

1 **Article type:** Essay

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3 **Simple rules for concise scientific writing**

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5 Scott Hotaling<sup>1,#</sup>

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7 **Affiliation:**

8 <sup>1</sup> School of Biological Sciences, Washington State University, Pullman, WA, USA

9 # ASLO Raelyn Cole Editorial Fellow

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11 **Correspondence:** Scott Hotaling, School of Biological Sciences, Washington State University,  
12 Pullman, WA, USA; Email: [scott.hotaling@wsu.edu](mailto:scott.hotaling@wsu.edu); Phone: (828) 507-9950

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14 **Author contributions:** S.H. wrote the essay.

15

16 **Scientific significance statement:** One of the most common editorial refrains, regardless of  
17 discipline, is “this needs to be *tighter*.” It typically means too many words and ideas are jumbled  
18 together and the underlying point is obscure. The writing isn’t *concise*. But, improving  
19 conciseness is difficult because the problem is caused by a host of factors that are easily  
20 overlooked, especially by early career researchers. Here, I describe what it means to write  
21 concisely and outline 10 rules, with examples, to help scientists tighten their prose.

22

23 **Data availability statement:** There are no data associated with this essay.

24

25 **Keywords:** writing advice, publishing, manuscript preparation, professional development, early  
26 career researcher advice

27

28 **Running head:** Rules for concise scientific writing

29 “I am writing a longer letter than usual because there is not enough time to write a short one.”

30 Blaise Pascal, *Lettres Provinciales* (ca. 1657)

31

32 **Introduction:**

33 For many scientists, writing clear and concise manuscripts is a major hurdle to professional  
34 success. This overarching challenge can be split into two issues: writing initial drafts and  
35 effective revision. Both require considerable investments of time and energy; yet, even with  
36 endless supplies of both, making it to the “end” can be difficult, because the “end” is undefined.  
37 It’s a “you know it when you see it” point that requires considerable experience to identify.  
38 Getting to that endpoint – a clear and concise finished work – is often particularly difficult for  
39 early career researchers.

40

41 This essay’s motivation stems from a common editorial refrain: “this needs to be *tighter*.” I have  
42 given and received this advice dozens of times. I can also attest to how vague it can feel when  
43 received, and how desirable specific steps to remedy the issue would be. Ultimately, your  
44 reader is telling you to be more *concise*. They want you to give the same information in fewer  
45 words. By spending the necessary time to craft your manuscript with conciseness in mind, you  
46 will build goodwill with your audience. However, before getting to the rules below, a note of  
47 caution: it’s important not to take your pursuit of conciseness too far. It is easy to condense into  
48 unclarity. By cutting too many words and losing key information, you will create one problem  
49 while fixing another. The key is to tighten your writing while keeping the core ideas intact.

50

51 Below, I provide a practical guide to writing more concise scientific manuscripts structured as 10  
52 rules that range from big picture, philosophical ideas to specific, practical concepts. Like any  
53 good rule, most can be broken under the right circumstances, so I encourage the reader to treat  
54 them more as guidelines than laws. However, I have book-ended the essay with two rules that

55 should not be broken. To succeed in writing concisely you must take writing seriously (Rule 1)  
56 and embrace feedback (Rule 10). Finally, I must acknowledge the inherent irony that the  
57 published version of this essay will represent. Like every bit of writing that has or ever will be  
58 drafted, this essay could be more concise. This is unavoidable. Writing concisely is not a binary  
59 of success or failure. Rather, it is a question of degree. You should strive to do it well while  
60 recognizing that you must eventually stop somewhere.

61

## 62 **Rules for concise scientific writing**

### 63 Rule 1. Take writing seriously.

64 Conciseness alone does not ensure good scientific writing. However, good science writing that  
65 isn't concise is rare (or non-existent), so pursuing conciseness as part of a larger strategy to  
66 write effectively is worthwhile. In his guide to scientific writing, Joshua Schimel makes a key  
67 point for scientists: "you are a professional writer" (Schimel 2012). Thus, you must take your  
68 writing seriously. For me, this means writing almost every day, learning as much as I can about  
69 the process by talking with and reading writers I admire, and actively seeking feedback on my  
70 work. While much has been written about increasing writing productivity and effectiveness (e.g.,  
71 Filstrup 2019; Strunk et al. 2007; Schimel et al. 2012; Hotaling et al. 2018), less attention has  
72 been devoted to advising writers on issues of clarity and conciseness (but see Gopen & Swan  
73 1990, Williams & Bizup 2016). From emails to manuscripts, the ability to make points clearly  
74 and efficiently is perhaps the most important writing skill you can develop. However, if you think  
75 you'll always nail it on the first attempt, you'll be mistaken. Before you can write well, you must  
76 get comfortable receiving feedback and revising your work (see Rule 10). Great writing blooms  
77 from great revision, and great revision starts with listening to feedback. But it all begins and  
78 ends with putting time and effort into your writing.

79

### 80 Rule 2. Identify and stick to your message.

81 As early in the writing process as possible, you should identify your message. What is your  
82 paper's goal? Can you summarize the key points in a few sentences? I often add summary  
83 sentences to the top of my working document so I see them often. Others like to write the  
84 Abstract before anything else. Regardless, once your guide is set, every paragraph and  
85 sentence should flow from that overarching roadmap. In other words, you must *stick* to your  
86 message. Many scientists find success laying out manuscripts with the ABT (And, But,  
87 Therefore) method where main points are linked with an "and", conflict or *why this matters* is  
88 introduced with a "but", and things are tied together with a "therefore" (Olson 2015). The ABT  
89 template is well-suited to drafting the summary sentence(s) described above.

90

91 For Introductions and Discussions, I take my approach a step further. I write each paragraph's  
92 focal point in a sentence or less above it and I draft the paragraph with this goal in mind. This  
93 process keeps my thoughts on track and limits the inevitable text expansion that comes with  
94 directionless writing. Later, when revising, I ask modified versions of my earlier question for  
95 each section, paragraph, sentence, and word: does it advance the story? Is it adding value? If  
96 the answer(s) are anything other than yes, I either edit to be clearer or remove the offending text  
97 altogether. As Kurt Vonnegut put it, I try to "have the guts to cut" (Vonnegut 1980).

98

99 It's also important that your manuscripts and even individual sentences not read like mysteries.  
100 Your reader is experiencing your thoughts for the first time. They can't predict where you are  
101 going. And, even if they can, making them try distracts them from their most important job:  
102 reading and considering what you wrote. Give the reader an early roadmap so everything you  
103 lay out fits the picture they already have in mind from your setup. By connecting each part of  
104 your paper to a larger, overarching message, you will build one of the world's most powerful  
105 communication tools: *narrative*.

106

107 Rule 3. Get to the point.

108 You and your audience have a mutual goal: transferring information as efficiently as possible.  
109 Long-winded setups, extra details, and irrelevant tangents undermine that goal. At best, they  
110 waste the reader's time. At worst, they confuse or cause them to stop reading. As you write, a  
111 little voice in your head should be reminding you to get to your point as efficiently as possible for  
112 everyone's sake.

113

114 Rule 4. Keep your Methods and Results contained.

115 Text that should be in the Methods and Results has a way of creeping into other parts of a  
116 paper. At times, this is alright; you may want to contextualize what you are setting up or  
117 discussing. But, too often, early drafts (and often published papers!) will re-hash these details  
118 where they don't belong. You should read and re-read your manuscripts with an eye towards  
119 moving anything better suited to the Methods or Results to those sections. If you find the  
120 information is already there, it's time to delete it. Similarly, there is also no need to rehash a  
121 study's broader goals in the Methods or Results; manuscript framing belongs elsewhere. One  
122 note of caution: this rule assumes a standard Introduction, Methods, Results, and Discussion  
123 structure. Some journals include the Results before the Methods. If this is the case, you will  
124 likely need to give some methodological context to each result as you go. That's okay.

125

126 Rule 5. Don't repeat yourself (too often).

127 Redundancy is the bane of conciseness and repetitive papers come across as lazy. Of course,  
128 there are places (e.g., Conclusions) where reiteration can guide the reader to a bigger  
129 message. But in general, once you state something, it only needs to be repeated to add key  
130 information (e.g., differentiating between two approaches when describing results). It is also  
131 unnecessary to repeat content in figures and tables elsewhere in the manuscript. For example,  
132 if you provided an overview of the study area in Figure 1, there is no need to spend precious

133 text describing where your study sites are in relation to each other. The same is true for tables.  
134 Once information is in a table, you should only refer to specific details (e.g., a study group and  
135 statistical value) in the text before referencing your table.

136

137 Rule 6. Avoid unnecessary or inefficient “lead-ins.”

138 When writing a scientific article, unnecessary “lead-ins” undermine brevity. If you’re unclear  
139 what I mean by an unnecessary “lead-in,” re-read the first sentence of this section. Do I need  
140 “when writing a scientific article” to set up the sentence? I don’t. The sentence should begin with  
141 “unnecessary” and with that simple edit, its length drops from nine to four words. Similar  
142 pointless setups are pervasive and over an entire manuscript – perhaps totaling 8,000 words –  
143 their net effect can be hundreds, even thousands, of extra words. By learning to recognize and  
144 avoid them, you will tighten your writing and make your readers happier (see examples in Box  
145 1).

146

147 Rule 7. Use first-person, active voice.

148 First-person, active voice is generally tighter and, in my view, more interesting as it allows the  
149 writer to describe the actions they performed from their perspective. *We collected the data this*  
150 *way. I argue this point. Our finding is interesting for this reason.* First-person, active voice puts  
151 key subjects and actions at the beginning of the sentence which helps you get to the point  
152 quickly and avoid inefficient sentences (see Box 1). It should be noted, however, that situations  
153 may arise that require passive voice. For instance, if the author(s) did not collect the data being  
154 referred to, then referencing its collection passively (i.e., “Samples were collected...”) is  
155 appropriate.

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157 Rule 8. Remove unnecessary words.

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*"The road to hell is paved with adverbs."*

Stephen King, *On Writing: A Memoir of the Craft* (2000)

Two types of "filler" sneak into sentences: extra words or phrases that can be removed with no effect on the message and phrases that can be tightened from several words to one or two. Sentence filler generally consists of three features being overused: (1) qualifiers, (2) prepositional phrases, and (3) transitions. However, they are not mutually exclusive and often co-occur.

(1) Qualifiers are usually adverbs that modify or enhance other words in a sentence (e.g., quickly, extremely, frequently). They often add nothing and can be removed. (2) Extraneous prepositional phrases (e.g., in this case, among other writers, on the other hand, for the most part) or similar multi-word setups can make sentences feel jumbled and unclear. While it may be hard to cut a phrase entirely, look to replace multi-word phrases with single words. Switching from passive to active voice (see Rule 7) can also help reduce overuse of prepositional phrases. (3) Transitions – those words that link one sentence to the next (e.g., however, meanwhile, thus) – can be important, but odds are you include more than you need. Work to remove extraneous transitions and, if possible, link sentences together. See Box 2 for examples of common filler.

Rule 9. Simplify your language.

*"Use the smallest word that does the job."*

E.B. White

184 You don't need complicated words and clever phrasing to write well. They take up space, waste  
185 time, and may cause your reader to misinterpret your message. Stephen King cautions against  
186 being so taken with a certain word or phrase that you stick with it despite issues (King 2000). As  
187 you revise to reduce your word count, you should also try to reduce your manuscript's syllable  
188 count by using shorter words wherever possible (e.g., replacing "utilize" with "use"; see Box 3  
189 for common examples).

190

191 Rule 10. Seek and embrace feedback.

192

193 *"I believe more in the scissors than I do in the pencil."*

194 Truman Capote

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196 Diagnosing editorial issues in your own writing is difficult which makes good feedback as  
197 important as the writing itself. From the perspective of conciseness, for instance, it is hard to  
198 see alternative, tighter ways to phrase something, to notice when you are repeating yourself, or  
199 to identify places where your narrative has strayed from the overarching goal. While all editorial  
200 feedback will not be focused on conciseness, plenty will. You can also direct those giving you  
201 feedback to focus on certain components of your manuscript. If I'm working under a word limit, I  
202 will remind readers that the paper needs to be a specific length and to please look for areas  
203 where it can be condensed, whether through rephrasing or removing entire portions.

204

205 Helpful editorial input won't happen magically, however, even with the right co-author, peer, or  
206 supervisor. It starts with you – the writer – and the feedback environment you construct. Are you  
207 overconfident and quick to ignore people's input? Do you take feedback seriously? Are you kind  
208 to those giving you feedback (especially those that are well-intentioned but critical)? While

209 difficult to hear, having a friend or reviewer let you know when something isn't ready for  
210 publication due to major flaws will save you considerable trouble in the long run.

211

212 To get the most out of the feedback process, I have three recommendations. First, take the  
213 plunge and send your work to people who you can trust to be critical when warranted. While a  
214 pat on the back or "Looks great!" message may feel good in the short-term, a lack of critical  
215 feedback before submission or publication is a recipe for disaster. Second, take feedback  
216 graciously. You are asking someone to do something difficult – to spend their time reading your  
217 work and telling you how they think it could be improved. This is no small feat. People are busy  
218 and don't want to hurt your feelings, especially when you are their peer or mentee. Third, take  
219 feedback seriously. Many writers, and particularly those early in their career, cannot properly  
220 assess their own writing and tend to be overconfident. Or, they are at least unaware of the effort  
221 required to produce high-quality work. So, it's important to be humble when taking criticism.  
222 Disagreements about wording or style are common. They are what make writing more art than  
223 science. But, to dismiss someone's feedback outright, or to assume you know best, undermines  
224 the process, weakens your writing, and wastes everyone's time.

225

226 For many, the idea of being *overconfident* in their writing ability is unimaginable. If you're in that  
227 group, you likely experience a lot of anxiety about writing, especially when it comes to receiving  
228 feedback. If that's true, remember that the feedback you receive only applies to your writing. It  
229 has nothing to do with you as a person. It may help you to remember the bigger message your  
230 critics are giving you when they provide feedback; they believe in you and your writing enough  
231 to spend their limited time helping you improve. If they thought you couldn't do it, they wouldn't  
232 waste their time.

233

234 However, if you lack confidence, be careful not to blindly accept comments or edits as absolute  
235 truth. Consider each one carefully, ask for clarification when needed, and trust your own  
236 intuition when you aren't sure about something. If a problem is noted, your critic is likely correct  
237 that something is amiss where they specified. However, they may not necessarily be right about  
238 how to fix it.

239

240 **Conclusion:**

241 In this essay, I described 10 rules for concise scientific writing (summarized in Box 4). This list is  
242 neither exhaustive nor absolute. Rather, it stems from my own experiences in academia and the  
243 feedback I've given or received on everything from emails to manuscripts. No matter where your  
244 career takes you, being able to write clear, concise prose will serve you well.

245

246 **Acknowledgements:**

247 I thank Jim Cloern, Dave Crowder, Lynn Hotaling, Enrique Kratzer, Kerry McGowan, Kelsey  
248 Poulson-Ellestad, Patricia Soranno, and three anonymous reviewers for comments that  
249 improved this essay. I would also like to acknowledge many co-authors, reviewers, and  
250 mentors, particularly Deb Finn, Joanna Kelley, and David Weisrock, for emphasizing the power  
251 of brevity and helping me improve my writing throughout my career. In addition to the ASLO  
252 Raelyn Cole Editorial Fellowship, this work was supported by NSF award #OPP-1906015.

253

254 **Conflict of interest:** The author has no conflicts of interest.

255

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