



◦ Writing science in plain English

how to deliver your message with clarity and grace

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Writing styles (Richards, 2002)

- The architect
- The bricklayer
- The oil painter
- The water colorist



Accommodate your writing to your neuroses:

- Mildly obsessive-compulsive personality



Make every unit of discourse convey a single message

- Your paper should tell one story.
- Your paragraph should explain one idea or experiment.
- Your sentence should describes one fact or argument.
- Your word must have a single meaning.

Graceful



Ocelot

Not quite as graceful



Common vampire bat

How to recognize graceful writing?

Bad writing comes in many flavors

- Vulgar, sloppy, kitschy, trendy, pompous.
- We want to sound serious, precise, authoritative, professional and objective.
- We end up pretentious, lengthy, vague, and dull

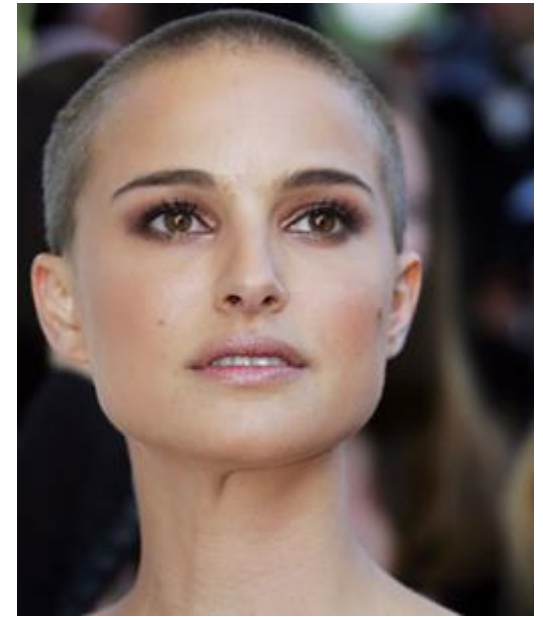




“Everything should be made as simple as possible – but not simpler”

The **K.I.S.S** principle:
Keep It Short & Simple

Short is beautiful



If a word or phrase can be removed or shortened without losing meaning, do it

Due to the fact that	→	because
With regard to	→	regarding
Prior to	→	before
In accordance with	→	accordingly
Is capable of	→	can

Avoid over-cautious language:

It is **possible** that this rapid death **might** be attributable to a cytokine storm.

→ This rapid death **may** be attributed to a cytokine storm.

Active is more straightforward than passive

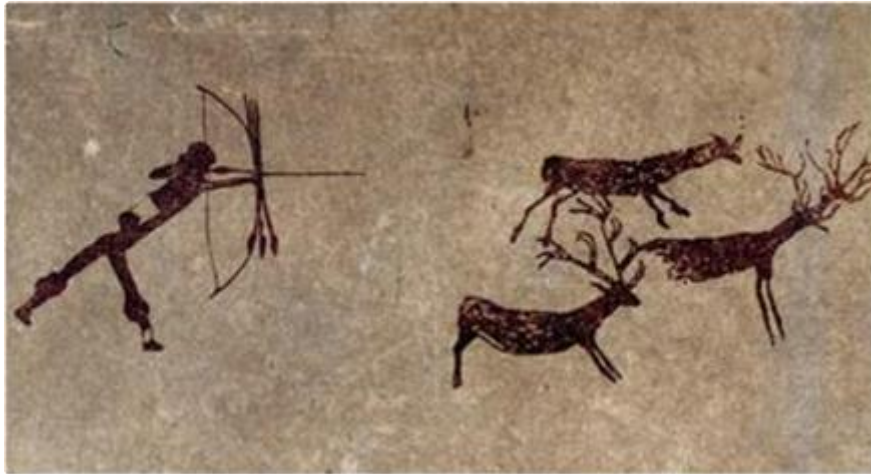
- e.g. “Mistakes were made”

BUT

- Use the passive voice when it is justified:
 - When the doer is irrelevant (e.g. Methods Section)
 - For variation
 - Linking back
 - “Our previous study indicated that hypoxia triggers increased production of NO. Several groups have since confirmed this surprising finding.”
 - → “Our previous study indicated that hypoxia triggers increased production of NO. This surprising finding has since been confirmed by several groups.”

People crave action; they always have

So, identify the
action,
and put it the verb!



Altamira cave, ~15,000 BC

Deer undergo hunting by a man armed with bow and arrows.

Bow and arrows allow a man to hunt deer.

A man utilizes bow and arrows for hunting deer.

✓ A man hunts deer with bow and arrows

Avoid weak verbs that make your writing wimpy:

- Be, involve, mediate, affect, induce, allow, initiate, produce, exhibit, permit, suggest.

example:

- “Following IFN ligation, reduced production of cyclic AMP was exhibited by the cells, allowing more contact formation”
- → “As IFN activated the cells, they produced less cyclic AMP and formed more contacts”

Avoid abstract nouns that make your writing fuzzy

- Ability, environment, approach, nature, tendency, parameter...
- “Ninety percent of human malignancy-related death is the result of tumor cell propagation to vital organs.”
- → “Cancer kills 90% of its victims by spreading to vital organs.”

Hunting for nominalizations

- **Look for the suffixes:**
verbment, verbiation, verbasion,
verbure, verbing, verbiage,
verbosity, verbness, verbience
- **Find them and kill them!**
(or turn them into verbs)

Finding the right word



Flaubert

“Le mot juste” – Gustave Flaubert



Prefer the:

Common word to the rare word,
the short to the long,
the single to the multiple,
the standard to the off-beat,
the specific to the general,
the definite to the vague,
the concrete to the abstract,
the Anglo-Saxon to the Latinate.

Common words better than rare



Results 1-10 of about 797,000 for **quantitate**

Results 1-10 of about 12,200,000 for **quantify**

Specific words better than general

Levels → concentrations, quantities, copies ...

Animals → rats, mice...

Changed → increased/decreased...

Play a role → facilitate/take part/enhance/compose...

Previous research¹ showed → Smith showed

The Battle of Hastings, 1066.

Verbosity wins

Anglo-Saxon



**King Harold,
Bayeux Tapestry**

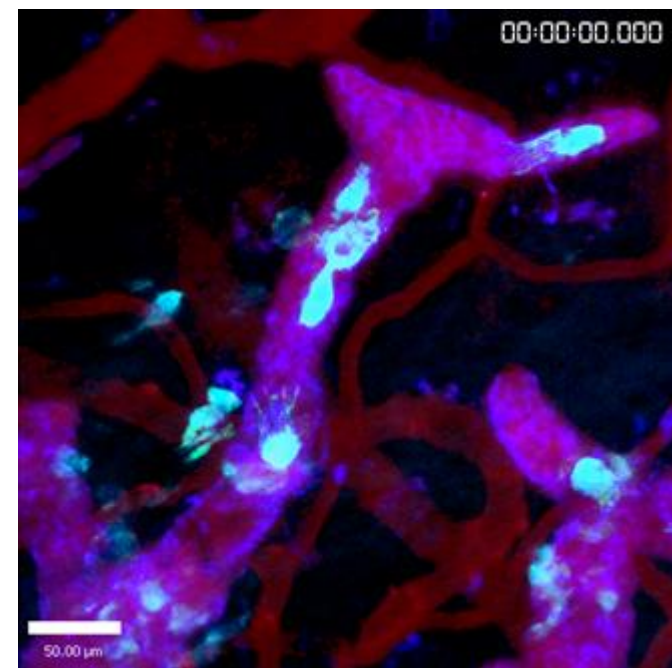
let – permit
ask – inquire
before – prior to
buy – purchase
speed – velocity
talk – converse
many – numerous
show – demonstrate

Latinate

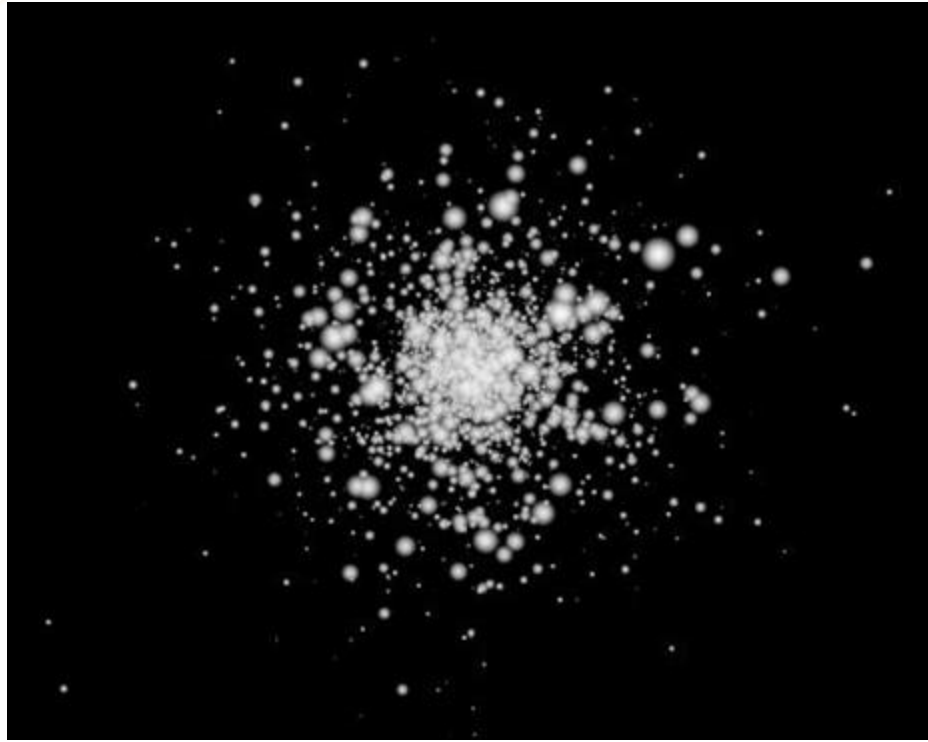


**King William,
Bayeux Tapestry**

The cells _____ along the lymphatic wall



Word	Common / Rare	Precise / Vague	Short / long	Single / Multiple	Anglo / Latin	Standard / Quirky	Concrete / Abstract
move	★★★	★	★★★	★★★	★★★	★★★	★
locomote	★★	★	★	★★★	★	★★	★
crawl	★★★	★★	★★★	★★★	★★★	★★★	★★
extend lamellipodia	★	★★★	★	★	★	★★	★★★
carry themselves	★★★	★	★	★	★★★	★★★	★
propagate	★★	★	★	★★★	★	★★	★
slither	★★	★★	★★	★★★	★★★	★	★★



Bust the evil noun clusters!

“We then employed factor analysis data mining tools to identify linkage.”

→ “We then employed factor analysis as a tool to mine our data and identify linkage.”

Metaphors:

Use them sparingly, don't **mix** them
use **new** ones and **dead** ones, avoid **dying** ones

Dead: the groundbreaking discovery of DNA structure...

Dying: the discovery of DNA structure, the holy grail of genetics...

New: the discovery of DNA structure, more Newtonian than Copernican...

Mixed: the discovery of DNA structure singlehandedly kick-started the field of molecular genetics

Respect the grammatical expectations of the reader

- Keep the subject and verb close:
 - “The Ammonite culture, which survived for 5 centuries despite constant attacks from the Moabites, left little written evidence.”
 - → The Ammonite culture survived for 5 centuries despite constant attacks from the Moabites. Even so, it left little written evidence.”
- Put contextual and old information first
- Save the punch-line for the end, put important new messages at the point of syntactic closure:
 - “The boy emerged unscathed although he was pushed onto the tracks just as the train arrived.”
 - “Even though he was pushed onto the tracks just as the train arrived, the boy emerged unscathed.”

To enliven your style, use variations in sentence structure

- “Mount St. Helens erupted on May 18, 1980. A cloud of hot rock and gas surged northward from its collapsing slope. The cloud devastated more than 500 square kilometers of forests and lakes. The effects of Mount St. Helens were well documented with geophysical instruments. The origin of the eruption is not well understood.”
- **Variations in rhythm, length, voice, @ connection:**
“Mount St. Helens erupted on May 18, 1980. Its slope collapsing, the mountain emitted a cloud of hot rock and gas. In minutes, the cloud devastated more than 500 square kilometers of forests and lakes. Although the effects of the eruption were well documented, its origin is not well understood.”

Acronyms and abbreviations:

- Don't force your reader to remember new acronyms
 - shorten your abstract in other ways.
- Don't spell out ubiquitous acronyms unless they force you to
(who cares DNA is DeoxyriboNucleic Acid?)

My favorite science clichés

- implications for therapy
- further research needed
- paradigm shift
- holy grail
- plays a role
- sheds new light
- cutting-edge science
- State-of-the-art equipment
- silver bullet
- necessary and sufficient

Concluding Example

“Animals were exsanguinated so as to produce samples in which blood sugar time course could be recorded.”



“We repeatedly bled the mice and followed the sugar concentration in their blood samples.”

Some Online Resources

- [Strunk: *The Elements of Style*](#)
- [The Economist style guide](#)
- [The science of scientific writing, Gopen & Swan](#)
- [A list of wordy expressions to avoid](#)