

Lecture 9

Words, Style, and Energizing Writing

Chao Song

College of Ecology
Lanzhou University

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Active vs. passive voice

Active voice is clear, concise, and direct. It is also visual and evocative. The actor and action are both clear.

Passive voice shows the acted-on and often weakens the story structure of a sentence.

Because passive voice is weaker storytelling than the active, most writing textbooks recommend using active voice as much as possible.

Active vs. passive voice

Active voice is usually more visual and engaging. Contrasting the following two pieces of writing.

For well over a half century, gross primary production (GPP) and ecosystem respiration (ER) have been estimated from whole stream dissolved oxygen (DO) measurements. The method was originally developed by Odum and was based on the fact that, after accounting for air–water exchange, DO changes at night are solely due to ER and DO changes during the day reflect the difference between DO inputs from GPP and DO consumption via ER.

For well over half a century, stream ecologists have been measuring gross primary production (GPP) and ecosystem respiration (ER) from whole stream dissolved oxygen (DO) measurements. Odum first proposed using diel changes in DO concentration to parse the autotrophic and heterotrophic components of stream metabolism. He realized that, after accounting for air–water exchange, DO changes at night are solely due to ER and DO changes during the day reflect the difference between DO inputs from GPP and DO consumption via ER.

Active vs. passive voice

Passive voice can be useful for several purposes. It can be used to control perspective or shift topic of the sentence. This is useful for creating flow.

Salvage logging is an increasingly common way of harvesting forests that have been attacked by insect pests. In salvage logging, **trees that have been attacked are selectively harvested**. The dead trees that are harvested, however, can provide cavities that are nesting sites for birds. The population biology of cavity-nesting birds is therefore likely affected by salvage logging.

Passive voice is useful when we do not need to show the actor.

When expression of *Chla* and *Chlb* were compared, similar patterns of transcript abundance were observed in plants at different developmental stages.

Fuzzy verb

Fuzzy verbs say that something happened but not what. Action verbs show you what. Action verbs make the writing clear and concrete. Avoid fuzzy verbs in scientific writing as much as possible.

Compare the two sentences below. The fuzzy verb is too vague while the action verb shows the content concretely.

× herbivores facilitate the invasion of exotic grasses by mediating competition between exotic and native plants

✓ Herbivores preferentially eat native plants, giving exotic grasses a competitive advantage that allows them to invade.

Fuzzy verb

Avoid fuzzy verbs in hypotheses as they are usually too vague to be testable.

× Microbial community composition is controlled by the chemical nature of plant inputs, water availability, and soil chemistry.

✓ Chemical nature of plant inputs is the single strongest control on the composition of soil microbial community composition and on their distribution across the landscape.

Common fuzzy verbs and action verbs

Fuzzy verbs

| | | | |
|--------|------------|---------|-----------|
| Occur | Facilitate | Conduct | Implement |
| Affect | Perform | | |

Action verbs

| | | | |
|------------|----------|---------|------------|
| Modify | Increase | React | Accelerate |
| Accomplish | Decrease | Inhibit | Migrate |
| Create | Invade | Disrupt | |

Nominalization

The process of turning a verb into a noun is known as creating a nominalization. Using a noun rather than a verb to describe action gains length but contains no more information.

- × We conducted an investigation on plant growth rates.
- ✓ We investigated plant growth rates.

Nominalization may push the action out of a critical position in the sentence.

- × Although models exist to calculate reaction rates as a function of molecular size, a failure to reproduce the experimental data is often observed
- ✓ Although models exist to calculate reaction rates as a function of molecular size, they often fail to reproduce the experimental data.

Nominalization

Adjective nominalization occurs when we convert an adjective into a noun. Nominalizing adjectives steals color and energy from writing and leave it heavy and flat.

× The characteristics of this condition are the oxidation of membrane lipids, the denaturation of proteins, and a reduction in growth rates.

✓ This condition is characterized by oxidized membrane lipids, denatured proteins, and reduced growth rates.

Jargon

Jargon: a term that refers to a schema the readers do not hold. A term for which there is an adequate plain language equivalent.

Technical term: a schema the readers hold. A term for which either there is no plain language equivalent or where using it would be confusing.

The distinction between jargon and technical terms is fluid and depends on the readers' knowledge. **Use technical terms, avoid jargon.**

Jargon

How and where you introduce a term may determine whether readers react to it as a jargon or not:

- Beginning of the sentence: you assume that every reader knows the term. You run the risk of it appearing to be jargon.
- End of the sentence: you define a new term for everyone. You run the risk of appearing ignorant it is a well-known concept.
- Middle of the sentence: you assume most reader know the term. You also indicate that the term itself is not critical to the story. You run the risk of people missing the term.

Jargon

There is no single perfect place to introduce terms. You have to evaluate your audience and what they know. If you err, err on the side of over-defining.

Embedding potential jargon in a parenthetical clause is an effective approach to dealing with jargon.

This idea that excited states relax with rates determined by the solute–solvent system’s ordinary energy fluctuations, **commonly called linear response theory**, is a critical component in the success of transition–state theories of chemical reaction rates in liquids. (Moskun et al 2006, Science)

Programmed cell death, **or apoptosis**, is prominent in neural progenitors and appears to play an important role in the development of cerebral cortex. (Pulvers and Huttner 2009, Development)

Acronyms and abbreviations

Undefined abbreviations and acronyms is a form of jargon. Acronyms is convenient to write, but we should make sure to spell out the acronyms the first time we use them. Avoid using an abbreviation not defined in the paper.

We estimated gross primary productivity (GPP) and ecosystem respiration (ER) in 15 streams. The GPP and ER were estimated from the time series data of dissolved oxygen (DO) concentration, water temperature, and photosynthetically active radiation.

Acronyms and abbreviations

While abbreviations are convenient to use, avoid using too many of them.

We compared soil respiration (R_s) using short-term collar and long-term collar deployment. To explore the causes for the differences in R_s between treatments, we quantified field soil temperature (T), soil moisture (M), bulk density (BD), root biomass (RB) and microbial biomass (MBC).

When using abbreviations, use an acronym that makes intuitive sense and is easy to understand.

- × We selected one deciduous (LYL) and one coniferous (ZYL) forest.
- ✓ We selected one deciduous (DEC) and one coniferous (CON) forest.

Prepositional phrases vs. compound nouns

Prepositional phrase is made up of an object and a modifier tied together with a preposition, e.g., effects of precipitation.

Compound noun is when one noun directly modifies another.

They express the same meaning. But prepositional phrase is often longer and chunkier than compound nouns. Thus, compound nouns are usually preferred.

Compare the following two sentences. Using compound nouns makes the sentence a little shorter and tighter.

- × The rate of the reaction increased sixfold when pH was decreased to 4
- ✓ The reaction rate increased sixfold when pH was decreased to 4.

Prepositional phrases vs. compound nouns

Use prepositional phrase when compound nouns are too long. If there are two words, a compound noun is usually better. If there are four or more words, use prepositional phrase. If there are three, it depends on the complexity of the words.

× Current theory suggests that **microbial community composition effects** are most likely to be observed for physiologically narrow processes.

✓ Current theory suggests that **the effects of microbial community composition** are most likely to be observed for physiologically narrow processes.

Prepositional phrases vs. compound nouns

Another situation when prepositional phrases are preferred is when you need to control which word land in a sentence's stress position.

Consider the following two sentences. The first sentence puts the strong phrase global warming into the stress position, and is probably preferable.

× Ecosystem can be managed to limit the global warming effects.

✓ Ecosystem can be managed to limit the effects of global warming.

Condensing

Scientific writing should be tight and concise. When your ideas are buried in words, cumbersome sentences, and extraneous information, readers get confused and frustrated, leading to extra rounds of revision or outright rejection.

Brevity comes from **selection**, not compression.

Prune the big limbs, then shake out the dead leaves:

- First figure out what you do not need to say, then don't say it;
- Then cut unnecessary words from the pieces that stay.

Condensing

Potential targets for condensing:

- redundancies;
- obvious;
- modifiers: adjectives and adverbs;
- metadiscourse;
- verbosity.

Condensing: redundancies

Redundancies occur when we use several words, but one word does all the work that needs doing.

× I will develop, test, and apply a new synthetic approach to produce photovoltaic plastics.

✓ I will develop a new approach to produce photovoltaic plastics

× Most, but not all of the test subjects responded.

✓ Most of the test subjects responded.

Condensing: obvious

When ideas are well-known or implied, they do not need to be said anywhere.

× There is evidence that X-17 production can be associated with enzyme induction

✓ X-17 production can be associated with enzyme induction.

× Snow cover is a characteristic of high alpine ecosystem that is critical in regulating both plant community dynamics and hydrology.

✓ Snow cover in alpine ecosystems is critical in regulating both plant community dynamics and hydrology.

× The greatest challenge in dealing with the crisis of a pandemic is that it is global in scope and so public health responses must operate across national borders.

✓ The greatest challenge in dealing with the crisis of a pandemic is that public health responses must operate across national borders

Condensing: adjective and adverb

Adjectives and adverbs are unnecessary when they add no additional meaning. Eliminating them makes the writing tighter.

- × The entire reaction sequence takes less than one hour to complete
- ✓ The reaction sequence takes less than one hour.

“Empty amplifiers” try to intensify the word they are referring to but don’t add meaning. Avoid empty amplifiers, use concrete information in writing instead.

- × The treatment dramatically increased X
- ✓ The treatment increased X by 50%.

Condensing: adjective and adverb

Good modifiers clarify or define their referent, they should remain. For example, results indicate that they are final, thus the modifier “final” is redundant. In contrast, deleting the modifier “preliminary” would change the meaning of the phrase, thus it is a necessary modifier.

× Final results

✓ Preliminary results

Common empty amplifiers:

certain(ly), quite, substantially, dramatic(ally),
extreme(ly), very, entire(ly), real(ly),
rather, high(ly) simple(ly)

Condensing: metadiscourse

While metadiscourse is sometimes necessary to develop the flow or an argument, it can be obvious or redundant.

× We found that aniline did not react with...

✓ Aniline did not react with...

× According to calculation, it is found that degradation rate of dissolved organic carbon was 0.018 day^{-1} on average.

✓ The average degradation rate of dissolved organic carbon was 0.018 day^{-1} .

Common redundant words used in metadiscourse:

We found that...

We argue that...

Our results suggest that...

Our data indicate that...

In this study, we measured...

Condensing: verbosity

Verbosity occurs when the sentence contains multiple types of meaningless fillers, creating sentences that ramble on endlessly. Verbosity buries the key message and makes the sentence hard to comprehend.

- × The data show that some enhancement in the applicability of these measurements can be accomplished with freeze-fracture prior to analysis by laser-ablation mass spectrometry.
- ✓ Freeze-fracture pre-treatment improved analyses by laser-ablation mass spectrometry.

Proper use of common expressions

However: avoid starting the sentence with however when the meaning is “nevertheless”. The word usually serves better when not in first position.

× The roads were almost impassable. However, we at last succeeded in reaching the camp.

✓ The roads were almost impassable. At last, however, we succeeded in reaching the camp

When “however” is used to mean “to whatever extent” or “in whatever way”, it may be used at the beginning of the sentence.

However you advise him, he will probably do what he thinks is the best.
However discouraging the prospect is, they never lost heart

Proper use of common expressions

That and which: “that” is the defining or restrictive pronoun; “which” is nondefining or nonrestrictive. They can be interchangeable, but it is better to use them with precision. use “that” when you intend to define something.

Compare the two sentences below. The first one specifies which lawn mower it refers to. The second one adds a fact about the lawn mower.

The lawn mower that is broken is in the garage

The lawn mower, which is broken, is in the garage.

Proper use of common expressions

Comma: in a series of three or more terms with a single conjunction, use a common after each term except the last one.

We measured temperature and light intensity.

We measured temperature, light intensity, and nitrate concentration.

Enclose parenthetical expressions between commas. Here, abbreviations, academic degrees, title, or nonrestrictive clause are considered parenthetical. Restrictive clause is not parenthetical and needs no comma.

The audience, which had at first been indifferent, became more and more interested.

Dean Jianquan Liu, Ph.D., presided over the faculty meeting.

Linear regression requires homoscedasticity, i.e., the variance of the residuals is constant.

People who live in glass houses shouldn't throw stones.

Proper use of common expressions

Firstly, secondly, thirdly etc.: These are grammatically correct but superfluous words. Modern usage prefers first, second, third etc. to show textual enumeration.

like and as: “like” governs nouns and pronouns; “as” is used before phrases and clauses.

She speaks like a native speaker

We spent the evening as in the old days.

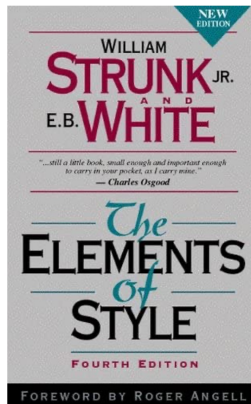
Proper use of common expressions

Latin abbreviations offer an easy way to write repetitively used words and phrases in a shorter package.

| Abbreviation | Full word | Meaning |
|---------------|-----------------------|----------------------|
| <i>ca.</i> | <i>circa</i> | about, approximately |
| <i>cf.</i> | <i>confer</i> | compare |
| <i>et al.</i> | <i>et alii</i> | and others |
| <i>vs.</i> | <i>versus</i> | in contrast to |
| <i>i.e.</i> | <i>id est</i> | that is |
| <i>e.g.</i> | <i>exempli gratia</i> | for example |
| <i>etc.</i> | <i>et cetera</i> | and so forth |
| <i>N.B.</i> | <i>nota bene</i> | please note |
| <i>p.a.</i> | <i>per annum</i> | per year |

Reference on writing tips

The Elements of Style is a useful handbook on writing tips. The book was originally published in 1918 by William Strunk. The original edition of the book is available online: <https://www.bartleby.com/141/>



Professor William Strunk and the book The Element of Style.