Chapter 4
Pre- and suf-fix-es:
Engl-ish Morph-o-log-y
/ˈpɹij ən ˈsʌfɪksəz/
/ˈɪŋglɪʃ ˌmɔɹˈfɑlədʒij/

In Chapter 1 we saw that there was a significant mismatch between independently meaningful units (*listemes*) and phonological words. One of the main reasons for this mismatch is that there are meaningful elements contained *within* phonological words. There are even some elements that are obviously regular subparts of words even though they *aren't* independently meaningful. These subparts, whether meaningful or not, are called *morphemes*. We will look at the morphemes which make up English words in some detail in this chapter, learning about the processes of *derivation* and *inflection*. We will also consider the differences between historically Germanic and historically Latinate morphemes in English, and learn about the ways affixation interacts with stress assignment and part of speech.

4.1   Making up words

The 43rd president of the United States, George W. Bush, is famous for his tendency to coin words on the fly. Here are some examples:

(40)   "The war on terrorism has *transformationed* the US-Russia
         relationship"
         —Nov. 14, 2001

   "We're working with Chancellor Schröder...to help Russia
      securitize ... the dismantled nuclear warheads."
                           —Berlin, Germany, May 23, 2002

"Thirdly, the *explorationists* are willing to only move equipment during the winter..."
—Conestoga, Pa., May 18, 2001

"I do think we need for a *troop* to be able to house his family.
—Tyndall Air Force Base, Florida, March 12, 2001

"The results ...will make America what we want it to be—a literate country and a *hopefuller* country."
—Washington, D.C., Jan. 11, 2001

"This case has had full *analyzation* and has been looked at a lot.
—June 23, 2000

"When your economy is kind of *ooching* along, it's important to let people have more of their own money."
—Boston, Oct. 4, 2002

Putting aside the question of whether you think these new words reflect poorly on Bush's vocabulary, there's no question that he knows his morphology. And so do you: if you're a native speaker of English, you likely understand very precisely what the President meant by each of his neologisms. Take a moment and try to define each of the italicized words from the list above.

Exercise 1: Define each of Bush's neologisms
from the list in (1)

It's not too challenging a job. You've seen words like *partitioned, positioned,* and *conditioned,* which are formed on the same principle as *transformationed; fossilize, nationalize,* and *customize,* which are formed in the same way as *securitize; violinist, cyclist* and *receptionist,* for *explorationist; dog/dogs, idea/ideas,* and *worker/workers* for *troop/troops; smarter, prettier,* and *harder* for *hopefuller; civilization, naturalization,*

and *immunization* for *analyzation,* and *scream, whistle* and *rattle (along)* for *ooch along.* Chances are you came up with something like the following:

(41) a. *transformationed*: transformed, caused a transformation of
    b. *securitize*: to secure, cause the security of[40]
    c. *explorationists*: explorers, those who conduct explorations
    d. *troop*: a soldier, the singular of *troops*
    e. *hopefuller*: more hopeful
    f. *analysation*: analysis, 'had full analysation' = 'been fully analyzed'
    g. *ooching*: limping painfully, moving while saying 'ooch'

In fact, it's pretty clear that you yourself could have made up any of these words with exactly these meanings if you'd wanted to. These words, though, sound a bit funnier than other possible neologisms. Another new coinage, associated with the above, is *Bushisms*, a word made up to describe the funny-sounding expressions of George W. Bush—but the word *Bushism* itself isn't particularly funny. In this chapter and the next, one of the topics we'll investigate is why these Bushisms 'sound funny'.

One reason Bushisms are funny is that many of them are redundant—there are other, simpler words that express the intended meaning: *transform, secure, explorer* and *analysis*. Others are funny because they reveal a mistaken assumption about the composition of a more complex word: *troops*, referring to the Armed Forces collectively, is derived from the plural of *troop*, a word referring to a group of soldiers, as *herd* refers to a group of cows (*troops* bears the same relationship to *troop* as *herds* does to *herd*). If Bush were unfamiliar with *troop* as a collective noun, and had mostly only heard the word *troops* in expressions like *You're scheduled to address the troops at 12:30*, it would be easy for him to think that *troops* was the plural of a word *troop* which meant simply *a*

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[40] Interestingly, *securitize* is actually an accepted English word, of recent vintage—the OED lists the first use in print as 1981—but it doesn't have the meaning that Bush seems to intend. To *securitize* a financial asset, e.g. a loan, is to convert it into the financial instruments called *securities*—an unlikely thing to do to nuclear warheads.

soldier. *Hopefuller* is funny for reasons we'll explore later in this chapter. *Ooching along* is an example of a word-formation strategy which is very common in English (but uncommon in many other languages). In English, we can name a verb that describes movement after the sound that is made while the movement is happening. Hence we have *Sue whistled to work*, *A giant rhino rumbled through the room*, and *The door creaked shut*. Bush's verb *ooching* is notable in that the sound-word he chose to form it from is rather uncommon and evocative. In my opinion, it's the only expression in the list with any poetic or rhetorical value. We'll look at all these examples in more depth as we go on. But first, let's consider how you knew what all of Bush's neologisms meant!

4.1.1 Compositionality within words

Bush's word-analyzation machinery, like yours, can compute the meanings of novel words from the meanings of their parts, if each part has an independent meaning. Take *explorationists*. How many parts does it have? At least *explore*, *-ation*, *-ist* and *-s*, right? The meaning of each of these parts is part of the knowledge of most adult speakers of English. Let's take each in turn:

(42) *explore*: to conduct a systematic search
       (this is the sense of *explore* Bush was using in his
       quote above)[41]
       -ation: the action or process of Xing
       -ist: one that performs an action Y
       -s: more than one Z

Taking the word apart into its components, our grammar deduces that *explorationists* means 'more than one *explorationist*', that *explorationist* means 'one that performs the action of *exploration*', that *exploration* means 'the action or process of *explor*ing', and that *exploring* means 'conducting a systematic search'; Consequently, we know that *explorationists* means something like 'more than one person performing

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[41] These definitions are based on those in Merriam-Webster's Collegiate dictionary.

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the action of conducting a systematic search.' The meaning of each subpart composes with the others to give the meaning of the whole.

In many cases, however, there are subparts of words which don't seem to have independent meanings—they're the equivalent of our *caboodle* example from chapter 1, except at a sub-phonological-word level. Consider the words *cranberry, loganberry* and *raspberry*. They're all types of *berries*, and the word *berry* seems to be a subpart of each—but what does the other part mean? In *blueberry* and *blackberry*, the first half of the word describes the color of the fruit, but that's not the case with *cranberry* or *loganberry*. Can you come up with a meaning for *cran-*, *logan-*, or *rasp-*, as used in these words, off the top of your head? Similarly, *deflect, inflect,* and *reflect* each seem to have an element *-flect* in them—but can you define a uniform meaning for *-flect* that is part of the meanings of these verbs? (I can't.) Finally, *unkempt* and *disheveled* seem to be made up of *un+kempt* and *dis+sheveled*—but *-kempt* and *-sheveled* aren't words of English by themselves.

In these words, there are structural subparts that seem to be linguistic units of some kind, but they don't have their own meaning. They're like the word *caboodle* in our example from chapter one, *kit and caboodle*. There, we had a phonological word that didn't have its own meaning. Here, we have a piece of a word that doesn't have its own meaning.

Word-pieces are called *morphemes*. Morphemes can be identified in a number of ways. In the easiest cases, morphemes are also listemes, so that when they show up as part of a phonological word, they bring along their own meaning to that word. The word *dogs* is made up of two pieces, both of which are listemes, and the meaning of the whole word is made up of the meaning of the pieces.

As we've just seen, however, words sometimes seem to be made up of independent pieces that don't have their own independent meaning. How can we identify those morphemes? For example, just now I asserted that the string *cran*, in *cranberry*, was a morpheme, but that it is not a listeme—it doesn't have a meaning of its own. But in a word like, say, *Scranton* (a town in Pennsylvania), the same sound sequence is not a

morpheme—*Scranton* is not made up of *s+cran+ton*.[42] How can we tell the difference?

In *cranberry,* it's easy: *berry* is obviously a morpheme (and a listeme); we know that because it can occur as a word on its own and also it's familiar from all the other names of berries. If *berry* is a piece of *cranberry*, then the part that's not *berry* must be another piece. We'll see other ways to detect the presence of a morpheme without meaning later in the chapter. Meaningless morphemes are often called *cran-morphs*, after the *cranberry* example.[43]

Morphemes, then, are subunits of phonological words. They are mostly, but not always, also listemes. In order for Bush to use the subunit *-ize* or *-ist* in a novel word, he had to have an idea of the meaning he'd get by using them. When morphemes are also listemes, so that the meaning of the word is created from meanings of its morphemes, as in *securitize*, we say the word is *compositional*—the meanings of the morphemes *compose* the meaning of the entire word.

Non-compositional words include those which contain cran-morphs, of course. However, there are also non-compositional words which are made up of morphemes which do have their own meanings, but where the meaning of the whole word doesn't seem to be related in a regular way to the meanings of its parts. For example, *terrific* is made up of *terrify + -ic*, but the meaning of *terrify* doesn't seem to be part of the meaning of *terrific*. (If something terrifies you, it causes terror, but if something is terrific, it doesn't usually cause terror!)

Words like *terrific* with multiple morphemes that don't semantically compose are exactly like idioms — they're word-sized equivalents of a phrase like *kick the bucket* when it's used to mean 'die'. Compositional words, on the other hand, are like the literal interpretation

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[42] Actually, *-ton* probably is a morpheme in Scranton; it's a reduced form of 'town'. But *-cran* definitely isn't!

[43] Ironically, after linguists used *cran-* to name a particular kind of unproductive morpheme, marketers started using it productively to form juice names: *cranapple, cranpassion*, etc.—to indicate a blend of cranberry+X juices. Wouldn'tcha know it. At least it does make the point that *cran-* is a morpheme, although now a more independently meaningful and productive one.

of a phrase like *kick the bucket* when it's used to mean 'kick the bucket'. The phrase *kick the bucket* has both a compositional and a non-compositional meaning. So does the word *transmission*, which can mean, compositionally, 'the action or object of transmitting', or, non-compositionally, 'a piece of machinery in a car which shifts gears.'[44]

4.2   Function and content, free and bound, root and stem

Listemes come in two varieties. Consider the following two groups of monomorphemic phonological words.

(43)   that   monkey
               an   squint
               did   wriggle
               but   bright
               of   massage
               the   carpet
               to   sad

Do you notice anything different? One obvious difference is that the listemes on the right are mostly longer than the ones on the left. The ones on the left are all just one syllable, but many of the ones on the right contain two.

Another difference is one we touched on briefly in the previous chapter: the listemes on the right all contain a necessarily stressed syllable, and consequently have to be pronounced with at least one full vowel. The ones on the left, on the other hand, can all be pronounced with no stress and just a reduced vowel: /ən'æpl̩/ "an apple", /ə'lɛtəɹtə'dʒɑn/ "a letter to John", /'sɪksəv'wʌn/ "six of one", etc.

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[44] A car's transmission actually does have something to do with transmitting—it transmits power to the drivetrain. However, as an instrument, rather than an action, a truly compositional name for the thing would be formed with the instrumental –*er* suffix. It should be *transmitter*, as in *screwdriver*, rather than *transmission*, which contains the action-suffix –*ion*.

A third difference has to do with the relative 'meaningfulness' of the two sets. The words on the left tend to convey mostly grammatical information—they only do any real work when they're actually in a phrase. It would be difficult to write a conventional definition for these words. The ones on the right, on the other hand, convey more of a real message. If you were pretending to be Tarzan, or sending a telegram, you'd be likely to leave out the words on the left: Tarzan might say "Monkey sad" for "The monkey is sad," or "Tarzan want banana" for "Tarzan wants a banana."

The words on the left are examples of the *function* words we learned about in the last chapter. The richly meaningful words on the right, on the other hand, are *content* words.

Function words are an integral component of the grammar—knowing how to use *the* or *of* is part of knowing how to speak English. If you don't know a content word, you can always get around it, with a filler word like *thingy* or *whatchamacallit*. There's no getting around function words, though. The function words of a language are thus part of a fairly fixed list, which doesn't vary much from speaker to speaker, or even from dialect to dialect. Consequently it's very difficult to introduce a new function word, or change an old one. A few years ago there was a determined effort to introduce a new, gender-neutral singular pronoun *sie* into English, which just never caught on despite its obvious usefulness when you don't know someone's gender (as in *A doctor was called to the scene, but sie arrived too late*.). The problem was that the pronouns of a language are function words, not content words, and consequently very difficult to change, since they are a part of the grammar.

Function words are called *closed-class* words, because new ones cannot be easily introduced, and content words are *open-class* because it's extremely easy to invent or borrow new ones. Nearly every new word in any language is like the words on the right—contentful, descriptive—and it's almost impossible to introduce a new word into the list on the left. Any language can borrow a word from any other language in the open-class category—in fact, this is how modern English got much of its vocabulary, by borrowing open-class words from various languages, mostly French and Latin (see chapter XX).
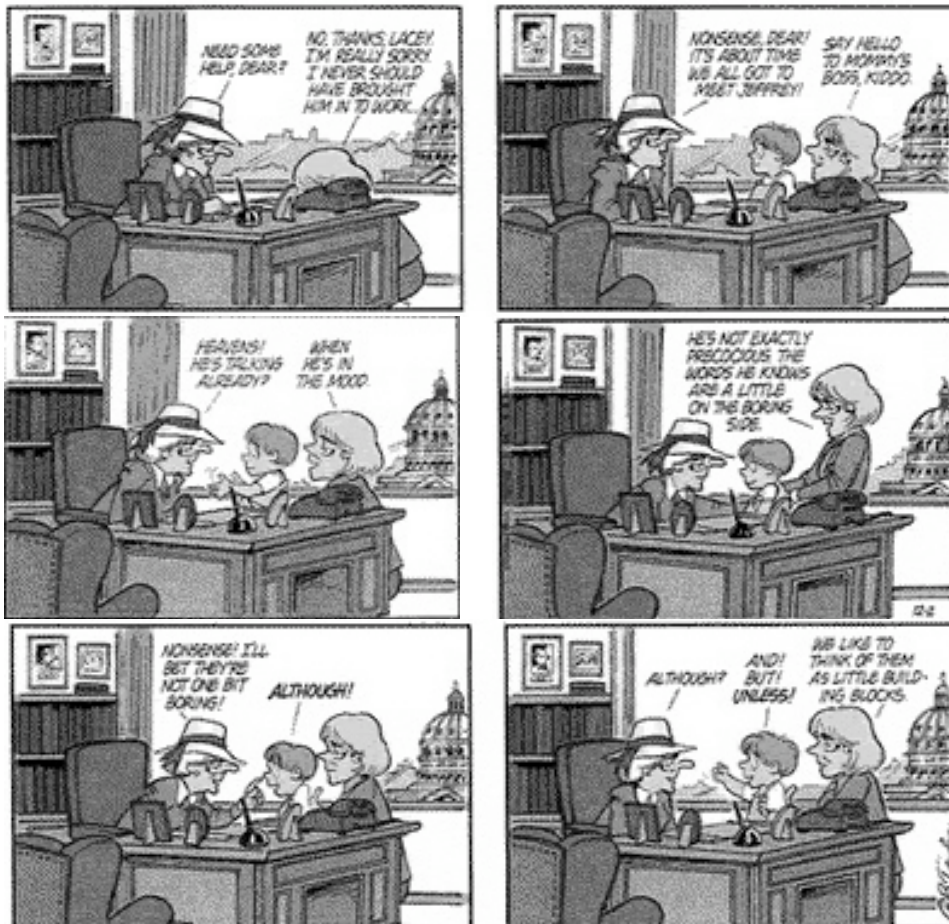
This distinction between more and less contentful elements can be seen below the level of the phonological word, too. Every word that is made up of more than one morpheme has a central element—a root—that usually contributes the meaty part of the word's meaning. Roots are open-class morphemes. So in *dog-s*, the root is *dog* and *-s* is just a functional affix indicating plurality. Similarly in *unhappiness,* the main 'dictionary' meaning comes from the root /hæpiɪ/, and *un-* and *-ness* just indicate negation and nounhood, respectively.

This can lead to the frustrating serial look-up effect, where the information you really need is what the meaning of the *root* is, but the dictionary entry just tells you the meaning of an affix, which you already know, and leaves the mysterious root in the definition. You've just read the sentence, "I remember a fashionable perruquier being tried for treason many years ago" in your 19th-century novel, and naturally you want to know what a *perruquier* is. You get out your dictionary, which tells you that it's "One who makes, dresses or deals in perruques"—but you could have guessed that much, because you know *-ier* from *furrier, chocolatier, hosier, clothier, farrier, courtier,* etc.[45] The real problem is that you don't know what the meaning of the root is—you don't know what a *perruque* is. Only when you look up the root *perruque* do you finally find out that a *perruquier* is someone who makes, dresses or deals in *wigs*.

4.2.1   Free and bound morphemes

It's important to notice that not all roots are independent phonological words. In the words *electric*, *toxic* or *emphatic* (all of which contain the adjectival suffix *-ic* that we know from *photograph-ic* or *prophet-ic*) the root is *electr-* /ijlɛktr/, *tox-* /tɑks/ and *emphat-* /ɛmfæt/ — none of which are independent phonological words.

Morphemes which can be independent words on their own—including many roots, like *happy* or *dog*—are called *free* morphemes. Morphemes which cannot be independent words on their own—often affixes, like *-ed* or *-ness*, but sometimes also roots like *electr-* —are called *bound* morphemes.

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[45] Surprisingly, *soldier* and *lawyer* are formed with this self-same suffix.

Exercise 2: Try to think of five other bound roots in English. How many different words do they occur in? Hint: most bound roots in English are Latinate in origin. There are many bound roots in scientific and scholarly words.

4.2.2   Roots and stems

There's one more piece of terminology we need before we move on. The *root* of a word is its central morpheme. But it's possible to add an affix to a word that already has an affix on it. When you do that, you're not adding the affix to the root directly. The unit that you add an affix to is called the *stem*. In *childishness*, the suffix *-ness* has been added to the stem *childish*, which has been formed by combining *child* with the adjectival suffix *-ish—child* is both the root of the whole word, and the stem to which *-ish* attaches. The difference between roots and stems is illustrated in (44) below:

(44)

child) ish) ness

Root of whole word
Stem for *-ish*

Stem for *-ness*
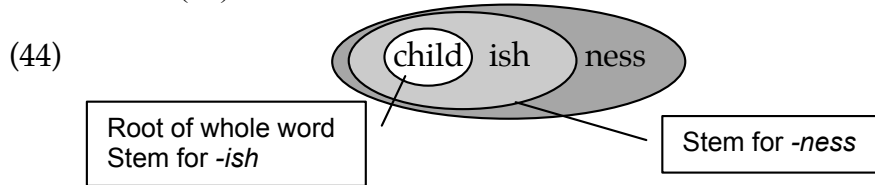
Words like *competitive* provide clear illustration of the need to differentiate between roots and stems. In *competitive*, an adjective, we clearly see the presence of the adjective-forming suffix *-ive*, as in *act-ive* or *impress-ive.* In other words, it looks like the suffix *-ive* turns verbs (*act, impress*) into adjectives. But what is the verb from which *competitive* is formed? We want to say *compete*, but the stem—the bit to which the affix *-ive* attaches—is actually not *compete,* but *compet-it-. Compet-it-* is not a verb! The *-it-* part is a meaningless morpheme (a cran-morph) that attaches to *compet-* to produce a stem that allows other affixes to attach. We also see the *-it-* in *competition* and *competitor*. The root of all these words, including the verb *to compete,* as well as *compet-it-ive, compet-it-*

ion and *compet-it-or*, is *compet-*.[46] In these cases, the stem has to be different from the root.

4.3   Inflection and Derivation

Even among the less-contentful bound morphemes of English—affixes like *-ive* or *-ed*—there are some that seem more contentful than others. The change in meaning from *intend* to *intends* or *intended* seems less significant, content-wise, than the change from *intend* to *intention*. The change from *intention* to *intentions* feels like it has less effect on meaning than the change from *intention* to *intentional*. Sometimes this distinction can be very dramatic. The change from *terror* to *terrors* is considerably less significant than the change from *terror* to *terrific*! Similarly it's much less of a step to go from *arrest* to *arrests* than it is to go from *arrest* to the adjective *arresting* (as in "He had an arresting voice").

Endings like *-s* and *-ed* don't seem to have much effect on 'dictionary' meaning, but they are essential elements of the grammar of English. If you are a native speaker of standard American or British English, you will immediately know what's wrong with the following sentences:

(45)   a.   *Two crows lands on my porch every morning.
       b.   *Two crows have land on my porch.
       c.   *Two crow land on my porch every morning.
       d.   *Two crow have landed on my porch.

The problem in every case is a suffix. The meanings of all four utterances are perfectly clear; (a) and (c) are saying "Two crows land on my porch every morning", while (b) and (d) are saying "Two crows have landed on my porch." The only thing wrong with (a) is that the verb form should be *land* and not *lands*; the only thing wrong with (b) is that the verb should be *landed*, not *land*; in (c) and (d) *crow* should be *crows*.

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[46] We'll talk about the variation in the pronunciation of the "e" in words like these later in the chapter.

These suffixes carry a little information, true — that the verb has a 3rd person singular subject, for instance, or that the noun is plural — but the dictionary meaning of the root is preserved exactly. Further, the addition of the suffix is *required* by the grammar. *Any* regular verb in a sentence like (b) above would have to have the *-ed* suffix, and *any* regular noun in the equivalent position in the sentence in (a) above would have to bear the *-s* suffix. Even if I make up a noun or a verb that you've never heard before, you can still tell me that there's something wrong with these sentences:

(46) a. I heard some yelping outside, and when I went out to look, I saw that two crows had caloop the dog.
    b. Two bondle bought all the duct tape in the store.

Again, we prefer *had calooped* and *two bondles* — whatever *caloop* and *bondle* mean. Every Standard American English speaker knows and uses these suffixes, because knowing them is part of what it means to know Standard American English. These affixes are like function words.

In contrast, it's possible to imagine that some English speakers might never learn to use a suffix like *-ize* or *-er*. The grammar doesn't force these suffixes on speakers; they're voluntary. If you wanted to say sentence (47)a below without using *-ize*, you could say sentence (47)b; essentially the same message would be conveyed. Similarly, if you wanted to say (47)c without using *-er*, you could say (47)d:

(47) a. Congress criminalized flag-burning today.
    b. Congress made flag-burning a criminal act today.
    c. Mary is a writer.
    d. Mary writes for a living.

The grammar doesn't require you to use *-er* or *-ize*, or *-ion* or *-ish* or *-ness*, for that matter. You could go through your entire life without using a single word containing one of those suffixes and yet still be considered a speaker of Standard English, albeit one with a fairly limited vocabulary.

The fact that affixes like *-ize, -ish,* or *-ion* are not required is also reflected in the fact that sometimes it doesn't seem possible to add them to

a word, even when it seems like it should be possible. If you *reserve* something, you make a *reservation*. If you *conserve* something, you are doing *conservation*. If you *preserve* something, you are engaging in *preservation*. So if you *deserve* something, why aren't you involved in **deservation*?

Functional affixes like *-ed* or *-s,* which the grammar requires are called *inflectional* affixes. The meaning of the root to which they are attached always remains the same—inflectional affixes always form completely compositional phonological words. Affixes like *un-, -ize* or *-er* which the grammar doesn't pay such strict attention to are called *derivational* affixes—and words containing derivational affixes are sometimes compositional (like *writer*) and sometimes not (like *terrific*). Inflectional affixes just 'inflect' a stem to satisfy the grammar, leaving its core meaning essentially unchanged. Words formed with derivational affixes, however, sometimes gradually take on their own, unique meaning over time, in the same way that an oft-repeated metaphor can become an idiom. We will call such meaning drift *idiomatization*.

Exercise 3: The suffix *-ion* is usually added to a verb, X, to derive a noun meaning "the act of Xing" or "the result of Xing" What are the verbs that *conception, reception, deception* and *inception* are formed from? Notice anything strange? Which of these *-ion* words have undergone idiomatization?

4.3.1   Dual-use affixes: both inflectional *and* derivational

There are a few suffixes that seem to be on the border between inflection and derivation. The verbal suffix *-ing* is one such. One of its functions is to produce the progressive participle—the form of the verb you use when you want to talk about something that is going on right now: *Sue is walk**ing**, Bill is call**ing** Joe, I'm think**ing** out loud*. That use is clearly inflectional: it is required by the grammar. (You can't say **Bill is call*.) It has another function, too, however—it turns verbs into nouns: *The sing**ing***

*woke me up, I really don't like all the word-process**ing** I have to do in this job*, *Jane made $10 baby-sit**ing***. This category-changing function seems more derivational. The dual nature of this suffix can lead to amusing ambiguity. The headline *Police Stop Slaying Suspect Look-alikes* is funny because *slaying* is intended to be read as a noun, forming part of a bigger compound noun *slaying suspect look-alikes*, but in this headline, *slaying* can also be interpreted as the progressive participle of the verb *to slay*, which results in the idea that the police have been killing people who look like their suspect (though the headline informs us that fortunately they've stopped).

Another piece of verbal morphology which is similarly ambiguous between an inflectional and derivational use is another suffix that forms a different verbal participle. It's the form of the verb you use when you want to talk about something that happened before something else (the 'perfect') or when you want to describe what happened without necessarily saying who did it (the 'passive'). It's the *perfect* or *passive* participle, and you see it in sentences like *He had writt**en** the letter* (perfect) ; *The letter was writt**en*** (passive)*, She has play**ed** her hand well* (perfect), *I was fool**ed** by the disguise* (passive). In English, most verbs form their perfect participle in the same way they form the past tense—by adding *-ed*—but you can tell the participle is a distinct form of the verb because some verbs have different forms in the perfect and in the past:

(48)   a.   She wrote the letter.   (past)
          b.   She has written the letter.   (perfect)
          c.   He went to school.   (past)
          d.   He had gone to school.   (perfect)
          e.   Mary drove the car.   (past)
          f.   Mary had driven the car.   (perfect)

The verbal participle is required by the grammar of English (you can't say *She has play her hand well*), and hence we know the participial morphology is inflectional. However, the participle form can also be used as an adjective, as in *a well-played hand*, *a completely fooled parent, an unopened letter*, *an inflated balloon*—which means that the participle

suffix *-ed* has changed the stem from being a V to being an Adj, in a rather derivational way.

　　The distinctness of the inflectional participle form and the derivational adjective form is clear when we look a little closer, despite their homophony. Some adjectival participles have undergone meaning drift (idiomatization), as sometimes happens with derivational morphology. The adjectival form of *drive* is *driven*, and it often just has a regular compositional meaning, as in *an undriven car*. When it's applied to a person, though, it means 'ambitious, obsessively focussed on a goal,' as in *a driven man*. Similarly, *fallen* has a regular, compositional adjectival meaning, as in *a fallen tree*, but also can mean 'sinful,' as in *a fallen woman*. Sometimes, the connection between the adjectival participle form and the verbal participle is lost entirely. The participle of the verb *to drink* is now *drunk*, as in *I have drunk the wine*. That form can be used adjectivally, as usual — *he was a bit drunk*—but an older participle is also still used adjectivally, as in *a drunken man*. This adjectival form has no inflectional use as a participle: you can't say **I have drunken the wine*. The loss of *drunken* as a participle did not result in the loss of *drunken* as an adjective—evidence that the adjectival form really is derivational, and distinct from the inflectional participle form. The same thing happened to *shrink*—participial *shrunk*, adjectival *shrunken*.

　　For these cases, then, we can say that there are actually two distinct suffixal listemes, *-ing₁* and *-ing₂*, and *-ed₁* and *-ed₂*: an inflectional one which forms a participle, and a derivational one which changes the category of the word. These listemes are distinct in our mental lexicons, but homophonous—they sound the same. In that way, they're similar to more obvious pairs of homophones, like *bank* 'a financial institution' and *bank* 'a sloped incline of earth, esp by the side of a river'. Other homophonous affixal listemes include the *-s* in *Two dogs* and the *-s* in *John knows French*. One signals plurality, and one signals that the verb is in the present tense with a singular, third-person subject—they sound the same, but they have two different meanings. They must be two distinct listemes.

4.4   Affixal syntax: Who's my neighbor?, Part I

We have seen that derivational morphology can change the part of speech of the stem it attaches to. So for instance, *nation* is a noun, but when the suffix *-al* is added, the resulting word *national* is an adjective. In the example from exercise 3 above, you might have noticed that *-ness* attaches to adjectives to form nouns: *sick—sickness, weird—weirdness, silly—silliness*.

Derivational affixes don't *always* change the part of speech of the stem they attach to, but they do always specify the part of speech of the words they produce. The suffix *-ness*, for example, always produces nouns, no matter whether it's attached to an adjective or to a word that's already a noun.[47] When it attaches to nouns, of course, the new word ends up being the same part of speech as the stem.

Affixes (both inflectional and derivational) also care about the category of the thing they're attaching to. The suffix *-ness* really doesn't like to go on verbs, for instance: **affectness, *competeness, *repelness* sound very bad, compared to *affectedness, competitiveness,* and *repulsiveness*, where we've added the adjective-forming suffix *-ive* before attaching *-ness*.

Similarly, you might have noticed that *un-* attaches to adjectives and verbs—*unwilling, unafraid, undo, unwrap, un-American*—to produce more adjectives and verbs. Even though it doesn't *change* the category of the stem, it still cares what the category of the stem *is*: it refuses, for instance, to go on nouns: **unfear, *unAmerica*.

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[47] *Ness* is a very frequently used suffix, and although an English grammar wouldn't recommend attaching it to nouns, it often is attached to them in less formal contexts. A website about caring for basset hounds, for instance, includes the opinion that "The one thing I believe everyone who deals with these problems will agree on is that many owners aren't paying enough attention to their dog's 'dogness'."
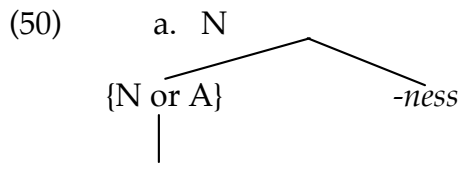
Exercise 4: In the word *unhappiness*, which affix was combined with the root first? Is *unhappiness* built out of *un-* combined with the stem *happiness*, or is it built out of *-ness* combined with the stem *unhappy*? Or does it matter? Why?

Besides information about its pronunciation, and its meaning, our mental dictionary entry for *-ness* has to include a note about what it can combine with. That is, it contains information about the *syntax* of *-ness*. We saw above that *-ness* likes to attach to adjectives or nouns. Our mental lexical entry for *-ness*, then, must look something like this:
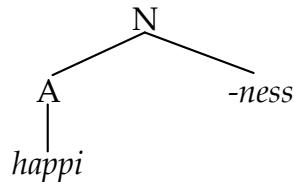
(49)   *Phonology*   *Syntax*   *Semantics*
        /nɛs/   [[_____]$_{N\,or\,A}$ -ness]$_N$ "the quality of
                                                          being [___]$_{N\,or\,A}$"

In (49), the blank space in the syntax and the semantics entries is intended to represent the stem to which *-ness* is attached. The subscript labels outside the brackets show what the part of speech of the whole thing inside those brackets is.

Syntactic structures like the one in the entry for *-ness* above can be drawn with upside-down trees, rather than brackets. In syntactic tree drawings, the root of the tree represents the whole word, and its branches represent the subparts. The labels show what the category of each subtree and branch is, and the morphemes themselves are the leaves at the end of each branch. We could represent the bracketed structure that represents the requirements for *-ness* in (49) as the tree below in (50)a, and the structure of a word like *happiness* as in (50)b.
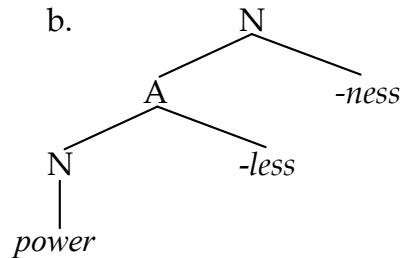
(50)   a. N

        {N or A}   *-ness*

        _____

b.   [[happi]_A-ness]

```
            N
           / \
          A   -ness
          |
        happi
```

A word like *powerlessness*, which has a more complicated structure than *happiness*, would look like this, in bracketing and tree-drawing:

(51)   a.   [[[power]_N -less]_A -ness]_N

b.   N
```
              / \
             A   -ness
            / \
           N   -less
           |
         power
```

Now that we know that an affix specifies the category of the word it attaches to, we can see the answer to the question posed in exercise 4 above. Consider the derivation of the word *unhappiness*. The root is *happy*, an adjective. Let's try putting the *-ness* on first. The suffix *-ness* can go on adjectives just fine, so *happy* can combine with *-ness* to form the noun *happiness* (which is indeed a fine English word).

However, can we add *un-* to the noun *happiness* to get *unhappiness*? No! We saw above that that *un-* doesn't go on nouns! (You can say *un-American* but you can't say *un-America*.) Consequently, we know we can't make *unhappiness* by combining *un-* with *happiness*. But *un-* is perfectly happy to go on adjectives. It must be the case, then, that, *un-* is prefixed to *happy* first, to form the adjective *unhappy*; then *-ness* can combine with *unhappy* to form the noun *unhappiness*. In other words, the operations which form *unhappiness* happen in the order illustrated in

(7)a, with the structure illustrated by bracketing in (52)b and by a tree in (52)c:

(52) a.   Adj +   Adj
             un- +   happy
      = Adj
         unhappy

             Adj +   N
             unhappy   -ness
      = N
         unhappiness

      b.   [[un- [happy]$_A$]$_A$-ness]$_N$

      c.   N
                   Adj   *-ness*

             un-   Adj
                           |
                         happy
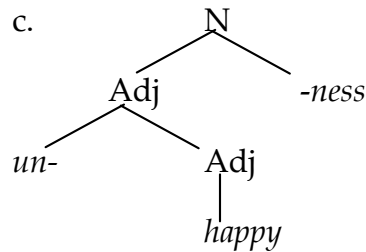
Exercise 5: *Un-* goes on verbs as well as adjectives: *undo, unbutton, unlock*. It has a slightly different meaning on verbs than it does on adjectives however. How would you describe *un-*'s meaning when it attaches to verbs? What does it mean when it attaches to adjectives?

Exercise 6: *-Able* goes on verbs and produces adjectives: *doable, buttonable, lockable*. *Un-* goes on both adjectives and verbs. As a result, words like *unlockable* have two different potential derivations. Each derivation has a different meaning, illustrated in the following sentences:

(i)   "The door was unlockable, so I was forced to leave it open"
(ii)   "The door was unlockable, so I got it open without trouble"

Explain the ambiguity of *unlockable* by describing the two different affixation sequences that can create it. Draw two trees like the one in (52)c, one representing each affixation sequence, and indicate which tree represents which meaning.

4.5   Affixal phonology: Who's my neighbor? Part II

Above, we saw that affixes must be memorized complete with syntactic information about what kind of stem they can attach to. Affixes care about the part of speech of their stem.

Some affixes also care about phonological properties of their stem. In some cases, everything else seems right—the meanings of the stem and affix are compatible, and the category requirements of the affix are compatible with the category of the stem—but it still seems wrong to put them together into one word. Look at the following pairs:

(53)	a.	*Adjective*	*Comparative*	
			Suffixed	Periphrastic
	i.	smart	smarter	?more smart
		intelligent	*intelligenter	more intelligent
	ii.	pretty	prettier	?more pretty
		attractive	*attractiver	more attractive

iii.	dark	darker	?more dark
	opaque	*opaquer	more opaque
iv.	quick	quicker	?more quick
	rapid	*rapider	more rapid

The suffix *-er* is an inflectional suffix which creates the comparative form of an adjective. (Don't get it mixed up with the homophonous derivational suffix *-er* which forms a noun referring to the doer of the action from a verb, as in *writer* and *driver*!) But it doesn't seem to be happy going on all adjectives, even when they have a very similar meaning to other adjectives that *-er* attaches to. For comparatives of words like *intelligent*, you can't attach *-er*—you have to use the periphrastic form, with the separate phonological word *more*. What's wrong with the *-er* forms in these cases?

The problem is that this suffix places restrictions on the phonology of the things it can attach to, just as we saw that *-ness* places a syntactic part-of-speech restriction on the kinds of things it can attach to.

Exercise 7: Figure out what the phonological restrictions are on the suffix *-er*. Feel free to consider any extra examples you can think of, though be sure that they're examples of the comparative, not a homophonous decoy!

One difference in the list above between the phonology of the things that *-er* attaches to easily and the things it doesn't attach to is that the former are all one syllable long, while the ones it refuses to attach to are more than one syllable long. So perhaps that's the restriction: *-er* only attaches to monosyllabic words. It turns out that that's only part of the story.

In fact, there are some multi-syllable adjectives that comparative –*er* attaches to perfectly happily. Let's compare some ones it can go on with some ones it can't:

(54)   Bisyllabic adjectives and comparatives in *-er*

Good comparatives		*Bad comparatives*	
happy	happier	pallid	*pallider
tiny	tinier	afraid	*afraider
shallow	shallower	naked	*nakeder
brainy	brainier	active	*activer
mighty	mightier	verdant	*verdanter

Notice anything different about these two sets? What do the good comparative adjectives on the left have in common? What do the bad ones on the right have in common?

The second syllable of the words on the left all end in a vowel. The ones on the right all have a second syllable whose vowel is followed by at least one consonant. That is, the second syllable of the words on the right all have a coda, while the second syllable of the words on the left are codaless. (Codaless syllables are called *open* syllables; syllables with a coda—with one or more consonants on the end—are called *closed* syllables. We'll see later that the distinction between open and closed syllables has played an important role in the history of English! (Chapter XX, section XX))

The open/closed distinction only matters to *-er* when it's attaching to a word that has more than one syllable. Any one-syllable adjective is fair game, no matter whether its one syllable is open or closed. (Think about words like *slower*, where it's attaching to a single, open syllable, and *faster*, where it's attaching to a single closed syllable.) But when there's more than one syllable in the stem, it can only attach to an open syllable, not a closed one.

So, the comparative suffix *-er* cares a) whether the stem it's attaching to has one or more syllables, and, b) if it has more than one syllable, whether the last syllable is open or closed. (Notice that the noun-forming suffix *-er* has no such restrictions—*receiver, compiler* and

interpreter are all fine, though their stems are multisyllabic verbs whose last syllable has a coda.) We have to find room in the lexical entry of comparative *-er* for this information.

One way to represent it is like this. In the syntactic part of the entry, that shows what the affix can attach to, rather than have a simple blank space representing the stem that the affix attaches to, we'll include symbols that stand for the syllable structure of the stem. We'll specify one, or optionally two syllables, and indicate that the second syllable must be open.

We'll use the linguist's standard symbol for syllable, the lower-case Greek letter sigma (σ), and subscript it with the letter 'o' to indicate 'must be **o**pen'. Regular round brackets around the second syllable symbol indicate that it's optional, as usual[48]:

(55) *Phonology*   *Syntax*   *Semantics*
      /əɹ/ $[\ [\sigma\ (\sigma_o)\ ]_A$ -er $]_{Comp}$ "more [___]$_A$"

Now we can see what's so odd-sounding about George Bush's neologism *hopefuller*. He put the comparative suffix *-er* on a two-syllable adjective whose second syllable has a consonant on the end!

4.6 Allomorphy

In the previous chapter, we learned that sometimes the same underlying sound, or *phoneme,* could be pronounced in different ways, depending on the context; for instance, /p/ is pronounced with

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[48] To be strictly correct, we'd have to include the information that the last syllable in a multisyllabic adjective has to be unstressed for it to take *-er*, which is why we say *more astray*, not **astrayer*. Also, we'd need a notation that allowed for more than two syllables in the stem, as long as the last one is unstressed and open (*shadowy-shadowier, persnickety-persnicketier*). The following notation would do the job: $[\sigma\ (\sigma^n\ {}^u\sigma_o)]_A$, where $n \geq 0$, and the prefixed superscript 'u' indicates 'unstressed'. Finally, I haven't mentioned that liquids and nasals can sometimes form the nucleus of an unstressed open syllable by themselves, in words like *little* and *able* (transcribed as /lɪtl̩/ and /ejbl̩/), which is why we get *littler* and *abler*.

aspiration—as /pʰ/—when it occurs alone as the onset of a stressed syllable (compare *pit* and *spit*). We called these different pronunciations of the same sound *allophones*.

The same sort of thing happens with morphemes, both inflectional and derivational. Try pronouncing the following phrases aloud to yourself, and then transcribe the verbs in them carefully in IPA:

(56) a.   The dog wagged his tail.
      b.   The dog smelled the food.
      c.   The dog cleaned out his bowl.
      d.   The dog barked.
      e.   The dog lapped up some water.
      f.   The dog sniffed at the food.
      g.   The dog trotted out the door.
      h.   The dog padded down the street.
      i.   The dog wounded the cat.

Exercise 1: Transcribe the verbs from the phrases in (9). What do you notice about the pronunciation of the past tense morpheme?

If you did your pronunciation and transcription carefully, you should have noticed that the pronunciation of the past tense morpheme varies quite a lot, even though we consistently spell it "*-ed*". In *wagged*, it's pronounced /d/, in *lapped* it's pronounced /t/, and in *wounded* it's pronounced as a separate syllable: /əd/ or /ɨd/.

Even thought these are three quite distinct pronunciations, we *spell* the suffix exactly the same way in all cases — it's spelled 'ed'. We don't need to indicate in the spelling when it's pronounced one way or when it's pronounced another way. We don't need to because this variation in pronunciation is 100 per cent predictable: it's determined by the pronunciation of the last sound in the stem that the past tense suffix attaches to. What characteristics of the preceding phoneme is the past-tense morpheme sensitive to?

> **Exercise 2:** What aspects of the preceding sound in the stem determine the pronunciation of the plural morpheme?

You probably noticed that you get the /ɨd/ pronunciation when the verb stem ends in a /t/ or a /d/ —i.e. when it ends in an alveolar stop, as in *patted* or *waded*. When you don't have the /ɨd/ pronunciation, the voicing of the preceding sound determines the pronunciation of the past tense—it's /t/ when the preceding sound is voiceless, as in *barked* or *sniffed*, and /d/ when the preceding sound is voiced, as in *raised* or *smelled*.

Intuitively speaking, this variation in pronunciation makes the stem-suffix sequence easier to pronounce. More precisely, it happens because the phonological words that are created by affixation have to comply with the constraints of English phonotactics. We can represent the situation as follows, where $/(p^{n \geq 1})/$ stands for the initial phonemes in a stem that could be one or more phonemes long, and $/p^{n+1}/$ is the last phoneme in the stem:

(57) <u>Semantics:</u>   <u>Pronunciations:</u>
      [+Past]   /ɨd/, /t/, or /d/

      <u>When you get each pronunciation</u>
      a. $[/(p^{n \geq 1})p^{n+1}/]_V$ -/ɨd/   when p^{n+1} is an alveolar stop
      b. $[/(p^{n \geq 1})p^{n+1}/]_V$ -/t/   when p^{n+1} is voiceless
                                  (but not an alveolar stop)
      c. $[/(p^{n \geq 1})p^{n+1}/]_V$ -/d/   when p^{n+1} is voiced
                                  (but not an alveolar stop)

4.6.1　Which one is the listeme?

If these are 'variations' in pronunciation, though, what are they varying from? They're clearly all related to each other. One of them must be the 'real' past tense suffix, and the others are the variants, forced to sound the way they do because of the phonotactic rules of English. Thinking about the phonotactic rules of English, then, will let us figure out which of these pronunciations of the past tense morpheme is the *real* listeme for the past tense.

We can assume that the pronunciation of the suffix changes in cases when adding the 'real' suffix would result in a sound sequence that violates English phonotactic rules. Let's consider the possibility that each of these suffixes is the real one in turn.

First, let's consider the possibility that the 'basic' pronunciation is the syllabic one, /ɨd/. If the past tense morpheme is /ɨd/, would there any phonotactic reason to change the pronunciation to /t/ or /d/ in some circumstances? That is, would adding /ɨd/ to a word ever produce an unpronounceable string of phonemes? Take the verb /wæg/, 'wag', for example. If the 'basic pronunciation of the past tense suffix is /ɨd/, adding the past tense to 'wag' would produce the form /wægɨd/. Is that a possible phonological word of English? The answer, of course, is yes. There's nothing about the sequence /wægɨd/, say, or /snɪfɨd/, that violates the phonotactic rules of English (indeed, words like 'pallid' or 'wicked', with the same phonological structure, are perfectly good). If the 'real' morpheme was pronounced /ɨd/, it would be perfectly easy to retain that pronunciation in all circumstances—there'd be no phonotactic reason to change the pronunciation to /wægd/ and /snɪft/. So we can conclude that /ɨd/ isn't the basic form. It must be a variation on one of the other forms

What about /t/? Can we explain the other two forms as variants of /t/? We know that there are constraints on what sounds can co-occur in a syllable coda together, so it's likely that a morpheme that was a single consonant like /t/ would be subject to variation. For instance, if the listed pronunciation of the past tense suffix is /t/, it would be easy to understand why a /t/ would change to a /d/ after a voiced consonant, as in /wægd/.

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The phonotactic rules of English forbid two obstruents in the same coda to have different voicing (Rule #14 from the previous chapter). While there are syllables that end in two voiceless obstruents, like *box*, /baks/, and syllables that end in two voiced obstruents, like *wagged*, /wægd/ there are no syllables that end in a voiced one followed by a voiceless one. So if the suffix was /t/, the voicing change to /d/ after voiced consonants could be explained as a change in pronunciation that helps the newly formed syllable to conform to the phonotactic rules of English, making the voicing match.

Similarly, if the basic form is /t/, the phonotactics of English would require a change in the pronunciation of the morpheme when it was suffixed to another word ending in /t/ or /d/. The phonotactic rules of English forbid two alveolar stops together in a coda. (Double-check Fig. 5 from the last chapter to confirm this). It would be very hard to say a sequence like /pætt/ 'pat-t' or /wejdt/ 'wade-t' so that it was distinguishable from /pæt/ or /wejd/. Changing to the /ɨd/ pronunciation when the verb ends in an alveolar stop would fix that problem.

There are two problems with the idea that /t/ is basic, however. If the basic suffix is /t/, why does the pronunciation change to /d/ when it is suffixed to words that end in vowels? (Try pronouncing *cooed, played,* and *treed* to yourself. Definitely different from words ending in /t/, right? Compare them to *coot, plate,* and *treat*.) In these verbs, the past tense suffix is pronounced /d/, not /t/. But this can't be due to a phonotactic requirement, because lots of English syllables end in a vowel followed by /t/: *coot, plate, treat* are just three of the many words that illustrate this.

Further, in the case where the suffix is added to a word that ends in /d/ or /t/, why do we change the suffix to /ɨd/ rather than to /ɨt/? If the suffix is /t/, there is no explanation for the change in voicing quality of the final consonant after a vowel in these cases, either. (There are lots of English words that end in /ɨt/: *muppet, puppet, gullet, parrot, wallet...* it's a perfectly legitimate syllable, phonotactically speaking). So /t/ can't be the basic pronunciation either. It also must be a variant of the basic form.

The best explanation is to assume that the underlying pronunciation of the past tense suffix is just /d/. The change from /d/ to /t/

after voiceless consonants, as in /snɪft/, *sniffed*, is still easily understood as an effect of phonotactic rule #14. And best of all, we can understand why and how the pronunciation changes to /ɨd/. It'd be just as phonotactically bad to add /d/ to verbs ending in an alveolar stop as it would be to add /t/ — try saying /pætd/ 'pat-d' or /wejdd/ 'wade-d' to confirm this. If the basic suffix is /d/, all one has to do to account for the change to /ɨd/ in these cases, is assume that an extra ('epenthetic') vowel is inserted between the suffix and the stem to make the suffix audible. And finally, if the morpheme is really /d/, there's no reason to change it to anything else when it's suffixed to any other voiced consonant or a vowel, so it remains the same, giving /cuwd/ 'cooed', /plejd/ 'played' and /paɹtɨd/, 'parted'.

This kind of variation in pronunciation is called *phonologically conditioned allomorphy*. Its effects on a given morpheme are one hundred per cent regular and predictable, according to the phonological environment. It happens for the various suffixes spelled -*s* too, in all of their many functions: the 3rd person present tense verbal suffix, the plural suffix, the possessive suffix (spelled -*'s*), or the reduced forms of *is* or *has* (also spelled -*'s*).[49] The pronunciation of these suffixes varies considerably, just as the pronunciation of -*ed* does, but as with -*ed*, we don't need to vary the spelling of -*s* to show the different pronunciations, because they're predictable.

Exercise 3: Try and determine what the underlying phonological form of the plural suffix -*s* is, using the same type of reasoning as we used for the past tense suffix above.

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[49] See the appendix to this chapter for discussion of the interaction between allophony and phonologically conditioned allomorphy.

4.6.2   Phonologically conditioned allomorphy in derivation

Phonologically conditioned allomorphy is not restricted to inflectional morphology, either. Consider the derivational prefixes in the following groups of words:

(58)   a.   impossible   intangible   inconsiderate
               imperfect   intractable   incorrigible
               impenetrable   insoluble   incorruptible

          b.   empower   ensure   enclose
               embitter   entrain   enquire
               embroil   encircle   encapsulate

          c.   compare   consolidate   concur
               combine   contain   concatenate
               compatible   conceal   concoct

Again, be very careful that you're considering the pronunciation of these forms, not the spelling, which can be misleading. Transcribe one or more rows from each group. Do you notice anything about the pronunciation of these prefixes that depends on the pronunciation of the stems they're attached to?

> **Exercise 4:** What determines the variation in form of *in-* ('not'), *con-* ('together') and/or *en-* ('in') illustrated in (58)? Can you think of three words which must show the true underlying form of these prefixes with no possibility of influence from neighboring consonants?

Remember from the previous chapter that English words almost never contain a nasal followed by a stop pronounced at a different place of articulation. So, for instance, the sequence /ɪŋglɪʃ/ is a likely word of

English, but a sequence like /ɪngrijn/ is likely to be two words, 'in' plus 'green'. Similarly, /ɪmprɪnt/ is a good English word, but /ɪnprɪnt/ is likely to be two words, 'in print'. In nasal-plus-stop sequences within the same phonological word, the nasal has to be pronounced at the same place of articulation as the stop—the nasal has to be *homorganic* with the stop, even across syllables. This phonotactic rule is the reason for the changes in pronunciation of the derivational prefix *in-*, meaning 'not', above.

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concatenate, *v*. to connect like the links of a chain, to link together. From Latin *concatēnāre* 'to link together,' made up of *con-* 'together' + *catēnāre* 'to chain,' itself from *catēna* 'chain.'

4.7   Closed-class and open-class morphemes: Reprise

One final note concerning derivation and inflection. Above, we saw that certain kinds of function words and inflectional morphemes were similar in that they are part of the grammar of English: if you don't know the use of the suffix *-ed* or the definite determiner *the*, you're not a speaker of English. We contrasted these elements with open-class root morphemes like *cake, amuse, cold, fun, qual-, cred-* and *necess-* — a speaker of English could go through their entire life without knowing the meanings of these particular roots, if they never happened to come across them.

Are derivational affixes more like open-class or closed-class morphemes? Above, we argued that they're not a necessary part of the grammar of English—you could speak English and still never use a single derivational morpheme. In that regard, they're more like open-class morphemes: while you certainly need *some* open-class morphemes in order to say anything at all, you don't need any *particular* ones—if I know an open-class morpheme that you don't, that doesn't mean that you don't speak English. Similarly, if you know and use a particular derivational morpheme that I don't know, that doesn't mean that I don't speak English either.

Another respect in which derivational morphemes are more like open-class words is that, in all cases, they produce words that are either nouns, verbs, adjectives or adverbs.[50] Free open-class roots all belong to one of these four syntactic categories as well. Closed-class words, on the other hand, tend to be things like determiners, auxiliaries, complementizers, or modals—they're grammatical in nature. So derivational morphemes are more like open-class words in that they belong to one of the four part-of-speech categories that content words may have.[51]

One final way in which derivational affixes are like open-class morphemes is that we can easily borrow or create new ones. We've seen many borrowed derivational affixes in our discussions above, including some which were borrowed quite recently, like *-esque* and *-itis*. English is still borrowing derivational affixes; one recent one is *-nik*, from Slavic via Yiddish, which shows up in *refusenik, beatnik, peacenik* and *no-goodnik*, and whose earliest attestation in the OED is in 1945. We also create new affixes on a regular basis. After the Watergate scandal in 1972, *-gate* was detached from the compound *Watergate* and became a derivational suffix used to mean "a political scandal involving X", e.g. *Hollywoodgate, Irangate, Monicagate*. People suffering from various addictions or compulsive behaviors now have names formed with a new suffix *-(a)holic*, extracted from the word *alcoholic* (which itself is formed, of course, from *alcohol+ic*, not from *alc+oholic*), so now there are *chocoholics, shopaholics, workaholics*, etc. Recently, young speakers have added a bound morpheme *-licious* to the language, meaning essentially the same thing as 'delicious because of X' — *applelicious* would be 'delicious because of the apples'. The recent hit single by Destiny's Child called

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[50] There's only one adverb-producing suffix, *-ly*, which attaches only to adjectives.

[51] It's a harder question to decide what category inflectional morphemes belong to. The traditional approach says that they belong to the same category as the word they attach to, so plural *–s* makes Nouns, past-tense *–ed* makes Verbs, etc. Linguistic analysis suggests that this approach is too simpleminded, however. The past-tense morpheme *–ed* alternates with the auxiliary verb *did* in sentences like *John walked to school/John didn't walk to school* and *Mary passed the butter/Did Mary pass the butter*? This distribution suggests that *–ed* should also itself be considered to be some kind of 'auxiliary'. Similar arguments suggest that plural *–s* belongs to a functional category Number, etc.

'Bootylicious' discusses the extremely delicious qualities of the singer's body, specifically those associated with the booty.

Alcohol, *n*. The intoxicating component of fermented drinks such as wine, beer, or vodka. From Arabic *al-kohl* 'the eyeshadow', circa 1500. 'Alcohol' originally referred to a dark metallic powder which was used for cosmetic purposes in the East, also known simply as *kohl*. The Arabic definite derminer, *al*, was borrowed together with the noun, giving *al-kohl* (the Arabic borrowings *algorithm, alchemy* and *alkaline*, among others, also contain the determiner). *Alcohol* came to refer to any metallic powder produced by sublimation, and consequently to the concentrated distillate of any liquid. The phrase *alcohol of wine* came into common use to refer to concentrated spirits made from wine, and was then shortened to *alcohol*, from which our present meanings for the word arose.

Other recently coined or borrowed affixes include *-(a)rama* and *-meister*, as well as *-eriffic*, and *-tacular* as used in the following affixally extravagant sentence by *Tucson Weekly* movie critic James DiGiovanna:

> "Then, right after that, [you'll see] the trailer for the nerd-a-licious League of Extraordinary Gentlemen, the trailer for the geek-a-riffic Hulk movie, and then, if you're lucky, the grosstacular trailer for the upcoming Willard remake starring Crispin Glover."

In this regard, derivational affixes seem more like open-class than closed-class morphemes. In the next chapter, we'll consider how this can help us to shed some light on a peculiar distributional fact about derivational morphology: derivational *pre*fixes almost never change the part of speech of the word they attach to, while derivational *suf*fixes often do.

*4.8   Appendix: Rule-based versus constraint-based approaches to
        phonological processes:*

4.8.1   The relationship between phonologically conditioned allomorphy
        and allophony

In Chapter 3, we learned about a process of aspiration, that changed the pronunciation of voiceless stop consonants slightly in certain phonological environments (when they were the lone onset of a stressed syllable). We also learned about a process of lengthening, that caused certain vowels to be held a bit longer in certain environments (when they occurred before a voiced coda consonant). These variations in pronunciation were called *allophones* of the basic phonemes that they applied to.

Phonologically conditioned allomorphy is similar, in that it involves changing the pronunciation of a particular morpheme in certain environments. What's the relationship between allomorphy and allophony? Do both kinds of changes happen together? Does one happen before another? Or does their relative order matter?

To investigate this question, let's look at a third allophonic process of American English, called *flapping*. Flapping is a change that happens to alveolar stop consonants—/t/ and /d/—when they appear a) between two vowels and b) the second vowel is unstressed.

Consider the pronunciation of two trochaic words which differ only in which of the two alveolar stops occurs in the middle of them: *matter* (the noun) and *madder* (the comparative adjective), or *catty* (the adjective) and *caddy* (the noun). In most dialects of American English, they sound practically indistinguishable, even though monosyllabic words ending in the two consonants sound quite different (compare *cat* and *cad*, or *mat* and *mad*). The reason they sound so similar is that they both trigger the allophonic process of flapping, which means that the voicing difference which normally distinguishes them is nullified. Both *madder* and *matter* trigger flapping because they both show the following pattern:

(59)   a.   If: [52] ...VCV...

<div style="text-align:right;">unstressed</div>

[+stop]
[+alveolar]

    b.   Then:
            C → / ɾ /

This rule says to change a /t/ or a /d/ to a flap when it occurs between two vowels, the second of which is unstressed. So a form like /kæti/, 'catty', ends up pronounced as /kæɾi/, and so does a form like /kædi/. Flapping in American English creates a lot of homophones out of words that sound quite distinct in other varieties of English!
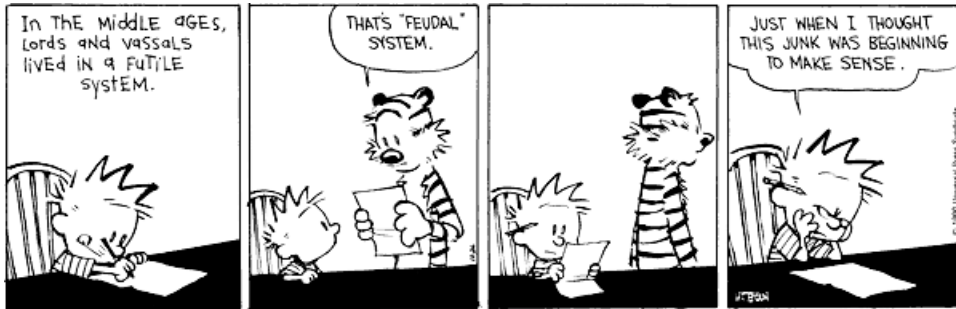
(A flap—written in the IPA as /ɾ/—is sound made when the tip of the tongue quickly 'flaps' up and down, touching the alveolar ridge area quickly, once. It's like a single trill in a trilled 'r' sound. Many languages use a flap as an intervocalic liquid—Japanese uses it this way, and the flap

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[52] The onset of the preceding syllable can be anywhere from zero to three consonants—it's irrelevant. The crucial thing is that the alveolar stop comes between two vowels, and that the second vowel is unstressed.

is one of the varieties of Spanish *r*, as in the word *pero*, 'but'. In American English, though, the flap is an allophone of /t/ and /d/.[53])

4.8.2   Rule ordering

Let's say we think about these processes—both allomorphic and allophonic—as instructions: rules that a speaker has to apply in sequence to get from an underlyng form to a pronounceable one. The question then is, do allophonic rules apply before or after phonologically conditioned allomorphic rules? Or does it matter? Consider the following verbs, and transcribe their past tense forms, paying attention to whether they have a flap in them or not:

(60)   a. pat   /pæt/   a′.   patted
         b.   pad   /pæd/   b′.   padded
         c.   bet   /bɛt/   c′.   betted

They all have a flap, right? That is, the way 'patted' is pronounced is /ˈpærɨd/, not /ˈpætɨd/. What must have happened is the following:

(61)   a. [/pæt/]ᵥ + [+Past Tense] → /pæt/+/d/
         b.   Phonologically conditioned allomorphy applies to insert an unstressed vowel between the /t/ of /pæt/ and the /d/ of the past tense: /pætd/ → /pætɨd/
         c.   Allophony applies to change the intervocalic /t/ in /pætɨd/ to a flap: /pætɨd/ → /pærɨd/

The allomorphic process, which inserts an unstressed vowel to prevent two alveolar stops from occurring together, has to apply *before* the allophonic process which changes intervocalic alveolar stops into flaps. If the allophony applied before the allomorphy, the form it would apply to would be /pætd/—and in that pre-allomorphy form, the /t/ is not between two vowels, so it wouldn't be turned into a flap.[54]

4.8.3   Constraint-based approaches

Another way to look at these kinds of effects is to think of them as trying to satisfy a series of constraints which must be prioritized with respect to each other. This approach lets you get away without thinking them as a series of processes that happen in a certain order; rather, a bunch of possible outcomes are simultaneously evaluated for how well they manage to satisfy a group of constraints—say, the constraints that govern what makes up a well-formed English syllable—and the one that does the best at it is the actual outcome.

For instance, we can assume that, all other things being equal, English likes to pronounce an input form in exactly the same way as it is listed in the lexicon; we could call that constraint on the output "Faithfulness". We can also assume that English doesn't like to have two alveolar stops next to each other in the coda of a syllable; we could call that constraint AvoidAlvStopSequences. Finally, we can assume that English doesn't like to have an alveolar stop between two vowels—it prefers to insert a flap, instead; we could call this constraint AvoidV-AlvStop-V.

Let's say that one violation of a highly-ranked constraint is worse than multiple violations of low-ranked constraints. Given the input form /pætd/, and these constraints on English word structure, what prioritization of constraints will produce the correct output /pærɨd/ over all the other possible outputs? The following ranking will result in the

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[54] See the Appendix to this chapter for discussion of a non-rule-based approach that doesn't require these rule-ordering effects to produce the correct outcome.

correct winner even though it violates Faithfulness twice (once by inserting the unstressed vowel and once by changing the /t/ to a flap):

(62)

Input: /pætd/		← Higher Ranking AvoidAlvStopSequences	AvoidV-AlvStop-V	Lower Ranking → Faithfulness
Winner	/pærɨd/	ok	ok	2 violations
Loser	/pætɨd/	ok	violation	violation
Loser	/pætd/	violation	ok	ok

Although it is crucial that both the other constraints outrank Faithfulness, their order with respect to each other doesn't matter here. If AvoidV-AlvStop-V was ranked below Faithfulness, then /pætɨd/ would win, and if AvoidAlvStopSequences was ranked below Faithfulness, then /pætd/ would win. As long as both outrank Faithfulness, however, the relative ranking of AvoidAlvStopSequences and AvoidV-AlvStop-V doesn't matter, at least for the candidate outputs considered here—no matter which is ranked higher, /pærɨd/ wins. If we folded other possible outcomes and other independently motivated constraints into the mix, however, their relative order might come to matter.
XX to come: problem sets, further reading XX