

Researching Responsible and Trustworthy Natural Language Processing

Session 2: Scientific Writing: Audience

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Introduction

Audience

Purpose

Occasion

Reading: Alley (2018), Chapter 1.

Please also look at Alley's web site, which has a lot of videos and additional materials:

<https://www.craftofscientificwriting.org/>

Introduction

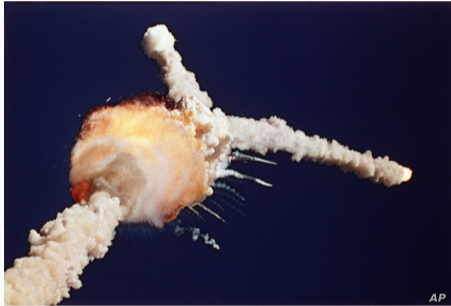
Writing Matters: Example from Alley (2018)

On January 28, 1986, the Space Shuttle *Challenger* took off from Cape Canaveral, Florida. On board were seven astronauts, including teacher Christa McAuliffe, the first civilian in space. Millions of school children across the US watched.



Writing Matters

The Shuttle exploded 73 seconds after takeoff, killing all seven astronauts on board.



A subsequent investigation found that the solid rocket boosters were the source of the explosion. Two O-rings, seals to prevent the fuel from escaping, had failed.

Long before the fatal launch, engineers had reservations about the design of the O-rings on the boosters. NASA management requested they seek opinions from O-ring experts.

So NASA engineers visited two manufacturers of O-rings. They found that both manufacturers had serious concerns about the design of the O-rings.

The engineers wrote up a report about their visits. It contained strong warnings about the design of the O-rings and was entitled:

Subject: Visit to Precision Rubber Products Corporation and Parker Seal Company

But no one responded to the report. NASA's paper trail ends here.

Over to You

Exercise 1

The title of the reports on the Shuttle O-rings was:

Subject: Visit to Precision Rubber Products Corporation and Parker Seal Company

Can you see anything wrong with this title?

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Subject: Visit to Precision Rubber Products Corporation and Parker Seal Company

Can you see anything wrong with this title?

This is a weak title:

- It does not tell you what the report is about.
- The authors clearly haven't thought about their audience.

To write successfully, you need to understand your audience.

Exercise 1

To come up with a better title, let's think about the audience of this report:

- Who is the audience?
- Why is the audience reading?
- What does the audience know?

Based on this, what title would you suggest?

Exercise 1

The quality of titles varies a lot also in our field! Consider:

- Attention is all you need

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- On the Dangers of Stochastic Parrots

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We will come back to *Attention is all you need* in the next session.

We will come back to *On the Dangers of Stochastic Parrots* in a moment.

Audience

Audience, Purpose, Occasion

Before you write a scientific document, analyze:

- audience
- purpose
- occasion

These will greatly influence how you will write the document.

We will look at each aspect in turn.

Who is the audience?

- conference paper: audience has very similar background to yourself; experts in your area
- journal article: audience is typically broader, and depending on the journal may include generalists
- grant proposal: mixture of experts (reviewers) and generalists (panel members)
- podcast: general audience with an interest in scientific issues

The broader or more mixed the audience is, the harder the document will be to write.

Why is the audience reading?

- Once you know who your audience will be, ask what they want to get out of the document.
- Make sure this information is there, is detailed enough, and is structured so as to be easy to find and digest.
- For a grant proposal, look at the review form to see what the reviewers will look for; for a journal paper, look at other papers published in the same journal, etc.

Audience: Knowledge

What does the audience know? Thinking about this will tell you:

- how to arrange the content
- which terms to define
- what background to include

This tells you how to structure your document. Particularly hard if you have a mixed audience!

Think about your **primary** audience; maybe put content for your **secondary** audience in an appendix.

Purpose

Purpose: Inform

Most scientific writing has two specific purposes: *to inform and to persuade*. The level of persuasion varies: instructions require very little, a grant proposal requires a lot of persuasion.

Alley's analogy: a scientific document provides path that leads the reader up the mountain of your scientific expertise. If your purpose is merely to inform:

- you need to provide a path up the mountain
- it can be gentle (simple content) or steep (complex content)
- but you need to make sure readers can follow, break down the information, provide “vistas of understanding”

Purpose: Inform



Image: Alley (2018)

Purpose: Persuade

To inform, you need to answer *what, where, when, how*. To persuade, you also need to answer *why*. You need to build *credibility* with the audience:

- expend extra words to persuade; it's not about being maximally efficient
- you may not take most direct path up the mountain; it's more like navigating a boulder field
- the writing style changes: from lists (informative) to longer paragraphs (persuasive)

Persuasive writing explains why this is the right topic, research question, method, and technique.

Over to You

On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?

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The Aether

ABSTRACT

The past 3 years of work in NLP have been characterized by the development and deployment of ever larger language models, especially for English. BERT, its variants, GPT-2/3, and others, most recently Switch-C, have pushed the boundaries of the possible both through architectural innovations and through sheer size. Using these pretrained models and the methodology of fine-tuning them

alone, we have seen the emergence of BERT and its variants [39, 70, 74, 113, 146], GPT-2 [106], T-NLG [112], GPT-3 [25], and most recently Switch-C [43], with institutions seemingly competing to produce ever larger LMs. While investigating properties of LMs and how they change with size holds scientific interest, and large LMs have shown improvements on various tasks (§2), we ask whether enough thought has been put into the potential risks associated with developing them and strategies to mitigate these risks

Exercise 2: Twelve year old child

- Why is the audience reading?
- What does the audience know?
- What purpose do you want to achieve?

Exercise 2: CEO of a tech startup

- Why is the audience reading?
- What does the audience know?
- What purpose do you want to achieve?

Occasion

The occasion for which you're writing the document determines its:

- form
- formality

Occasion: Form

Form refers to style and grammar, but also length and format of the document. We will discuss this later in the course.

Alley provides advice on grammar, punctuation, and usage in *Appendices A–C* of his book. Useful for both native and non-native speakers!

Important not to be prescriptive. Alley gives *advice*, not based on right/wrong, but on unsettles/distracts readers.

Note differences of British and American spelling. Important not which one you use, but to be consistent.

The *length of your document* has an obvious effect on how you write: a conference paper has half a page of literature review, a PhD thesis has a whole chapter.

The format of your document is often fixed (style file of conference or journal, thesis template). But Alley's *Appendix D* has general recommendations for formatting scientific documents (“for situations in which no graphic designer is available”).

Occasion: Formality

A certain level of formality is expected in scientific writing. Examples:

Too informal	Accepted
<i>a lot</i>	<i>much or many</i>
<i>get</i>	<i>obtain</i>
contractions (<i>don't</i>)	written out (<i>do not</i>)
<i>And ...</i>	<i>Also, ...</i>
<i>But ...</i>	<i>However, ...</i>

Normally, don't address the reader with *you* (exception: instructions).

But what about writing for a general audience (like the twelve year old)?

References

Alley, Michael. 2018. *The Craft of Scientific Writing*. Springer, New York, NY, 4 edition.

Bender, Emily M., Timnit Gebru, Angelina McMillan-Major, and Shmargaret Shmitchell. 2021. On the dangers of stochastic parrots: Can language models be too big? In *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*. Association for Computing Machinery, New York, NY, USA, FAccT '21, page 610–623.