

Steven Pinker. *Words and Rules. The Ingredients of Language*. 1999. New York: Perennial, 2000. 29-41

<http://web.udl.cat/usuaris/m0163949/pinker1.htm>

Let's now peer into the morphology box. Morphology may be divided into *derivation* – rules that form a new word out of old words, like *duck feathers* and *unkissable* – and *inflection* – rules that modify a word to fit its role in a sentence, what language teachers call conjugation and declension. The past tense and plural forms are examples of inflection.

English inflection is famous among linguists for being so boring. Other languages exploit the combinatorial power of grammar to generate impressive numbers of forms for each noun and verb. The verb in Spanish or Italian comes in about fifty forms: first, second, and third persons, each singular and plural, each in present, past, and future tenses, each in indicative, subjunctive and conditional moods, plus some imperative, participle, and infinitive forms. Languages outside the Indo-European family, such as those spoken in Africa or the Americas, can be even more prolific. In the Bantu language Kivunjo, for example, a verb is encrusted with prefixes and suffixes that multiply out to half a million combinations per verb. But English speakers subsist on only four:

open
opens
opened
opening

Strangely enough, English grammar does not have only four roles for verbs to play. It has at least thirteen different roles, but it shares the four forms among them, as if suffixes were expensive and the designers of the language wanted to economize.

The first suffix is a silent bit of nothing, $-\emptyset$, which when added to the stem *open* turns it into the inflected form *open*. You may wonder: Why say that speakers hallucinate an imaginary suffix at the end of a word? The reason is that it distinguishes the root or stem – the irreducible nugget found in the mental dictionary that captures the essence of a verb and upon which suffixes are hung – from a particular incarnation of that verb with a particular person, number, and tense. In English they can sound the *same* – *to open* and *I open* – which disguises the fact that they are different versions of the verb. In other languages the form of the verb that you look up in a dictionary cannot be pronounced. For example, in Spanish you can say *canto*, *canteis*, *canten*, and so on, leaving *cant-* as the stem, but you can never say *cant-* by itself. Stems are therefore not the same things as pronounceable verb forms, and that distinction is useful to preserve in English – *to open* versus *open \emptyset* – even though the two forms sometimes sound the same.

The suffix, $-\emptyset$ is used in four variations of the verb in English:

Present tense, all but third-person singular: I, you, we, they *open* it.
Infinitive: They may *open* it, They tried to *open* it.

Imperative: *Open!*

Subjunctive: They insisted that it *open*.

The suffix *-s* is used for only one purpose:

Present tense, third-person singular: He, she, it *opens* the door.

The suffix *-ing* is used in at least four ways:

Progressive participle: He is *opening* it.

Present participle: He tried *opening* the door.

Verbal noun (gerund): His incessant *opening* of the boxes.

Verbal adjective: A *quietly-opening* door.

Finally we come to our friend *-ed*, which has four jobs:

Past tense: It *opened*.

Perfect Participle: It has *opened*.

Passive Participle: It was being *opened*.

Verbal adjective: A recently-*opened* box.

Why make all these distinctions among verb forms that sound the same? One reason is that the list of phrases calling for a form such as *opened* have nothing in common: To capture the behavior of *-ed*, we have no choice but to list four phrase types separately. Another reason is that some distinctions that are inaudible for regular verbs are audible for irregular ones, and this shows that English speakers register these distinctions as they speak. About a third of the irregular verbs have different forms for the stem, the past tense, and the perfect participle: I *sing*, I *sang*, I *have sung*; I *eat*, I *ate*, I *have eaten*. A few make a further distinction and have a special form for the verbal adjective – *newly wedded couple*; *a drunken sailor*; *a shrunken head*; *rotten eggs* – which is not used for the participle: people say *They have wed*, not *wedded*; *He has drunk*, not *drunken*; *It has shrunk*, not *shrunken*; *The eggs have rotted*, not *rotten*. And one verb comes in *eight* different forms:

Infinitive; subjunctive; imperative: To *be* or not to *be*; Let it *be*; *Be* prepared.

Present tense, first-person singular: I *am* the walrus.

Present tense, second-person singular, all persons plural: You/we/they *are* family.

Present tense, third-person singular: He/she/it is the rock.

Past tense, first- and third-person singular: I/he/she/it *was* born by the river.

Past tense, second-person singular, all persons plural; subjunctive:

The way we/you/they *were*; If I *were* a rich man.

Progressive and present participle; gerund: You're *being* silly; It's not easy *being* green; *Being* and Nothingness.

Perfect participle: I've *been* a puppet, a pauper, a pirate, a poet, a pawn and a king.

With nouns, too, different grammatical forms have to dip into the same small pool of suffixes. The naked stem *dog* must be distinguished from the singular *dog* + Ø because a *dogcatcher* doesn't catch just one dog and a *dog lover* doesn't love just one. The *dog* inside these compounds refers to dogs in general and thus differs in meaning from the singular form in *a dog*. The plural *dogs* uses -s, which we have already met in the verb system in *She opens the door*. The possessive forms *dog's* (singular) and *dogs'* (plural) use it too; the three noun forms *dogs*, *dog's*, and *dogs'* differ only in punctuation.

All this redundancy suggests that regular inflection in English is remarkably simple. All the inflections are suffixes; none of the grammatical roles call for a prefix or some other way of decorating or tinkering with a word. And every word has at most one inflectional suffix. We never get *opened* or *opening*, nor do the plural -s and possessive 's stack up when several owners own something: *the dogs' blanket*, not *the dogs's* (dogzez) *blanket*. Finally, each niblet of sound making up a suffix has a life of its own and combines with several verb forms, noun forms, or both, rather than being a slave to only one role. This suggests that instead of crediting English speakers with seventeen verbose rules like "To form the past tense, add -ed to the end of the verb," we can credit them with just *one* rule: "A word may be composed of a stem followed by a suffix," like the simple rule shown on page 16. All the other details can be handled by assuming that suffixes are stored in the mental lexicon with entries like those for words, perhaps something like this:

-ed

sound: d

part of speech: suffix

use 1: past tense of a verb

use 2: perfect participle of a verb

use 3: passive participle of a verb

use 4: adjective formed from a verb

By factoring seventeen verbose rules into one austere rule and four lexical entries, one per suffix, we not only save ink but get some insight into the mental organization of language. English *could* have used seventeen different forms for its seventeen slots in the noun declension and verb conjugation: prefixes such as *ib-*, *tra-*, and *ka-*, suffixes such as *-og*, *-ig*, and *-ab*, and so on. Instead the slots share a few sounds (-Ø, -ed, -s, -ing) and one position (immediately following the verb). This miserliness, called syncretism, is found in language after language. Syncretism suggests that the mind keeps separate accounts for the templates that build words (for example, "word = stem + suffix"), for the scraps of sound that may be added to words (-s, -ed, and -ing), and for the roles these additions can play (for example, plural, participle, imperative). A particular construction like the English past tense is a mix-and-match affair, assembled by hooking together parts also used in other constructions. No one knows why languages like to recycle their suffixes and other ways of modifying words. It's certainly not to save memory space, because the savings are trivial. Perhaps the reason is to help listeners recognize when a word is composed of a stem and a suffix rather than being a simple stem. Whatever its purpose, syncretism shows that in the language system, combination is in the blood; even

the tiniest suffixes are combinations of smaller parts.

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Syncretism – one form, several roles – is one kind of violation of the simplest conceivable system in which every sound has one meaning and vice-versa. The other kind of violation – one role, several forms – is rampant in languages as well; linguists call it allomorphy. Take the regular past-tense suffix – or is it suffixes? Though always spelled *-ed*, it is pronounced in three different ways. In *walked*, it is pronounced *t*. In *jogged*, it is pronounced *d*. And in *patted*, it is pronounced *id*, where *i* is a neutral vowel called “schwa.” We also find allomorphy in the regular plural: The suffix *-s* has three different forms in *cats*, *dogs*, and *horses*.

Are there in fact three past-tense suffixes and three plural suffixes? In some languages, we are forced to this messy conclusion. Dutch speakers, for example, select either *-en* or *-s* as the regular plural, depending on the sound of the end of the noun. But in English the three-way variation has a simpler explanation, worked out by the linguists Arnold Zwicky and Alan Prince. *One* past tense suffix is stored in the lexicon, not three, and a separate module fiddles with its pronunciation: the rules of phonology; which define the sound pattern or accent of a language.

Why do we pronounce the past tense suffix as *t* in *walked*, *d* in *jogged*, and *id* in *patted*? The choice is completely predictable, and can be stated as a list of rules:

1. Use *id* if the verb ends in *t* or *d* (for example, in *patted* and *padded*).
2. If it doesn't, use *t* if the verb ends in an unvoiced consonant – that is, a consonant in which the vocal cords don't buzz, namely *p, k, t, s, sh, ch*, and *th* (for example, *tapped, walked, sniffed, passed, bashed, touched*, and *frothed*).
3. Use *d* for all other verbs: those ending in vowels, such as *played* and *glowed*, and those ending in the voiced consonants *l, r, m, n, b, g, v, z, j, zh*, and *th* (for example, *smelled, marred, slammed, planned, scrubbed, pegged, saved, buzzed, urged, camouflaged*, and *bathed*).

This sounds like something out of the tax code. Let's see if we can do better.

The first thing to notice is that nothing in these rules is specific to the past tense. Other constructions that use *-ed* work the same way:

	<i>t</i>
Past tense:	kicked
Perfect participle:	has kicked
Passive participle:	was kicked
Verbal adjective:	a kicked dog

Outside the verb system entirely is yet another *-ed* construction that comes in the three variations; it turns a noun that means “X” into an adjective that means “having X”:

	<i>t</i>
Nominal adjective:	hooked
	saber-toothed
	pimple-faced
	foul-mouthed
	thick-necked

The regular plural -s also comes in three forms, which you can hear in *hawks*, *dogs*, and *horses*. The variation mirrors the past tense uncannily. Use *iz* when the noun ends in a sibilant sound: *s*, *z*, *sh*, *zh*, *j*, or *ch*. If it doesn't, use *s* if the noun ends in an unvoiced consonant. Use *z* for all other nouns. In fact, not only does this pattern appear with the plural, it appears with the other -s suffixes as well:

	<i>s</i>
Plural:	hawks
3rd person singular:	hits
Possessive:	Pat's

The variation even appears in versions of -s that aren't genuine suffixes. English speakers commonly contract the verbs *has*, *is*, and *does* to their final consonant and glue it onto the end of the subject, as in *Mom's left* or *Dad's home*. Sure enough, the contraction is pronounced in three ways, depending on how the noun ends:

	<i>s</i>
<i>has</i> :	Pat's eaten
<i>is</i> :	Pat's eating
<i>does</i> :	What's he want?

That's not all. English has an *affective* -s that can be used to form nicknames in some dialects and argots, as in *Pops*, *Moms*, *Fats*, *Pats*, and *Wills* (the prince second in line to the British throne). That -s can also show up in emotionally colored slang such as *bonkers* and *nuts*, similar to the -y and -o that give us *batty* and *wacko*. (Sometimes the two suffixes are even used together, as in *Patsy*, *Bugsy*, *Mugsy*, *footsie*, *fatso*, and *Ratso*.) Still another version of -s appears in adverbial forms such as *unawares*, *nowadays*, *besides*, *backwards*, *thereabouts*, and *amidships*. A final use for s is as a meaningless link joining the words in compounds such as *hunterman*, *statesman*, *kinsman*, *bondsman*, *Scotsman*, and *grantsmanship*. And yes, all of these -s's can be pronounced either as s or as z, depending on the preceding consonant (it's hard to come up with examples for the third column):

	<i>s</i>
Affective	Pops, Patsy
Adverbial:	thereabouts

So we have *fifteen* suffixes that show the same three-way or two-way variation. Forty-one suffixes that happen to fall into fifteen parallel sets of alternatives is too much of a coincidence to stomach. More likely, *one* set of rules creates the three-way variation, and the set applies in at least fifteen situations.

There is a second, equally striking set of coincidences that runs across the suffixes. If the variation came from any old set of *if ... then* rules, we would expect to find all kinds of pairings between stems and suffixes: for example, “Use *s* after the vowels *a* and *e* or after the consonants *th* and *g*,” “Use *d* after a *k*,” and so on. But the rules are far more lawful than that. The *t* sound comes after unvoiced consonants, and the *t* itself is unvoiced. The *d* sound comes after voiced sounds, and the *d* itself is voiced. The *-s* suffixes show the same chameleonlike behavior: We find unvoiced *s* after unvoiced consonants, and voiced *z* after voiced consonants. It looks as if something is trying to keep the consonants at the end of a word consistent: All of them are voiced, or all of them are unvoiced.

Indeed, something is – the sound pattern of the English language. English never forces speakers to turn their vocal cords on for one consonant then off for the next, or vice-versa. We see the restriction in force in one-piece words that end in a cluster of consonants. These words never received a suffix; they just happen to be built that way, so any sound pattern they display cannot have come from a suffix rule, but rather from the way English speakers like to pronounce words in general. In all but one of these words, the vocal cord switch can be left in the “off” position:

After <i>k</i> (unvoiced):	<i>s</i> can occur <i>ax, fix, box</i>
	<i>t</i> can occur <i>act, fact, product</i>
After <i>p</i> (unvoiced):	<i>s</i> can occur <i>traipse, lapse, corp.</i>
	<i>t</i> can occur <i>apt, opt, abrupt</i>
After <i>t</i> (unvoiced):	<i>s</i> can occur <i>blitz, kibitz, Potts</i>
After <i>s</i> (unvoiced):	<i>t</i> can occur <i>post, ghost, list</i>

In one English word, *adze*, the vocal cord switch is left in the “on” position:

After <i>d</i> (voiced)	<i>s</i> cannot occur —
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In *no* English word is the voicing switch toggled on and off, in an ending like *zt, gs, kz*, or *sd*.

These difficult-to-pronounce clusters *can*, however, be created by a dumb rule of morphology that pins a suffix onto the end of a word without regard for how the resulting train of consonants is to be pronounced. That is what happens when a rule adds a *d* sound to *walk* or an *s* sound to *dog*. English cleans up these awkward mismatches with a different kind of rule. The rule says, “When there is a cluster of consonants at the end of a syllable, adjust the voicing setting of the last consonant to make it consistent with its neighbor on the left.” (In other words, change *kz* to *ks*, *pd* to *pt*, and so on.) The rule does not care whether the syllable was formed by a past-tense suffix, a plural suffix, a contracted *has*, a nickname with *-s*, or anything else. It kicks in *after* the syllable has been assembled, in the cleanup module we call phonology.

Can we now tell whether the suffix stored in the lexicon is *-d*, and is converted to a *t* when it finds itself at the end of *walk*, or whether it is *-t* and is converted to *d* when it finds itself at the end of *jog*? A little detective work can settle the question. Not every sound cares about the consonant that follows it. Those that do are consonants in which the airstream is obstructed, namely *p, b, t, d, k, g, s, sh, ch, z, zh*, and *th*. But the vowels, and the vowel-like consonants *r, l, n*, and *m*, are indifferent to what comes after them; they tolerate either *s* or *z*, either *t* or *d*, as we see in these one-piece words:

After n:	s can occur <i>fence</i>
	t can occur <i>lent</i>
After r:	s can occur <i>force</i>
	t can occur <i>fort</i>
After l:	s can occur <i>pulse</i>
	t can occur <i>guilt</i>
After a vowel	s can occur <i>niece</i>
	t can occur <i>goat</i>

Here we have *laissez-faire* environments in which the suffixes can show their true colors, untouched by rules of phonology. What do we find? That the virgin suffixes are pronounced *-d* and *-z*, not *-t* and *-s*:

After n:	we don't say s —
	we don't say t —
After r:	we don't say s

	—
	we don't say t —
After l:	we don't say s —
	we don't say t —
After a vowel:	we don't say s —
	we don't say t —

The *-t* and *-s* we hear in words with choosy sounds such as *walked* and *cats* must be the aftermath of the rule.

Finally, what about the funny extra vowel in *patted* and *horses*? Here again the change in sound is not some random act of vandalism. The vowel appears when *d* follows *t* or *d*, and when *z* follows *s* or *z*. The word endings that trigger the extra vowel are similar in pronunciation to the suffixes themselves, and that can't be a coincidence. Apparently a rule is trying to separate too-similar adjacent consonants by pushing a vowel between them: between *t* and *d*, *d* and *d*, *s* and *z*, *z* and *z*, *sh* and *z*, and so on. In many languages the rules of phonology do *something* when a rule of morphology leaves two identical or near-identical consonants in a row, presumably because there's no natural way to pronounce them. Some languages drop the second consonant, others merge the two into one long consonant, and still others, like English, wedge a vowel between them. As with the rule that fiddles with voicing, the rule that inserts a vowel must live in a phonology module separate from rules that stick on the various suffixes, because the rule is oblivious to what kind of suffix it manipulates.

We even can deduce which of the two rules applies first, the one that changes the voicing setting or the one that inserts the vowel. The devoicing rule is triggered by adjacent consonants; the vowel rule breaks up adjacent consonants. If the voicing rule came first, it would convert *pat + d* to *pat + t*, and only then would the vowel be inserted, yielding *patit*:

Morphology: *pat + d*
↓
Devoicing: *pat + t*
↓
Vowel insertion: *pat + i + t*

But that is not how we pronounce it; we say *patid*. This means that the vowel rule must have come first, creating *patted*; now the voicing rule is no longer compelled to do anything, because the *td* sequence that would trigger it has been broken up:

Morphology: *pat + d*

↓
Vowel insertion: *pat + i + d*
↓
Devoicing: not triggered

The ordering makes sense when you think about how the phonology module should be organized. It has some rules that edit the string of vowels and consonants composing a word (phonology proper), and other rules that convert the string into actual sounds or muscle movements (phonetics). The vowel-insertion rule makes a major change in the stuff that makes up a word, and belongs in the first subcomponent; the voicing rule does a last-minute adjustment of pronunciation for the benefit of the muscles, and belongs in the second.

This completes the analysis of the three versions of the past-tense suffix. When we started, we needed forty-odd rules, each stipulating that some suffix be placed next to some word ending. We have ended up with just two rules. Best of all, what the rules do, why they do it, and in what order they do it all make sense in the light of the sound pattern of English. Indeed, this kind of layering may be found in languages all over the world.

Incidentally, there is corroborating evidence of a completely different kind that shows that the three forms of *-ed* and *-s* are created on the fly by a phonological rule. Some psycholinguists keep a pad and pencil in their pockets and write down every slip of the tongue they hear. People make one or two such errors for every thousand words they say, and many of the errors consist in deleting, repeating, or switching around vowels or consonants. The last kind of error is called a Spoonerism, in honor of the Reverend William Spooner (1844-1930), warden of New College at Oxford, who came out with surprises such as *Our queer old dean, You have hissed all my mystery lessons and tasted the whole worm*, and *It is now kistomary to cuss the bride*. They sound too good to be true, but I have heard similar errors myself. After I spoke at a scientific symposium the chair wrapped up the session by saying *I would like to spank the speakers*, and when I asked a friend how he liked his new condominium, he said *It seats my nudes*.

Speech errors provide clues on how the speech system is organized. For example, when a person intends to say *grapefruits* but accidentally leaves out the *t*, how does he pronounce the plural? If there were a distinct plural suffix pronounced *-ss*, he would say *grapefrooss*, since this is what the *t* in the *grapefruit* entry would have demanded. In fact he says *grapefrooz* – pronouncing the plural as *z*, which is appropriate to words ending in a vowel. Similarly, a person may say *The infant tucks – touches the nipple*, not *tuck-iz*, or may say *Did you buy enough breakfasiz?*, not *breakfass*. The errors show that the form of the suffix must be computed after the vowels and consonants of the noun or verb were placed on the chute to the vocal tract.

English did not always have single-consonant suffixes and a rule that separates them from a too-similar word ending. Our current system is the result of a reorganization that began around the time of the origin of Modern English in the seventeenth century.

Before that, *-ed* and *-s* suffixes were pronounced (and spelled) with vowels all the time, not just with words ending in *t* or *d* or in *s* or *z*. For centuries, English speakers had been concentrating stress on the first syllables of words, which shriveled the later syllables, and speakers began to leave out the vowels in the suffixes of many words. Writers called attention to the new, clipped pronunciations by spelling them phonetically with an apostrophe in place of the deleted vowel, as in Shakespeare's play about "a pair of star-cross'd lovers":

Death, that has suck'd the honey of thy breath,
Hath no power yet upon thy beauty:
Thou art not conquer'd; beauty's ensign yet
Is crimson in thy lips and in thy cheeks.

The guardians of the English language deplored the change, as they do all changes. In "A Proposal for Correcting, Improving, and Ascertaining the English Tongue," Jonathan Swift wrote:

What does your lordship think of the words "drudg'd," "disturb'd," "rebuk'd," "fledg'd," and a thousand others everywhere to be met with in prose as well as verse? Where, by leaving out a vowel to save a syllable, we form so jarring a sound, and so difficult to utter, that I have often wondered how it could ever obtain.

His contemporary, Samuel Johnson, who was standardizing the spellings of English words in a way that reflected the morphemes that composed them, recognized that *'d* and *-ed* were the same morpheme, and obliterated the distinction in their spelling, making *ed* the spelling for both. It is unclear why he chose to leave the *e* in *-ed* across the board (*mapped* and *matted*), but opted to spell *-s* either with or without an *e*, depending on how it is pronounced (*maps* and *masses*).

Today the old syllabic suffix survives in a handful of adjectives: *accursed*, *aged*, *beloved*, *bended* (in the expression *on bended knees*), *blessed*, *crooked*, *cussed*, *dogged*, *jagged*, *learned*, *naked*, *ragged*, *wicked*, and *wretched*. (A few more survive in rural dialects, such as *forkèd*, *peakèd*, *streakèd*, and *stripèd*.) Many of them are archaic or poetic and are used mainly in self-conscious speech. The psychologist Melissa Bowerman, a researcher of child language, had this exchange with her four-year-old daughter about a class trip to a natural history museum:

MOTHER (*playfully*): Maybe you'll see something wingèd.
DAUGHTER: Maybe we'll see something snakèd!