

# Part III - Structure



## Providing Transition, Depth and Emphasis

Assigned Reading: Alley, M. 1996, *The Craft of Scientific Writing*, 3<sup>rd</sup> ed. Chapter 3, p. 53-72.



## Transitions

- Transitions are critical to lead the reader through your organizational strategy & to get your points across
  - Between sections
  - Between paragraphs &
  - Between sentences (*Part IV*)



## Section Transitions

- Having set up an organization with sections, there have to be transitions between the sections so the reader understands how sections are related
- Mapping sections
  - Presenting the name of the sections in an explanatory list (like a table on contents) just *before* the sections



## Section Transitions

- Smooth transitions
- Sections may be introduced by:
  - Introducing the subject
  - Repeating the heading in sentence context
  - Providing brief background information



## Paragraph Transitions

- Words or phrases should link paragraphs to create a smooth flow between them
  - Repeat the *same* word from the last sentence of the previous paragraph to the first sentence of the next
  - Use a *similar* word in the first sentence of the next paragraph to one in the last sentence of the previous paragraph
  - Use a *detail* from the previous paragraph in the next one
  - Use *introductory works* like: in addition, meanwhile, because, since, nevertheless, however, etc.



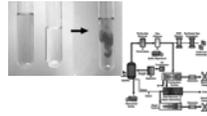
## Transitions to Avoid

- Empty beginning – waste the first sentence without saying anything significant
  - *Many people are interested in global warming*
- Begin with details that are too specific
  - *Oxygen isotopic data from Antarctic ice cores on the Ross Ice Shelf range from ...*
- Begin with a statement that is too general
  - *Global warming is a world-wide problem*



## Eliminate Sentence Discontinuities with Transition Bridges

- Discontinuities are typically a result of poor transitions between ideas :
  - Use conjunctive words early in a sentence to make strong transitions from previous sentences (although, however,...)
- Transitional words signal one of three things:
  - Movement of ideas will continue in the same direction
    - Also, moreover, first...second... third
  - Movement of ideas will pause
    - For instance, for examples, in other words
  - Movement of ideas will reverse
    - However, on the other hand, conversely



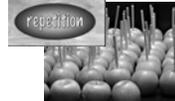
## Depth of Details

- Depth includes the way you classify, analyze, and assess details
  - Level 1 – classification & organization of data
  - Level 2 – analyze data for significance
  - Level 3 – assess the validity of analysis
- Audience determines level of detail
  - Interest of the audience
  - Technical level of the audience
  - Purpose for the audience (info vs persuasion)
- Parallel depth of discussion of related topics



## Emphasis of Details

- Details need to be presented so that the reader understands their relative importance
  - Four ways to emphasize:
    - Repetition
    - Wording
    - Illustration
    - Placement



## Emphasizing Details with *Repetition*

- Repeating important results in different sections of the paper – in the abstract, summary and conclusions, for instance
- Increases the likelihood that the reader will recall important details
- Contrast *repetition* with *redundancy*
  - redundant – containing material that is predictable from its context (It was late in the month of July vs It was late July)



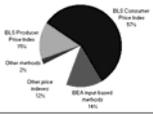
## Emphasizing Details with *Wording*

- To emphasize important details, sentences should explain why the details are important
- Rather than giving details in a sequence of prepositional phrases (*above the lake, along the shore, under the ledge*), which give equal emphasis, use dependent clauses and infinitive phrases



## Emphasizing Details with *Wording*

- Dependent clauses begin with introductory words such as: *because, since, as, although, when*
  - *Although most of the gneisses were granitic, we recognized several interlayers of mafic gneiss*
- Infinitive phrases are verb phrases that begin with the word "to"
  - *To make sure we recognized all of the mafic gneisses, we conducted traverses at 100-meter intervals.*
- These help show the relative importance of details
- Inverse word order also emphasizes the details in both of the example sentences

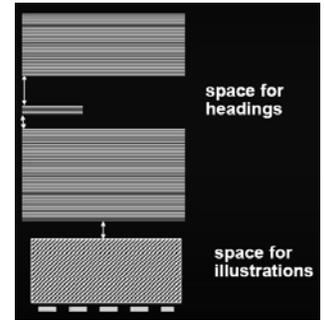


## Emphasizing Details with *Illustrations*

- Readers may not read every sentence, but they will usually look at your illustrations
- If possible, put important results in an illustration
- Always integrate your illustrations into your text for emphasis of the text
- Overuse of illustrations dilutes their ability to emphasize

## Emphasizing Details with *Placement – Sentences & Paragraphs*

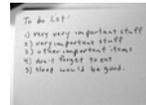
- Text that borders white space has more emphasis than text surrounded by words
  - Titles and headings
  - Beginning and end of sections or paragraphs
  - Just before or after figures



## Emphasizing Details with *changes in sentence & paragraph length*

- Changes in the length of sentences and paragraphs
    - Short sentences or paragraphs following long sentences or paragraphs receive emphasis
- *We hiked about five miles over rugged terrane and forded two streams before arriving at the mine around dusk.*
- *It was flooded.*

## Emphasizing Details with *Placement – Items in Lists*



- Lists of important information should be short, prioritized and placed for emphasis
- Consider using numbers or first, second etc.
- Consider a vertical listing (use sparingly)
- Consider shortening a list to two or three important points followed by a list of secondary points or recommendations

# Part IV - Language

Being Precise, Clear,  
Forthright, Familiar,  
Concise and Fluid

Assigned Reading: Alley, M. 1996, *The Craft of Scientific Writing*, 3<sup>rd</sup> ed. Chapters 4, 5, 6, 7, 8, & 9 p. 72-145.



## **Being Precise –** Saying what You Mean

- One of the most important goals of language in scientific writing
- Involves two aspects of language:
  - Choosing the right word - usage
  - Choosing the appropriate level of accuracy



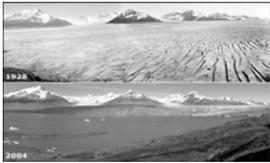
## Choosing the Right Word

- Understand the correct use of similar meanings:
  - Comprise vs compose
  - Affect vs effect
  - Continual vs continuous
  - Principle vs principal
  - See also Appendix B of - Alley (1996)



## Choosing the Right Word

- Avoid using word grouping with no meaning:
  - Centers around, revolves around
- Avoid using words as synonyms that are not exact synonyms
  - Classified – secret – mysterious – unidentified – unclassified



## Choosing the Right Level of Detail

- Balance general statements with specific statements
  - General statements establish the direction of thought
    - Global warming may lead to major changes in sea level
  - Specific statements give evidence to support the thought
    - Studies have already shown that many of the Antarctic glaciers have undergone extensive melting between 1928 and 2004



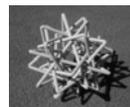
## Choosing the Right Level of Detail

- General statements by themselves do not leave an impression, they only set up the context for details
- Too many details without a context confuses your reader or makes for tiresome reading
- Choose only useful details



## **Being Clear** – Avoiding Things that You Don't Mean

- Two things make writing unclear
  - Needless complexity of
    - words
    - phrases
    - sentences
  - Ambiguity

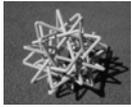


## Needlessly Complex Words

- Are the words precise?
- Are the words clear?
  - If so, use them; if not find simpler substitutes
- Suspect words end in ize,

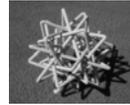
Examples of Needlessly Complex Words

Category	Example	Possible Substitute
nouns	familiarization	familiarity
	has the functionality	can function
	has the operability	can operate
verbs	utilization	use
	facilitate	cause
	finalize	and
	prioritize	assess
adjectives	utilize	use
	forementioned	mentioned
	discretized	discrete
	individualized	individual
adverbs	personalized	personal
	firstly, secondly, thirdly	first, second, third
	heretofore	previous
	hitherto	until now
	whereas	while



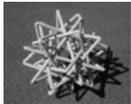
## Needlessly Complex Phrases

- Are commonly a result of strung together modifiers preceding the noun
  - “Critically important aspects of the fluorescent dye tracer testing procedures resulted in a very unfortunate failure of our experiment.”
  - “Problems with our dye tracer procedures caused the experiment to fail.”
  - Complexity dilutes the significance of the modifiers because they get lost in the phrase
  - Complexity can reduce the precision of the sentence



## Needlessly Complex Sentences

- Long sentences test a readers patience, but not all long sentence are complex
- Convoluted sentences are a bigger problem
  - Too many prepositional phrases
  - Too many ideas
- Every sentence should have just one main idea



## Spotting Complex Sentences

- Does the sentence have more than one idea?
- Do you notice that the sentence is long
  - In a good long sentence you don't notice the length
- How clear would it be to you as the reader
  - Imagine yourself sitting across from your most important reader
  - Write your paper as if you were talking to that reader
- Get rid of needless formality and complexity
  - Your purpose is to inform, not to impress your reader with needlessly formal or complex wording



## Avoid Ambiguity



- Ambiguity occurs when a word, phrase or sentence can be interpreted in more than one way
- You are most likely to recognize ambiguity when you are revising your writing several days after having written it
  - You are more likely to recognize ambiguity as a reader than as a writer
- Print out a draft rather than reviewing it only on a computer screen



## Types of Ambiguity

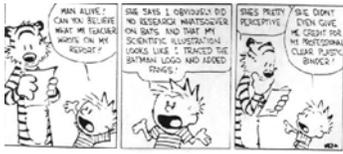
- Ambiguity of word choice
  - Many word in English have multiple meanings
    - “I parked down the street about two meters”
- Ambiguity in syntax
  - Syntax refers to the order and structure of word or phrases in a sentence
    - “The geologists left the camp site dirty”
- Ambiguity of pronouns
  - There should be no doubt as to what the pronoun refers
  - Be careful using “it” and “this”
  - “I stepped onto the rocky ledge and hit the rock with the pointed end of my hammer. This was a dangerous thing to do.”



## Types of Ambiguity

- Ambiguity of punctuation
  - Commas cause the most ambiguity
- Mandatory commas – used to keep a sentence from being misread
  - For instance, following an introductory phrase
  - Commas with “and” or “or” in sequences of three or more (serial comma)
    - We went to a dry cleaners, a hardware, and grocery store.

## Language: *Being Forthright*



- When you are forthright you are:
  - Sincere, straightforward
  - You use strong nouns and verbs
- You control this with the “tone” of your writing
- Tone is the part of your language that indicates your attitude toward your subject



## Controlling Tone

- Avoid pretentious words that are likely to smack of a “pseudo-intellectuality”
  - facilitate, implement, interface, component, utilize
    - To facilitate and implement our business marketing interface, we utilized lettered plastic components on the office door.
    - To let people know about our business, we put up a plastic sign on the office door.
- Avoid arrogant phrases
  - as is well known, of course, clearly demonstrate, unambiguous, it is obvious that
- Avoid clichés
  - Rat race, bundle of nerves, ...



## Choosing Strong Nouns & Verbs

- A noun is strong if it invokes one of the five senses in a reader (concrete nouns)
  - touch, smell, taste, hearing & vision
- Abstract nouns do not invoke the senses
  - ability, approach, capability, concept, factor, nature, parameter

## Strong Verbs

- Avoid verb phrases in favor of active verbs
  - arranged vs made arrangements for
  - decided vs made the decision
- Words that indicate the natural action of the sentence are the best verbs
- Don't bury strong verbs with verb “to be”
  - begins vs is beginning
  - detects vs is used to detect



## Active vs Passive Voice

- In most cases, sentences are more straight forward if the subject completes the action of the sentences (active voice) rather than being acted upon (passive voice)
  - The seismometer recorded the earthquake
    - “recorded” is an active verb
  - The earthquake was recorded by the seismometer
    - “was recorded” is a passive verb construction
- General rule: let subjects do the things they were made to do

## Passive Voice to Avoid First-Person References

- We analyzed the samples for gold.  
vs
- The samples were analyzed for gold.
- Use of the first person is fine as long as the emphasis remains on your work and not on you.



## Language – *Being Familiar*

- Use terms that are familiar to your primary audience.
- Avoid unnecessary jargon
- Define unfamiliar terms if necessary
- Define acronyms the first time they are used
  - X-ray computed tomography (CT) will revolutionize rock textural studies.

## Incorporate Examples and Analogies

- Whenever you make a general statement, you should anchor the statement with examples.
  - Color is not a good property to use to identify a mineral. For instance, quartz...
- Analogies compare obscure thoughts, features, or processes to familiar ones



## Language – *Being Concise*

- Being concise usually follows from being clear and being forthright
- Four ways to cut the fat in scientific writing
  - Eliminate redundancies
  - Eliminate meaningless phrases (zeros)
  - Reduce sentences to their simplest form
  - Cut bureaucratic waste

## Eliminate redundancies

- Redundancies occur when you:
  - Repeat the meaning of an earlier expression
    - (completely) eliminate, mix (together), (still) persists
  - Make a point that is implicit in what has already been stated
    - aluminum (metal)
- Catch redundancies by reading to eliminate words



## Eliminating Writing Zeros

- Writing zeros are phrases that have no meaning and offer no information to the reader:
  - It is interesting to note that...
  - The presence of ...
  - In the course of...
  - I might add that...
  - As a matter of fact...



## Reducing a Sentence to Its Simplest Form

- This does not mean limiting yourself to simple sentences
- It means using only the necessary words in whatever sentence structure you choose, be it simple, compound, or complex

## Reducing a Sentence to Its Simplest Form **Examples**

- Eliminate fat phrases
  - At this point in time = now
  - In the vicinity of = near
  - In the event that = if
- Eliminate overused adjectives or adverbs that don't serve a purpose in your sentence
  - Comprehensive, detailed, fundamental, somewhat, rather, very, pervasive are commonly overused or unnecessary

## Reducing a Sentence to Its Simplest Form **Examples**

- Eliminate nouns containing verbs
  - Establishment, measurement, development
- Eliminate needless passive voice
  - It was concluded that...



## Eliminating Bureaucratic Waste

- Eliminate the use of empty bureaucratic nouns
  - Target, parameter, development
- Think about the interest of your principal audience
  - Consider what your audience wants to learn from your document
- Eliminate things that are superfluous
- *Concise writing is forceful and helps your audience focus on what you say*
- *Fat writing is lethargic and allows your reader's mind to wander from your text*



## Language – *Being Fluid*

- Fluid writing uses variations in:
  - Sentence rhythms
  - Sentence lengths
  - Sentence structure
  - Paragraph length
    - to lead the reader through the text
- Fluid writing - eliminate discontinuities by
  - Providing smooth transitions between ideas
  - Providing a smooth visual format



## Varying Sentence Rhythms

- Sentences that have the same kind of beginning, same length, the same noun, verb, and phrase arrangements are boring to read and can make your subject boring.
- Vary rhythms by changing the way sentences begin, the way they end, the position of subjects and verbs, their length, and their complexity (see Alley, p. 130-137)

## Summary

- Read your textbook assignments!
- Assigned Reading: Alley, M. 1996, *The Craft of Scientific Writing*, 3rd ed. Chapters 1, 2, 3, 4, 5, 6, 7, 8, & 9 p. 72-145.
- So, what was the message?



## Stages of the writing process

- Getting in the mood
  - Preparing to write
- Writing the first draft
  - Thinking & writing
- Revising, revising, revising
  - Rewriting
- Finishing
  - Attending to layout/format



## Think Before You Write

(note just while you write)



- Think about your audience
  - And strategies for achieving it
- Think about your purpose
  - Structure
  - Language
  - Illustrations

## Who is your audience?

- Your boss, a client, co-worker?
  - Management (your professor?)
- Your answer determines
  - Your choice of words
  - The detail of illustrations you can present
  - The depth of your presentation
  - The kinds of bridges that you have to construct for your audience from known information to new information



## Purpose of the Document

### ■ Informing

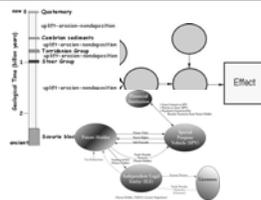


### ■ Persuading



## Strategies to Fit Your Purpose

- Types of strategies:
  - Chronological – used in discussions of timeline or cyclic processes
  - Spatial – to follow the pattern of a physical form
  - Flow – to follow the change in some variable through a system
  - Cause and effect
  - Division and classification



## Writing Style

- Style is the way that you put your thoughts into words and images. Includes, for example:
  - The way you emphasize details
  - Sentence length and structure you use
- Three basic elements of style:
  - Structure
  - Language
  - Illustration



Beginning

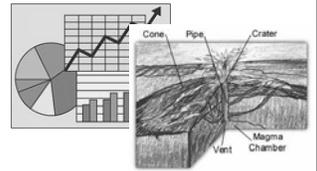
Middle

Ending

## Their Functions

- Beginning- prepares the reader for the middle by fulfilling certain expectations:
  - Defines the work to be described
  - Indicates why it was done
  - Gives background for understanding the work
  - Indicates how the work will be presented
- Middle – presents the work
- End – provides analysis, summary, and future perspectives

## Illustrations



- Illustration
  - The meshing of figures and tables with language
- Illustrations make your writing efficient by clarifying concepts that are too complex to be conveyed by language alone
  - Used for emphasis
  - Used for detail
- Use may be governed by format constraints

## Six Goals of Language

- Your writing should be:

- Precise
- Clear
- Fortright
- Concise
- Familiar
- Fluid

