APPLIED THEORY

SUMMARY

- **Challenges some putative rules of grammar and mechanics in an effort to improve technical texts for the people who read them**
- **Proposes that editing decisions be based on prescriptive grammar, "organic" grammar, and relevant research**

Reconsidering Some Prescriptive Rules of Grammar and Composition

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INTRODUCTION

In this article, I discuss some rules and exceptions to the rules of grammar and mechanics. My recommendations for reconsidering these prescriptions are based on my experience as a technical editor and writer in a corporate, bureaucratic environment, as well as research in grammar and the reading process. The inertia of tradition is a powerful force in the workplace. Rules, whose origins have long been forgotten, take on lives of their own. A sharp argument can seemingly eviscerate the feeblest rules, but somehow they persist. I propose here that writing and editing decisions should be based not only on prescriptive grammar but also on "organic" grammar (the grammar "hard wired" in our brains), research in cognitive psychology and human factors, research in other relevant disciplines, and reflection.

IRRECONCILABLE DIFFERENCES

A tale of two grammars

The premise of this article is that writers, editors, and readers must continually reconcile two overarching grammars when they work with a text: the grammar that we were taught in school and the grammar that we developed during language acquisition, which is hard-wired in our brains. (For a wonderful introduction to grammar and language acquisition, read Pinker 1994.) Before I address grammar and mechanics, we need to understand this premise.

First of all, what is *grammar?* Grammar is a system of syntactic, semantic, and phonological rules that govern the use of language. The grammar that we develop during language acquisition, which I call "organic grammar," serves as a language template so that users of a common language can exchange ideas. The grammar that many of us were taught in school, which I call "prescriptive grammar," is an attempt to express the rules of organic grammar. I say *attempt* because sometimes prescriptive rules are promulgated even though they cannot be reconciled with organic grammar. Sometimes, prescriptive rules of English grammar are not based on English at all.

For example, we are all familiar with the moribund proscription against splitting the two elements of an infinitive phrase in English. This rule derives from the fact that the infinitive form of Latin verbs is a single word. For example, the infinitive of the Latin word *go* is *îre*. Because it is one word, you cannot split it and insert an adverb—perhaps the Latin word for *boldly*—between its halves. English grammarians of the 18th and 19th centuries who were trained in classical Latin attempted to prescribe the rules and patterns of Latin grammar to English and thus forbad the splitting of two-word English infinitives with an adverb.

Also, grammar mavens apply logic to language use. However, as a psychology professor once told me, people are not logical—they're psychological. For example, grammar mavens argue that "a double negative does mean a positive" (Manning 2002, p. 134). Organic grammar will have none of this nonsense. It is strong and abiding, having evolved over many years (Connatser 1997a). To appreciate how the capacity for language is hard-wired and not merely a cultural artifact, consider the natural creation of a new language, which linguists call *creole*.

When an indigenous culture encounters a foreign culture through trade, the comparatively impoverished indig-

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enous people who deal with the goods-bearing culture may attempt to adopt its language. The resulting language is a crude mish-mash of new words and old language called *pidgin*. When the children of these indigenous pidgin speakers are exposed to several languages plus the pidgin of their caregivers, they develop a new, fully fledged language in as little as one generation. Without receiving any formal education in language at all, these children, through their inborn language faculty, organize the input of language into an organic grammar that serves them and their succeeding generations. Louisiana creole is a prime example of this phenomenon.

As the linguist Derek Bickerton says, "the brain must have evolved in certain specific ways that make possible the automatic production of language [and] we can assume that the brain mechanisms that determine language are genetically transmitted" (1996, p. 38). In other words, we are born with a faculty for language that organizes an organic grammar when children are exposed to a language during the critical period of language acquisition (or multiple organic grammars for children exposed to more than one language spoken by their caregivers). This organic grammar is a powerful force in our speaking, reading, and writing lives, pushing through the unconscious like shoots of grass pushing through the most slender cracks in a concrete slab.

Violations of organic grammar

When prescriptive grammar violates organic grammar, bad things can happen during the reading process. Violations can impede the reading process, for example, when the reader becomes aware that something did not get processed properly. The most dangerous effect of a violation, I believe, is the unintentional shift in the reader's *rhetorical role*.

Studies have shown that readers assume a rhetorical role when they read, depending on the genre of the text, the perceived difficulty of the text, and the purpose of reading, among others (Bower 1976; Pichert and Anderson 1977; Connatser 1999a). Coney has been exploring the idea of rhetorical roles in technical communication for over two decades (Coney 1978; Coney 1987; Thompson and Coney 1995). Thompson and Coney used a usability technique called the "ethnomethodological approach" to study technical readers in a "reading-to-do" environment (Redish 1988). Asserting that readers always read within a role, they discuss an intriguing conclusion of their research, "that a significant force in determining and controlling the role of the reader originates in the reader, and that this force is quite independent of the role created by the author through the text" (Thompson and Coney 1995, p. 108).

When prescriptive grammar violates organic grammar, bad things can happen during the reading process.

The danger of violating organic grammar is the unintended shift in rhetorical roles from "reader" to "error detector." Once a reader becomes aware of the reading process, he or she is likely to become more critical. Finding a few errors could set off a counterproductive shift in the rhetorical role of the reader. The opposite may be true as well. That is, violating a prescriptive rule to comply with organic grammar could also evoke a counterproductive rhetorical role. For example, when writing for a highly educated audience that is intimately familiar with even arcane prescriptive grammar rules, breaking a rule to satisfy organic grammar may evoke a different kind of error detector, but an error detector nonetheless.

Breaking prescriptive rules

So how are we to know which rules to follow and which to break? In my opinion, if we were experts, we would know. I believe that an expert is someone who not only knows the rules but also knows when to break them. However, unless we understand both prescriptive grammar and organic grammar, we cannot call ourselves experts. Understanding organic grammar requires much more research into the reading process.

For example, Spyridakis and Isakson recently studied the effects of sentence structures such as nominalizations and instances of passive voice on the technical reader. In the first set of experiments (1998a), they wanted to determine the effect of text variables—such as active voice versus passive voice—on recall of ideas in a text taken from *Scientific American*. In another study, they used technical monographs, one on real estate and another on resettlement and population, as opposed to text taken from *Scientific American,* because they "wanted to be able to apply our results to aid technical editors" (1998b, p. 169).

This is the kind of research into the reading process that I am advocating. As Spyridakis and Isakson point out, such research has not been the practice of reading researchers: "Except for our work . . . , only three studies have been conducted with technical passages and they did not use naturally occurring passages" (p. 164). Until we step up research into how prescriptive rules (or the breaking of those rules) affect the reading process, we will have to rely on the existing data gleaned from a dearth of reading experiments and *observation*.

Introduction

Please take a few moments to complete this short survey. I'm writing an article comparing retention of fundamental knowledge about electrical engineering to retention of fundamental knowledge about grammar. With this survey, I'm testing the assertion of F. Middleton et al. that "soon after graduation, electrical engineering students forget basic principles such as Ohm's Law" (F. Middleton, G. Harper, and C. H. Zimmer, "Practicing Electrical Engineers and the Retention of Fundamentals," *Electrical Engineering Education [EEE],* vol. 38, no. 3, 1999, pp. 436–447). Please solve the unknown values in the five circuits on the next page.

A Few Rules

To facilitate entering the results in a database and conducting an analysis, please follow these rules:

This test is for engineers and technicians only.

Do not write your name anywhere on your test. The results of the test must be completely anonymous.

You do not need to show your work.

You can use a calculator.

Please show no more than five digits in your answer.

Don't use prefixes such as "Mega" and "milli" or scientific notation. Instead, write out the entire number. Examples:

WRITE 14,456 Ohms NOT 14.456 kilohms
WRITE 0.000154 NOT 154×10^{-4}

Use leading zeros for values between –1 and 1. Example:

WRITE 0.567 NOT .567

Spell out all units of measurement. Examples:

WRITE 1 Ohm NOT 1
WRITE 1 Volt NOT 1 V
WRITE 1 Ampere NOT 1 A

"Volt" is the unit of measurement for given voltage values (V), "Ampere" for given current values (I), and "Ohm" for resistance (R).

Please do not consult any reference material during this test.

Figure 1. Instructions for the first part of an experiment on value/unit agreement.

If you as an editor are continually repairing the same "error" committed by multiple writers, then perhaps it is not an error at all. Perhaps it is a conflict between organic and prescriptive grammar. What follows are recommendations for possibly breaking the rules of prescriptive grammar to better serve the reading audience.

GRAMMAR

Agreement: Number and case

When it comes to agreement, organic and prescriptive grammar sometimes disagree. Each is as intractable as the other. Prescriptive grammarians simply will not budge on some rules, and the reader is at the mercy of the reading machinery. Let me start with a rather detailed example of this loggerhead: value/unit agreement.

Value/unit agreement The prescription for agreement between a value and its unit of measurement has always struck me as a hyper-extension of logic that defies observation. Although I am an editor by profession, I recently had the enriching experience of having my work second-edited. On a page here and there, the editor changed units of measurement from plural to singular, stating that if the value is greater than 1 or less than –1, then the unit should be plural. If the decimal value is between 1 and –1 (inclusive), then the value is singular. So, she revised "0.54 ohms" to "0.54 ohm," for example.

I had run across this rule before while working with a translator. He insisted on the rule because it made sense to him. But organic grammar objects. If we were to report decimal values between 1 and –1 (also called decimal fractions) by relying on organic grammar, we would—invariably, I argue—use plural units unless the value were 1 or –1 (although I have my doubts about –1).

Note that the *Chicago manual of style* (1993) and the *APA publication manual* (2001) are silent on this topic. However, *Chicago* does follow the prescriptive rule in one example of using numerals with SI units: "So too, *0.003 cubic centimeter* is preferably written 3 mm^3, not 0.003 cm^3" (p. 481, emphasis added).

My hypothesis is that any decimal value between 1 and –1 is naturally treated by speakers and writers as a plural and should thus take a plural unit of measurement. To test my hypothesis, I created a two-part experiment and used engineers and technicians at my company as experimental subjects. These engineers and technicians were raised all over the United States (and a few in other countries), so their introductions to the English language were quite varied.

I concealed the purpose of the experiment because I wanted the experimental subjects to use their organic grammar. Therefore, I misdirected their attention from their

TABLE 1: CORRECT VALUES FOR THE FIVE UNKNOWN VALUES CALCULATED FROM GIVEN VALUES IN THE FIVE DIAGRAMS

Question Number	Value	Unit (Singular)
1	3.455	Ohm
2	0.2	Ampere
3	0.077	Ampere
4	0.1	Ohm
5	1.5	Volt

TABLE 2: UNITS OF MEASUREMENT (SINGULAR OR PLURAL) GIVEN BY THE RESPONDENTS

Question Number	Singular Unit (N)	Plural Unit (N)
1	4	11
2	5	10
3	4	11
4	5	10
5	2	12

conscious rules of language and toward a technical objective (solving math problems). I considered such an effort to conceal the true purpose of the experiment vital to the accuracy of the results. The informal nature of the experiment and the relationship between me and my subjects enabled such dissembling, which would perhaps be frowned on in a more formal experiment. Figure 1 shows the instructions for the first part of the experiment.

Five electrical diagrams with various values of current, voltage, and resistance followed these instructions. Table 1 shows the correct values of the unknown variables. All of the respondents got the correct values. Table 2 shows the units of measurement given by the respondents. Sixteen of 24 engineers and technicians responded to the survey. One survey was eliminated from consideration because the respondent used fractions instead of decimals. Therefore, N = 15. Question 5 was eliminated for one respondent because the respondent used the abbreviation *V* instead of

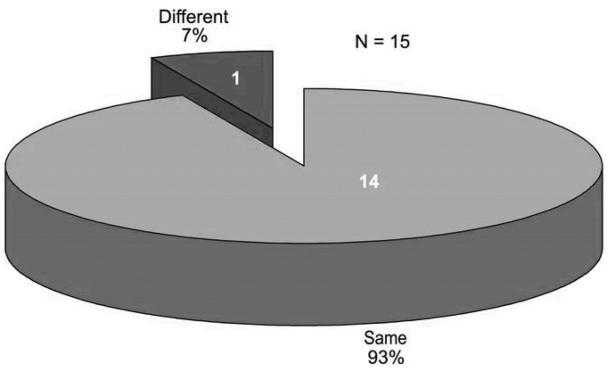

Figure 2. Comparison of results for question 1 and question 4 of value/unit experiment (part 1).

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Many thanks to those of you who completed the survey. As some of
you have wondered, the survey was designed not to test your
knowledge of Ohm's law (all of your answers were correct, by the
way) but rather to test your knowledge of a particular grammar
rule that I'll call "value/unit agreement": That is, when do you
use a plural unit of measurement and when do you use a singular
unit? When do you use "Ohm" and when do you use "Ohms"?

In part two of my admittedly deceptive "Ohm's Law" survey, please
answer the following two questions according to your
understanding of value/unit agreement:

1. Please type in the correct answer (selected from the two
options in parentheses) after the colon in each of the following.

3.455 (Ohm/Ohms):

0.2 (Ampere/Amperes):

0.077 (Ampere/Amperes):

0.1 (Ohm/Ohms):

1.5 (Volt/Volts):


2. Please informally state the rule of value/unit agreement as
you understand it:
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Figure 3. The test used in the second part of an experiment on value/unit agreement.

the unit of measurement *volt* or *volts*. Some of the respondents reported all units as singular, perhaps because of my overzealous law-giving in the instructions.

To determine whether the results confirmed my hypothesis, I compared the results for the highest value in the experiment (question 1, a value of 3.455) with the results for the value that was most likely to indicate a singular unit according to the prescriptive rule (in this case, the value most likely to take a singular unit of measurement is 0.1, the correct value for question 4).

If the organic grammar of the respondents *agrees* with the prescriptive rule for value/unit agreement, then the respondents *will differentiate* between question 1 and question 4. That is, more respondents will have *a different answer* (singular or plural) for question 1 from the answer given for question 4. On the other hand, if the organic grammar of the respondents *disagrees* with the prescriptive rule for value/unit agreement, then the respondents *will not differentiate* between question 1 and question 4. That is, more respondents will have *the same answer* (singular or plural) for question 1 as the answer given for question 4.

Figure 2 shows the results of comparing the answers to question 1 with the answers to question 4. Nearly all of the respondents (14 of 15) had the same answer for question 1 as for question 4 (that is, singular or plural). Although not scientific, these results (to some extent) confirm the notion that singular units of measurement are not used for values between 1 and –1 (exclusive) *according to organic grammar.*

In the second part of the experiment, I redirected the

TABLE 3: UNITS OF MEASUREMENT (SINGULAR OR PLURAL) GIVEN BY THE RESPONDENTS

Value Number	Value	Singular Unit (N)	Plural Unit (N)
1	3.455	0	13
2	0.2	8	5
3	0.077	8	5
4	0.1	9	4
5	1.5	0	13

attention of the subjects away from math and toward their conscious rules of language, stating that the true purpose of the first test was to determine whether the engineers and technicians new the rule about value/unit agreement. Figure 3 shows the second test, which was transmitted via e-mail.

Thirteen of the original 16 respondents of the first survey responded to the second survey. All responses were used. Therefore, N = 13. Table 3 shows the units of measurement given by the respondents for the values provided in the test.

In the first test, the respondents were distracted from a conscious application of grammar. This distraction enabled their organic (unconscious) grammar to prevail. In the second test, I evoked their knowledge of prescriptive grammar. Once again, I compared the results for the highest value in the experiment (value number 1, 3.455) to the results for the value that was most likely to indicate a singular unit according to the prescriptive rule (in this case, the value most likely to take a singular unit of measurement is 0.1, value number 4).

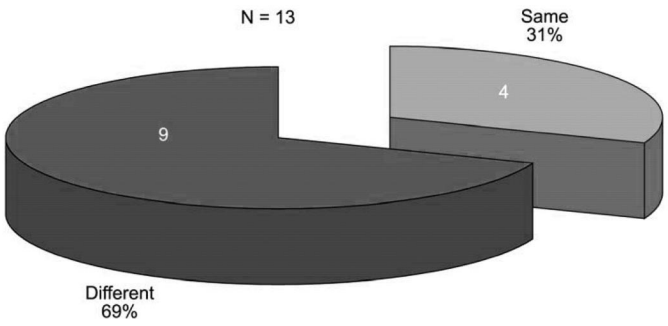

Figure 4. Comparison of results for question 1 and question 4 of value/unit experiment (part 2).

If the respondents' conscious concept of value/unit agreement *agrees* with the prescriptive rule for value/unit agreement, then the respondents *will differentiate* between value 1 and value 4. That is, more respondents will have *a different answer* (singular or plural) for value 1 from the answer given for value 4. On the other hand, if the respondents' conscious concept of value/unit agreement *disagrees* with the prescriptive rule for value/unit agreement, then the respondents *will not differentiate* between value 1 and value 4. That is, more respondents will have *the same answer* (singular or plural) for value 1 as the answer given for value 4. (One qualification: The strength of any difference depends on the exposure of the respondents to instructions in grammar.)

Figure 4 shows the results of comparing the answers given for value 1 to the answers given for value 4. Sixty-nine percent had a different answer for value 1 from the answer given for value 4. A comparison of the results of the first test, which evoked organic grammar, to the results of the second test, which evoked prescriptive grammar, reveals a stark difference between the two. On average, a respondent was likely to use organic grammar in one way but prescriptive grammar in an opposing way. It is just this type of irreconcilable difference that formal style guides should consider.

Subject/verb agreement Some of the Latin and Greek words that have entered directly into the English language cause grammar problems. No wonder. Consider the differences between Latin and English nouns, for example. Latin is called a case-marker language because information about number and case is incorporated into the noun. In English, only the number is incorporated into the noun (usually by adding *-s* or *-es*); the case of an English noun is determined by the position of the noun in its phrase or clause. When a brain that is hard-wired for English tries to negotiate the strangeness of an exotic case marker, only the contrivance of a higher education can prevent it from stumbling.

Consider a real bugaboo for editors in many technical fields, the word *data.* The Latin word *data* is the past, plural, passive participle of the verb *dare,* which means "to give." Therefore, the literal English translation of *data* is "things having been given," and every editor knows that plural nouns such as *data* take plural verbs such as *are.* Grammar mavens also know that a plural antecedent requires a plural pronoun ("data . . . them") or plural adjective ("these data").

Readers, however, do not care about etymology or word forms in the root language. They match subjects and verbs based on the notion of the subject (this is called "notional accord"). They know, for example, that the notion of *data* is singular, roughly equivalent to *dataset.* As a

TABLE 4: VOICE TRANSFORMATION TO IMPROVE READABILITY

	Transformation from Passive to Active
Passive	A site-selection process *to identify a sample of the population of existing sites where participating utilities have deployed monitors since the completion of DPQ I* was developed.
Active	The project team developed a site-selection process *to identify a sample of the population of existing sites where participating utilities have deployed monitors since the completion of DPQ I.*
	Transformation from Active to Passive
Active	Customers *in the industrial complex whose programmable logic controllers were affected by the high-frequency switching transient from the capacitor bank* installed filters.
Passive	Filters were installed by customers *in the industrial complex whose programmable logic controllers were affected by the high-frequency switching transient from the capacitor bank.*

result, I felt uncomfortable when a style guide coerced me to change "Data is not information" to "Data are not information." Similarly, preferring "This project had many more data" over "This project had much more data" just does not pass the sound test for me.

So why the confusion? There is no serviceable singular form of *data. Phenomena* has *phenomenon,* for example, but the literal singular form of *data—datum—*is used in only a handful of disciplines, such as surveying. When most people talk about a single element of a dataset, they use the term *data point,* not *datum.*

Here are a few more examples of prescriptive rules on subject/verb agreement that should be reconsidered:

- ***Media/medium*** Although *media* has a serviceable singular form (*medium*), enforcing a literal translation by matching a plural verb may violate organic grammar. One of my journalism professors dismissed the concept of "notional accord" and insisted on "the media are" even when *media* is used as a collective noun.
- ***None is/are*** The argument for using *none* with a singular verb is basically the argument for using a singular unit of measurement for decimal values between 1 and –1. News reporters who read from a teleprompter or sheet of paper invariably use a singular verb with *none,* but likely use a plural verb in unscripted speech if the object of the modifying prepositional phrase (whether expressed or implied) is plural. For example, we are likely to say "none of the people are" but "none of the apple is." Simple observation of language performance will bear this out. While writing this article, I was listening to the local news in the background. I heard a field reporter—who was reading from prepared copy—use the sentence "None of the residents is insured against flood damage." As the story ended, the newscaster asked the reporter a question. The reporter repeated the phrase. However, without a script to artificially guide her speech, she changed "is insured" to "are insured"—a revealing juxtaposition of language usage indeed.
- ***Alumnus/alumni/alumna/alumnae*** Gender complicates language. Latin case markers for nouns and adjectives include information about not only number and case but also gender. As I discuss later in this article, attempts to be inclusive can result in some clumsy constructions. As a man, I am privileged by language because the masculine has been traditionally used to embrace the feminine (yes, a very sexist rationale). Since the 1960s, that privilege has been slowly revoked by powerful movements in political correctness. Today, a graduated student is an alumnus of the school if he is a male but an alumna if she is female. Male graduates are alumni, whereas female graduates are alumnae. It is equitable to specify these distinctions in a style guide. However, one must consider the cognitive vocabulary (the words we know) of the intended audience. Does a particular audience know what an alumna is? Would the audience consider the use of that word a misspelling of *alumnus* or *alumni?* These are the

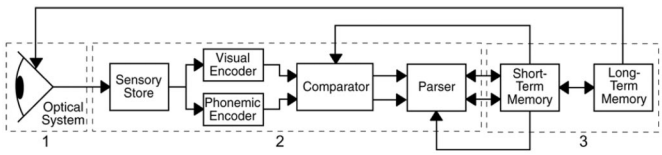

Figure 5. Model of the reading process (Connatser 1997b).

types of issues that should be debated among writers and editors, especially those who help build authoritative style guides.

Pronoun/antecedent agreement Readers often pay the price for a writer's political correctness. To be inoffensive, writers embrace the whole of humanity with neutered contrivances. The use of the singular subjective pronouns *he* and *she* have undergone quite a radical evolution in a very short time. *He* once encompassed *she.* Then *she* gained a condescending acknowledgment, accompanying *he* inside parentheses like so: *he (she).* Soon, *she* came out of the parentheses: *he or she.* The two danced around the slash, as in *he/she* and *she/he.* And now the two have fused to form *s/he.* The problem with *s/he* is that the reader cannot pronounce it (I discuss phonology later in this article). In a jest that reveals the frustration of negotiating political correctness, some writers have recommended using the all-inclusive pronoun *s/h/it.*

Merriam-Webster (1993) says that using *their* instead of *his* or *her* is acceptable usage. Of course, speakers have always known that *their* is acceptable. Yet writers are often reluctant to follow the ways of ordinary speech. In some cases, however, the use of *their* is appropriate despite a prescriptive insistence on using a singular pronoun. In the sentence "Everyone returned to his/her seat," the term *his/her* should be *their,* not necessarily because *Merriam-Webster* permits it but because the sentence can be construed as grammatical even with the use of *their.*

Consider that a pronoun must match its antecedent in number and gender. As long as the number is plural, we have no problem; plural is what we have. The antecedent of the pronoun in this case is not *everyone* but *people.* Where is *people?* The same place where *you* hides in the sentence "Hand me the book." The sentence is elliptical. The complete sentence with all its parts—expressed and implied—is "Everyone [of the people] returned to their seats." The word *people* is the antecedent. Therefore, it takes a plural pronoun.

Other superstitions

Dangling modifiers I would like to start this catchall section on other rules of grammar with a fairly detailed examination of the proscription against beginning a sentence with a "dangling" modifier such as *hopefully.* Once again, the problem is an irreconcilable difference between prescriptive and organic grammars. Hopefully, you will agree that there is nothing wrong with the sentence that you are now reading. Somehow, as a reader, you have processed the word *hopefully* at the beginning of the sentence to create some sort of meaning. Yet many editors (most, I think) would claim that the word just dangles there. It does not modify anything, it does not contribute to the meaning of the sentence, and it therefore impedes the reading process.

Fishing, you will agree that something is wrong with the sentence that you are now reading. *Fishing* certainly dangles. It does not modify anything (unless you actually happen to be fishing while you are reading this), it does not contribute to the meaning of the sentence, and it therefore impedes the reading process. Yet even the most dyed-in-the-wool curmudgeons must agree that *hopefully* in the first example is more meaningful than *fishing* in the second example. So where does the sense come from? To answer that question, we have to look at what the reader brings to the text.

The reading process involves multiple people. There is the reader, of course, and then there is an explicit author, who can be a single person, a group of people, a corporation, the government, and so on. The explicit author is the entity responsible for recording the words that the reader reads. For example, Bradford R. Connatser is the explicit author of the article that you are now reading. His name appears on the first page of the article. However, you do not really know Brad. What you sense when you read this article is what Wayne Booth calls the implied author, "an ideal, literary, created version of the real man" (Booth 1983).

You have a sense of a human presence in the text, a "word giver" if you will. Therefore, the word *hopefully* at the beginning of a sentence does not dangle; it modifies the psychology of the implied author. A less elegant, more startling, and prescriptively correct way of rephrasing *hopefully* is, "I, the implied author, hope that . . . . " This linguistic proposition applies to some other danglers as well, such as *unfortunately* and *interestingly.*

The explicit author lives outside the text. Your reading of the text cannot alter the explicit author in any way. However, the implied author lives in the text, always present, always modifiable. Your idea of him or her changes as the text changes. You sense that the implied author is excited at the mere presence of an exclamation point or downright dejected when you read the word *unfortunately.*

Passive/active voice Proponents of using the active voice as a matter of habit claim that the passive voice

- Bores the reader
- Is wordy
- Reverses the natural order of sentence elements
- Is sneaky by concealing the agent

Both editors and readability formulas assume that active sentences are simply more effective and engaging than passive sentences. However, these assumptions are not based on science but misapplied logic or intuition. Research on passive versus active is difficult to find, and of the studies published in peer-reviewed publications, the results are contradictory or inconclusive. For example, Spyridakis and Isakson (1998a) point out four studies on the effect of passive voice on reader response—two showed that active voice did facilitate recall, and two showed that it did not.

Cautionary articles on the general proscription against the use of the passive voice are not as difficult to find. For example, Riggle (1998) calls for textbooks to treat the active and passive voice equally instead of treating the passive as an exception. Coleman (1997), in his article "In defense of the passive voice in legal writing," points out the danger of overemphasizing the use of the active voice:

> *Although no guidebook states the rule absolutely, i.e. "Never use the passive!", the exceptions provided to the general rule are often incomplete or weakly stated. Most readers quickly forget the "exception" but remember the rule, only to begin applying it indiscriminately. (p. 201)*

Cornelis (1995) proposes an "alternation principle" in writing computer manuals. Using this principle, the writer of a computer manual uses active voice to describe user actions ("press the enter key") but uses passive voice to describe computer actions ("the page is assigned the same header"). Cornelis cites the results of research in functional and cognitive linguistics to support her position.

Until reliable research into passive versus active voice shows a significant difference between the effects of the two, I propose that the proscription against the passive should be flouted when

- The object (receiver of the action) is actually the topic of the sentence
- The action is more important than the actor
- The actor is unknown
- The actor is insignificant
- The actor is known, but the repetition of the actor would distract the reader from the intended focus
- Using active voice creates a left-branching series that puts too much information between subject and verb (see Table 4 and Connatser 1994 for an explanation of left- and right-branching series)

Freedom to use both the passive and active voice enables you to repair real problems. For example, when an overwhelming amount of information comes between the subject and verb (and taxes short-term memory), recasting an active sentence as passive or vice versa can improve the sentence. Table 4 shows some examples of recasting a sentence by transforming the voice to improve readability. The problem-causing information is in italics.

The composition of a document involves not only grammar but also mechanics.

May/might As a reader, I do not distinguish between *may* and *might*. As an editor, I understand that other editors prefer to use *may* to convey only the idea of permission. *Might* should be used to convey possibility or probability. Then there is the dictionary, which defines the two in such a way that a reasonable person must conclude that the two words are interchangeable in most contexts. If the reader makes no distinction between the two, and a hefty dictionary supports this way of thinking, then why are we making the distinction? How does the reader benefit? As an editor, I have better contributions to make to a text than crossing out *may*s and inking in *might*s.

Not beginning a sentence with a coordinating conjunction The logic behind this prescription is that coordinating conjunctions join linguistic structures *within* sentences and not *between* them. But this logic contradicts organic grammar. For example, the previous sentence began with a coordinating conjunction, serving effectively as a transitional expression that joins two sentences. More than likely, you processed the sentence with no problem.

COMPOSITION

The composition of a document involves not only grammar but also mechanics. What is *mechanics?* It is a set of rules that govern the visual representation of spoken language, including ink on paper and the activation of light on a cathode ray tube or liquid crystal display. Spelling, punctuation, capitalization, leading, and word spacing are governed by mechanics. Unlike grammar, there is no "organic" mechanics. There are no capital letters in a spoken language. There are no spaces between words. There are no punctuation marks. However, some rules of mechanics can be correlated to speech. For example, a comma may indicate an inflection, a question mark may indicate a rise in pitch, and an italicized word may indicate a tone of incredulity.

Unlike speaking, reading and writing are not intuitive (Connatser 1997b). As Darwin said, "man has an instinctive tendency to speak, as we see in the babble of our young children; whilst no child has an instinctive tendency to brew, bake, or write" (1981, p. 55). Reading and writing are taught, not naturally acquired.

The way that we teach children to read should influence the way that we write (Connatser 1997a). As De Beaugrande says, "A theory of writing cannot be sensibly formulated without regard for theories of reading; what writers do depends on what they expect that their readers will do" (1982, p. 128). A serviceable style guide, then, includes rules of composition—rules related to both grammar and mechanics. And those rules should be, to the extent possible, based on the way readers read. Therefore, a brief discussion of the reading process seems in order.

As shown in Figure 5, reading is the process of (1) looking for words, (2) identifying words, and (3) synthesizing words to create meaning. The model shown in Figure 5 includes sensory memory to store visual images for a few seconds, a visual encoder, a parsing faculty, and short- and long-term memories. Also note an often-overlooked element of the reading process: the box labeled "Phonemic Encoder."

Remember that grammar is a system of syntactic, semantic, and phonological rules that govern the creation of *spoken*—and by extension, *written*—language. The following are example violations of each type of rule:

- **Ungrammatical syntax** "Ate animals the mice the." This is an example of improper word order; that is, the typical order for an English declarative sentence is subject–verb–object, and for a noun phrase it is modifier–noun.
- **Ungrammatical semantics** "The beds ate the mice." This is an example of improper meaning; that is, beds cannot eat.
- **Ungrammatical phonology** "The animalés ate the mice." This is an example of improper pronunciation; that is, English speakers do not pronounce the plural suffix of a noun ending in *l* /és/; they pronounce it /z/.

So how important is the third category, the phonological rules? When people read silently, they unconsciously translate what they read into a speech-like code that facilitates word identification and the creation of meaning. Known as "silent speech," this speech instinct is a powerful and unconscious force (see Connatser 1997a). It influences reading in many ways, including the following:

- Silent speech helps lexical access by transforming a surface phonemic representation (a printed word) into a deep phonemic code that speeds up word identification.
- Silent speech helps short-term memory keep meaningful units of information in an active state so that the information can be semantically integrated with other information from long-term memory.
- When silent speech is disrupted or suppressed, lexical access, the parser, and short-term memory are significantly impaired, decreasing comprehension.
- The more difficult the reading material, the more the reader uses silent speech to create meaning from text.

The parts of our brain that process language require that we read with our ears as well as with our eyes. After all, writing is a device for recording the sounds we make when we talk. More significant for technical writers and editors is that the activation of the speech apparatus increases as the difficulty of the text increases. Therefore, the ability to easily pronounce the words that we read in difficult texts—such as technical documents—plays a crucial role in understanding those words.

What follows are some dubious rules that should be reconsidered in light of our knowledge about the reading process. I group them here because they fall under the category of mechanics or are related to research on the reading process, both of which may seem out of place in the previous discussion of grammar.

Comma after introductory element

Consider the following rule: Use a comma after an introductory element only if it is needed. The part of this prescription that bothers me is "only if it is needed." The author is too close to the text to make such a call. Although it is common practice, omitting a comma after an introductory element can create confusion. The writer cannot recognize the need for a comma after an introductory element because he or she understands where the introductory element ends while crafting the sentence. The writer cannot see—or hear—that the element can sprawl into the rest of the sentence.

Here is an example of a sprawling introductory element: "As the input voltage continued to drop the output voltage finally reached near nominal." If this sentence were to come to us via speech, the speaker would indicate the end of the introductory element "As the input voltage continued to drop" by a falling pitch. As it is written, however, it sprawls into the rest of the sentence. The last word in the introductory element (*drop*) is often used as a transitive verb. Without a comma after *drop,* the reader may misread *the output voltage* as the object of the verb *drop* instead of the subject of *reached,* as I did when I first encountered the sentence. Omitting the comma created what linguists call a garden-path sentence, which denies the reader's predictions about how succeeding words function in a sentence.

Consider another example of how omitting the comma after an introductory element can create confusion for the reader: "In this case only the subject was able to understand the command." Because the writer omitted the comma, the sentence has an ambiguous meaning that cannot be resolved without help from the writer. Does the comma go after *case,* which renders one meaning, or after

End-of-line hyphenation is bound by phonics because words are broken at syllabic junctures.

only, which renders another? Does *only* modify *in this case* or *the subject?* In this case, only the writer knows.

Hyphenation

Hyphenation is a thorn in the collective side of technical communicators. To hyphenate or not to hyphenate? That is a question that writers and editors must frequently confront, often with dubious results. Ubiquitous in technical documents, the noun string (also called a *portmanteau*) poses a difficulty for the average editor. Hyphenating unit modifiers in noun strings is one way to clarify what modifies what. Most people who write on the job (such as engineers) do not even address hyphenation, assuming that readers will correctly figure out the relationships between words in a string. However, when the reader *starts* trying to figure things out, he or she *stops* reading. Further, without hyphens to guide the reader to the correct interpretation of a noun string, consecutive nouns and adjectives can crash into each other and cause confusion.

Again, here is an example to illustrate the effectiveness of hyphenating unit modifiers: "The man eating fish was caught just offshore." Here, the omission of the hyphen between *man* and *eating* creates an ambiguity. Did the man who was eating fish get caught? Or did a fish that eats men get caught? Hyphenation removes all ambiguity by properly indicating the stresses of each syllable. The resulting tonal information leads the reader to the correct meaning: "mán-eating fish," not "mán eáting fish." In the same vein, a "dry cleáning agent" is Ajax, whereas a "dry-cleaning agent" is benzine. "Small búsiness woman" is a derogatory term, whereas "small-business woman" is a respectful one. "American hístory teacher" is a teacher of history who is an American, whereas "American-history teacher" is a teacher of American history. Notice that in all of the above comparisons, the unhyphenated modifiers have slightly different stress contours than the hyphenated ones.

Hyphens are also used to break words at the end of a line. End-of-line hyphenation is bound by phonics because words are broken at syllabic junctures. Sometimes, there is not enough information in the first part of a broken word to identify the whole word. If a word is broken at the first syllable and that first syllable is identical to the first syllable of other words, the reader has to guess, relying only on semantic and syntactic predictions to hedge his or her bet. Consider the following example:

> *Some feel that the features of the president's healthcare plan are a recipe for disaster.*

The *c* in *recipe* can be pronounced soft, as in *recipe,* or hard, as in *recommended*. The ambiguity can be easily repaired by breaking the word between the *i* and the *p* (dictionaries propose that the word can be broken after the *c* or the *i*). We instinctively know that if an *i* follows a *c*, the *c* is pronounced softly. Furthermore, the additional letter narrows our choices considerably. Although not at all common, I have noticed this end-of-line-hyphenation problem more with double-spaced manuscripts and manuscripts produced using word processors with automatic hyphenation.

Also, joining a prefix to a word without hyphenation can cause confusion, even though the union may be considered correct. The addition of an unhyphenated prefix can create a familiar spelling pattern that tricks the reader into incorrectly pronouncing the word, resulting in a break from the reading process while the reader tries to figure out the word. For example, consider the addition of the prefix *re* to the word *arrange*. Without a hyphen, we get the word *rearrange,* which your word processor will not flag as incorrect. However, because this is an infrequently occurring word, the reader may not recognize it at one glance (called a *fixation* in reading-research jargon). To assimilate the word, the reader will look for a familiar spelling pattern and find one: *rear*. But identifying *rear* as an element of the word instead of recognizing the boundary between the prefix and the word proper, the reader is led up the garden path. The word *rearrange* is more helpfully written as *re-arrange*.

Finally, the hyphen is often used in a way that inhibits silent speech. For example, in the following sentence, the hyphen conceals the relationship between the two words it joins: "Lowering line-pole grounding resistance made a real improvement." When we read this sentence, we say "line pole" instead of "line to pole" as the writer intended. A writer may intend for a hyphen to equal *to*, but the latent word *to* is not translated into the speech code. Therefore, the reader does not make the logical connection between the two words. The same can be said about hyphens used to indicate a range, such as "20% to 30%" (more precisely, an en dash is used to represent range rather than a hyphen). To enable the reader's silent speech, write "line-to-pole" and "20% to 30%."

Sentence length

Keep sentences short, many style guides say. In my experience, the problem with long sentences is not that they are too long but that they are too complex. A long sentence need not be *too* complex. According to Pinker, as "long as the words in a sentence can be immediately grouped into com-

plete phrases, the sentence can be quite complex but still understandable" (1994, p. 203). For example, "The house that Jack built," a well-known nursery rhyme, concludes with a 71-word sentence with 13 relative clauses (O'Connor 1950).

Readability formulas also make the same faulty correlation between sentence length and reading difficulty (Connatser 1999b). Although "The house that Jack built" would rate a bad readability score by most readability formulas, it nevertheless remains in the canon of preschool treasures.

Period at the end of a bulleted or numbered list

Using a period at the end of a bulleted or numbered list is often based on whether the list items are complete sentences. But consider this scenario. You have two lists separated by a single sentence. In the first list, the items form complete sentences. Therefore, you terminate all the items in the list with periods. In the second list, none of the items form a complete sentence. Therefore, you do not use periods. A reader, noticing this obvious difference but not knowing the rule behind it, may consider it sloppy writing, casting doubt on the authority of the author. You have now evoked a counterproductive rhetorical role: the error detector. Periods are used for things besides terminal punctuation: decimals and ellipses, for example. Therefore, consider using a period at the end of a list item not as terminal punctuation for a sentence but as terminal punctuation for an item.

Location of adverbs

Put adverbs where they go naturally in speech. Yes, English speakers split infinitives. English speakers also intuitively place adverbs between a verb and its auxiliary. We would not say, "A loop antenna also was used." We would say, "A loop antenna was also used." Yet, many technical writers and editors insist on unifying a verb and its auxiliary at the expense of satisfying the reader's speech instinct.

CONCLUSION

Making good prose requires more than following the traditional rules of English composition. Those who contribute to the construction of widely used grammars and style guides should consider research into the reading process as they revise and update their products. Additionally, I believe that writers and editors should be more discriminating when they apply the content of such products. Tip O'Neill's admonition that "all politics is local" applies to technical communication as well. All writing is local, done for a specific subject, purpose, and audience. As revered editor Don Bush says, "good editors carry in their heads a style manual for each type of reader" (1998, p. 54). Perhaps the lynchpin of good writing and editing is a willingness to localize—or bend, if you will—the rules of a language to produce the most readable texts. T**C**

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