

TYPES OF SOUND CHANGE

While it may not be particularly surprising to learn that all languages change over time, you may be surprised to learn that different languages tend to change in remarkably similar ways. For instance, if you look at the history of the sound [p] in the Uradhi language of northern Queensland, you will find that it has undergone a change to [w] in the modern language:

	Uradhi	
*pinta	→ winta	'arm'
*pilu	→ wilu	'hip'
*pata	→ wata	'bite'

Now, if you look at the history of the same sound [p] in a completely different language, which has no known historical connection with Uradihi, you will find that exactly the same change has taken place. Let us look at the Palauan language of Micronesia. (Ignore all sounds except for those in bold type.)

	Palauan	
*paqi	→ waʔ	'leg'
*paqit	→ waʔaʔ	'bitter'
*qatap	→ ʔaʔow	'roof'

It would be easy to find examples in other languages of the world of the sound [p] changing to [w]. But we would also find repeated examples of [p]

¹ In the study of the history of languages, the symbol * is used to mark a form that has never actually been heard or written, but which is inferred or reconstructed in a protolanguage on the basis of evidence that is available. We will be looking at how we arrive at such reconstructions in Chapter 5.

The first kind of sound change that I will talk about is *lenition*, or *weakening*. The concept of lenition is not very well defined, and linguists who use the term often seem to rely more on intuition or guesswork than on a detailed understanding of what lenition really is. Linguists sometimes speak of certain sounds as being relatively 'stronger' or 'weaker' than others. Many people would intuitively judge the sounds on the left below to be 'stronger' than those on the right:

	Stronger	Weaker
p	β p	β b
f	x	h
b	v	w
a	i	e
d	l	r
s	t	ʔ
k		ʔ

The generalisations that can be made regarding these correspondences are that voiced sounds can be considered 'stronger' than voiceless sounds. Similarly, stops rank higher than continuants in strength; consonants are higher than semi-vowels; oral sounds are higher in rank than glottal sounds; and front and back vowels rank higher than central vowels.

These generalisations about the relative strength and weakness of sounds correspond roughly to the widely discussed sonority hierarchy that is invoked in many discussions of synchronic phonology. This hierarchy is as follows, with the most sonorous sounds to the left and the least sonorous sounds to the right:

- a > e > o > i > u > rhotics > laterals > nasals > voiced fricatives > voiceless fricatives > voiced stops > voiceless stops

The kinds of changes that I have just presented, therefore, tend to involve a shift from more sonorous to less sonorous sounds. It should be noted, however, that some of the commonly encountered changes listed above are difficult to account for purely in terms of loss of sonority, so the notion of phonetic weakening has to be more complex than I have indicated.

When phonetic change takes place, it is very often in the direction of a strong sound to a weak sound. That is to say, we would be more likely to find a change of [k] to [ʔ], for example, than the other way around, with [ʔ] becoming [k]. Changes of the reverse order are possible, of course, though less likely. These rarer sorts of sound changes could be referred to as strengthening (or *fortition*) to contrast them from lenition. So, for instance, we could say that the final consonant of the English word [naɪf] underwent fortition when it was copied into Tok Pisin,² where the corresponding word is [naɪp].

I will now give examples of phonetic lenition, or weakening, in different languages. The change of [b] and [p] to [f] in the Kara language of New Ireland (in Papua New Guinea) is one good example of lenition:

		Kara	
*bulan	→	fulan	'moon'
*tapine	→	tefin	'woman'
*punti	→	fut	'banana'
*topu	→	tuf	'sugarcane'

Similarly, the change from [p] to [w] in the Uradhi and Palauan examples given in the introduction to this chapter illustrate lenition. In the Jajgir language of northern New South Wales in Australia, stops are often lenited (or weakened) to semi-vowels at the beginning of a word, as shown by the following examples:

		Jajgir	
*da:lan	→	ja:lan	'mouth'
*bu:lan	→	ju:lan	'belly'
*gana:mbil	→	jana:mbil	'tongue'

There is one particular kind of lenition that goes under the name of *rhotacism*. The term *rhotic* is often used to cover all types of *r* sounds (trills, flaps, glides, and so on), as distinct from all types of *l* sounds (which are together referred to as *lateral*s). Laterals and rhotics collectively make up the phonetic class of *liquids*. The change known as rhotacism refers to the lenition of [s] or [z] to a rhotic between vowels. This kind of change took place in the history of the Latin language:

		Latin	
*ami:kosum	→	ami:korum	'of the friends'
*genesis	→	generis	'of the type'
*hono:sis	→	hono:ris	'of the honour'

There is even evidence in the spelling of modern English that rhotacism has taken place in the history of this language. The plural form of the verb [wɔɪz] 'was' is [wɔ:z] 'were' (though in many dialects it is pronounced as [wɔ:z]). Assuming that the spelling of English more closely reflects an earlier pronunciation than the modern pronunciation, it seems that the final *e* of *were* represents an earlier plural suffix, and that the root was probably something like [wɔ:ɛ] or [wɛ:ɛ] and there was later lenition of the [s] to [z], to give [wɔ:z] or [wɛ:z]. It is from this form that the modern form [wɔ:z] in some dialects is derived. It is also from this form that the pronunciation [wɔ:z] has been derived in the case of those dialects of English which have lost syllable-final [l].

A very common kind of sound change that takes place in languages is the loss of one or more sounds. This can be viewed as an extreme case of lenition: the weakest a sound can be is not to exist at all! An example from modern English of a sound being lost altogether would be illustrated by the variable pronunciation of a word such as 'history'. While some people pronounce this as [hɪstɔ:ri], others simply say [hɪstri], dropping out the schwa vowel [ə]. Some people even say [stɪri], dropping out the initial [h] as well. Another example of sound loss would be the word that is typically written as *long* in all three varieties of Melanesian Pidgin, and which functions as a preposition meaning 'to', 'from', 'in', 'at' (as well as a variety of other meanings). Despite the fact that the word is written as though it is pronounced [lonŋ] (reflecting its origin in the English word *along*), people now commonly pronounce it simply as [loŋ], as in the following sentence:

Mi kam lo bus
I come from bush
'I have come from the bush.'

It is very common in languages of the world for sounds at the ends of words to be lost. In many languages of the Pacific, for example, final consonants are regularly dropped, as shown by the following changes that have taken place in the history of Fijian:

		Fijian	
*niur	→	niu	'coconut'
*tɔ:ɪs	→	tɔ:ɪ	'cry'
*ika:n	→	ika	'fish'
*bulan	→	vula	'moon'
*tansik	→	taði	'sea'

² Tok Pisin is the name given to the dialect of Melanesian Pidgin spoken in Papua New Guinea. The dialect spoken in Solomon Islands is known as Pijin, while the Vanuatu variety of the language is known locally as Bislama.

*[ajar	→	laða	'sail'
*[anjit	→	lanji	'sky'

There are some kinds of sound loss that are covered by particular terms. These special terms are described and illustrated below:

(a) **Aphaeresis**

Initial segments are sometimes dropped. We can refer to this as *aphaeresis*, pronounced [afɛrɛsɪs] (or sometimes as *aphesis*). The following examples of aphaeresis come from the Angkamuthi language of Cape York Peninsula in Australia:

		Angkamuthi	
*[maj]	→	aji	'food'
*[nani]	→	ani	'ground'
*[ɲampu]	→	ampu	'tooth'
*[pukal]	→	uka:	'foot'
*[yanu]	→	antu	'canoe'
*[wapun]	→	apun	'head'

(b) **Apocope**

Apocope, pronounced [apɒkəpi:], is the name you will come across in textbooks for the loss of word final segments. This is a very common change in languages, and examples are easy to find. For example, look at the following changes that have taken place in the history of the language of Southeast Ambrym in Vanuatu:

		Southeast Ambrym	
*[utu]	→	ut	'lice'
*[ajo]	→	aj	'fly'
*[asue]	→	asu	'rat'
*[tohu]	→	toh	'sugarcane'
*[hisi]	→	his	'banana'
*[use]	→	us	'rain'

(c) **Syncope**

This term, pronounced [sɪŋkəpi:], refers to a very similar process to apocope. Rather than the loss of final segments, *syncope* refers to the loss of segments in the middle of words. It is syncope which often produces consonant clusters in languages that did not formerly have them when medial vowels are lost. The common pronunciation of the word 'policeman' as [pɒlɪs:mən] instead of [pɒlɪs:mən] is an example of syncope; so too is the pronunciation of 'history' without the schwa that you saw earlier. In some languages, syncope is a very regular change. In Lenakel, which is spoken on the island of Tanna in Vanuatu, we find that this sort of change is very common.

		Lenakel	
*[namatana]	→	nəmɾɪn	'his/her eye'
*[nalimana]	→	nəlɪmɪn	'his/her hand'
*[masa]	→	mha	'low tide'

(You will see in these Lenakel examples that a substantial number of other sound changes have also taken place, such as the lenition of [t] to [ʈ], of [s] to [h], and of [a] to [ɨ], as well as the raising of [a] to [e].)

(d) **Cluster reduction**

When consonants come together in a word without any vowels between them, we speak of *consonant clusters*. Very often, such clusters are reduced by deleting one (or more) of the consonants. This is one kind of change that has taken place word-finally in English words ending in [mb] and [ŋɡ], such as *bomb* and *long*, where the spelling reflects the earlier pronunciation, though the modern pronunciations are [bɒm] and [lɒŋ]. This change is still spreading in English, as word-final stops in clusters of [nd] are now being lost. Words such as *hand* are often pronounced as [hæn] rather than [hænd], especially when there is a following consonant. Thus, *handgrip* is frequently pronounced by many people as [hæŋɡrɪp] rather than [hændɡrɪp].

Cluster reduction has also occurred in the middle of many words in English. Although the word *government* is derived from the root *govern* with the following suffix *-ment*, the resulting cluster [nm] is normally reduced simply to [m]. So, instead of saying [gʌvənmənt], we normally just say [gʌvəmənt]. For many people this is further reduced by syncope to just [gʌvmənt], and consonant cluster reduction sometimes again applies to produce [gʌvmənt], or even [gʌvmənt].

(e) **Hapology**

Hapology is a kind of change that is rare and tends to be fairly sporadic in its application. This term refers to the loss of an entire syllable, when that syllable is found next to another identical, or at least very similar, syllable. For some reason, people find it difficult to pronounce sounds when they are near other sounds that are identical or very similar. This is why people so easily make mistakes when they try to say tongue-twisters such as *She sells sea shells by the sea shore* very quickly.

Hapology is the process that is involved when we pronounce the word *library* as [laɪbrɪ] instead of [laɪbrɪəri]. The word *England* [ɪŋɡlənd] was originally *Anglaland*, meaning the land of the Angles. (The Angles were a group of people who settled in Britain over 1000 years ago, bringing with them the ancestor of the modern English language.) The two *la* syllables in *Anglaland* were reduced by this process of hapology, and now we have only one *l* in the name *England* as a result.

2.2 SOUND ADDITION

While lenition, and particularly the total loss of sounds, is a very common kind of sound change, you will also find that sounds are sometimes added rather than dropped. On the whole, however, sound addition is rather rare. In modern English, you can see evidence of this kind of change taking place when we hear people saying [sʌmpθɪŋk] instead of the more common [sʌmθɪŋ] for 'something'. There are also examples such as [nɒʊp] 'nope' and [jɛp] 'yep' instead of [nɒʊ] 'no' and [jɛ:] 'yeah', in which the final [p] seems to be added as a way of emphasising what we are saying by sharply cutting off the flow of air, perhaps symbolising the fact that the speaker's intention is absolutely final.

Sound addition often takes place at the end of words with final consonants, where many languages add a vowel. Many languages tend to have a syllable structure of consonant plus vowel (represented as CV), allowing no consonant clusters and having all words ending in vowels. If a language adds a vowel to all words ending in a consonant, then it is moving in the direction of this kind of syllable structure. So, for instance, when words in Māori are borrowed from English, vowels are always added after consonants at the end of the word to make sure that the words follow this kind of pattern:

Māori	
ka:fe	'calf'
ko:ti	'court'
ko:rofa	'golf'
kuki	'cook'
mapi	'map'
miraka	'milk'
raiti	'light'

Some kinds of sound addition are known by specific names in the literature of historical linguistics. These terms, with examples of the process that they refer to, are presented below.

(a) Excrescence

Excrescence refers to the process by which a consonant is added between two other consonants in a word. Although this change operates against the general tendency in languages to produce consonant plus vowel syllable structures, in that it creates even longer consonant clusters, it is nevertheless a fairly common kind of change. The insertion of [p] in the middle of the cluster [mθ] in the word *something* that I mentioned earlier is an example of excrescence. Excrescence has also taken place in other words in the history of English, and the added consonant is now even represented in the spelling system, e.g.

English	
*æntɪŋ	→ empty
*θɪmlɛ	→ θɪmbl 'thimble'

The excrescent stop that is inserted in these examples has the same point of articulation (or is *homorganic* with) the preceding nasal in all of these examples. The stop is added to close off the velum (which is open during the production of the nasal) before going on to produce the following non-nasal sound (i.e. a stop or a liquid).

(b) Epenthesis or Anaptyxis

The term *epenthesis* (or *anaptyxis*)³ is used to describe the change by which a vowel is added in the middle of a word to break up two consonants in a cluster. This change therefore produces syllables of the structure CV (i.e. consonant plus vowel), again illustrating the common tendency for languages to avoid consonant clusters and final consonants. Speakers of some varieties of English often insert an epenthetic schwa [ə] between the final consonants of the word [fɪlm] 'film', to produce [fɪləm]. Epenthesis has also taken place fairly frequently in the history of Tok Pisin. Compare the English and Tok Pisin forms below and note the occurrence of epenthetic (or anaptyctic) vowels in Tok Pisin:

English		Tok Pisin	
blaek	→	blɪak	'black'
blu:	→	bulu	'blue'
nekst	→	nekɪs	'next'
sɪks	→	sɪkɪs	'six'
skɪn	→	sɪkɪn	'skin'
plɛs	→	peles	'village'
fɪlm	→	pɪlum	'film'

(c) Prothesis

Prothesis is another term used to refer to a particular type of sound addition, i.e. the addition of a sound is at the beginning of a word. In the Motu language of Papua New Guinea, for example, when a word began with an [a], a prothetic [l] was added before it, as shown by the following examples:⁴

Motu	
*api	→ lahi 'fire'

³ Although anaptyxis and epenthesis are given here as synonymous, you should note that there is some variation in the way that these terms are used in the literature of historical linguistics. Some writers use the term *epenthesis* as a cover term for excrescence, anaptyxis, and prothesis together, while others prefer *epenthesis* to anaptyxis when referring specifically to the insertion of a vowel between two consonants occurring in a consonant cluster.

*asan	→	lada	'gills of fish'
*au	→	lau	'l.me'

2.3 METATHESIS

The change known as *metathesis* [metəθeɪsɪs] is a fairly uncommon kind of change. It does not involve the loss or addition of sounds, or a change in the appearance of a particular sound. Rather, it is simply a change in the order of the sounds. If someone mispronounces the word *relevant* as *revelan*, this is an example of metathesis.

Metathesis has taken place in the history of some English words and the changed form has become accepted as the standard. The English word *bird* [bɜ:ɹd] was originally pronounced as [bɹɹd]. This then became [bɹɹd] by metathesis, and this is the form that we still represent in our spelling system. Of course, the sounds [ɹɹ] have undergone further changes in some dialects to become [ɜ:ɹ] (though in dialects of English such as American, Scottish, and Irish English, the original [ɹ] is still clearly pronounced).

Although metathesis is a rare sort of change, generally occurring in only one or two words in a language, there are still some cases of regular metathesis. In the Ilokano language of the Philippines, for example, there has been fairly consistent switching of word final [s] and initial [t], as shown by the following comparisons with Tagalog, the national language of the Philippines (which reflects the original situation):

Tagalog	Ilokano	
tapis	sa:ɹɹit	'cry'
tubus	subut	'redeem'
tigis	si:ɹɹit	'decant'
tamis	samɹɹit	'sweet'

2.4 FUSION

Phonetic *fusion* is a fairly frequent kind of sound change, in which two originally separate sounds become a single sound. The resulting single sound carries some of the features of *both* of the original sounds.

Before I go on to give examples of fusion, it will be necessary to clarify what is meant by the term *feature*. All sounds can be viewed as being made up of a number of particular features, which determine different aspects of the nature of the sound. The sound [m], for instance, contains the following features (among others):

1. [+ consonantal]
2. [+ voiced]

3. [+ labial]
4. [+ nasal]

The sound [a], on the other hand, contains the following features:

1. [- consonantal]
2. [+ voiced]
3. [+ low]

When two sounds are changed to become one in the process of fusion, some of the features of one sound and some of the features of the other sound are taken and a new sound is produced that is different from both, yet which also shares some features of both of the original sounds. I will take an example of a change of this type from French:

	French	
*ɔn	→	ɔ̃
*bɔn	→	bɔ̃
*vɔn	→	vɔ̃
*blan	→	blɑ̃
		'one'
		'good'
		'wine'
		'white'

(The symbol ̃ is known as a *tilde* and is placed over the vowel to indicate that the vowel is nasalised, with the air coming out through the nasal passage as well as through the mouth.) The generalisation we can make here is that:

Vowel + Nasal → Nasalised Vowel

Expressing this in terms of features, we can say that the [- consonantal] feature of the first sound has been kept, while the [+ nasal] feature of the second sound has been kept, and a single new sound combining both features has been created:

1. [- consonantal]
2. [+ nasal]

A second example of fusion can be quoted from the Attic dialect of Greek. Examine the data below:

	Attic Greek	
*gwous	→	hous
*gwatis	→	basis
*gwasiheus	→	basileus
*leikwɔ:	→	leipɔ:
*je:kwar	→	he:par
		'cow'
		'going'
		'official'
		'I leave'
		'liver'

In the original forms, there was a [g] or a [k] with the feature specification of velar stops. These were followed by a [w], which had the feature specification for a semi-vowel with lip-rounding. In the fused forms of the Attic dialect, we find that the stop feature of the first sound has been taken

along with the bilabial feature of the second sound to produce a bilabial stop. Thus, when there was an original voiced stop as in [gw], that first sound became the voiced bilabial stop [b], and when there was an original voiceless stop as in [kw], the fused sound became the corresponding voiceless bilabial stop, i.e. [p].

A particular type of phonological fusion can be referred to as *compensatory lengthening*. This kind of sound change is illustrated by the following forms from Old Irish:

	Old Irish	
*magl	→ ma:l	'prince'
*kenel	→ ke:nl	'gender'
*etn	→ e:n	'bird'
*datl	→ da:l	'assembly'

What has happened here is that a consonant has been lost and 'in compensation' for this loss, a vowel has been lengthened. If we introduce the idea of *phoneme space* as a feature of a sound, we can treat this kind of change as another type of fusion. If each phoneme carries, among its collection of features, a phoneme space (i.e. the actual space it occupies in a word), then we could say that all features *except* this single feature of phoneme space can be lost, and that only this one feature is fused with the features of the preceding sound. This new sound therefore contains two features of phoneme space. This is reflected in the change in the examples above from a short vowel (i.e. one space) to a long vowel (i.e. two spaces).

2.5 UNPACKING

Unpacking is a phonetic process that is just the opposite of phonetic fusion. From a single original sound, you will find that a sequence of two sounds may develop, each with some of the features of the original sound. We saw earlier that, in French, vowels followed by nasal consonants underwent fusion to become nasalised vowels. It is also possible to find examples of languages in which the reverse kind of change takes place. In Bislama (the variety of Melanesian Pidgin spoken in Vanuatu), words of French origin that contain nasal vowels are incorporated into the language by unpacking the vowel features and the nasal features to produce sequences of plain vowels followed by the nasal consonant [ŋ]:

French		Bislama
<i>canion</i>	→	kamioŋ
<i>accident</i>	→	aksidoŋ
<i>carton</i>	→	kartoŋ
<i>caleçon</i>	→	kalsoŋ

<i>lagon</i>	lagɔ̃	→	lagonj	'lagoon'
<i>putain</i>	pytɛ̃	→	pitɛŋ	'whore'
<i>avance</i>	avãs	→	avoŋ	'advance on wages'
<i>bouchon</i>	bujɔ̃	→	busoŋ	'cork'

In these examples, the original nasal and vowel features of the final vowels in French are distributed over two sounds, i.e. the oral vowels and the following velar nasal. We therefore have a change that can be expressed as:

Nasal Vowel → Vowel + Nasal Consonant

2.6 VOWEL BREAKING

In the change known as *vowel breaking*, a single vowel changes to become a diphthong, with the original vowel remaining the same, but with a glide of some kind being added either before or after it. When a glide is added before the vowel, we call this an *on-glide*, but if a glide is added after the vowel, we refer to this as an *off-glide*. One of the more noticeable features of some varieties of American English is the 'broken vowels'. What is pronounced in most dialects of English as [brɛd] 'bad', is pronounced by some Americans as [bræd], or even as [brɛɪd], with an off-glide. One of the distinguishing features of the Barbadian English in the West Indies is the palatal on-glide before the vowel [æ]. Instead of pronouncing [kæt] 'cat', people from Barbados will say [kɛjæt].

Vowel breaking is fairly common in the languages of the world. A good example of a language apart from American English that has undergone regular vowel breaking is the Kairiru language that is spoken on an island near Wewak in Papua New Guinea:

	Kairiru
*pale	→ pial
*manu	→ mian
*namu	→ niam
*ndanu	→ rian
*lako	→ liak
	'house'
	'bird'
	'mosquito'
	'water'
	'go'

(Note that in these examples there is also evidence of apocope, or the loss of the final vowels.)

2.7 ASSIMILATION

Many sound changes can be viewed as being due to the influence of one sound upon another. When one sound causes another sound to change so that

the two sounds end up being more similar to each other in some way, we call this *assimilation*. Since assimilation is by far the most common kind of sound change, I will present a fairly detailed discussion of the various sub-types of assimilation along with numerous examples of these.

Before I do that, I will define the concept of *phonetic similarity*. Two sounds can be described as being phonetically more similar to each other after a sound change has taken place if those two sounds have more phonetic features in common than they did before the change took place. If a sound change results in an increase in the number of shared features, then we can say that assimilation has taken place.

As an example I will take a word that contains a consonant cluster of the form [np] in an imaginary language. The two sounds in this cluster each have the following phonetic features:

	[n]	[p]
1.	[+ voiced]	[- voiced]
2.	[+ coronal]	[+ labial]
3.	[+ sonorant]	[- sonorant]

We could assimilate one, or two, or all of the features of one of these two sounds in the direction of the other. For instance, the [n] could lose its nasal feature — i.e. [+ sonorant] — and replace it with the stop feature of the [p] that is next to it. This change would have the following effect:

*np → dp

If, instead of assimilating the nasal feature to the following stop, we were to assimilate the place of articulation of the nasal to that of the following stop, we would have the following change:

*np → mnp

Finally, if the voiced feature of the nasal were to acquire the voicelessness of the following stop, this change would show up as follows:

*np → np̥

(Note that the [p̥] with a circle beneath it represents a voiceless alveolar nasal. Such a sound is rare in the world's languages, and the last change that I referred to would be less likely to occur than the previous two changes.)

The changes that I have just presented all involve the assimilation of only a single feature. It is, of course, possible to assimilate two features at a time, as in the following examples:

*np → bp

(keeping only the voicing of the nasal, but assimilating it to the following sound both in its manner of articulation and its place of articulation)

*np → tp

(keeping only the alveolar place of articulation of the nasal, but assimilating it to the following [p] both in its voicelessness and in its manner of articulation)

*np → np̥

(keeping only the nasal feature, but assimilating it to the [p] in its voicelessness as well as in its place of articulation)

All of these changes are examples of *partial assimilation*, because the changed sound always retains at least *one* of the original features by which it is distinguished from the unchanged sound. If *all* of the features are changed to match those of another sound, then the two sounds end up being identical and we produce a *geminate* (or phonetically double) sound. When assimilation produces geminate sounds in this way, we can speak of *total assimilation*. In the case of the cluster [np], an example of total assimilation would be a change of [*np] to [pp].

There is yet another dimension that we should discuss regarding this kind of assimilation. All of the examples that I have just presented are what are called *regressive assimilation*. This means that the 'force' of the change operates 'backwards' in the word, i.e. from right to left. It is the features of the following [p] in all of the examples above that influence the features of the preceding [n], which is why we call this regressive assimilation. This kind of assimilation can be represented in the following way:

A < B

(The symbol < indicates the direction of the influence of one sound over the other.)

There is, of course, a second possibility, in which the direction of the change is reversed, and it is the preceding sound that exerts its influence over the sound that follows it. This kind of situation could be represented by the symbol facing forward in the word like this:

A > B

Such a situation, in which the features of a following sound are changed to match those of a preceding sound, is called *progressive assimilation*. Of the two types of assimilation, it is regressive assimilation that is by far the more commonly encountered in the world's languages.

If we take the same cluster [np] and this time treat the [n] as the influencing sound rather than the [p] as before, we find that the following changes can all be regarded as examples of partial progressive assimilation:

*np	→	nʰ	(with assimilation of voicing)
*np	→	n:	(with assimilation of place of articulation)
*np	→	nm	(with assimilation of manner of articulation)
*np	→	nm	(keeping only the voiceless feature of the [p])
*np	→	nm	(keeping only the bilabial feature of the [p])
*np	→	nd	(keeping only the stop feature of the [p])

Progressive assimilation can be total, as well as partial, so there is also the following final possibility:

*np	→	nn	(keeping none of the features of [p])
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With two sounds that have only three different features each, you can see that there are fourteen possible changes that can all be classed as assimilatory. This concept therefore covers a wide range of possible sound changes, and as I said at the beginning of this section, most sound changes that take place in the languages of the world involve assimilation in one way or another.

Rather than continuing to talk about assimilation in the abstract as I have been doing, I will now give concrete examples to show how this process works. To begin with, let us look at the pronunciation of the word [kloʃtu] 'nearby' in the Tok Pisin of some older speakers from the rural areas in Papua New Guinea who have not been to school. Such people may pronounce this as [korotʃtu]. Ignoring for the moment the insertion of an epenthetic [o] and the shift of [l] to [r], the change that is of particular interest to us is the change of the cluster [st] to the geminate stop [ʃt]. The [s] has totally assimilated in all of its features to the following [ʃ]. This is therefore a case of total regressive assimilation.

As I have already mentioned, progressive assimilation is much less common than regressive assimilation and examples are much harder to find. However, in the history of Icelandic, the following are examples of very regular total progressive assimilation:

		Icelandic	
*findan	→	finna	'find'
*gulð	→	gull	'gold'
*halð	→	hall	'inclined'
*munð	→	munn	'mouth'
*unðan	→	unna	'love'

Examples of partial assimilation are more common than examples of complete assimilation. Partial assimilation can involve a wide range of possibilities, as we have already seen, with the changes involving the place of articulation (including the high, low, front, and back features of vowels, as well as the features referring to the place of articulation of consonants), manner of articulation (whether stop, fricative, nasal, lateral and so on), and

voicing (whether voiced or voiceless). Assimilation may also involve any combination of these various features.

Assimilation of place of articulation is a very common change. You can see the results of this change in modern English with the varying forms of the negative prefix [in-] 'in-'. This is normally pronounced with the variant [ɪn-] before bilabial consonants, [ɪŋ-] before velars and [ɪn-] before all other sounds (including vowels), e.g.

ɪn-dævɪzəbl	'invisible'
ɪm-bəleɪns	'imbalance'
ɪŋ-kənɪdɪəɪt	'inconsiderate'
ɪn-ədɪmɪsəbl	'inadmissible'

The [n] has assimilated in its place of articulation to the following consonant, i.e. the alveolar feature has been replaced with the feature for the place of articulation of the following sound when the next sound is bilabial or velar.

The change that is known as *palatalisation* is also an assimilatory change. By this change, a non-palatal sound (i.e. a dental, an alveolar, a velar, and so on) becomes a palatal sound, usually before a front vowel such as [i] or [e]. or before the semi-vowel [j]. Sounds that we can class as palatal include the palato-alveolar affricates [tʃ] and [dʒ] and the sibilants [ʃ] and [ʒ] (as well as some other consonants which are less common). This change can be described as assimilatory because the palatal feature of the vowel (i.e. the fact that it is front rather than back) is transferred to the neighbouring consonant.

One good example of palatalisation is the change from [tʃ] to [tʃj] before the vowel [i] in many dialects of Fijian. For example, where Standard Fijian has [tinana] 'his/her mother', many of the local dialects have palatalised the initial consonant to produce [tʃinana]. There are examples of palatalisation having taken place in the history of English too. The velar stops [k] and [g] became palatalised to [tʃ] and [dʒ] respectively when there was a following front vowel, as shown by the following examples:

		English	
*kɪn	→	tʃɪn	'chin'
*ke:si	→	tʃi:z	'cheese'
*geldan	→	dʒɪld	'yield'
*gearn	→	dʒe:n	'yarn, thread'

(Note that the change of [g] to [dʒ] probably involved palatalisation of [g] to [tʃ] first, and then the [tʃ] underwent lenition to [dʒ].)

Sometimes, a palatal that is produced as a result of this kind of assimilation can undergo lenition to become [ʃ]. For example, in Motu in Papua New Guinea, [tʃ] has shifted to [ʃ] in a similar kind of palatalising environment to that described above for Fijian, even though [ʃ] is a post-alveolar sound rather than a palatal sound. Note the following examples:

	Motu	
*tama	→ tama	'father'
*tajis	→ tai	'cry'
*tumpu	→ tubu	'grandparent'
*topu	→ tohu	'sugarcane'
*tolu	→ toi	'three'
*tina	→ sina	'mother'
*gate	→ ase	'liver'
*mate	→ mase	'die'

In addition to assimilation involving changes in the place of articulation, changes in the manner of articulation of a sound to make two sounds phonetically more similar to each other are also common. Examine the following changes in the Banoni language of the North Solomons Province of Papua New Guinea:

	Banoni	
*pekas	→ beyasa	'faeces'
*wakar	→ bayara	'root'
*pakan	→ vayana	'add meat to staple'
*tipi	→ tsivi	'traditional dance'
*makas	→ mayasa	'dry coconut'

The intervocalic stops in these examples have changed to become voiced fricatives in Banoni at the same place of articulation. This can be viewed as the assimilation of two of the features of the original voiceless stops to the features of the surrounding vowels. The stops have become voiced to match the feature of voicing for the vowels. The change from stop to fricative can also be considered to be assimilatory. Vowels, as well as nasals, fricatives, and laterals, are all continuant sounds in that they can be continued or 'held' as we pronounce them. These sounds contrast with non-continuant sounds, such as stops, affricates, and semi-vowels, as these kinds of sounds cannot be 'held'. The change from a stop to a continuant between two other continuant sounds is a clear case of assimilation in the manner of articulation, as well as of voicing.

Another very common type of change that can also be viewed as a special kind of assimilation is the change called *final devoicing*. Sounds at the end of a word, especially stops and fricatives (but sometimes also other sounds, even vowels) often change from being voiced to voiceless. In German, the devoicing of final stops has been very regular, for example:

	German	
*ba:d	→ ba:t	'bath'
*ta:g	→ ta:k	'day'
*hund	→ hunt	'dog'

*land	→ lant	'land'
*ga:b	→ ga:p	'gave'

In a case like this, the voiced feature of the original sound is changed to voiceless to match the voicelessness of the following silence at the end of the word.

There is a further aspect to assimilation that I have not yet touched on. This is the contrast between what we call *immediate assimilation* and *assimilation at a distance*. In the examples of assimilation that I have presented so far it has always been a case of one sound being influenced by the sound either immediately preceding or following it. These are, therefore, all examples of immediate assimilation.

In the case of assimilation at a distance, however, a sound is influenced by another sound not immediately to the left or the right of it, but further away in the word, perhaps even in another syllable altogether. In the Southern Highlands of Papua New Guinea, when speakers of the Huli language adopt the Tok Pisin word *piksa* 'picture' into their language, it is sometimes pronounced by older people as [kikida] rather than [pikida] as we might expect. What has happened is that the [p] of the first syllable has assimilated (at a distance) in place of articulation to the [k] of the second syllable.

Sometimes assimilation at a distance like this is a very regular feature of a language, and some type of assimilation may even apply over an entire word. When this happens, we call this *harmony*. Many languages have what we call *vowel harmony*, which means, basically, that there is assimilation of one (or more) features of one vowel to some (or all) of the other vowels in the same word. In Bislama, for example, we find a good example of vowel harmony involving the original transitive suffix [-im] on verbs. In Bislama, this suffix has three main variants, as illustrated below:

kuk-um	'cook'	mit-im	'meet'	har-em	'feel'
put-um	'put'	kil-im	'hit'	mek-em	'make'
sut-um	'shoot'	rit-im	'read'	so-em	'show'

Following a syllable with a high back vowel, the [i] of the suffix becomes [u]. This is an example of assimilation at a distance of the feature 'front' in one syllable to the feature 'back' in another. Following a syllable with a mid or a low vowel, the [i] of the suffix is lowered to [e]. This is again assimilation at a distance, this time with the feature 'high' changing to 'mid' under the influence of the vowel of the preceding syllable.

Sometimes you will find harmony involving features other than just vowel features. In the Enggano language (spoken on an island off the coast of southern Sumatra in Indonesia) there has been a change that we refer to as *nasal harmony*. In this language, all voiced stops in a word became homorganic nasals and all plain vowels became the corresponding nasal vowels following any nasal sound in a word. So:

	Enggano	
*honabu	→ honāmt	'your wife'
*eh̄kua	→ eh̄kūā	'seat'
*eŋʔadaʔa	→ eŋʔānāʔa	'food'

There is one special kind of vowel harmony that goes under the name of *umlaut*. This term is most frequently used in Germanic languages to refer to the fronting of a back vowel or the raising of a low vowel under the influence of a front vowel in the following syllable. Very often, the following high front vowel that caused the change to take place in the first place was then dropped in these languages (by apocope), or reduced to schwa. Thus, the new front vowel became the only way of marking the difference between some words. The irregular singular/plural pairs of words such as *foot/feet* in English are the result of such vowel harmony, or umlaut. The original singular form was [fo:t], and its plural was [fo:t-i]. The [o:] was later fronted to the front rounded vowel [ø:] under the influence of the following front vowel [-i] in the plural suffix, so the plural came to have the shape [fɔ:t-i]. Later, the vowel of the suffix was dropped, and the front rounded vowel of the root was unrounded to become [e:i]. So, while the singular was [fo:t], the plural had become [fe:t]. It was this alternation between [fo:t] and [fe:t] that was the source of the modern irregular pair *foot/feet*. (This kind of umlaut in the history of English is described in more detail in Section 4.3.)

2.8 DISSIMILATION

Now that we have studied at length the concept of assimilation, it should be a relatively simple matter to grasp the concept of *dissimilation*. This process is precisely the opposite to assimilation. Instead of making two sounds more like each other, dissimilation means that one sound changes to become less like some other nearby sound. Dissimilation, therefore, reduces the number of shared phonetic features between two sounds.

I have already mentioned in this chapter the difficulty that we have with tongue-twisters — if you say these fast enough, you will sometimes find yourself dropping out sounds that are very similar to each other when they occur frequently in the same sentence. Another thing that happens when you say tongue-twisters is that we tend to make sounds more distinct from nearby sounds than they are supposed to be. If you say *Peter Piper picked a peck of pickled peppers* frequently, the chances are that you will end up saying *pickled peppers* instead of *peppers*. This would perhaps be partly a case of the [p] in the word *peppers* assimilating at a distance to the [k] in words such as *pickled* and *peck*, but at the same time the [p] is probably dissimilating from the other [p] sounds that are found near it in the same word.

I will mention one very famous example of dissimilation here, because it is frequently encountered in textbooks of historical linguistics, where it is often

referred to as *Grassmann's Law*. This sound change, first recognised in 1862 by the German scholar Hermann Grassmann, took place both in the ancient Sanskrit language in what is now India, and in the ancient Greek language. In both of these languages, there was a phonemic contrast between aspirated and unaspirated stops. However, when there were two syllables following each other and both contained aspirated stops, the first of these lost its aspiration and became unaspirated. So, in Sanskrit, the earlier form [**bho:dhaj*] 'bid' became [*bo:dhaj*], and in Greek, the form [**phewrtho*] with the same meaning became [*pewrtho*]. This is clearly a case of dissimilation at a distance.

An example of immediate dissimilation (rather than dissimilation at a distance) can be found in Afrikaans, the language of one of the two major tribes of Europeans in South Africa (the other being English-speakers).

Observe the following changes:

	Afrikaans	
*sxo:n	→ sko:n	'clean'
*sxouder	→ skouar	'shoulder'
*sxœlt	→ skœlt	'debt'

In the original forms, there was a sequence of two fricative sounds, i.e. [s] and [x]. In Afrikaans, the fricative [x] changed to a stop at the same place of articulation, i.e. [k], so that there would no longer be two fricatives next to each other. Thus, the [x] dissimilated in manner of articulation to [k] from the fricative [s].

2.9 ABNORMAL SOUND CHANGES

In this chapter, I have presented a wide range of types of sound changes that you will come across in languages of the world. However, there are numerous examples of sound changes in language that would appear, at first glance, to be abnormal — in the sense that they do not obviously fit into any of the categories that I have set out above. For instance, take the French word *cent* 'hundred', which is pronounced [sɛ̃]. This ultimately goes back to a form that can be reconstructed as [kɛ̃ntom] (with the first [m] being a syllabic nasal, i.e. a nasal that can be stressed in the same way as a vowel). How can the change from [kɛ̃ntom] to [sɛ̃] possibly be described in terms of the types of changes that we have been looking at in this chapter?

The answer to this question comes in the observation that, while the changes between these two forms might appear to be immense (and therefore unlikely), we can usually reconstruct various intermediate steps between the two extreme forms that appear to represent quite reasonable sorts of changes. Let us imagine that the change from [kɛ̃ntom] to [sɛ̃] in fact took place through the following series of steps over a very long period of time:

- kɪnɒm → kɛntɒm
 (unpacking of features of syllabic and consonant to two separate sounds)
- kɛntɒm → kɛntɒm
 (regressive assimilation of [m] to [t] in place of articulation)
- kɛntɒm → kɛnt
 (loss of final unstressed syllable)
- kɛnt → sɛnt
 (palatalisation of [k] to [ç] before front vowel)
- sɛnt → sɛnt
 (lenition of stop to fricative)
- sɛnt → sɛn
 (loss of final consonant)
- sɛn → sɛ̃
 (fusion of features of vowel and nasal to produce nasal vowel)
- sɛ̃ → sã
 (lowering of vowel)

(Note that while all of these changes in one way or another actually took place in the history of this word, they did not necessarily take place exactly as stated, or in the order given. The exact details of the history of this word are not particularly important for the purposes of the present discussion.)

Sometimes we find that an individual sound has changed in a rather unusual way. Although we should keep in mind the types of sound changes described in this chapter as being somehow more likely to occur than other kinds of sound change, students of languages will always come up against apparently 'odd' changes. For instance, in some languages there have been regular changes of [t] to [w], and in the Mekeo language (spoken in the Central Province of Papua New Guinea), there has been a change of both [d] and [l] to the velar nasal. This latter change is illustrated by the following examples:

	Mekeo	
*dua	→	gua 'two'
*dan	→	ɲanau 'leaf'

How might we account for such changes? Again, it is possible to suggest a series of more reasonable intermediate stages which have left no trace. The Trukese change of [t] to [w] may have passed through the following stages, for example:

[t] → [θ] → [ʃ] → [v] → [w]

Similarly, the Mekeo change of [d] and [l] to [ŋ] may have gone through the following steps:

[d] → [l] → [n] → [ŋ]

Given a sufficient period of time, any sound can change into any other sound by a series of changes such as those we have discussed in this chapter. It is partly for this reason that the reconstruction of the history of languages by the method described in this volume has not really been able to go back further than about 10,000 years. Any changes beyond that time would probably be so great that, even if two languages were descended from a common ancestor, time would have almost completely hidden any trace of similarities that the languages may once have had.

READING GUIDE QUESTIONS

1. What is lenition?
2. What is rhotacism?
3. What is cluster reduction?
4. What is the difference between apocope and syncope?
5. What is the difference between haplology and metathesis?
6. What is the difference between excrescence and epenthesis?
7. What is the difference between aphæresis and prothesis?
8. What is phonetic fusion?
9. What is meant by compensatory lengthening?
10. What is the difference between phonetic unpacking and vowel breaking?
11. How is assimilation different from dissimilation?
12. What is the difference between partial and complete assimilation?
13. What is the difference between assimilation at a distance and immediate assimilation?
14. What is palatalisation, and how can this be viewed as assimilation?
15. What is final devoicing, and how can we view this as assimilation?
16. What is vowel or consonant harmony?
17. What is meant by the term umlaut?
18. What is Grassmann's Law? What sort of sound change does this involve?

EXERCISES

1. Some of the phonetic changes described in this chapter can be regarded as belonging to more than one of the named categories of changes. For instance, final devoicing was described in Section 2.7 as a kind of

- assimilation, while devoicing in general was described in Section 2.1 as lenition, or weakening. Can you find any other kinds of sound change that can be described under two different headings?
2. What do you think the spelling of the following words indicates about the phonetic history of English: *lamb, sing, night, rough, stone, mate, tune, Christmas*. Describe any changes that might have taken place in terms of the kinds of sound changes described in this chapter.
3. Many place names in England have spellings that do not reflect their actual pronunciations. From the following list, suggest the kinds of phonetic changes that may have taken place as suggested by the original spellings:

Cirencester	[sɪstə]
Salisbury	[sɒlzbrɪ]
Barnoldswick	[bɑ:lɪk]
Leicester	[lestə]
Chiswick	[tʃɪzɪk]
Cholmondeley	[tʃɒmlɪ]
Gloucester	[glɒstə]

4. Speakers of English for whom English is their first language pronounce the following words as shown:

society	[səsaɪtɪ]
social	[səʊʃəl]
taxation	[tæksətʃən]
decision	[dɪsɪʒən]

Papua New Guineans speaking English frequently pronounce these words as [səsəɪtɪ], [səʊʃəl], [tæksɪʃən], and [dɪsɪʒən] respectively. What kind of phonetic changes do these pronunciations involve?

5. A change of [mp] to [b] has taken place in the Banoni language of the North Solomons in Papua New Guinea, as illustrated by the word initial changes in the following words:

*mpaya	→	bara	'fence'
*mpunso	→	busa	'fill'
*mpua	→	buyava	'betel nut'

This change can be described as a kind of fusion. Why?

6. The following changes have taken place in Romanian. Should we describe these changes as phonetic unpacking or as vowel breaking? Why?

*poti	→	pwate	'he is able'
*porta	→	pwarta	'door'
*nokti	→	nwapte	'night'

- *flori → flwara 'flower'
- *ora → wara 'hour'
- *eska → jaska 'hair'
- *erba → jarba 'grass'
7. The following changes took place in some dialects of Old English. Should we describe these as phonetic unpacking or as vowel breaking?

*kald	→	keald	'cold'
*erða	→	eorða	'earth'
*lirnan	→	liornan	'learn'
*melkan	→	meolkan	'milk'

8. In the following data from the northern dialect of Paamese (Vanuatu), why do we say that assimilation has taken place? What particular kind of assimilation is involved?

*kail	→	keil	'they'
*aim	→	eim	'house'
*hah	→	heih	'pandanus'
*auh	→	ouh	'yam'
*sautin	→	soutin	'distant'
*hauhu	→	houhu	'many'

9. In the following data from Toba Batak (Sumatra), what kind of assimilation has taken place?

*hentak	→	ottak	'knock'
*kimpal	→	hippal	'lump of earth'
*cintak	→	sittak	'draw sword'
*cɪŋkɔp	→	sikkɔp	'enough'
*pintu	→	pittu	'door'

10. In the following Italian data, what kind of assimilation has taken place?

*noktem	→	notte	'night'
*faktum	→	fatto	'done'
*ruptum	→	rotto	'broken'
*septem	→	sette	'seven'
*aptum	→	atto	'apt'
*sommus	→	sonno	'sleep'

11. In the following Banoni forms, there is evidence of more than one pattern of assimilation having taken place. What are these patterns?

*manuk	→	manuva	'bird'
*kulit	→	yuritsi	'skin sugarcane'
*ngjalan	→	sanana	'road'
*tapis	→	tanjisi	'cry'
*pekas	→	beyasa	'faeces'
*poyok	→	borovo	'pig'

12. Old English had a causative suffix of the form [-*jan*], and an infinitive suffix of the form [-*an*], both of which have been lost in Modern English, and their original functions are now expressed in different ways. Examine the pair of words below from Old English:

drink-an	'to drink'
drink-j-an	'to cause (someone) to drink'

The modern words *drink* and *drench* respectively evolved from these two words. What sort of change has been involved to derive the final consonant of *drench*?

13. In the Marshallese language of Micronesia, the following changes have taken place:

*matapa	→	medan	'his/her eye'
*damapa	→	dem ^w an	'his/her forehead'
*masakit	→	metak	'pain'
*masala	→	metal	'smooth'
*nsakavu	→	tekaj	'reef'
*madama	→	meram	'light'

How would you characterise the changes that have affected the vowels in Marshallese?

14. In Data Set 1, a series of sound changes in Palauan is presented. Try to classify these changes according to the types of sound change discussed in this chapter.
15. Examine the forms in Ngunyaywana in Data Set 2. The original forms are given on the left. Try to classify the changes that have taken place.
16. Refer to the forms in Mbabaram in Data Set 3. Try to describe the kinds of changes that have taken place.
17. From the data in Yimas and Karawari given in Data Set 4, what kinds of changes would you say had taken place in each of these two languages?
18. Assume that in some language, the following sound changes took place. These changes all appear to be quite abnormal in that there is no simple change of features from one stage to the other. Can you suggest a

succession of more reasonable sounding intermediate steps to account for these unusual results?

b	→	h
e	→	l
k	→	t
k	→	s
p	→	w
l	→	i
k	→	h
y	→	ʔ
s	→	ʔ
s	→	t
t	→	f
b	→	l

19. Can we argue that there is some kind of 'conspiracy' in languages to produce CV syllable structures? What kinds of sound changes produce this kind of syllable structure? What kinds of sound changes *destroy* this kind of syllable structure?

20. In the Rotuman language (spoken near Fiji) words appearing in citation (i.e. when the word is being quoted rather than being used in a sentence) differ in shape from words that occur in a natural context. Some of these different forms are presented below. Assuming that the contextual forms are historically derived from the citation forms, what sort of change would you say has taken place?

Citation Form	Contextual Form	
laej	laej	'coral'
kami	kaim	'dog'
rako	raok	'learn'
maho	maoh	'get cold'
tepi	teip	'slow'
hefu	heuf	'star'
lima	liam	'five'
tiko	tiok	'flesh'
hosa	hoas	'flower'
mose	moes	'sleep'
pure	puer	'rule'

21. In Bislama (Vanuatu), the word for 'rubbish tin' is generally pronounced as [pubel]. Some speakers pronounce this in Bislama as [krubel]. What sort of change is involved here?
22. Compare the forms in Standard French and the French that is spoken in rural Québec in Data Set 12. Assuming that the Standard French forms

represent the original situation, what kinds of changes have taken place in the French that is spoken in Québec?

FURTHER READING

1. Leonard Bloomfield *Language*, Chapter 21 'Types of Phonetic Change', pp. 369-91.
2. Anthony Arlotta *Introduction to Historical Linguistics*, Chapter 6 'Types of Sound Change', pp. 77-89.
3. Robert J. Jeffers and Ilse Lehiste *Principles and Methods for Historical Linguistics*, Chapter 1 'Phonetic Change', pp. 1-16.
4. Mary Haas *The Prehistory of Languages*, 'Phonological loss and addition', pp. 39-44.
5. Hans Henrich Hock *Principles of Historical Linguistics*, Chapters 5-7 'Sound Change', pp. 61-147.

CHAPTER THREE

EXPRESSING SOUND CHANGES

3.1 WRITING RULES

When reading the literature of the history of sound changes in languages, you are almost certain to come across various formal rules written by linguists to express these changes. You will therefore need to know how to write and interpret such rules. This short section of the chapter aims to provide you with this knowledge.

When a sound undergoes a particular change wherever that sound occurs in a language, we refer to this as an *unconditioned sound change*. Comparatively few sound changes are completely unconditioned, as generally there are at least some environments (however restricted) in which the change does not take place, or in which perhaps some other changes occur. One example of a completely unconditioned sound is that found in the Motu language of Papua New Guinea, where there has been an unconditioned loss of earlier [ŋ], as shown by the following forms:

	Motu	
*asay	→ lada	'gills of fish'
*taji	→ tai	'cry'
*laji	→ lai	'wind'
*taliŋa	→ taia	'ear'

Similarly, in Hawaiian there was an unconditioned change of [t] to [k], and another of [ŋ] to [n], as shown by the forms presented below:

