language, leaving behind the word *unkempt*, in which an affix appears with a bound root.

Still other words with bound roots were borrowed into English as whole words. *Inept*, for instance, comes from Latin *ineptus*, 'unsuited'. Its relationship to the word *apt* may have been evident at one time, but it now seems to consist of a prefix meaning 'not' and a bound root.

Another class of words that are problematic for morphological analysis includes items such as *receive, deceive, conceive,* and *perceive,* or *permit, submit,* and *commit.* These items were borrowed into English from Latin (usually via French) as whole words, and their component syllables have no identifiable meaning of their own. Unlike the *in-* of *inept*, which retains the meaning of negation, the *re-* of *receive* does not have the sense of 'again' that it does in *redo*, and no specific meaning can be assigned to *-ceive* or *-mit*. For this reason, we will not treat these word parts as morphemes.

2 Derivation

Derivation uses an affix to build a word with a meaning and/or category distinct from that of its base. One of the most common derivational affixes in English is the suffix *-er*, which combines with a verb to form a noun with the meaning 'one who *Vs*' as shown in Table 4.5. (Do not confuse this suffix with the *-er* that applies to a noun in cases such as *New Yorker* and *islander* or the *-er* that combines with an adjective in cases such as *taller* and *smarter*.)

Table 4.5 The derivational affix *-er*

Verb base	*Derived noun*
sell	sell-er (one who sells)
write	writ-er (one who writes)
teach	teach-er (one who teaches)
sing	sing-er (one who sings)
think	think-er (one who thinks)

Other examples of derivation include *treatment*, in which the suffix *-ment* combines with the verb *treat* to give the noun *treatment*; *unkind*, in which the prefix *un-* combines with the adjective *kind* to give a new adjective with a different meaning; and the other derived words illustrated in Figure 4.5.

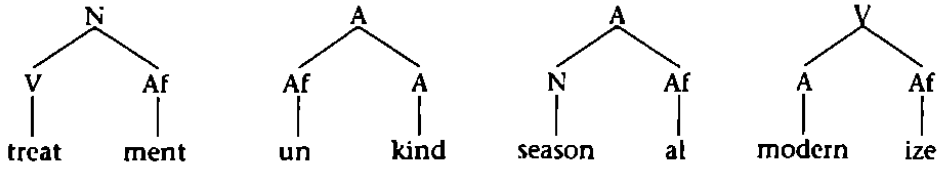

Figure 4.5 Some words formed by derivation

Once formed, derived words become independent lexical items that receive their own entry in a speaker's mental dictionary. As time goes by, they often take on special senses that are not predictable from the component morphemes. The word *writer*, for example, is often used not just for someone who can write but rather for someone who writes for a living (e.g., *She's a writer*); *comparable* (with stress on the first syllable) means 'similar' rather than 'able to be compared'; *profession* usually denotes a career rather than the act of professing; and so on.

2.1 Some English Derivational Affixes

Table 4.6 provides a partial list of English derivational affixes, along with information about the category of their usual base (ignoring bound roots) and of the resulting derived word. The entry for *-able*, for example, states that it applies to a verb base and converts it into an adjective. Thus, if we add the affix *-able* to the verb *fix*, we get an adjective (with the meaning 'able to be fixed').

The category of the base to which an affix attaches is sometimes not obvious. In the case of *worker*, for instance, the base (*work*) is sometimes used as a verb (as in *They work hard*) and sometimes as a noun (as in *The work is time-consuming*). How then can we know the category of the base for *-er*? The key is to find words such as *teacher* and *writer*, in which the category of the base can be unequivocally determined. Because *teach* and *write* can only be verbs, we can infer that the base with which *-er* combines in the word *worker* is also a verb.

Complex Derivations

Since derivation can apply to a word more than once, it is possible to create words with multiple layers of internal structure, as in the following example.

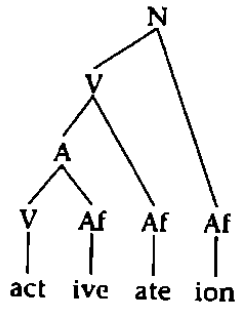

Figure 4.6 A word with a multilayered internal structure

As can be seen here, each layer of structure reflects the attachment of an affix to a base of the appropriate type. In the deepest layer, the affix *-ive* attaches to the verbal base *act* to give an adjective. In the next layer, *-ate* attaches to the adjective and converts it into a verb (*activate*). Finally, the affix *-ion* is added, converting the verb into the noun *activation*.

Table 4.6 Some English derivational affixes

Affix	*Change*	*Examples*
Suffixes:		
-able	V → A	fix-able, do-able, understand-able
-ing$_1$	V → A	the sleep-ing giant, a blaz-ing fire
-ive	V → A	assert-ive, impress-ive, restrict-ive
-al	V → N	refus-al, dispos-al, recit-al
-ant	V → N	claim-ant, defend-ant
-(at)ion	V → N	realiz-ation, assert-ion, protect-ion
-er	V → N	teach-er, work-er
-ing$_2$	V → N	the shoot-ing, the danc-ing
-ment	V → N	adjourn-ment, treat-ment, amaze-ment
-dom	N → N	king-dom, fief-dom
-ful	N → A	faith-ful, hope-ful, dread-ful
-(i)al	N → A	president-ial, nation-al
-(i)an	N → A	Arab-ian, Einstein-ian, Minnesot-an
-ic	N → A	cub-ic, optimist-ic, moron-ic
-less	N → A	penni-less, brain-less
-ous	N → A	poison-ous, lecher-ous
-ize$_1$	N → V	hospital-ize, vapor-ize
-ish	A → A	green-ish, tall-ish
-ate	A → V	activ-ate, captiv-ate
-en	A → V	dead-en, black-en, hard-en
-ize$_2$	A → V	modern-ize, national-ize
-ly	A → Adv	quiet-ly, slow-ly, careful-ly
-ity	A → N	stupid-ity, prior-ity
-ness	A → N	happi-ness, sad-ness
Prefixes:		
anti-	N → N	anti-hero, anti-depressant
ex-	N → N	ex-president, ex-wife, ex-friend
de-	V → V	de-activate, de-mystify
dis-	V → V	dis-continue, dis-obey
mis-	V → V	mis-identify, mis-place
re-	V → V	re-think, re-do, re-state
un-$_1$	V → V	un-tie, un-lock, un-do
in-	A → A	in-competent, in-complete
un-$_2$	A → A	un-happy, un-fair, un-intelligent

In some cases, the internal structure of a complex word may not be so transparent. The word *unhappiness*, for instance, could apparently be analyzed in either of the ways indicated in Figure 4.7. However, by considering the properties of the affixes

un- and *-ness*, it is possible to determine that the structure in Figure 4.7a is the right one. The key observation is that the prefix *un-* combines quite freely with adjectives but not with nouns, as shown in Table 4.7.

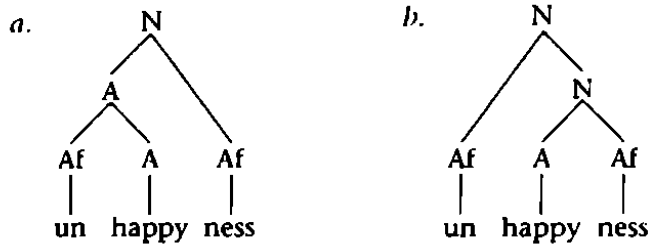

Figure 4.7 Two possible structures for the word *unhappiness*

Table 4.7 The prefix *un-*

un + *A*	un + *N*
unable	*unknowledge
unkind	*unhealth
unhurt	*uninjury

This suggests that *un-* must combine with the adjective *happy* before it is converted into a noun by the suffix *-ness*, exactly as depicted in Figure 4.7a.

By contrast, in a word such as *unhealthy*, the prefix *un-* can be attached only AFTER the suffix has been added to the root. That is because *-y* turns nouns into adjectives (as in *wealthy* and *cloudy*), creating the category of word with which *un-* can combine (see Figure 4.8).

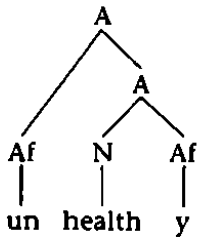

Figure 4.8 The internal structure of the word *unhealthy*

Constraints on Derivation

Derivation is often subject to special constraints and restrictions. For instance, the suffix *-ant* (see Table 4.6) can combine with bases of Latin origin, such as *assist* and *combat*, but not with those of native English origin, such as *help* and *fight*. Thus, we find words such as *assistant* and *combatant* but not **helpant* and **fightant*.

In other cases, derivation may be blocked by the existence of an alternative word. For instance, the word *cooker* in American English (to mean 'one who cooks') is blocked by the existence of the word *cook*, which already has that meaning; *famosity* (from *famous*) is blocked by *fame*; and so on.

Sometimes, a derivational affix is able to attach only to bases with particular phonological properties. A good example of this involves the suffix *-en*, which can combine with some adjectives to create verbs with a causative meaning as shown in Table 4.8 (*whiten* means roughly 'cause to become white').

Table 4.8 Restrictions on the use of *-en*

Acceptable	*Unacceptable*
whiten	*abstracten
soften	*bluen
madden	*angryen
quicken	*slowen
liven	*greenen

The contrasts illustrated here reflect the fact that *-en* can be attached only to a monosyllabic base that ends in a consonant other than /l/, /ɹ/, /m/, or /n/. Thus, it can be added to *white*, *quick*, *mad*, and *live*, which are monosyllabic and end in a consonant of the right type. But it cannot be added to *abstract*, which has more than one syllable; to *slow* or *blue*, which end in a vowel; or to *green*, which ends in the wrong type of consonant.

2.2 Two Classes of Derivational Affixes

It is common to distinguish between two types of derivational affixes in English. **Class 1 affixes** often trigger changes in the pronunciation of the base's consonants and vowels, and may affect stress placement as well. In addition, they often combine with bound roots, as in the last of the examples in Table 4.9.

Table 4.9 Typical effects of Class 1 affixes

Affix	*Sample word*	*Change triggered by affix*
-ity	san-ity; public-ity	vowel in the base changes from /e/ to /æ/ (cf. *sane*), final consonant of the base changes from /k/ to /s/, stress shifts to second syllable (cf. *'public* vs. *pub'licity*)
-y	democrac-y	final consonant of the base changes from /t/ to /s/, stress shifts to second syllable (cf. *'democrat* vs. *de'mocracy*)
-ive	product-ive	stress shifts to second syllable (cf. *'product* vs. *pro'ductive*)
-(i)al	part-ial	final consonant of the base changes from /t/ to /ʃ/ (cf. *part* vs. *partial*)
-ize	critic-ize	final consonant of the base changes from /k/ to /s/ (cf. *critic* vs. *criticize*)
-ion	nat-ion	final consonant of the base changes from /t/ to /ʃ/ (cf. *native* vs. *nation*)

In contrast, **Class 2 affixes** tend to be phonologically neutral, having no effect on the segmental makeup of the base or on stress placement (see Table 4.10).

Table 4.10 Some typical Class 2 affixes

Affix	*Sample word*	*Change triggered by affix*
-ness	prompt-ness	None
-less	hair-less	None
-ful	hope-ful	None
-ly	quiet-ly	None
-er	defend-er	None
-ish	self-ish	None

As the following examples illustrate, a Class 2 affix cannot intervene between the root and a Class 1 affix.

11) relat-ion-al — ROOT 1 1
divis-ive-ness — ROOT 1 2
*fear-less-ity — ROOT 2 1
fear-less-ness — ROOT 2 2

Notice that all combinations of Class 1 and Class 2 affixes are found in English words, except one—a Class 2 suffix followed by a Class 1 suffix.

3 Compounding

Another common technique for word building in English involves **compounding**, the combination of two already existing words (see Figure 4.9). With very few exceptions, the resulting **compound word** is a noun, a verb, or an adjective. (Possible examples of compound prepositions include the words *into* and *onto*.)

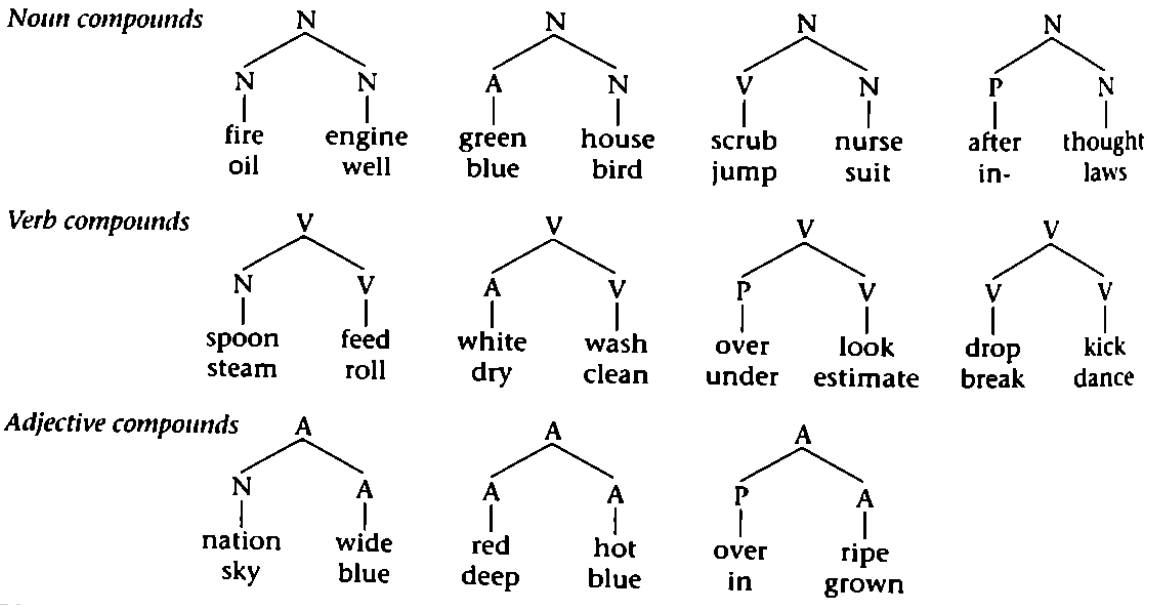

Figure 4.9 Some English compounds

In the most common type of English compound, the rightmost morpheme determines the category of the entire word. Thus, *bluebird* is a noun because its rightmost component is a noun, *spoonfeed* is a verb because *feed* also belongs to this category, and *nationwide* is an adjective just as *wide* is. The morpheme that determines the category of the entire word is called the **head**.

Once formed, compounds can be combined with other words to create still larger compounds, as the examples in Figure 4.10 show.

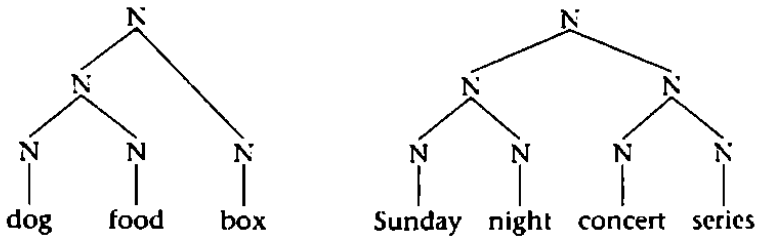

Figure 4.10 Compounds formed from smaller compounds

In addition, compounding can interact with derivation, yielding forms such as *abortion debate*, in which the first word in the compound is the result of derivation, as shown in Figure 4.11.

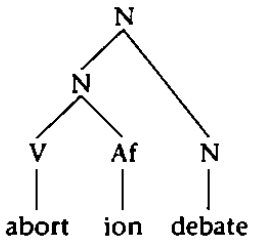

Figure 4.11 The interaction of derivation with compounding

Compounding is an inexhaustible source of new words in English, as can easily be seen by perusing the new-word updates offered by Oxford Dictionaries Online. Additions for 2013 included the following items, among many others.

Table 4.11 Some new compounds recognized by Oxford Dictionaries Online in 2013

New compound	*Meaning*
bitcoin	a digital currency
buzzworthy	likely to arouse public interest and attention
cake pop	a piece of cake on a stick
digital detox	refraining from using electronic devices
hackerspace	a community-operated workspace where people with common interests can socialize and collaborate
space tourism	travel to space for recreational purposes

3.1 Properties of Compounds

English orthography is not consistent in representing compounds, which are sometimes written as single words, sometimes with a hyphen, and sometimes as separate words. In terms of pronunciation, however, an important generalization can be made (see Table 4.12): adjective–noun compounds are characterized by more prominent stress on their first component. In noncompounds consisting of an adjective and a noun, in contrast, the second element is generally stressed.

Table 4.12 Compounds versus noncompounds

Compound word		*Noncompound expressions*	
'greenhouse	'a glass-enclosed garden'	green 'house	'a house painted green'
'blackboard	'a chalkboard'	black 'board	'a board that is black'
'wet suit	'a diver's costume'	wet 'suit	'a suit that is wet'

A second distinguishing feature of compounds in English is that tense and plural markers can typically not be attached to the first element, although they can be added to the compound as a whole. (There are some exceptions, however, such as *craftsman* and *parks supervisor*.)

12) a. Compound verb with internal tense:
*The player [dropped kick] the ball through the goal post.
b. Compound verb with external tense:
The player [drop kick]ed the ball through the goal post.

13) a. Compound noun with internal plural:
*The [ducks hunter] didn't have a license.
b. Compound noun with external plural (different meaning):
The [duck hunter]s didn't have a license.

LANGUAGE MATTERS Do You Say Brothers-in-Law or Brother-in-Laws?

Is it *attorneys-general* or *attorney-generals*? *Maids-of-honor* or *maid-of-honors*? *Runners-up* or *runner-ups*? There is now variation on this point. For some people, at least some expressions of this type have become compounds, which is why the plural marker cannot occur inside, as it once had to.

3.2 Endocentric and Exocentric Compounds

In most cases, a compound denotes a subtype of the concept denoted by its head (the rightmost component). Thus, *dog food* is a type of food, a *caveman* is a type of man, *sky blue* is a type of blue, and so on. Such compounds are said to be (semantically) **endocentric compounds**. In a smaller number of cases, however, the meaning of the compound does not follow from the meaning of its parts in this way. Thus, although

redneck is a noun (like *neck*), it denotes a type of person, not a type of neck. Similarly, a *hot dog* is a type of meat rather than a type of dog. Such compounds are **exocentric compounds**.

A very striking difference between English endocentric and exocentric compounds sometimes shows up in cases where the head is a word like *tooth* or *foot*, which has an irregular plural form. Consider in this regard the examples in Table 4.13.

Table 4.13 Pluralization in English compounds

In endocentric compounds	*In exocentric compounds*
wisdom teeth	saber-tooths (an extinct species of carnivore)
club feet	bigfoots (a mythical creature, Sasquatch)
policemen	Watchmans (a type of portable TV)
oak leaves	Maple Leafs (Toronto's NHL hockey team)

Notice that whereas the endocentric compounds employ the usual irregular plural (*teeth*, *feet*, etc.), the exocentric compounds permit the regular plural suffix *-s*.

3.3 Compounds in Other Languages

The practice of combining words (especially nouns) to build a more complex word is very widespread in the languages of the world. With the exception of Tagalog, in which compounds are left-headed, the languages exemplified in Table 4.14 all have compounds in which the rightmost element is the head. In right-headed Korean, for example, the head of *kot elum* 'icicle' is *elum* 'ice' since icicles are a type of ice, and the head of the *nwun mwul* 'tears' is *mwul* 'water' since tears are a type of water. In left-headed Tagalog, in contrast, the head of *tubig-alat* 'sea water' is *tubig* 'water' since sea water is a type of water, and in *bayad-utang* 'debt payment', the head is *bayad* 'payment' since a debt payment is a type of payment.

Table 4.14 Noun compounds in various languages

Korean		
kot elum straight ice 'icicle'	isul pi dew rain 'drizzle'	nwun mwul eye water 'tears'
Tagalog		
tubig-alat water salt 'sea water'	isip-lamok mind mosquito 'weak mind'	bayad-utang payment debt 'debt payment'
German		
Gast-haus guest-house 'inn'	Wort-bedeutungs-lehre word-meaning-theory 'semantics'	Fern-seher far-seer 'television'

Table 4.14 Continued

Finnish		
lammas-nahka-turkki sheep-skin-coat 'sheepskin coat'	elin-keino-tulo-vero-laki life's-means-income-tax-law 'income tax law'	
Cree		
mishtikw naapeu wood man 'carpenter'	piyesuu upiiwiih duck feather 'duck feather'	ishkuteu utaapan fire vehicle 'train'

Data from: East Cree Compound Nouns: http://www.eastcree.org/cree/en/grammar/southern-dialect/word-formation/noun-structure/compound-nouns-a1/.

4 Inflection

Virtually all languages have contrasts such as singular versus plural and present versus past. Such contrasts are often marked with the help of **inflection**, the modification of a word's form to indicate grammatical information of various sorts. (The base to which an inflectional affix is added is sometimes called a **stem**.)

4.1 Inflection in English

Inflection is most often expressed via **affixation**, and many languages (e.g., Japanese, Swahili, Inuktitut, and Finnish) have dozens of inflectional affixes. With only eight inflectional affixes (all suffixes), English is not a highly inflected language. Table 4.15 lists the inflectional affixes of English.

Table 4.15 The English inflectional affixes

Nouns	
Plural *-s*	the book<u>s</u>
Possessive (genitive) *-'s*	John<u>'s</u> book
Verbs	
3rd person singular nonpast *-s*	He read<u>s</u> well.
Progressive *-ing*	He is work<u>ing</u>.
Past tense *-ed*	He work<u>ed</u>.
Past participle *-en/-ed*	He has eat<u>en</u>/studi<u>ed</u>.
Adjectives	
Comparative *-er*	the small<u>er</u> one
Superlative *-est*	the small<u>est</u> one

Although most inflection in English involves affixation, some words mark inflectional contrasts in other ways. This is most obvious in the case of verbs, a number of which indicate past tense by substituting one form with another (as in *am-was* or *go-went*) or by internal changes of various sorts (*come-came, see-saw, fall-fell, eat-ate*). We will consider these processes in more detail in Section 5.

4.2 Inflection versus Derivation

Because inflection and derivation are both commonly marked by affixation, the distinction between the two can be subtle. Four criteria are commonly used to help distinguish between inflectional and derivational affixes.

Category Change

Inflection does not change either the syntactic category or the type of meaning found in the word to which it applies, as shown in Figure 4.12.

Figure 4.12 The output of inflection: there is no change in either the category of the base or the type of meaning it denotes

The form produced by adding the plural suffix *-s* in Figure 4.12a is still a noun and has the same type of meaning as the base. Even though *hearts* differs from *heart* in referring to several things rather than just one, the type of thing(s) to which it refers remains the same. Similarly, a past tense suffix such as the one in Figure 4.12b indicates that the action took place in the past, but the word remains a verb and it continues to denote the same type of action.

In contrast, derivational suffixes usually change the category and/or the type of meaning of the form to which they apply. Consider the examples of derivation given in Figure 4.13.

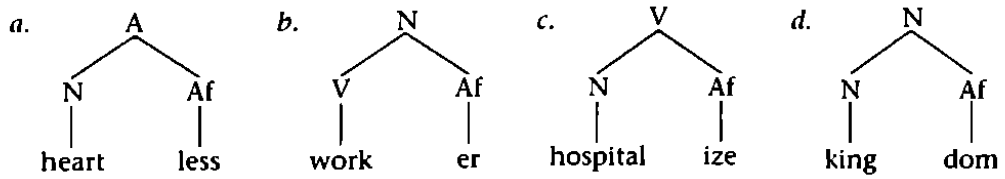

Figure 4.13 The output of derivation: there is a change in the category of the base and/or the type of meaning it denotes

As Figure 4.13a shows, *-less* makes an adjective out of a noun, changing the type of meaning it expresses from a thing (*heart*) to a property (*heartless*). Parallel changes in

category and type of meaning are brought about by *-er* (V to N) and *-ize* (N to V). Matters are a little different in the case of *-dom*, which does not bring about a category change in the word *kingdom* since both the base and the resulting word are nouns. However, *-dom* does modify the type of meaning from a person (*king*) to a place (*kingdom*).

It should be noted here that the suffixes *-ing* and *-en/-ed*, which were introduced in Table 4.15 as inflectional affixes, can also function as derivational suffixes. The suffix *-ing* can change a verb to a noun, as in *the singing of the choir*. Both *-ing* and *-en/-ed* can change a verb to an adjective, as in *the sleeping giant, a broken record*, or *the escaped convict*.

Order

A second property of inflectional affixes has to do with the order in which they are combined with a base relative to derivational affixes. As Figure 4.14 illustrates, a derivational affix must combine with the base before an inflectional affix does (IA = inflectional affix; DA = derivational affix).

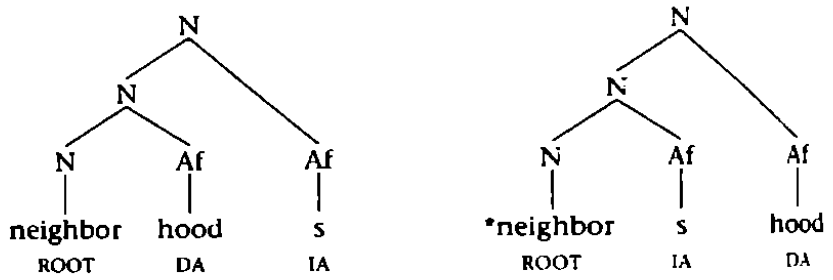

Figure 4.14 The relative positioning of derivational and inflectional affixes: the derivational affix must be closer to the root

The positioning of inflectional affixes outside derivational affixes in these examples reflects the fact that inflection applies to the output of derivation.

Productivity

A third criterion for distinguishing between inflectional and derivational affixes has to do with **productivity**, the relative freedom with which they can combine with bases of the appropriate category. Inflectional affixes are typically more productive than derivational affixes. The suffix *-s*, for example, can combine with virtually any noun that allows a plural form (aside from a few exceptions such as *oxen* and *feet*). In contrast, derivational affixes characteristically apply to restricted classes of bases. Thus, *-ize* can combine with only certain adjectives to form a verb.

14) modern-ize *new-ize
legal-ize *lawful-ize
final-ize *last-ize

In the case of verbs, matters are somewhat more complicated, since many English verbs have irregular past tense forms (*saw*, *left*, *went*, and so on). Nonetheless, the inflectional affix *-ed* is much more generally applicable than a derivational affix such as *-ment*. All the verbs in Table 4.16 can take the regular past tense ending, but only those in the top three rows are able to take the *-ment* suffix.

Table 4.16 Compatibility of verb bases with inflectional *-ed* and derivational *-ment*

Verb	*With* -ed	*With* -ment
confine	confined	confinement
align	aligned	alignment
treat	treated	treatment
arrest	arrested	*arrestment
straighten	straightened	*straightenment
cure	cured	*curement

Semantic Transparency

Finally, the contribution of an inflectional affix to the word's meaning is usually completely transparent and consistent. Adding a plural suffix gives the meaning 'more than one' (*cat-cats*, *tree-trees*), adding a past tense suffix gives the meaning 'prior to the present' (*walk-walked*, *play-played*), and so forth.

Things are not always so straightforward in the case of derivation, where it is often not possible to predict the word's meaning from its parts. An *actor* is someone who acts, but a *professor* is not someone who professes. The word *teacher* often refers to someone who holds a teaching job, but no such implication is associated with *walker*. *Government* can be used to refer either to an institution (as in *the government's agenda*) or the act of governing (as in *government by the people*), but *abandonment* lacks the first type of meaning.

4.3 Other Inflectional Phenomena

Inflection is a very widely used morphological process, and its effects can be seen in far more cases than can be discussed here. Nonetheless, two additional phenomena are worth mentioning, however briefly, because of their importance and frequency in languages of the world.

Case inflection indicates a word's grammatical role in the sentence (subject, direct object, and so on). A very simple example of this can be seen in English, where the pronoun form *he* is used for subjects and the form *him* is employed for direct objects. There is a comparable contrast between *I* and *me*, *she* and *her*, *we* and *us*, and *they* and *them*.

15) *He* met the new professor. The new professor met *him*.
↑ ↑
subject direct object

Agreement takes place when one word is inflected to match certain grammatical properties of another word. Especially common is agreement for number (singular vs. plural) and for person (first person—speaker; second person—addressee; third person—anyone else). Here again, English offers a simple example: the suffix *-s* appears on a present tense verb when the subject is third person singular.

16) That woman speaks French.

(Compare: *I speak French* or *They speak French*, with no *-s* suffix.)

5 Other Morphological Phenomena

No introductory textbook can hope to offer a full survey of the processes that contribute to word formation in human language. The preceding sections have touched upon many of the most common and central processes, but a number of others merit consideration as well. We will divide these into two groups—those that pertain primarily to inflection and those that involve other sorts of phenomena.

5.1 Processes Primarily Related to Inflection

Internal Change

Internal change is a process that substitutes one nonmorphemic segment for another to mark a grammatical contrast, as illustrated in the following pairs of words in Table 4.17.

Table 4.17 Internal change in English

sing (present)	sang (past)
sink (present)	sank (past)
drive (present)	drove (past)
foot (singular)	feet (plural)
goose (singular)	geese (plural)

Verbs such as *sing*, *sink*, and *drive* form their past tense by changing the vowel (e.g., from *i* to *a* in the first two examples). The term **ablaut** is often used for vowel alternations that mark grammatical contrasts in this way.

Some internal changes reflect phonologically conditioned alternations from an earlier stage in the language's history. The irregular plurals *geese* and *feet* came about in this way: the original back vowel /o/ in the words *goose* and *foot* was fronted under the influence of the front vowel in the old plural suffix /i/, which was subsequently dropped. This type of change in English and other Germanic languages is known as **umlaut**.