



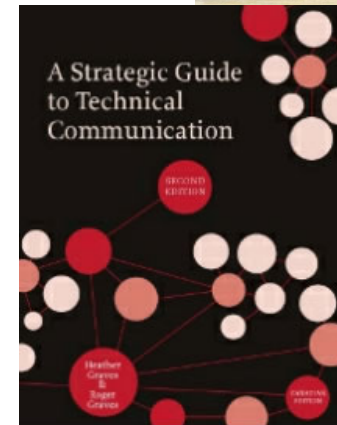
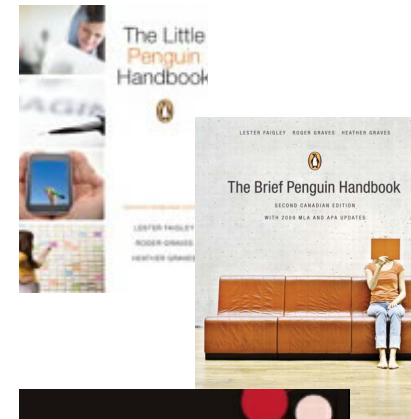
Explaining your research to the public:

SMART Neural Prosthesis Team

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Director, Writing Across the Curriculum
University of Alberta

Where am I coming from?

- PhD in rhetoric and writing
- Taught over 90 courses since 1992
- Consultant for business writers since 2001
- Co-author of *The Brief Penguin Handbook* and *A Strategic Approach to Technical Communication*



What is plain language?



- A worldwide effort to improve the clarity and accessibility of how legal contracts, government documents, and other important information is written
- Write short sentences, using specific, uncomplicated terms that most readers can understand
- A good basis for writing lay summaries

Plain language guidelines



- Plain language involves an ethical relationship between reader and writer
- Writers want to communicate clearly with readers
- Take your readers' point of view
- Organize ideas around what your reader needs to know

Know your readers



- What level of knowledge do they have?
- What is their cultural background?
- What is their income level?
- What do they want to know?
- What information will they use most frequently?
- What questions are they asking about the topic you are writing about?

Application: reports for the general public



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Genre options



- Quick reference cards
- White papers
- Online help manuals
- Reference manuals
- Reports

Ways to organize information



- A series of questions and answers
 - Put the most important information first 
 - Include everything readers need to know to understand and/or to act
 - Use bullet points to emphasize main ideas or points 
- **“2.4 Why work on climate and energy issues at the municipal level?”**
 - Figure #: Amount of money an Edmonton resident would spend on energy in 2044 if energy prices rise significantly [p. 44]
 - “we will refer to these materials, though not necessarily in sequence”
- You will also receive a second binder of additional materials including:
- Resources for working together on the Citizens' Panel (suggested ground rules, the difference between dialogue and debate, participant profiles, overviews of each session, and a call for volunteers to author the final report).
 - How we will plan to record the work of the Panel as new ideas and information are introduced, and instructions for how to raise your own questions as they come up.
 - Detailed materials for each of the six Panel sessions (we'll add to these as we go).
 - The original Energy Transition Discussion Paper, upon which this Handbook is based.
 - Advice on how to decide which scientific and technical claims to trust, and a discussion of how the energy models used in this Handbook were developed.

Words/images

processes forming a network. Microglia were also present, but appeared to be in their activated state (Figure 2).

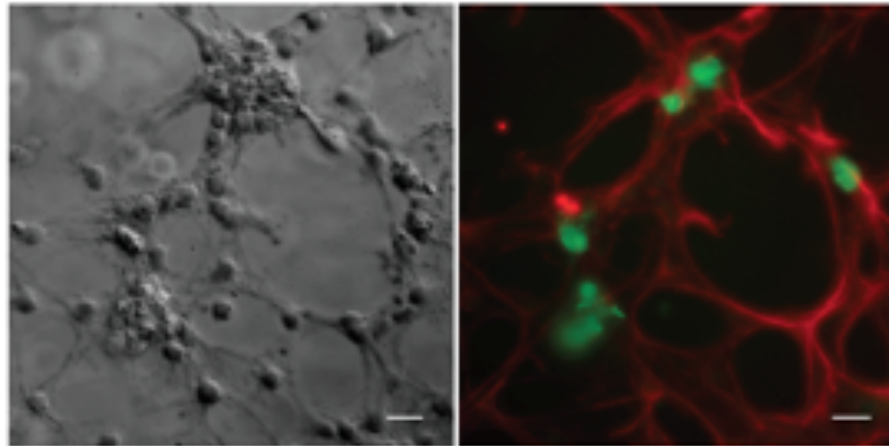



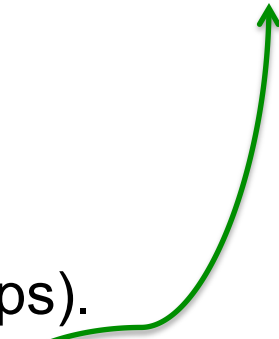
Figure 2: Iba1 (green) labeled microglia and GFAP (red) labeled astrocytes present in gel and extending processes after 1 week in culture. Scale bar 20 um.

Word-level plain language



- Use words that are accurate, appropriate, and familiar.
- Use technical jargon sparingly; do not use business jargon at all.
- Use active verbs most of the time.
- Use strong verbs (not nouns) to carry the weight of your sentences.

- 
- Use words that are accurate, appropriate, and familiar.
 - Use technical jargon sparingly; do not use business jargon at all (Stakeholders, roadmaps).
 - Use active verbs most of the time.
 - Use strong verbs (not nouns) to carry the weight of your sentences.

- “This study **proposes** the use of a hyaluronan (HA) hydrogel for cell encapsulation of astrocytes and microglia. ”
- 

Sentence-level plain language



- Be concise
- Vary sentence length and sentence structure
- Use parallel structure (especially in lists)
- Put your readers in your sentences
- Begin most paragraphs with topic sentences
- Use transitions to link ideas

Keep sentences short



- Working memory can only process about 25 words in a chunk.
- Use 25 words as your limit for sentences.
- Aim for 15 to 22 words (or 2 ½ to 3 lines of type in a document).
- Keep paragraphs short.
 - What is short? 6 to 8 lines of text.

10 lines in original: Break it up



- This study investigated the viability of mixed glial cells in a 3D scaffold over 7 days with varying seeding densities. Preliminary results indicated a trend of improved viability and attachment with increasing seeding density. This is most likely due to cell-cell signaling between glial cells. Further experiments must be done to determine the statistical significance of this improved viability. Immunocytochemistry was used to characterize cell types and their morphologies within the 3D HA-MA scaffold. Although astrocytes appeared to have a resting morphology with numerous processes, microglia were generally seen in their active state. Introduction of a Pt/Ir electrode did not interfere with cell characterization and the gel improved electrode stability during both culturing and immunolabeling. These results indicate that HA-MA is a promising scaffold for glial cells and would improve high-throughput testing of electrode biocompatibility. This improved model would not only reduce electrode shifting, but allow testing of the mechanical compatibility of the electrodes as well. Future work optimizing mechanical properties of the hydrogel (porosity and elastic modulus) is required to further improve the model.

What's wrong with long?



- Readers miss important points due to overextending memory
- They may not reread long sentences
- They may stop reading your document altogether.
- Exceptions?
 - When an idea makes more sense in one long sentence than in several short sentences, use a longer sentence.

How do I shorten sentences?



- Include only one or two ideas in a sentence.
- Explain qualifiers or modifiers to an idea in separate sentences.
- Explain any conditions attached to the main idea in separate sentences.
- Avoid using “and” to connect ideas that can be rewritten in separate sentences

164 words



- The pairing of implantable micro-electrode arrays with micro-electronic devices allows researchers to observe the activity of the nervous system in a new way compared to single electrode recording. State-of-the-art tethered recording systems use implanted micro-electrode arrays and can record raw data rates of at least 24 Mbps. Researchers using the system want to remove the tether to make it wireless, since wireless operation can allow observations of natural load bearing movement. It is therefore crucial, considering the power dissipation of wireless transmission, that signal compression be used in future systems. This report details a study of signal compression techniques applied to implanted wireless low-power neural signal recording implementations. Several compression techniques are simulated and are shown to have an estimated energy savings of 90% compared to systems with no compression. This report presents expected contributions as an investigation of alternatives for neural signal compression and at least one implementation of spike detection and spike compression with a manufactured micro-electronic chip arriving in late 2013.

What to avoid in shortening sentences?



- Don't sacrifice clarity to keep a sentence short.
- Link related ideas by using *that*, *which*, or *who*.
- Don't shorten sentences by leaving transitions out.

Use simple sentence structures



- Simple sentence structures ensure that your writing is direct, positive, and active
- Use simple, declarative sentences (**subject** + **verb** + **object**)
- Example
 - “**Your refund** **arrived** **today**.”
 - “**Climate change** also **will have** **significant national and international impacts**.”

Three tips




1. Connect modifiers to the words they modify:

Not “Please let me know whether you can meet the newest deadline as soon as possible.”

Instead “As soon as possible, please let me know whether you can meet the newest deadline.”

Tip #2



- If the paragraph exceeds 6 to 8 lines of text, change the format or use bullets to list information.

Not “The manual is divided into three section that are tailored to the background knowledge of various users such as the first time user who doesn’ t know how to turn the program on to the novice user who is ready to learn more advanced functions to the expert user who want to adapt the source code of the program.”

Instead “The manual is divided into three sections tailored to the user’ s background knowledge:

- First-time users who can’ t turn on the program
- Novice users ready to learn more advanced functions
- Expert users who want to adapt the source code of the program.”

Tip #3



- If you use bullet points, use parallel structure for parallel ideas

Not “To access the font formatting instructions follow these steps: 1) click on the help icon on the main toolbar, 2) next you need to scroll through the options until you find formatting, 3) next users would want to click on the “font” choice.”

Instead “To access the font formatting instructions follow these steps:

1. Click on the help icon on the main toolbar
2. Find the formatting option
3. Click on the “font” choice”

It's all about the verbs



Citizen Deliberation:

- **Creates** opportunities for deep learning and framing of issues, rather than just sharing perspectives, views, and opinions
- **Enables** a structured deliberative dialogue
- **Involves** a process to work through difficult choices
- **Organizes** discussion around values and assumptions
- **Determines** mutually acceptable compromises and areas of disagreement
- **Facilitates** group decision making
- **Identifies** a common ground for shared agreements

Readability and document design

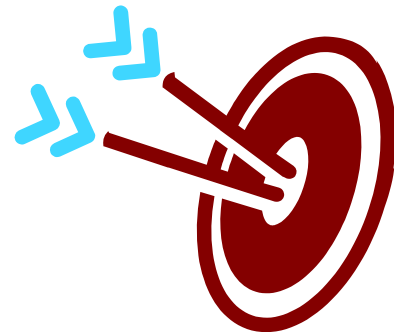


- Add white space: paragraph breaks
- Use bolding to highlight and enable skimming
- Use bulleted lists
- Use headings

8. Consider your conclusion. Restating your claim usually isn't the best way to finish; conclusions that offer only a summary tend to bore readers. The worst endings say something like "In my paper

Target: general public

- Our first task is to define the **genre** as clearly and as specifically as possible
- Our goal is to understand what we're aiming for, who our **readers** are
- Only then can we make good choices about how to revise our own writing



Exercise




In groups, count these items in the handout:

- Number of paragraphs:
- Number of sentences in each paragraph:
- Number of words in each sentence:

Divide the work up within your group—each person takes one paragraph, for example.

Totals



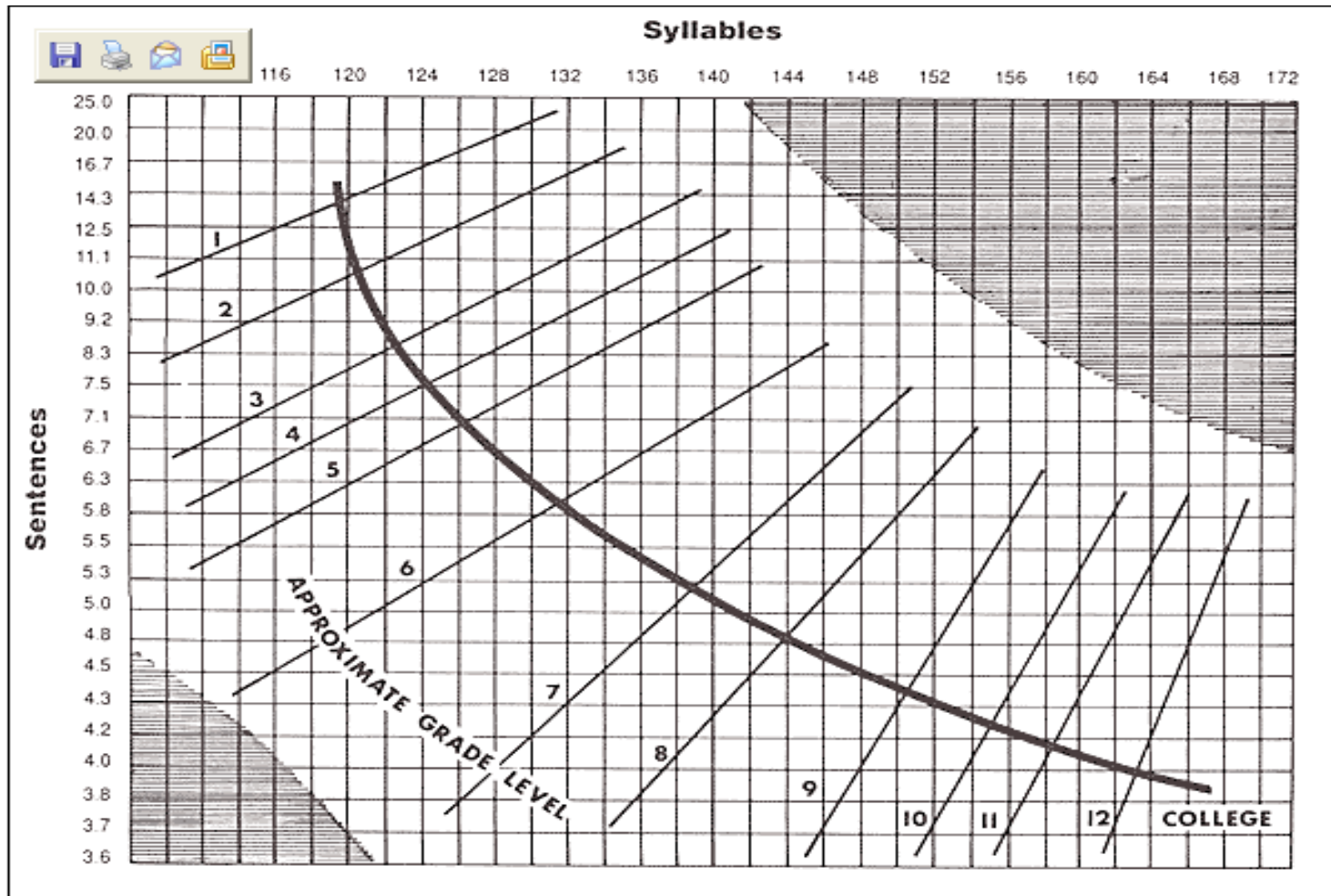
	Paragraphs	Sentences	Words/sent.

Fry's readability score



- Randomly select three sample passages and count exactly 100 words beginning with the beginning of a sentence. Don't count numbers. Do count proper nouns.
- Count the number of sentences in the hundred words, estimating length of the fraction of the last sentence to the nearest 1/10th.
- Count the total number of syllables in the 100-word passage. If you don't have a hand counter available, an easy way is to simply put a mark above every syllable over one in each word, then, when you get to the end of the passage, count the number of marks and add 100.
- Enter graph with average sentence length and number of syllables; plot dot where the two lines intersect. Area where dot is plotted will give you the approximate grade level.

Plot your scores




<http://www.on.literacy.ca/pubs/clear/20.htm>

Beyond formulas: sentence types



- Identify the sentence styles used:
- Simple (subject + verb + other)
- Compound (simple sent. + [and/but/;] simple sent.)
- Complex (dependent phrase/clause + main clause [simple sentence])
- Compound-complex [simple + simple + dependent phrase/clause]

Analysing the handout



	Paragraphs	Sentences	Words/sent.

Linguistic registers



- Levels of formality
- Level of difficulty of vocabulary
- Number of words in English: roughly 750,000 (Oxford Dictionary site)
- The most common 25 words make up about one-third of all printed material in English. The most common 100 make up about one-half of all written material
- Technical writing varieties of limited English: 1,000

Reability factors



- Readability studies of printed materials about cancer have shown them to be written at a Grade 10 level or higher, which leads to the following problems for seniors:
 - information overload
 - unclear messages
 - difficult vocabulary
 - incomprehensible technical language
 - uninviting tones
 - content that does not specifically target their cohort
 - little organization

Friedman, D. B., & Hoffman-Goetz, L. (2003). Cancer coverage in North American publications targeting seniors. *Journal of Cancer Education*, 18(1), 43-47.

Guidelines for revising the handout



- Break the text into paragraphs
- Vary your sentence length
- Vary your sentence types
- Search for simpler words/vocabulary
- Spell out acronyms
- Define technical terms in your sentences

Guidelines for revising your own work



- Put actors (you, the reader) into your sentences
- Make your organizational patterns clear (narrative, analysis)
- Use transitional words and phrases

Readability in other genres



TABLE 1. Brochure Readability, Atrial Fibrillation (n=8)

Brochure Name	Source (See Appendix)	SMOG Grade Level	Flesch-Kincaid Grade Level
<i>Atrial Fibrillation*</i>	Mosby, Inc.	8	8.3
<i>What is Arrhythmia?</i>	American Heart Association	9	7.2
<i>Detecting Atrial Fibrillation for Stroke Prevention</i>	National Stroke Association	9	6.5
<i>Atrial Fibrillation?</i>	DuPont Pharma	10	6.9
<i>Atrial Fibrillation, Coumadin® and You</i>	DuPont Pharma	11	7.8
<i>Atrial Fibrillation: Management of This Irregular Heartbeat†</i>	Mayo Clinic	12	10.2
<i>Atrial Fibrillation†</i>	3M Pharmaceuticals	13	10.7
<i>Anticoagulant Information†</i>	American Heart Association	13	11

*Brochure contains <30 sentences.

†Brochure posted on the Internet.

Anticoagulant Patient Information Material Is Written at High Readability Levels. Carlos A. Estrada, MD, MS; Mary Martin Hryniewicz, RN, MSN; Vetta Barnes Higgs, MD; Cathy Collins James C. Byrd, MD, MPH