few yards off.

The cat only grinned when it saw Alice. It looked good-natured, she thought: still, it had *very* long claws and a great many teeth, so she felt that it ought to be treated with respect.

‘Cheshire Puss,’ she began, rather timidly, as she did not at all know whether it would like the name; however, it only grinned a little wider. ‘Come, it’s pleased so far,’ thought Alice, and she went on, ‘Would you tell me, please, which way I ought to go from here?’

‘That depends a good deal on where you want to get to,’ said the Cat.

‘I don’t much care where,’ said Alice.

‘Then it doesn’t matter which way you go,’ said the Cat.

‘—so long as I get *somewhere*,’ she added as an explanation.

‘Oh, you’re sure to do that,’ said the Cat, ‘if you only walk long enough.’

Alice felt that this could not be denied, so she tried another question.

‘What sort of people live about here?’

‘In *that* direction,’ the Cat said, waving its right paw round, ‘lives a Hatter: and in *that* direction,’ waving the other paw, ‘lives a March Hare. Visit either you like: they’re both mad.’

Lewis Carroll, *Alice in Wonderland*.

Consonant contrasts practiced with nonsense words

This material can be used as an ear-training test. The teacher selects one of the 'blocks' (A, B, C, etc.) and chooses a sentence from it. He announces the block, and then reads the chosen sentence without giving its number. Students have to write down the number opposite the block letter; e.g. 'D4'.

If the training group is small, students can be asked, in turn, to choose a sentence from a particular block and read it aloud. If the sentence is read correctly, the teacher will be able to identify the sentence, and the student will confirm the identification. It may happen that the teacher is able to identify a sentence, but nonetheless notes a fault in the student's pronunciation, which he can point out.

Finally, students can be linked in pairs; each member of which, in turn, chooses and reads a sentence, which the other member has to identify. Each successful transmission and identification counts as one point for that pair; who compete with other pairs in the training group.

A. *'Trying the grog'*

1. Drying the grock
2. Drying the crock
3. Trying the grock.
4. Drying the crog.
5. Trying the crog.

B. *'Drawn to the group'*

1. Trawn to the groob.
2. Drawn to the croob.
3. Trawn to the croop.
4. Drawn to the croop.
5. Trawn to the group.

C. *'The track was so black'*

1. The drag was so plack.
2. The drack was so plag.
3. The drag was so blag.
4. The trag was so plack.
5. The track was so blag.

D. *'A trick to be caught'*

1. A drig to be cawd.
2. A trig to be gawt.
3. A drick to be gawd.
4. a drig to be tawg.
5. a drick to be kawt.

E. *'Which cats cost so much?'*

1. Wits catch cots so much?
2. Which cats cots so mutts?
3. Which catch cost so mutts?
4. Wits cats cots so much?
5. Wits catch cost so mutts?

F. *'Rich cats choose Pat's chips'*

1. Rits cats choose Pat's chips.
2. Rits cats choose patch chips.
3. Rich catch choose patch chips.
4. Rits catch choose Pat's chips.
5. Rich cats choose patch chips.

G. *'She sells sea shells, too'*

1. Sea shells she sells too.
2. She sells she shells too.
3. Sea sells she sells too.
4. She shells sea shells too.
5. Sea shells she shells too.

H. *'Wise men won't overwork'*

1. Vize men won't owerverk.
2. Vize men von't oververk.
3. Wise men von't owerwor k.
4. Vize men won't owerverk.
5. Wise men won't owerwork.

APPENDIX

The syllable.

The concept of the **syllable** is one that it is very hard to make objective. Thus Laver (1994:113) writes:

The notion of a phonetic unit the size of a syllable is a very attractive one, and it exercises a perennial attraction for phonetic research. But it is difficult to offer a definition of the phonetic syllable which has a claim to rigour, and which can show any demonstrable, objective correlates on physically measurable parameters.

Laver quotes Brosnahan and Malmberg (1970:140-2) who comment:

The syllable ... is by no means a simple concept. Within the one language a child can usually count on its fingers the number of syllables in a sequence, but no phonetician has succeeded so far in giving an exhaustive and adequate description of what the syllable is. ... No physiological theory of the syllable so far developed seems sufficiently well founded instrumentally to be acceptable as definitive and exhaustive.

And Laver adds that attempts to provide acoustic or auditory definitions have so far proved equally unsatisfactory.

In referring to 'physiological theory', Brosnahan and Malmberg must have had in mind, among others, the theory developed by the American psychologist R.H. Stetson. Stetson noted that the pulmonic (i.e. lung-generated) airstream used for all connected speech is produced in a series of puffs; which are caused by small contractions of the intercostal muscles between the ribs; rather than by a large contraction of the lateral dorsal muscle, such as you would use to blow up a balloon. This has been verified by electromyography; a technique in which small needles inserted in the muscles serve as electrodes to record muscular activity. Stetson considered that the syllable was based on a single contraction of the intercostal muscles, which produced a single puff of air, or 'chest pulse'; and that this was why native speakers of any language could always tell how many syllables there were in any utterance they had produced. They knew what their own muscles were doing. But electromyography has shown that, though the syllables reported by native speakers (of whatever language is investigated) correlate very well with contractions of the intercostal muscles, the correlation is not perfect. In English, electromyography has shown that single-syllable words (recognized as such by speaker and listener alike) which begin with long consonant clusters, as in *stream*, may sometimes be accompanied by two 'chest pulses'.

Other attempts to define the syllable have, as noted on p. 108, above, tried to relate it to the properties of the *sound* involved; in particular, to peaks in the *sonority* of speech. But as we have already noted, this theory does not work in every case, either; since there are words like *spy* which, although they have two peaks of sonority, everyone agrees consist of a single syllable.

Ladefoged notes (p. 218) that 'although nearly everybody can identify syllables, almost nobody can define them;' and that 'it is curiously difficult to state an objective procedure for locating the number of syllables in a word or phrase.' He also observes that, although in most cases people agree on the number of syllables there are in a word, there are also cases where they disagree. Some of the disagreement is due to dialectical differences; for example, a word such as *bottling* may be pronounced either as [bɒt lɪŋ] or as [bɒt|lɪŋ]. But people often disagree on the number of syllables there are in words which they pronounce in exactly the same way. The ending *-ism*, for instance, is considered by

some to be a single syllable, but by others to be two; resulting in different estimates of the number of syllables in words such as *communism*. Other groups of words on which people disagree, Ladefoged observes, include those in which a high front vowel is followed by /l/ (some people will say that *real* or *wheel* are two-syllable words) and those in which /r/ may, or may not be syllabic, in words such as *hire, fire, hour*. There is also disagreement over how many syllables there are in words in which an unstressed high vowel is followed by another vowel without an intervening consonant; words such as *mediate* or *heavier*; Ladefoged notes that though in some cases, disagreement may reflect genuine pronunciation differences, 'it is often not clear if a syllable has been omitted on a particular occasion.'

Ladefoged also points out that some of the disagreement may arise because people apply different criteria in making their judgments. Some may attend only to the particular word they are judging; but others may consider how it resembles other words. If they distinguish between *hire* and *higher*, they are likely to consider the first to be a monosyllable, and the second to have two syllables; but if they pronounce both words in the same way, they will probably judge both to have two syllables.

It was noted, on p. 108, above, that tongue slips almost always involve interaction between linguistic elements (either segments, or components of segments, such as voicing) which occur in the same position in two different syllables; usually the syllable-initial position. Further, that syllabic writing systems (i.e. systems that provide every syllable of a language with its own written character, or graph) have been invented several times in the history of civilization, before the invention of alphabetic writing. These facts suggest that, even though it has yet to be reliably defined in acoustic or articulatory terms, the syllable has some kind of objective reality; and is not merely the creation of grammatical tradition.

Stress.

This is a property of whole syllables, rather than of vowels and consonants. A stressed syllable is pronounced with greater energy than an unstressed.⁵⁸

Stetson considered that a **stressed syllable** was the result of an extra-vigorous muscular contraction; a 'reinforced chest pulse' or 'stress pulse'. This, he thought, was why native speakers could always tell you which syllables in their utterances were stressed; even though these might not be particularly loud (for example, if the stressed syllable were whispered, and a following unstressed syllable voiced, as sometimes may happen in the utterance 'Thank you'). Stetson's theory certainly agrees well with speakers' perceptions; but it has never been possible to provide empirical verification.

Stress is usually considered to involve one or more of the parameters of **duration, loudness, pitch, and quality** (i.e. whether a vowel demands a large excursion from the neutral or 'rest' position of the tongue and lips, or whether it is 'reduced'). The problem here is that no single one of these factors is invariably present in a stressed syllable. Stressed syllables are usually louder than unstressed, but do not have to be; and as already noted, if a stressed syllable is whispered it will be quiet in any case. They are often longer than unstressed syllables, but do not have to be. Professor David Abercrombie, when teaching the Ordinary course in Phonetics at the University of Edinburgh, used to compare the English sentences *Take Grey to London* and *Take Greater London*; he

⁵⁸ Ladefoged (1975), p. 222.

pointed out that in both instances, the segment [gret] was stressed, but that only in the first case was it long. They typically, but not invariably, have unreduced vowels. Their pitch may be higher than that of the surrounding syllables, or there may be a 'downward' pitch movement (in the case of a stressed syllable which is also the 'tonic' syllable of an utterance); but this is not always the case. Brown, however, considers (p. 45) that length is the single most reliable indicator of stress. She suggests that learners (of English) would do well to practice pronouncing English stressed syllables with a count of **two** as against a count of **one** for unstressed syllables.

Rhythm.

Linguists have usually held the view that speech tends to be produced **isochronously**; that is, with certain units of speech recurring at regular intervals of time. English and other Germanic languages are said to be a **stress-timed languages**; in which there is a tendency for **stressed syllables** to be isochronous. French and Italian, on the other hand, are said to be **syllable-timed**; since in these languages the **syllables** tend to be isochronous. In some other languages, the rhythm is considered to be based on **syllable 'weight'** rather than syllable *stress*. 'Heavy' syllables in these languages are those which have either a long vowel, or a short vowel followed by a long consonant; 'light' syllables are those which do not fulfil these conditions. In fact, syllable 'weight' is a matter of syllable length, or how much time the syllable occupies. Such languages are said to have a **mora-based rhythm**; and an often-cited example is Japanese; of which Ladefoged writes (p.224):

Japanese may be analyzed in terms of the classical Greek and Latin unit called a **mora**. A mora is a 0unit of timing. Each mora takes about the same length of time to say. The most common type of Japanese mora is formed by a consonant followed by a vowel. Japanese words such as [kakemono] (scroll) and [sukiyaki] (beef stew) each consist of four morae of this type. Note that in the latter word the high vowel /u/ is voiceless because it occurs between two voiceless consonants; but it still takes the same length of time as the vowels in the other syllables. Another type of mora is a vowel by itself, as in the word [iki] (breath). This word has two morae, each of which takes the same length of time to say. A consonant cannot occur after a vowel within a mora, but it too can form a mora by itself. The word [nippon] (Japan) must be divided into four morae [ni p po ŋ]. Although it has only two vowels, it takes the same length of time to say [nippon] as it does to say [kakemono] or [sukiyaki].

But it has proved difficult to confirm the existence of rhythm in spoken language from the objective analysis of recorded speech; and Laver (1994:524) has suggested that the perceived rhythm of speech may very well be *constructed*, since 'the human cognitive system seems unable to resist the temptation to impose a constructed rhythm on suitable sensory material in the time domain.' For example, the regular ticking of a clock (a series of regular noises of identical quality) is often perceptually grouped into sequences of two or more ticks, with one tick heard as dominant of the other(s) 'in an arbitrary and reversible rhythmic grouping.' He points out that syllable-timed rhythm, as described by Abercrombie (see p. 109, above) would not be possible except in a language where the syllables all had the same structure (for instance, CV); and in which the vowels were all of equal length. But in French (cited by Abercrombie as an example of a syllable-timed language) syllables are of varied lengths, and include the structures V, CV, CCV, VC, VCC, CVC, CCVC, CCVCC. Even proponents of the view that English (for example) is stressed-timed, and French (for example) is syllable-timed are forced to concede that if a stretch of English speech is recorded and the intervals between the stressed syllables

measured, these intervals are *not* perfectly isochronous; a fact which they get round by claiming that English such syllables *tend to be* produced isochronously. Laver continues (p. 525):

Speech offers a fairly clear illustration of the brain's predilection for constructively seeking out rhythmic interpretations of auditory material. A simple view of the perception of underlying rhythmicity in speech is that it depends on constructing a hypothesis about what the rhythm of an utterance might have been had it been free of the distorting accidents of the variety of individual lexical and other linguistic structures used. When asked to tap a pencil on a desk in time with the rhythmic beats perceived in continuous speech, for instance, listeners tap at a more regular rhythm than is typically justified by the speech material.

Finally, Laver cites the work of Dauer (1983); noting that:

In her meticulous experimental investigations of English, Spanish, Italian and Greek, she was able to show that the mean duration between stressed syllables in all these languages is proportional to the number of syllables in that interval, and that 'there is no more of a tendency for interstress intervals to clump together in English than in the other languages.' (Dauer 1983:54).

However this may be, I find it hard not to agree with Giegerich when he says (p. 259) that 'the "staccato" rhythm of English spoken with a strong French accent is clearly the result of syllable rather than foot isochrony (given that French is a syllable-timed language)'. Even though, in a sentence such as **This is the house that Jack built** (stressed syllables shown in bold type) the speaker spends longer on *This is the* than he does on *Jack*, he certainly does not spend **three times** as long. Similarly, a French speaker may take longer to say a syllable with the structure CCVCC than one with the structure CV; but not so long as would be the case if the CCVCC syllable were in the position of *Jack* in the above example from a stressed-timed language. In this connection, I think it should be pointed out that Dauer's finding, reported above, that the duration between stressed syllables is proportional (even in English) to the number of intervening unstressed syllables does nothing to invalidate the stress-timed/syllable-timed distinction **unless the proportion can be shown to be direct**; with *house that* taking *twice* as long to say as *Jack*, and *This is the*, *three times* as long. (Or *almost* three times as long; since even in a syllable-timed language, than the unreduced [æ] vowel of *Jack* might perhaps require slightly more time than the more central vowels of *This is the*). But if (as Giegerich says is the case) the 'proportionality' is rather a matter of *Jack* spanning three units of time measurement, and *house that* spanning four, and *This is the*, five, then the claim that English is (approximately) stress-timed is still valid; since in a syllable-timed language, the ratios would approximate to 3, 6, and 9. What Dauer's research *does* show is that 'syllable-timing' and 'stress-timing' are not categorical conditions; it would be more accurate to say that English **tends towards** stress-timing, and that it is **less** syllable-timed than French. It seems to me reasonable to suppose that even if the 'stress-timed rhythm' of English better describes the way the language is perceived by its native speakers than it does the physical reality, this perception is nonetheless likely to have an effect of some kind on the temporal sequence of syllable production. Speakers who perceive their language as stress-timed are likely to try to fit their unstressed syllables into the time-slot allowed by the perceived rhythm (and in so doing, employ reduced forms of both vowels and consonants); even if the mechanical movements required, even in reduced form, dictate that the measured result turns out to be a compromise between stress-timed and syllable-timed production.

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