

Scientific Writing 201

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Writing Well for Science

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What will be covered in Lecture 2:

More on structure: Providing transition, depth, and emphasis

How to write with precision and clarity

How to write concisely

How to write smoothly

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Writing Well for Science

Structure: Providing Transition, Depth, and Emphasis

“Science is built up with facts,
as a house is with stones.

But a collection of facts is no more
science than a heap of stones
is a house.”

---J. H. Poincare

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Transitions Between Details

1. Between sections:

- Map the sections

Using a list at the end of introduction.

- Smooth the entrances into sections

Avoiding three common beginnings:

an “empty” beginning,

a “too specific” beginning,

and a “too general” beginning.

Transitions Between Details (cont'd)

2. Between paragraphs:

Do not waste the first sentence to repeat what was said in the previous paragraph.

3. Between sentences:

Finish one thing before starting another.
Do not go back and forth.

Depth of Details

1. Limited by the length of the article
GRL versus JGR
2. Shown by the lengths of paragraphs and sections
3. Shown by repetition, wording, illustration, and placement

Emphasis of Details

3. Shown by repetition, wording, illustration, and placement

Repetition: mentioning a particular result in the abstract, result section, and conclusion.

Wording: using **dependent clauses** and **infinitive phrases**.

because, since, as, although, when...
to filter out the high-frequency signal...

Language: Being Precise

1. Choose the Right Word

affect/effect

farther/further

fewer/less

its/it's

2. Choose the Right Level of Detail

Denotation and connotation of words

A word's connotation is its associated meanings, which may go against its dictionary meaning.

Examples:

adequate ↔ adequate safety record (insufficient)

cheap (negative connotation) / inexpensive

simplistic (negative connotation) / simple

Language: Being Clear

Avoid Needless Complexity:

- 1) Needless Complex **Words**
- 2) Needless Complex **Phrases**
(avoiding stringing modifiers)
- 3) Needless Complex **Sentences**
(avoiding run-on sentences)

**In scientific writing,
beauty lies in clarity and simplicity.**

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Needlessly Complex Words

Category	Example	Possible Substitute
nouns	familiarization	familiarity
	utilization	use
verbs	facilitate	cause
	utilize	use
adjective	aforementioned	mentioned
	discretized	discrete
adverbs	firstly, secondly	first, second

Hint: Opting for the simpler word choices makes your ideas clear to your readers.

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Avoiding Ambiguity

1) Ambiguity in Syntax

Example:

During 1990-2000, we used in situ data for our anomaly maps.

We used in situ data from 1990-2000 for our anomaly maps.

2) Ambiguity in Pronouns

“it” and “this”

3) Ambiguity in Punctuation

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Avoiding Ambiguity (cont'd)

3) Ambiguity in Punctuation

Example:

We tested neat methanol, neat ethanol, methanol and 10% water and ethanol and 10% water.

We tested four fuels: neat methanol, neat ethanol, methanol with 10% water, and ethanol with 10% water.

Language: Being Forthright

Avoid the following phrases:

As is well known, ...

The results clearly demonstrate...

It is obvious ...

Our results prove ...

Use instead:

The results show...

Our results support ...

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Avoiding Weak Verb Phrases

In general, the smaller the verb phrase, the stronger the verb phrase.

is beginning	→	begins
is used to detect	→	detects
made the decision	→	decided
made the measurement of	→	measured

Language: Being Concise

1. Eliminate Redundancies
2. Minimize “Writing Zeroes”
3. Reduce Passive Voices
4. Reduce Sentences to Simplest Forms

Eliminating Redundancies

A redundancy is a needless repetition of words within a sentence.

(already) **existing**

(alternative) **choices**

at (the) **present** (time)

(completely) **eliminate**

(currently) **underway**

first (began)

introduced (a new)

mix (together)

(most) **critical**

never (before)

(still) **persists**

(very) **unique**

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Minimizing “Writing Zeroes”

It is interesting to note that ...

It should be pointed out that ...

It is noteworthy that ...

Use: Note that ...

Simplifying Phrases

Fat Phrase

has the ability to

in light of the fact that

in the event that

in the vicinity of

owing to the fact that

Reduction

can

because

if

near

because

Reducing adjectives and adverbs

detailed **understanding** of ...

somewhat **unique**

somewhat **perfect**

very **important**

very **heavily** depending on ...

Note: Avoid adverbs "always" and "never."

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Language: Being Familiar

1. Avoid Unfamiliar Terms

2. Define Unfamiliar Terms

Language: Being Fluid

1. Vary **Sentence Rhythm**
2. Vary **Sentence Lengths**
3. Vary **Sentence Structure**
4. Vary **Paragraph Lengths**

Eliminating Discontinuities

1) Make Transitions Between Ideas by Using Transitional Words.

Continuation: also, moreover, first...second...

Pause: for instance, for example, in other words

Reversal: however, on the other hand,
conversely, nevertheless

2) Avoid gaps in logic.

How to express numbers:

Avoid beginning a sentence with a numeral.

Example:

64.1 milligrams of copper corroded during the tests.

During the tests , 64.1 milligrams of copper corroded.

Sources:

1. *The craft of scientific writing.* Michael Alley.
2. *MLA Handbook for Writers of Research Papers.* Joseph Gibaldi.