Steven Pinker
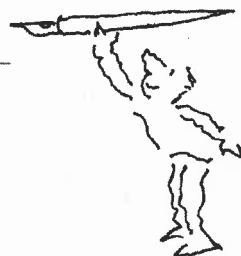
The
SENSE
OF
Style

THE THINKING PERSON'S
GUIDE TO WRITING
IN THE 21ST CENTURY

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Contents

Prologue

I love style manuals. Ever since I was assigned Strunk and White's *The Elements of Style* in an introductory psychology course, the writing guide has been among my favorite literary genres. It's not just that I welcome advice on the lifelong challenge of perfecting the craft of writing. It's also that credible guidance on writing must itself be well written, and the best of the manuals are paragons of their own advice. William Strunk's course notes on writing, which his student E. B. White turned into their famous little book, was studded with gems of self-exemplification such as "Write with nouns and verbs," "Put the emphatic words of a sentence at the end," and best of all, his prime directive, "Omit needless words." Many eminent stylists have applied their gifts to explaining the art, including Kingsley Amis, Jacques Barzun, Ambrose Bierce, Bill Bryson, Robert Graves, Tracy Kidder, Stephen King, Elmore Leonard, F. L. Lucas, George Orwell, William Safire, and of course White himself, the beloved author of *Charlotte's Web* and *Stuart Little*. Here is the great essayist reminiscing about his teacher:

> In the days when I was sitting in his class, he omitted so many needless words, and omitted them so forcibly and with such eagerness

and obvious relish, that he often seemed in the position of having shortchanged himself—a man left with nothing more to say yet with time to fill, a radio prophet who had outdistanced the clock. Will Strunk got out of this predicament by a simple trick: he uttered every sentence three times. When he delivered his oration on brevity to the class, he leaned forward over his desk, grasped his coat lapels in his hands, and, in a husky, conspiratorial voice, said, "Rule Seventeen. Omit needless words! Omit needless words! Omit needless words!"[1]

I like to read style manuals for another reason, the one that sends botanists to the garden and chemists to the kitchen: it's a practical application of our science. I am a psycholinguist and a cognitive scientist, and what is style, after all, but the effective use of words to engage the human mind? It's all the more captivating to someone who seeks to explain these fields to a wide readership. I think about how language works so that I can best explain how language works.

But my professional acquaintance with language has led me to read the traditional manuals with a growing sense of unease. Strunk and White, for all their intuitive feel for style, had a tenuous grasp of grammar.[2] They misdefined terms such as *phrase, participle,* and *relative clause,* and in steering their readers away from passive verbs and toward active transitive ones they botched their examples of both. *There were a great number of dead leaves lying on the ground,* for instance, is not in the passive voice, nor does *The cock's crow came with dawn* contain a transitive verb. Lacking the tools to analyze language, they often struggled when turning their intuitions into advice, vainly appealing to the writer's "ear." And they did not seem to realize that some of the advice contradicted itself: "Many a tame sentence . . . can be made lively and emphatic by substituting a transitive in the active voice" uses the passive voice to warn against the passive voice. George Orwell, in his vaunted "Politics and the English Language," fell into the same trap when, without irony, he derided prose in which "the passive voice is wherever possible used in preference to the active."[3]

Self-contradiction aside, we now know that telling writers to avoid the passive is bad advice. Linguistic research has shown that the passive construction has a number of indispensable functions because of the way it engages a reader's attention and memory. A skilled writer should know what those functions are and push back against copy editors who, under the influence of grammatically naïve style guides, blue-pencil every passive construction they spot into an active one.

Style manuals that are innocent of linguistics also are crippled in dealing with the aspect of writing that evokes the most emotion: correct and incorrect usage. Many style manuals treat traditional rules of usage the way fundamentalists treat the Ten Commandments: as unerring laws chiseled in sapphire for mortals to obey or risk eternal damnation. But skeptics and freethinkers who probe the history of these rules have found that they belong to an oral tradition of folklore and myth. For many reasons, manuals that are credulous about the inerrancy of the traditional rules don't serve writers well. Although some of the rules can make prose better, many of them make it worse, and writers are better off flouting them. The rules often mash together issues of grammatical correctness, logical coherence, formal style, and standard dialect, but a skilled writer needs to keep them straight. And the orthodox stylebooks are ill equipped to deal with an inescapable fact about language: it changes over time. Language is not a protocol legislated by an authority but rather a wiki that pools the contributions of millions of writers and speakers, who ceaselessly bend the language to their needs and who inexorably age, die, and get replaced by their children, who adapt the language in their turn.

Yet the authors of the classic manuals wrote as if the language they grew up with were immortal, and failed to cultivate an ear for ongoing change. Strunk and White, writing in the early and middle decades of the twentieth century, condemned then-new verbs like *personalize, finalize, host, chair,* and *debut,* and warned writers never to use *fix* for "repair" or *claim* for "declare." Worse, they justified their peeves with cockamamie rationalizations. The verb *contact,* they argued, is "vague and self-important. Do not *contact* people; get in touch with them, look

them up, phone them, find them, or meet them." But of course the vagueness of *to contact* is exactly why it caught on: sometimes a writer doesn't need to know how one person will get in touch with another, as long as he does so. Or consider this head-scratcher, concocted to explain why a writer should never use a number word with *people,* only with *persons:* "If of 'six people' five went away, how many people would be left? Answer: one people." By the same logic, writers should avoid using numbers with irregular plurals such as *men, children,* and *teeth* ("If of 'six children' five went away . . .").

In the last edition published in his lifetime, White did acknowledge some changes to the language, instigated by "youths" who "speak to other youths in a tongue of their own devising: they renovate the language with a wild vigor, as they would a basement apartment." White's condescension to these "youths" (now in their retirement years) led him to predict the passing of *nerd, psyched, ripoff, dude, geek,* and *funky,* all of which have become entrenched in the language.

The graybeard sensibilities of the style mavens come not just from an underappreciation of the fact of language change but from a lack of reflection on their own psychology. As people age, they confuse changes in themselves with changes in the world, and changes in the world with moral decline—the illusion of the good old days.[4] And so every generation believes that the kids today are degrading the language and taking civilization down with it:[5]

> The common language is disappearing. It is slowly being crushed to death under the weight of verbal conglomerate, a pseudospeech at once both pretentious and feeble, that is created daily by millions of blunders and inaccuracies in grammar, syntax, idiom, metaphor, logic, and common sense. . . . In the history of modern English there is no period in which such victory over thought-in-speech has been so widespread.—1978

> Recent graduates, including those with university degrees, seem to have no mastery of the language at all. They cannot construct a simple

declarative sentence, either orally or in writing. They cannot spell common, everyday words. Punctuation is apparently no longer taught. Grammar is a complete mystery to almost all recent graduates.—1961

From every college in the country goes up the cry, "Our freshmen can't spell, can't punctuate." Every high school is in disrepair because its pupils are so ignorant of the merest rudiments.—1917

The vocabularies of the majority of high-school pupils are amazingly small. I always try to use simple English, and yet I have talked to classes when quite a minority of the pupils did not comprehend more than half of what I said.—1889

Unless the present progress of change [is] arrested . . . there can be no doubt that, in another century, the dialect of the Americans will become utterly unintelligible to an Englishman.—1833

Our language (I mean the English) is degenerating very fast. . . . I begin to fear that it will be impossible to check it.—1785

Complaints about the decline of language go at least as far back as the invention of the printing press. Soon after William Caxton set up the first one in England in 1478, he lamented, "And certaynly our langage now vsed veryeth ferre from what whiche was vsed and spoken when I was borne." Indeed, moral panic about the decline of writing may be as old as writing itself:

OH, FOR CRYIN' OUT LOUD...YOU NEVER END A SENTENCE WITH A 𓂀!

ANCIENT GRAMMAR POLICE

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The cartoon is not much of an exaggeration. According to the English scholar Richard Lloyd-Jones, some of the clay tablets deciphered from ancient Sumerian include complaints about the deteriorating writing skills of the young.[6]

My discomfort with the classic style manuals has convinced me that we need a writing guide for the twenty-first century. It's not that I have the desire, to say nothing of the ability, to supplant *The Elements of Style.* Writers can profit by reading more than one style guide, and much of Strunk and White (as it is commonly called) is as timeless as it is charming. But much of it is not. Strunk was born in 1869, and today's writers cannot base their craft exclusively on the advice of a man who developed his sense of style before the invention of the telephone (let alone the Internet), before the advent of modern linguistics and cognitive science, before the wave of informalization that swept the world in the second half of the twentieth century.

A manual for the new millennium cannot just perpetuate the diktats of earlier manuals. Today's writers are infused by the spirit of scientific skepticism and the ethos of questioning authority. They should not be satisfied with "That's the way it's done" or "Because I said so," and they deserve not to be patronized at any age. They rightly expect *reasons* for any advice that is foisted upon them.

Today we can provide the reasons. We have an understanding of grammatical phenomena which goes well beyond the traditional taxonomies based on crude analogies with Latin. We have a body of research on the mental dynamics of reading: the waxing and waning of memory load as readers comprehend a passage, the incrementing of their knowledge as they come to grasp its meaning, the blind alleys that can lead them astray. We have a body of history and criticism which can distinguish the rules that enhance clarity, grace, and emotional resonance from those that are based on myths and misunderstandings. By replacing dogma about usage with reason and evidence, I hope not just to avoid giving ham-fisted advice but to make the advice that I do give easier to remember than a list of dos and don'ts. Providing reasons should also allow writers and editors to apply the

guidelines judiciously, mindful of what they are designed to accomplish, rather than robotically.

"The sense of style" has a double meaning. The word *sense*, as in "the sense of sight" and "a sense of humor," can refer to a faculty of mind, in this case the faculties of comprehension that resonate to a well-crafted sentence. It can also refer to "good sense" as opposed to "nonsense," in this case the ability to discriminate between the principles that improve the quality of prose and the superstitions, fetishes, shibboleths, and initiation ordeals that have been passed down in the traditions of usage.

The Sense of Style is not a reference manual in which you can find the answer to every question about hyphenation and capitalization. Nor is it a remedial guide for badly educated students who have yet to master the mechanics of a sentence. Like the classic guides, it is designed for people who know how to write and want to write better. This includes students who hope to improve the quality of their papers, aspiring critics and journalists who want to start a blog or column or series of reviews, and professionals who seek a cure for their academese, bureaucratese, corporatese, legalese, medicalese, or officialese. The book is also written for readers who seek no help in writing but are interested in letters and literature and curious about the ways in which the sciences of mind can illuminate how language works at its best.

My focus is on nonfiction, particularly genres that put a premium on clarity and coherence. But unlike the authors of the classic guides, I don't equate these virtues with plain words, austere expression, and formal style.[7] You can write with clarity and with flair, too. And though the emphasis is on nonfiction, the explanations should be useful to fiction writers as well, because many principles of style apply whether the world being written about is real or imaginary. I like to think they might also be helpful to poets, orators, and other creative wordsmiths, who need to know the canons of pedestrian prose to flout them for rhetorical effect.

People often ask me whether anyone today even cares about style. The English language, they say, faces a new threat in the rise of the

Internet, with its texting and tweeting, its email and chatrooms. Surely the craft of written expression has declined since the days before smartphones and the Web. You remember those days, don't you? Back in the 1980s, when teenagers spoke in fluent paragraphs, bureaucrats wrote in plain English, and every academic paper was a masterpiece in the art of the essay? (Or was it the 1970s?) The problem with the Internet-is-making-us-illiterate theory, of course, is that bad prose has burdened readers in every era. Professor Strunk tried to do something about it in 1918, when young Elwyn White was a student in his English class at Cornell.

What today's doomsayers fail to notice is that the very trends they deplore consist in oral media—radio, telephones, and television—giving way to written ones. Not so long ago it was radio and television that were said to be ruining the language. More than ever before, the currency of our social and cultural lives is the written word. And no, not all of it is the semiliterate ranting of Internet trolls. A little surfing will show that many Internet users value language that is clear, grammatical, and competently spelled and punctuated, not just in printed books and legacy media but in e-zines, blogs, Wikipedia entries, consumer reviews, and even a fair proportion of email. Surveys have shown that college students are writing more than their counterparts in earlier generations did, and that they make no more errors per page of writing.[8] And contrary to an urban legend, they do not sprinkle their papers with smileys and instant-messaging abbreviations like IMHO and L8TR, any more than previous generations forgot how to use prepositions and articles out of the habit of omitting them from their telegrams. Members of the Internet generation, like all language users, fit their phrasing to the setting and audience, and have a good sense of what is appropriate in formal writing.

Style still matters, for at least three reasons. First, it ensures that writers will get their messages across, sparing readers from squandering their precious moments on earth deciphering opaque prose. When the effort fails, the result can be calamitous—as Strunk and White put it, "death on the highway caused by a badly worded road

sign, heartbreak among lovers caused by a misplaced phrase in a well-intentioned letter, anguish of a traveler expecting to be met at a railroad station and not being met because of a slipshod telegram." Governments and corporations have found that small improvements in clarity can prevent vast amounts of error, frustration, and waste,[9] and many countries have recently made clear language the law of the land.[10]

Second, style earns trust. If readers can see that a writer cares about consistency and accuracy in her prose, they will be reassured that the writer cares about those virtues in conduct they cannot see as easily. Here is how one technology executive explains why he rejects job applications filled with errors of grammar and punctuation: "If it takes someone more than 20 years to notice how to properly use *it's,* then that's not a learning curve I'm comfortable with."[11] And if that isn't enough to get you to brush up your prose, consider the discovery of the dating site OkCupid that sloppy grammar and spelling in a profile are "huge turn-offs." As one client said, "If you're trying to date a woman, I don't expect flowery Jane Austen prose. But aren't you trying to put your best foot forward?"[12]

Style, not least, adds beauty to the world. To a literate reader, a crisp sentence, an arresting metaphor, a witty aside, an elegant turn of phrase are among life's greatest pleasures. And as we shall see in the first chapter, this thoroughly impractical virtue of good writing is where the practical effort of mastering good writing must begin.

Chapter 3

THE CURSE OF
KNOWLEDGE

THE MAIN CAUSE OF INCOMPREHENSIBLE PROSE IS THE DIFFICULTY OF IMAGINING WHAT IT'S LIKE FOR SOMEONE ELSE NOT TO KNOW SOMETHING THAT YOU KNOW

W hy is so much writing so hard to understand? Why must a typical reader struggle to follow an academic article, the fine print on a tax return, or the instructions for setting up a wireless home network?

The most popular explanation I hear is the one captured in this cartoon:

Good start. Needs more gibberish.

According to this theory, opaque prose is a deliberate choice. Bureau-crats and business managers insist on gibberish to cover their anatomy. Plaid-clad tech writers get their revenge on the jocks who kicked sand in their faces and the girls who turned them down for dates. Pseudo-intellectuals spout obscure verbiage to hide the fact that they have nothing to say. Academics in the softer fields dress up the trivial and obvious with the trappings of scientific sophistication, hoping to bam-boozle their audiences with highfalutin gobbledygook. Here is Calvin explaining the principle to Hobbes:
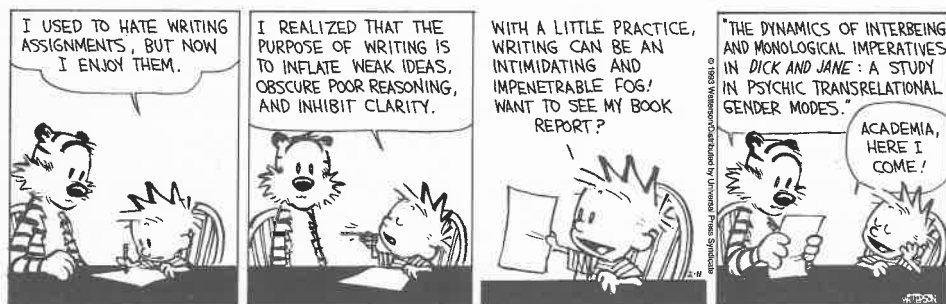
Calvin and Hobbes © 1993 Watterson. Reprinted with permission of Universal Uclick. All rights reserved.

I have long been skeptical of the bamboozlement theory, because in my experience it does not ring true. I know many scholars who have nothing to hide and no need to impress. They do groundbreaking work on important subjects, reason well about clear ideas, and are honest, down-to-earth people, the kind you'd enjoy having a beer with. Still, their writing stinks.

People often tell me that academics have no choice but to write badly because the gatekeepers of journals and university presses insist on ponderous language as proof of one's seriousness. This has not been my experience, and it turns out to be a myth. In *Stylish Academic Writing* (no, it is not one of the world's thinnest books), Helen Sword masochistically analyzed the literary style in a sample of five hundred articles in academic journals, and found that a healthy minority in every field were written with grace and verve.[1]

In explaining any human shortcoming, the first tool I reach for is

Hanlon's Razor: Never attribute to malice that which is adequately explained by stupidity.[2] The kind of stupidity I have in mind has nothing to do with ignorance or low IQ; in fact, it's often the brightest and best informed who suffer the most from it. I once attended a lecture on biology addressed to a large general audience at a conference on technology, entertainment, and design. The lecture was also being filmed for distribution over the Internet to millions of other laypeople. The speaker was an eminent biologist who had been invited to explain his recent breakthrough in the structure of DNA. He launched into a jargon-packed technical presentation that was geared to his fellow molecular biologists, and it was immediately apparent to everyone in the room that none of them understood a word. Apparent to everyone, that is, except the eminent biologist. When the host interrupted and asked him to explain the work more clearly, he seemed genuinely surprised and not a little annoyed. This is the kind of stupidity I am talking about.

Call it the Curse of Knowledge: a difficulty in imagining what it is like for someone else not to know something that you know. The term was invented by economists to help explain why people are not as shrewd in bargaining as they could be, in theory, when they possess information that their opposite number does not.[3] A used-car dealer, for example, should price a lemon at the same value as a creampuff of the same make and model, because customers have no way to tell the difference. (In this kind of analysis, economists imagine that everyone is an amoral profit-maximizer, so no one does anything just for honesty's sake.) But at least in experimental markets, sellers don't take full advantage of their private knowledge. They price their assets as if their customers knew as much about their quality as they do.

The curse of knowledge is far more than a curiosity in economic theory. The inability to set aside something that you know but that someone else does not know is such a pervasive affliction of the human mind that psychologists keep discovering related versions of it and giving it new names. There is egocentrism, the inability of children to imagine a simple scene, such as three toy mountains on a tabletop,

from another person's vantage point.[4] There's hindsight bias, the tendency of people to think that an outcome they happen to know, such as the confirmation of a disease diagnosis or the outcome of a war, should have been obvious to someone who had to make a prediction about it before the fact.[5] There's false consensus, in which people who make a touchy personal decision (like agreeing to help an experimenter by wearing a sandwich board around campus with the word REPENT) assume that everyone else would make the same decision.[6] There's illusory transparency, in which observers who privately know the backstory to a conversation and thus can tell that a speaker is being sarcastic assume that the speaker's naïve listeners can somehow detect the sarcasm, too.[7] And there's mindblindness, a failure to mentalize, or a lack of a theory of mind, in which a three-year-old who sees a toy being hidden while a second child is out of the room assumes that the other child will look for it in its actual location rather than where she last saw it.[8] (In a related demonstration, a child comes into the lab, opens a candy box, and is surprised to find pencils in it. Not only does the child think that another child entering the lab will know it contains pencils, but the child will say that he himself knew it contained pencils all along!) Children mostly outgrow the inability to separate their own knowledge from someone else's, but not entirely. Even adults *slightly* tilt their guess about where a person will look for a hidden object in the direction of where they themselves know the object to be.[9]

Adults are particularly accursed when they try to estimate other people's knowledge and skills. If a student happens to know the meaning of an uncommon word like *apogee* or *elucidate*, or the answer to a factual question like where Napoleon was born or what the brightest star in the sky is, she assumes that other students know it, too.[10] When experimental volunteers are given a list of anagrams to unscramble, some of which are easier than others because the answers were shown to them beforehand, they rate the ones that are easier for *them* (because they'd seen the answers) to be magically easier for *everyone*.[11] And when experienced cell phone users were asked how long it would take novices to learn to use the phone, they guessed thirteen minutes; in

fact, it took thirty-two.[12] Users with less expertise were *more* accurate in predicting the learning curves, though their guess, too, fell short: they predicted twenty minutes. The better you know something, the less you remember about how hard it was to learn.

The curse of knowledge is the single best explanation I know of why good people write bad prose.[13] It simply doesn't occur to the writer that her readers don't know what she knows—that they haven't mastered the patois of her guild, can't divine the missing steps that seem too obvious to mention, have no way to visualize a scene that to her is as clear as day.* And so she doesn't bother to explain the jargon, or spell out the logic, or supply the necessary detail. The ubiquitous experience shown in this *New Yorker* cartoon is a familiar example:
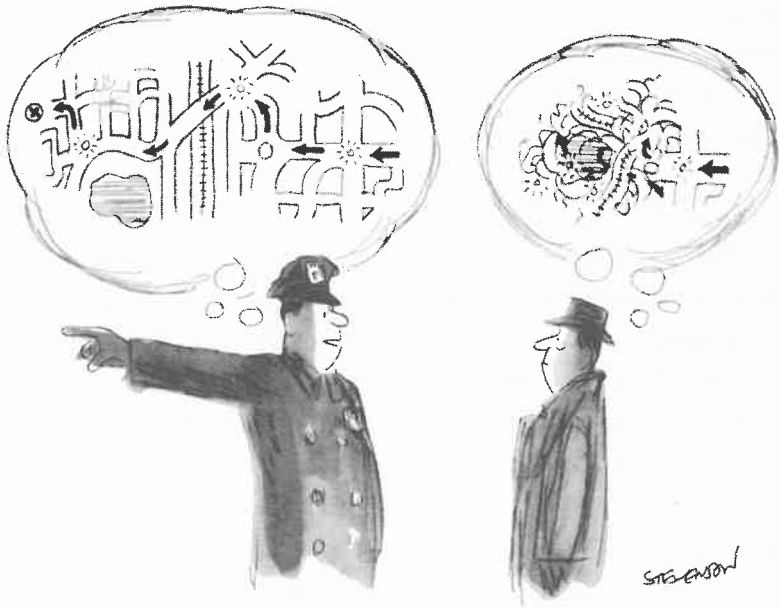
Anyone who wants to lift the curse of knowledge must first appreciate what a devilish curse it is. Like a drunk who is too impaired to realize that he is too impaired to drive, we do not notice the curse

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* In this chapter, it's the female gender's turn to be the generic writer.

because the curse prevents us from noticing it. This blindness impairs us in every act of communication. Students in a team-taught course save their papers under the name of the professor who assigned it, so I get a dozen email attachments named "pinker.doc." The professors rename the papers, so Lisa Smith gets back a dozen attachments named "smith.doc." I go to a Web site for a trusted-traveler program and have to decide whether to click on GOES, Nexus, GlobalEntry, Sentri, Flux, or FAST—bureaucratic terms that mean nothing to me. A trail map informs me that a hike to a waterfall takes two hours, without specifying whether that means each way or for a round trip, and it fails to show several unmarked forks along the trail. My apartment is cluttered with gadgets that I can never remember how to use because of inscrutable buttons which may have to be held down for one, two, or four seconds, sometimes two at a time, and which often do different things depending on invisible "modes" toggled by still other buttons. When I'm lucky enough to find the manual, it enlightens me with explanations like "In the state of {alarm and chime setting}. Press the [SET] key and the {alarm 'hour' setting}→{alarm 'minute' setting}→{time 'hour' setting}→{time 'minute' setting}→{'year' setting}→{'month' setting}→ {'day' setting} will be completed in turn. And press the [MODE] key to adjust the set items." I'm sure it was perfectly clear to the engineers who designed it.

Multiply these daily frustrations by a few billion, and you begin to see that the curse of knowledge is a pervasive drag on the strivings of humanity, on a par with corruption, disease, and entropy. Cadres of expensive professionals—lawyers, accountants, computer gurus, help-line responders—drain vast sums of money from the economy to clarify poorly drafted text. There's an old saying that for the want of a nail the battle was lost, and the same is true for the want of an adjective: the Charge of the Light Brigade during the Crimean War is only the most famous example of a military disaster caused by vague orders. The nuclear meltdown at Three Mile Island in 1979 has been attributed to poor wording (operators misinterpreted the label on a warning light), as has the deadliest plane crash in history, in which the pilot of a 747 at

Tenerife Airport radioed he was *at takeoff,* by which he meant "taking off," but an air traffic controller interpreted it as "at the takeoff position" and failed to stop him before he plowed his plane into another 747 on the runway.[14] The visually confusing "butterfly ballot" given to Palm Beach voters in the 2000 American presidential election led many supporters of Al Gore to vote for the wrong candidate, which may have swung the election to George W. Bush, changing the course of history.

How can we lift the curse of knowledge? The traditional advice— always remember the reader over your shoulder—is not as effective as you might think.[15] The problem is that just trying harder to put yourself in someone else's shoes doesn't make you a whole lot more accurate in figuring out what that person knows.[16] When you've learned something so well that you forget that other people may not know it, you also forget to *check* whether they know it. Several studies have shown that people are not easily disabused of their curse of knowledge, even when they are told to keep the reader in mind, to remember what it was like to learn something, or to ignore what they know.[17]

But imagining the reader over your shoulder is a start. Occasionally people do learn to discount their knowledge when they are shown how it biases their judgments, and if you've read to this point, perhaps you will be receptive to the warning.[18] So for what it's worth: Hey, I'm talking to *you.* Your readers know a lot less about your subject than you think they do, and unless you keep track of what you know that they don't, you are guaranteed to confuse them.

A better way to exorcise the curse of knowledge is to be aware of specific pitfalls that it sets in your path. There's one that everyone is at least vaguely aware of: the use of jargon, abbreviations, and technical vocabulary. Every human pastime—music, cooking, sports, art, theoretical physics—develops an argot to spare its enthusiasts from having to say or type a long-winded description every time they refer to a familiar concept in each other's company. The problem is that as we become proficient at our job or hobby we come to use these catchwords so often that they flow out of our fingers automatically, and we forget

that our readers may not be members of the clubhouse in which we learned them.

Obviously writers cannot avoid abbreviations and technical terms altogether. Shorthand terms are unobjectionable, indeed indispensable, when a term has become entrenched in the community one is writing for. Biologists needn't define *transcription factor* or spell out *mRNA* every time they refer to those things, and many technical terms become so common and are so useful that they eventually cross over into everyday parlance, like *cloning, gene,* and *DNA.* But the curse of knowledge ensures that most writers will overestimate how standard a term has become and how wide the community is that has learned it.

A surprising amount of jargon can simply be banished and no one will be the worse for it. A scientist who replaces *murine model* with *rats and mice* will use up no more space on the page and be no less scientific. Philosophers are every bit as rigorous when they put away Latin expressions like *ceteris paribus, inter alia,* and *simpliciter* and write in English instead: *other things being equal, among other things,* and *in and of itself.* And though nonlawyers might assume that the language of contracts, such as *the party of the first part,* must serve some legal purpose, most of it is superfluous. As Adam Freedman points out in his book on legalese, "What distinguishes legal boilerplate is its combination of archaic terminology and frenzied verbosity, as though it were written by a medieval scribe on crack."[19]

Abbreviations are tempting to thoughtless writers because they can save a few keystrokes every time they have to use the term. The writers forget that the few seconds they add to their own lives come at the cost of many minutes stolen from the lives of their readers. I stare at a table of numbers whose columns are labeled DA DN SA SN, and have to flip back and scan for the explanation: Dissimilar Affirmative, Dissimilar Negative, Similar Affirmative, Similar Negative. Each abbreviation is surrounded by many inches of white space. What possible reason could there have been for the author not to spell them out? Abbreviations that are coined for a single piece of writing are best avoided altogether, to spare the reader from having to engage in the famously tedious

memory task called paired-associate learning, in which psychologists force their participants to memorize arbitrary pairs of text like DAX-QOV. Even moderately common abbreviations should be spelled out on first use. As Strunk and White point out, "Not everyone knows that SALT means Strategic Arms Limitation Talks, and even if everyone did, there are babies being born every minute who will someday encounter the name for the first time. They deserve to see the words, not simply the initials."[20] The hazard is not limited to professional prose. Some of us receive annual Christmas letters in which the household spokesperson cheerily writes, "Irwin and I had a great time at the IHRP after dispatching the children to the UNER, and we all continue work on our ECPs at the SFBS."

A considerate writer will also cultivate the habit of adding a few words of explanation to common technical terms, as in *"Arabidopsis,* a flowering mustard plant," rather than the bare *"Arabidopsis"* (which I've seen in many science articles). It's not just an act of magnanimity: a writer who explains technical terms can multiply her readership a thousandfold at the cost of a handful of characters, the literary equivalent of picking up hundred-dollar bills on the sidewalk. Readers will also thank a writer for the copious use of *for example, as in,* and *such as,* because an explanation without an example is little better than no explanation at all. For example: Here's an explanation of the rhetorical term *syllepsis:* "the use of a word that relates to, qualifies, or governs two or more other words but has a different meaning in relation to each." Got that? Now let's say I continue with ". . . such as when Benjamin Franklin said, 'We must all hang together, or assuredly we shall all hang separately.'" Clearer, no? No? Sometimes two examples are better than one, because they allow the reader to triangulate on which aspect of the example is relevant to the definition. What if I add ". . . or when Groucho Marx said, 'You can leave in a taxi, and if you can't get a taxi, you can leave in a huff'"?[21]

And when technical terms are unavoidable, why not choose ones that are easy for readers to understand and remember? Ironically, the field of linguistics is among the worst offenders, with dozens of

mystifying technical terms: *themes* that have nothing to do with themes; *PRO* and *pro*, which are pronounced the same way but refer to different things; *stage-level* and *individual-level predicates,* which are just unintuitive ways of saying "temporary" and "permanent"; and *Principles A, B,* and *C,* which could just as easily have been called the Reflexive Principle, the Pronoun Principle, and the Noun Principle. For a long time I got a headache reading papers in semantics that analyzed the two meanings of *some.* In a loose, conversational sense, *some* implies "some, but not all": when I say *Some men are chauvinists,* it's natural to interpret me as implying that others are not. But in a strict, logical sense, *some* means "at least one" and does not rule out "all"; there's no contradiction in saying *Some men are chauvinists; indeed, all of them are.* Many linguists refer to the two meanings as the "upper-bounded" and "lower-bounded" senses, labels borrowed from mathematics, and I could never keep them straight. At last I came across a limpid semanticist who referred to them as the "only" and "at-least" senses, labels from everyday English, and I've followed the literature ever since.

This vignette shows that even belonging to the same professional club as a writer is no protection against her curse of knowledge. I suffer the daily experience of being baffled by articles in my field, my subfield, even my sub-sub-subfield. Take this sentence from an article I just read by two eminent cognitive neuroscientists, which appeared in a journal that publishes brief review articles for a wide readership:

> The slow and integrative nature of conscious perception is confirmed behaviorally by observations such as the "rabbit illusion" and its variants, where the way in which a stimulus is ultimately perceived is influenced by poststimulus events arising several hundreds of milliseconds after the original stimulus.

After I macheted my way through the overgrowth of passives, zombies, and redundancies, I determined that the content of the sentence resided in the term "rabbit illusion," the phenomenon which is supposed to demonstrate "the integrative nature of conscious perception." The

authors write as if everyone knows what the "rabbit illusion" is, but I've been in this business for nearly forty years and had never heard of it. Nor does their explanation enlighten. How are we supposed to visualize "a stimulus," "poststimulus events," and "the way in which a stimulus is ultimately perceived"? And what does any of this have to do with rabbits? Richard Feynman once wrote, "If you ever hear yourself saying, 'I think I understand this,' that means you don't." Though the article had been written for the likes of me, the best I could say after reading this explanation was, "I think I understand this."

So I did a bit of digging and uncovered a Cutaneous Rabbit Illusion, in which if you close your eyes and someone taps you a few times on the wrist, then on the elbow, and then on the shoulder, it feels like a string of taps running up the length of your arm, like a hopping rabbit. OK, now I get it—a person's conscious experience of where the early taps fell depends on the location of the later taps. But why didn't the authors just say that, which would have taken no more words than "*stimulus* this" and "*poststimulus* that"?

The curse of knowledge is insidious, because it conceals not only the contents of our thoughts from us but their very form. When we know something well, we don't realize how abstractly we think about it. And we forget that other people, who have lived their own lives, have not gone through our idiosyncratic histories of abstractification.

There are two ways in which thoughts can lose their moorings in the land of the concrete. One is called chunking. Human working memory can hold only a few items at a time. Psychologists used to think that its capacity was around seven items (plus or minus two), but later downsized even that estimate, and today believe it is closer to three or four. Fortunately, the rest of the brain is equipped with a workaround for the bottleneck. It can package ideas into bigger and bigger units, which the psychologist George Miller dubbed "chunks."[22] (Miller was one of the greatest stylists in the history of the behavioral sciences, and it's no coincidence that he co-opted this homey term rather than inventing some technical jargon.)[23] Each chunk, no matter how much

information is packed inside it, occupies a single slot in working memory. Thus we can hold in mind just a few of the letters from an arbitrary sequence like M D P H D R S V P C E O I H O P. But if they belong to well-learned chunks such as abbreviations or words, like the ones that pop out when we group the letters as MD PHD RSVP CEO IHOP, five chunks, we can remember all sixteen. Our capacity can be multiplied yet again when we package the chunks into still bigger chunks, such as the story "The MD and the PhD RSVP'd to the CEO of IHOP," which can occupy just one slot, with three or four left over for other stories. Of course this magic depends on one's personal history of learning. To someone who has never heard of the International House of Pancakes, *IHOP* takes up four slots in memory, not one. Mnemonists, the performers who amaze us by regurgitating superhuman amounts of information, have spent a lot of time building up a huge inventory of chunks in their long-term memories.

Chunking is not just a trick for improving memory; it's the lifeblood of higher intelligence. As children we see one person hand a cookie to another, and we remember it as an act of *giving*. One person gives another one a cookie in exchange for a banana; we chunk the two acts of giving together and think of the sequence as *trading*. Person 1 trades a banana to Person 2 for a piece of shiny metal, because he knows he can trade it to Person 3 for a cookie; we think of it as *selling*. Lots of people buying and selling make up a *market*. Activity aggregated over many markets gets chunked into *the economy*. The economy now can be thought of as an entity which responds to actions by central banks; we call that *monetary policy*. One kind of monetary policy, which involves the central bank buying private assets, is chunked as *quantitative easing*. And so on.

As we read and learn, we master a vast number of these abstractions, and each becomes a mental unit which we can bring to mind in an instant and share with others by uttering its name. An adult mind that is brimming with chunks is a powerful engine of reason, but it comes with a cost: a failure to communicate with other minds that have not mastered the same chunks. Many educated adults would be

left out of a discussion that criticized the president for not engaging in more "quantitative easing," though they would understand the process if it were spelled out. A high school student might be left out if you spoke about "monetary policy," and a schoolchild might not even follow a conversation about "the economy."

The amount of abstraction that a writer can get away with depends on the expertise of her readership. But divining the chunks that have been mastered by a typical reader requires a gift of clairvoyance with which few of us are blessed. When we are apprentices in our chosen specialty, we join a clique in which, it seems to us, everyone else seems to know so much! And they talk among themselves as if their knowledge were second nature to every educated person. As we settle in to the clique, it becomes our universe. We fail to appreciate that it is a tiny bubble in a vast multiverse of other cliques. When we make first contact with the aliens in other universes and jabber at them in our local code, they cannot understand us without a sci-fi Universal Translator.

Even when we have an inkling that we are speaking in a specialized lingo, we may be reluctant to slip back into plain speech. It could betray to our peers the awful truth that we are still greenhorns, tenderfoots, newbies. And if our readers do know the lingo, we might be insulting their intelligence by spelling it out. We would rather run the risk of confusing them while at least appearing to be sophisticated than take a chance at belaboring the obvious while striking them as naïve or condescending.

It's true that every writer must calibrate the degree of specialization in her language against her best guess of the audience's familiarity with the topic. But in general it's wiser to assume too little than too much. Every audience is spread out along a bell curve of sophistication, and inevitably we'll bore a few at the top while baffling a few at the bottom; the only question is how many there will be of each. The curse of knowledge means that we're more likely to overestimate the average reader's familiarity with our little world than to underestimate it. And in any case one should not confuse clarity with condescension. Brian Greene's explanation of the multiverse in chapter 2 shows how a classic stylist can explain an esoteric idea in plain language without patronizing his audience. The key is to

assume that your readers are as intelligent and sophisticated as you are, but that they happen not to know something you know.

Perhaps the best way to remember the dangers of private abbreviation is to recall the joke about a man who walks into a Catskills resort for the first time and sees a group of retired borscht-belt comics telling jokes around a table with their pals. One of them calls out, "Forty-seven!" and the others roar with laughter. Another follows with "A hundred and twelve!" and again the others double over. The newcomer can't figure out what's going on, so he asks one of the old-timers to explain. The man says, "These guys have been hanging around together so long they know all the same jokes. So to save time they've given them numbers, and all they need to do is call out the number." The new fellow says, "That's ingenious! Let me try it." So he stands up and calls out, "Twenty-one!" There is a stony silence. He tries again: "Seventy-two!" Everyone stares at him, and nobody laughs. He sinks back into his seat and whispers to his informant, "What did I do wrong? Why didn't anyone laugh?" The man says, "It's all in how you tell it."

A failure to realize that my chunks may not be the same as your chunks can explain why we baffle our readers with so much shorthand, jargon, and alphabet soup. But it's not the only way we baffle them. Sometimes wording is maddeningly opaque without being composed of technical terminology from a private clique. Even among cognitive scientists, "poststimulus event" is not a standard way to refer to a tap on the arm. A financial customer might be reasonably familiar with the world of investments and still have to puzzle over what a company brochure means by "capital changes and rights." A computer-savvy user trying to maintain his Web site might be mystified by instructions on the maintenance page which refer to "nodes," "content type," and "attachments." And heaven help the sleepy traveler trying to set the alarm clock in his hotel room who must interpret "alarm function" and "second display mode."

Why do writers invent such confusing terminology? I believe the answer lies in another way in which expertise can make our thoughts

more idiosyncratic and thus harder to share: as we become familiar with something, we think about it more in terms of the use we put it to and less in terms of what it looks like and what it is made of. This transition, another staple of the cognitive psychology curriculum, is called functional fixity (sometimes functional fixedness).[24] In the textbook experiment, people are given a candle, a book of matches, and a box of thumbtacks, and are asked to attach the candle to the wall so that the wax won't drip onto the floor. The solution is to dump the thumbtacks out of the box, tack the box to the wall, and stick the candle onto the box. Most people never figure this out because they think of the box as a container for the tacks rather than a physical object in its own right, with handy features like a flat surface and perpendicular sides. The blind spot is called functional fixity because people get fixated on an object's function and forget its physical makeup. The toddler who ignores the birthday present and plays with the wrapping paper reminds us of how we lose our appreciation of objects as objects and think of them as means to an end.

Now, if you combine functional fixity with chunking, and stir in the curse that hides each one from our awareness, you get an explanation of why specialists use so much idiosyncratic terminology, together with abstractions, metaconcepts, and zombie nouns. They are not trying to bamboozle us; that's just the way they think. The mental movie of a mouse cowering in the corner of a cage that has another mouse in it gets chunked into "social avoidance." You can't blame the neuroscientist for thinking this way. She's seen the movie thousands of times; she doesn't need to hit the PLAY button in her visual memory and watch the critters quivering every time she talks about whether her experiment worked. But we do need to watch them, at least the first time, to appreciate what actually happened.

In a similar way, writers stop thinking—and thus stop writing—about tangible objects and instead refer to them by the role those objects play in their daily travails. Recall the example from chapter 2 in which a psychologist showed people sentences, followed by the label TRUE or FALSE. He explained what he did as "the subsequent presentation of an assessment word," referring to the label as an

"assessment word" because that's why he put it there—so that the participants in the experiment could assess whether it applied to the preceding sentence. Unfortunately, he left it up to us to figure out what an "assessment word" is—while saving no characters, and being less rather than more scientifically precise. In the same way, a tap on the wrist became a "stimulus" and a tap on the elbow became a "poststimulus event," because the writers cared about the fact that one event came after the other and no longer cared about the fact that the events were taps on the arm.

But we readers care. We are primates, with a third of our brains dedicated to vision, and large swaths devoted to touch, hearing, motion, and space. For us to go from "I think I understand" to "I understand," we need to see the sights and feel the motions. Many experiments have shown that readers understand and remember material far better when it is expressed in concrete language that allows them to form visual images, like the sentences on the right:[25]

The set fell off the table.	The ivory chess set fell off the table.
The measuring gauge was covered with dust.	The oil-pressure gauge was covered with dust.
Georgia O'Keeffe called some of her works "equivalents" because their forms were abstracted in a way that gave the emotional parallel of the source experience.	Georgia O'Keeffe's landscapes were of angular skyscrapers and neon thoroughfares, but mostly of the bleached bones, desert shadows, and weathered crosses of rural New Mexico.

Notice how the abstract descriptions on the left leave out just the kind of physical detail that an expert has grown bored with but that a neophyte has to see: ivory chessmen, not just a "set"; an oil-pressure gauge, not just a generic "measuring gauge"; bleached bones, not just "forms." A commitment to the concrete does more than just ease communication; it can lead to better reasoning. A reader who knows what the Cutaneous Rabbit Illusion consists of is in a position to evaluate

whether it really does imply that conscious experience is spread over time, or whether it can be explained in some other way.

The profusion of metaconcepts in professional writing—all those levels, issues, contexts, frameworks, and perspectives—also makes sense when you consider the personal history of chunking and functional fixity in the writers. Academics, consultants, policy wonks, and other symbolic analysts really do think about "issues" (they can list them on a page), "levels of analysis" (they can argue about which is most appropriate), and "contexts" (they can use them to figure out why something works in one place but not in another). These abstractions become containers in which they store and handle their ideas, and before they know it they can no longer call anything by its name. Compare the professionalese on the left with the concrete equivalents on the right:

Participants were tested under conditions of good to excellent acoustic isolation.	We tested the students in a quiet room.
Management actions at and in the immediate vicinity of airports do little to mitigate the risk of off-airport strikes during departure and approach.	Trapping birds near an airport does little to reduce the number of times a bird will collide with a plane as it takes off or lands.
We believe that the ICTS approach to delivering integrated solutions, combining effective manpower, canine services and cutting-edge technology was a key differentiator in the selection process.	They chose our company because we protect buildings with a combination of guards, dogs, and sensors.

What we see as "a quiet room" an experimenter sees as "testing conditions," because that's what she was thinking about when she chose the room. For a safety expert at the top of the chain of command, who lives every day with the responsibility for managing risks, the bird traps set out by her underlings are a distant memory. The public-relations hack for a security firm refers to the company's activities in a press statement

in terms of the way she thinks about them when selling them to potential clients.

Slicing away the layers of familiar abstraction and showing the reader who did what to whom is a never-ending challenge for a writer. Take the expository chore of describing a correlation between two variables (like smoking and cancer, or video-game playing and violence), which is a staple of public-health and social-science reporting. A writer who has spent a lot of time thinking about correlations will have mentally bubble-wrapped each of the two variables, and will have done the same to the possible ways in which they can be correlated. Those verbal packages are all within arm's reach, and she will naturally turn to them when she has to share some news:

> There is a significant positive correlation between measures of food intake and body mass index.
> Body mass index is an increasing function of food intake.
> Food intake predicts body mass index according to a monotonically increasing relation.

A reader can figure this out, but it's hard work, like hacking through a blister pack to get at the product. If the writer de-thingifies the variables by extracting them from their noun casings, she can refer to them with the language we use for actions, comparisons, and outcomes, and everything becomes clearer:

> The more you eat, the fatter you get.

The curse of knowledge, in combination with chunking and functional fixity, helps make sense of the paradox that classic style is difficult to master. What could be so hard about pretending to open your eyes and hold up your end of a conversation? The reason it's harder than it sounds is that if you are enough of an expert in a topic to have something to say about it, you have probably come to think about it in abstract chunks and functional labels that are now second nature to

you but still unfamiliar to your readers—and you are the last one to realize it.

As writers, then, we should try to get into our readers' heads and be mindful of how easy it is to fall back on parochial jargon and private abstractions. But these efforts can take us only so far. None of us has, and few of us would want, a power of clairvoyance that would expose to us everyone else's private thoughts.

To escape the curse of knowledge, we have to go beyond our own powers of divination. We have to close the loop, as the engineers say, and get a feedback signal from the world of readers—that is, show a draft to some people who are similar to our intended audience and find out whether they can follow it.[26] This sounds banal but is in fact profound. Social psychologists have found that we are overconfident, sometimes to the point of delusion, about our ability to infer what other people think, even the people who are closest to us.[27] Only when we ask those people do we discover that what's obvious to us isn't obvious to them. That's why professional writers have editors. It's also why politicians consult polls, why corporations hold focus groups, and why Internet companies use A/B testing, in which they try out two designs on a Web site (versions A and B) and collect data in real time on which gets more clicks.

Most writers cannot afford focus groups or A/B testing, but they can ask a roommate or colleague or family member to read what they wrote and comment on it. Your reviewers needn't even be a representative sample of your intended audience. Often it's enough that they are not you.

This does not mean you should implement every last suggestion they offer. Each commentator has a curse of knowledge of his own, together with hobbyhorses, blind spots, and axes to grind, and the writer cannot pander to all of them. Many academic articles contain bewildering non sequiturs and digressions that the authors stuck in at the insistence of an anonymous reviewer who had the power to reject it from the journal if they didn't comply. Good prose is never written by a committee. A writer should revise in response to a comment when

it comes from more than one reader or when it makes sense to the writer herself.

And that leads to another way to escape the curse of knowledge: show a draft to *yourself*, ideally after enough time has passed that the text is no longer familiar. If you are like me you will find yourself thinking, "What did I mean by that?" or "How does this follow?" or, all too often, "Who wrote this crap?"

I am told there are writers who can tap out a coherent essay in a single pass, at most checking for typos and touching up the punctuation before sending it off for publication. You are probably not one of them. Most writers polish draft after draft. I rework every sentence a few times before going on to the next, and revise the whole chapter two or three times before I show it to anyone. Then, with feedback in hand, I revise each chapter twice more before circling back and giving the entire book at least two complete passes of polishing. Only then does it go to the copy editor, who starts another couple of rounds of tweaking.

Too many things have to go right in a passage of writing for most mortals to get them all the first time. It's hard enough to formulate a thought that is interesting and true. Only after laying a semblance of it on the page can a writer free up the cognitive resources needed to make the sentence grammatical, graceful, and, most important, transparent to the reader. The form in which thoughts occur to a writer is rarely the same as the form in which they can be absorbed by a reader. The advice in this and other stylebooks is not so much on how to write as on how to revise.

Much advice on writing has the tone of moral counsel, as if being a good writer will make you a better person. Unfortunately for cosmic justice, many gifted writers are scoundrels, and many inept ones are the salt of the earth. But the imperative to overcome the curse of knowledge may be the bit of writerly advice that comes closest to being sound moral advice: always try to lift yourself out of your parochial mindset and find out how other people think and feel. It may not make you a better person in all spheres of life, but it will be a source of continuing kindness to your readers.

23. From the Pennsylvania Plain Language Consumer Contract Act, http://www.pacode.com/secure/data/037/chapter307/s307.10.html.

24. G. K. Pullum, "The BBC enlightens us on passives," *Language Log*, Feb. 22, 2011, http://languagelog.ldc.upenn.edu/nll/?p=2990.

CHAPTER 3: THE CURSE OF KNOWLEDGE

1. Sword, 2012.

2. Named after Robert J. Hanlon, who contributed it to Arthur Bloch's *Murphy's Law Book Two: More reasons why things go wrong!* (Los Angeles: Price/Stern/Sloan, 1980).

3. The term "curse of knowledge" was coined by Robin Hogarth and popularized by Camerer, Lowenstein, & Weber, 1989.

4. Piaget & Inhelder, 1956.

5. Fischhoff, 1975.

6. Ross, Greene, & House, 1977.

7. Keysar, 1994.

8. Wimmer & Perner, 1983.

9. Birch & Bloom, 2007.

10. Hayes & Bajzek, 2008; Nickerson, Baddeley, & Freeman, 1986.

11. Kelley & Jacoby, 1996.

12. Hinds, 1999.

13. Other researchers who have made this suggestion include John Hayes, Karen Schriver, and Pamela Hinds.

14. Cushing, 1994.

15. From the title of the 1943 style manual by Robert Graves and Alan Hodge, *The reader over your shoulder: A handbook for writers of prose* (New York: Random House; revised edition, 1979).

16. Epley, 2014.

17. Fischhoff, 1975; Hinds, 1999; Schriver, 2012.

18. Kelley & Jacoby, 1996.

19. Freedman, 2007, p. 22.

20. From p. 73 of the second edition (1972).

21. Attentive readers may notice that this definition of *syllepsis* is similar to the definition of *zeugma* I gave in connection with the Sendak obituary in chapter 1. The experts on rhetorical tropes don't have a consistent explanation of how they differ.

22. G. A. Miller, 1956.

23. Pinker, 2013.

24. Duncker, 1945.

25. Sadoski, 1998; Sadoski, Goetz, & Fritz, 1993; Kosslyn, Thompson, & Ganis, 2006.

26. Schriver, 2012.

27. Epley, 2014.

CHAPTER 4: THE WEB, THE TREE, AND THE STRING

1. Florey, 2006.

2. Pinker, 1997.

3. Pinker, 1994, chap. 4.

4. Pinker, 1994, chap. 8.

5. I use the analyses in *The Cambridge Grammar of the English Language* (Huddleston & Pullum, 2002) with a few simplifications, including those introduced in the companion *A Student's Introduction to English Grammar* (Huddleston & Pullum, 2005).

6. The incident is described in Liberman & Pullum, 2006.

7. Huddleston & Pullum, 2002; Huddleston & Pullum, 2005.

8. Bock & Miller, 1991.

9. Chomsky, 1965; see Pinker, 1994, chaps. 4 and 7.

10. Pinker, 1994, chap. 7. For more recent reviews of the experimental study of sentence processing, see Wolf & Gibson, 2003; Gibson, 1998; Levy, 2008; Pickering & van Gompel, 2006.

11. From Liberman & Pullum, 2006.

12. Mostly from the column of Aug. 6, 2013.

13. I have simplified the tree on page 100; the *Cambridge Grammar* would call for two additional levels of embedding in the clause *Did Henry kiss whom* to represent the inversion of the subject and the auxiliary.

14. The first example is from the *New York Times* "After Deadline" column; the second, from Bernstein, 1965.

15. Pinker, 1994; Wolf & Gibson, 2003.

16. Some of the examples come from Smith, 2001.

17. R. N. Goldstein, *36 Arguments for the existence of God: A work of fiction* (New York: Pantheon, 2010), pp. 18–19.

18. From "Types of sentence branching," *Report writing at the World Bank*, 2012, http://colelearning.net/rw_wb/module6/page7.html.

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