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**How to write clear, concise (and more enjoyable to read) scientific academic articles**

MAY 14, 2015 BY [KIM PAWLAK](http://blog.taaonline.net/author/kim-pawlak/) [0 COMMENTS](http://blog.taaonline.net/2015/05/how-to-write-clear-concise-and-more-enjoyable-to-read-scientific-academic-articles/#disqus_thread)

Academics are often trained to write in a way that actually runs directly contrary to the principles of effective scientific writing, said Kristin Sainani, an associate professor at Stanford University, who has taught a popular open online course on writing in the sciences.

“What we need to do in science and academia is to convey our ideas in a clear, concise, and even enjoyable way,” she said, during her TAA webinar, [“Principles of Effective Scientific Writing”](http://www.taaonline.net/principles-of-effective-scientific-writing). “Even if we are talking about complex ideas, we don’t need to use complex language. I think a lot of times when academics sit down to write we don’t really have in the back of our minds, ‘oh, I want to make it enjoyable for the reader’. But we should think about that because we do want people to read what we write, and if it’s very hard to get through and not enjoyable, people aren’t going to read it.”

She said that to some extent in academia, the goal becomes publication instead of having somebody read, understand and use your work, which will only slow down the progress of science: “We want to get away from just writing for publication. We want to get to where people want to read it.”

Sainani shares three principles of effective scientific writing:

**1. Cut all unnecessary words and phrases that are weighing down your words. All they do is slow down the reader.**

Here’s an example of a piece of writing containing unnecessary words:

*“This paper provides a review of the basic tenets of cancer biology study design, using as examples studies that illustrate the methodologic challenges or that demonstrate successful solutions to the difficulties inherent in biological research.”*

“Step back for a minute and think what is the main idea of this sentence,” she said. “Basically that this paper reviews cancer biology study design. There’s not a lot to this sentence, yet there are a lot of words dedicated to getting across this really simply idea.”

Going through it piece-by-piece, word-by-word, this is what should be cut, she said:

*“This paper provides a review of…”*Why cut? Review has been turned into a noun and paired with the boring verb “provides”. It’s much cleaner to say “This paper reviews…”.

*“…the basic tenets of cancer biology study design.”* Why cut? “Basic tenets” doesn’t help clarify what the authors are talking about, and it’s too vague.

*“…using as examples studies that illustrate the methodologic challenges or that demonstrate successful solutions to the difficulties inherent in biological research.”* Why cut? Read that line out loud. It’s a little awkward. You don’t need both “examples” and “studies” because they mean the same thing. “Methodologic” is an empty word and doesn’t add much because it’s vague. You don’t need “illustrate” and “demonstrate”. “Illustrate” can go right through — it can illustrate the challenges and solutions so we can just get rid of demonstrate. “Successful” should also be removed because you really can’t have a solution that’s not successful, so successful is redundant. “Difficulty” can be removed because it is a repetition of “challenges”, and since the reader already knows we’re talking about biological research, that doesn’t need to be repeated.

“Once we get rid of all that extra garbage that’s slowing down the reader, we get the point across much more efficiently,” said Sainani.

Thus, the sentence, stripped down to its cleanest components, she says, reads:

*“This paper reviews cancer biology study design using examples that illustrate specific challenges and solutions.”*

“Spending the time in revision to take out all that extra clutter is what will make your writing really stand out,” she says.

**2. Use the active voice by writing with subject-verb-object.**

“Journals actively encourage you to use the active voice because it is so much easier to read,” says Sainani. “Active voice follows subject-verb-object. The passive voice inverts that: object-verb-subject, and sometimes the subject gets taken out.”

A classic example of passive voice is the sentence “Mistakes were made.” Notice that there is no subject in that sentence — we don’t know who made the mistakes. One of the uses of passive voice is to take out any responsibility.

Here’s how to recognize the passive verb, she says: Look for the form of the verb “to be” (“is”, “are”, “was”, “be”, “did”, and “am”. It will always be paired with the past tense of the main verb, and the main verb has to be a verb that takes an object — we call it a transitive verb. Here’s a sentence in the passive voice: “Cigarette ads were designed to appeal especially to children.” Notice that there is no responsible party; they just kind of got designed that way. Contrast that with the active voice: “We designed cigarette ads to appeal especially to children.” When you put things in the active voice you then identify a responsible party.

**3. Write with strong verbs. Don’t turn those verbs into nouns and don’t bury the main verb.**

**Do a verb check:** go through and underline all of the verbs in your first couple of paragraphs, looking for too many “to be” verbs — “is”, “are”, “was”, “were”, “be”, “do”, and “am”. You want to write with verbs, but you want to use strong ones. Avoid turning verbs into nouns or burying the main verb. Don’t put the main verb really far into the main sentence. “Readers are waiting for the verb, and they don’t really know where you’re going until  you get to the verb, so you want to put the main verb as close as possible to the beginning of the sentence,” she says.

Verbs make sentences go. They’re important. So compare. Here’s a before and after example:

Before:

*“Loud music exploded from speakers embedded in the walls and the entire arena shook as the hungry crowd leaped to its feet.”*

After, with the verbs changed:

*“The loud music came from speakers embedded in the walls, and the entire arena moved as the hungry crowd got to its feet.”*

“You can see here that the original really jumps out at you because of those great verbs, whereas the changes I made to put in meek verbs really made it a lot weaker,” she says. “Verbs are so important in the sentence that just changing the verbs really changes the feel of that sentence.”

**Don’t kill verbs by turning them into nouns.**This is a typical academic habit, she says. For example:

*“During DNA damage, recognition of Protein 1 by Protein 2 results in recruitment of Protein 3 and repression of cell proliferation genes.”*

The nouns “recognition”, “recruitment”, and “repression”, all could have been verbs “recognize”, “recruit”, and “repress”. Because they have been turned into nouns, it’s hard to figure out what’s going on.

By turning those nouns back into verbs, the sentence is easier to read:

*“During DNA damage Protein 1 recruits Protein 2 and Protein 3, which together repress cell proliferation genes.”*

“It forces you to say exactly who does what to whom; another good reason to use verbs because it will be more clear to your reader because you’re being more specific,” she says.

**Don’t bury the main verb too far into the sentence.**You want to keep the subject of the sentence and the main verb, or predicate, close together at the start of the sentence because readers are waiting for that verb. For example:

*“One study of 930 adults with multiple sclerosis receiving care in one of two managed care settings or in a fee-for-service setting found that only two-thirds of those needing to contact a neurologist for an MS-related problem in the prior six months had done so.”*

Notice where the main verb is in the sentence (“found”). The subject of the sentence is actually the study, and we get a lot of details about the study describing it, and don’t get to the main verb until “found”. So it’s the study that found this finding about how many needing to contact a neurologist had done so.

“So ‘found’ is the predicate, ‘the study’ is the subject, but we’ve got all this garbage in between that’s really hindering the reader from knowing where you’re going,” she says.

Sainani moved the verb ‘to be’ right up next to the subject, and this was the result:

*“One study found that of 930 adults with multiple sclerosis receiving care in one of two managed care settings or in a fee-for-service setting, only two-thirds of those needing to contact a neurologist for an MS-related problem in the prior six months had done so.”*

“Moving that verb up and sticking all the extra information in between commas so your reader knows you’re pausing to throw in some extra information, the reader’s fine with that,” she says.

Want more instruction on the principles of effective scientific writing? Kristin Sainani teaches an Open edX course called “Writing in the Sciences.” [Learn more](https://lagunita.stanford.edu/courses/Medicine/Sci-Write/Fall2014/about" \t "_blank)

For a more detailed look into her three principles of effective scientific writing, with many more examples, watch her TAA presentation, “Principles of Effective Scientific Writing”, on demand [here](http://www.taaonline.net/principles-of-effective-scientific-writing" \t "_blank).