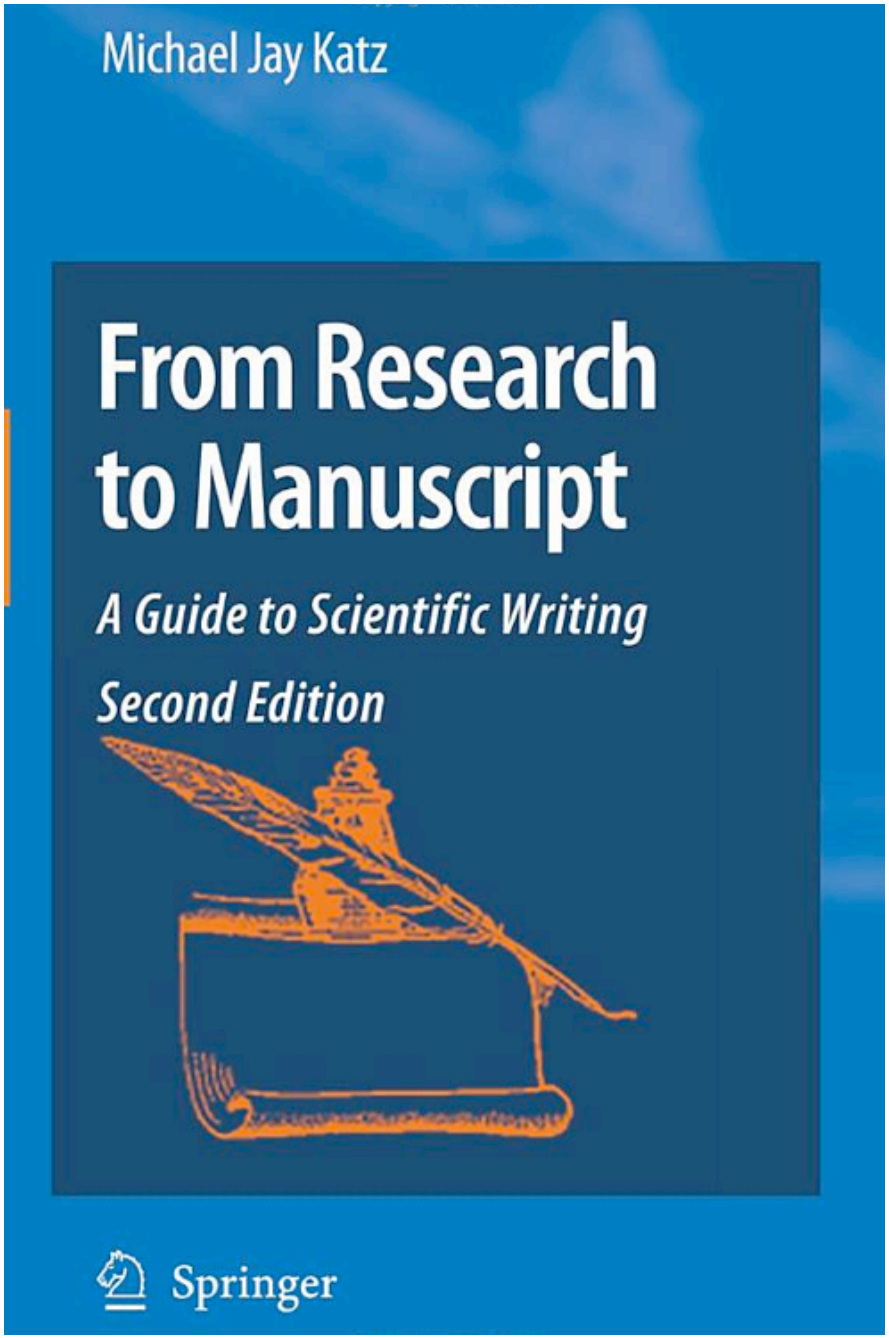
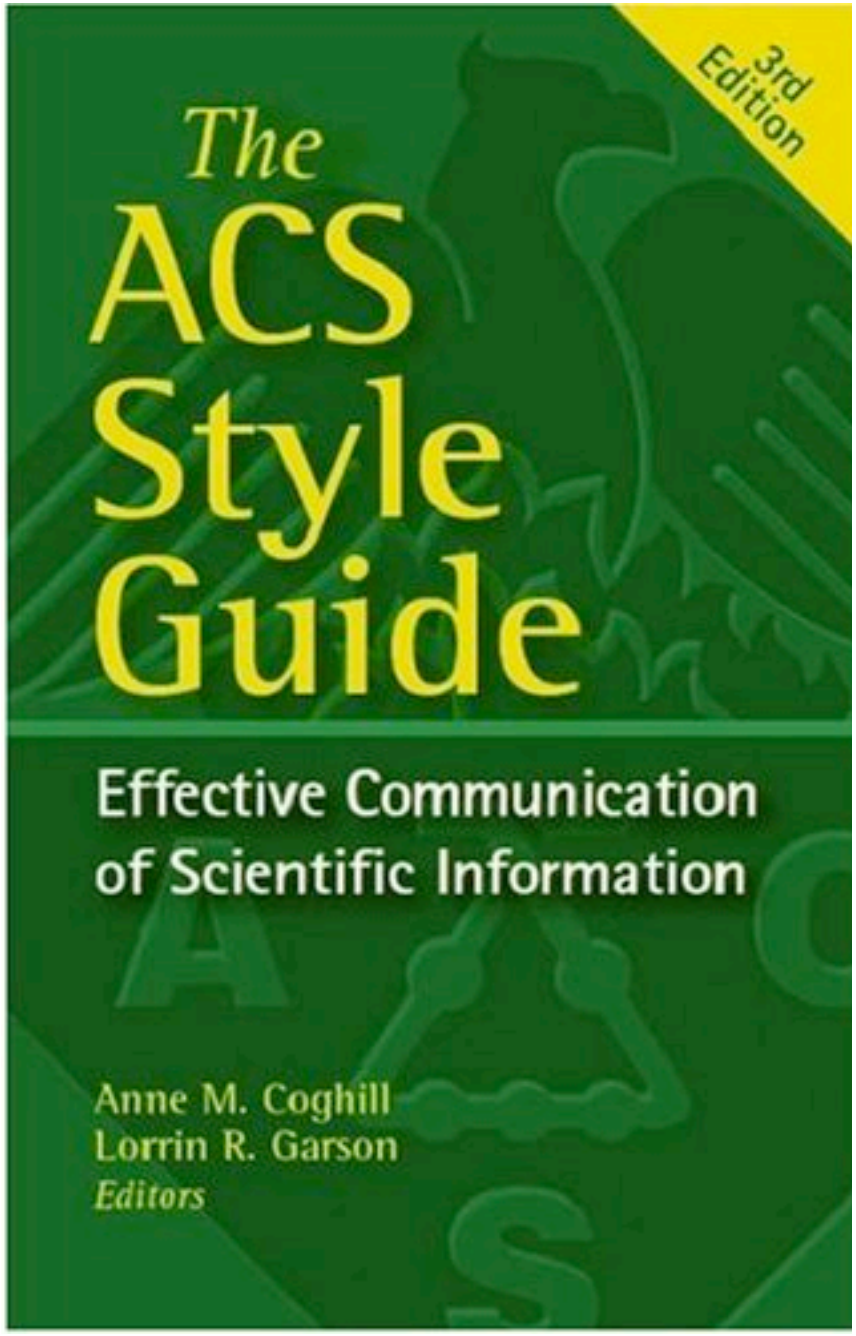
Organization of Presentation

Outlining & Stereotyped Format



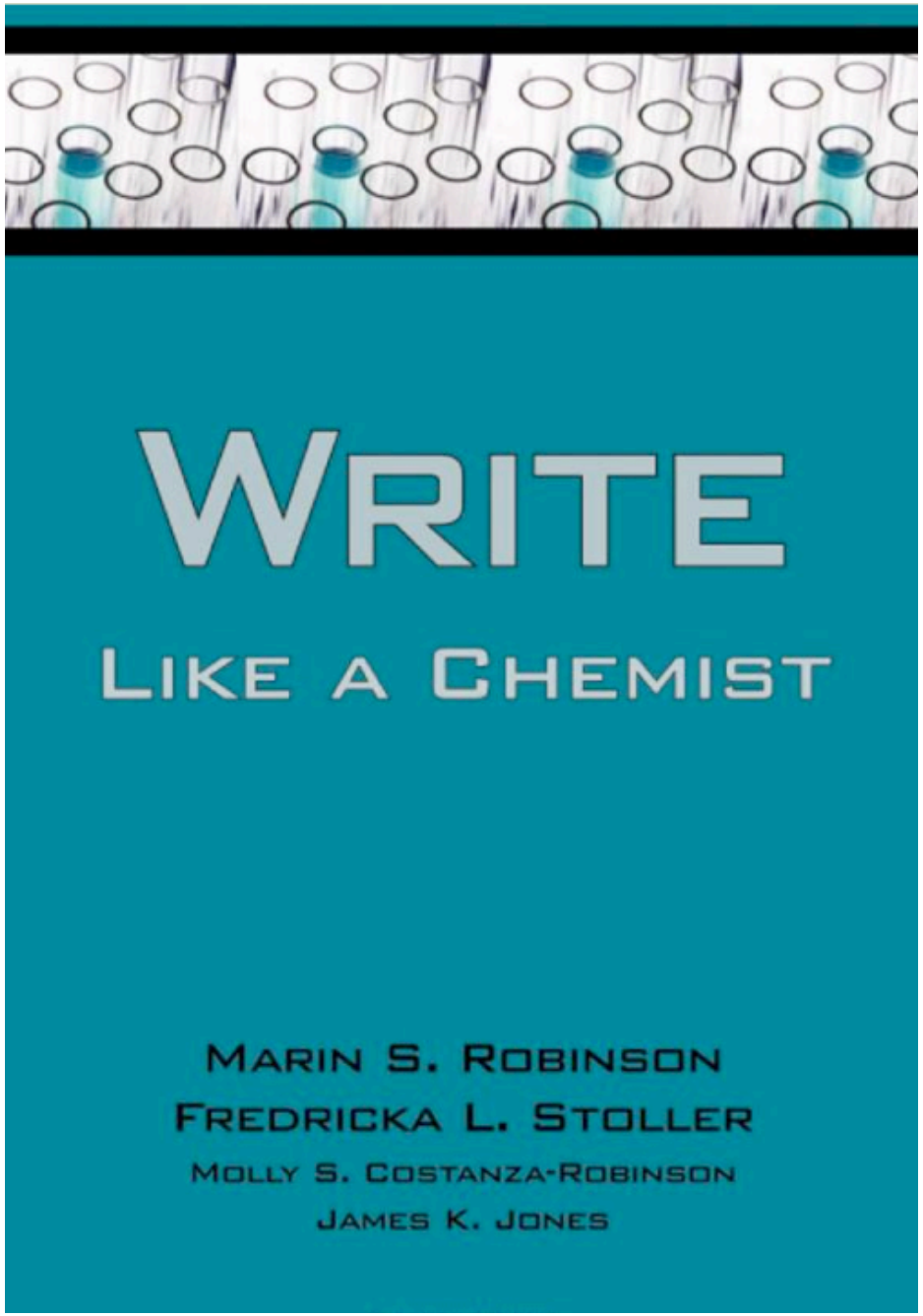
Scientific Writing Books I

From Research to Manuscript: A Guide to Scientific Writing. 2/e. Michael J. Katz. Springer: New York, **2009**. ($17.95; Amazon, accessed 01/19/10)



Scientific Writing Books II

The ACS Style Guide: Effective Communication of Scientific Information. Anne M. Coghill and Lorrin R. Garson. American Chemical Society: Washington, D.C., **2006**. ($37.99; Amazon, accessed 01/19/10)



Scientific Writing Books III

Write Like a Chemist: A Guide and Resource. Marin S. Robinson, Fredricka L. Stoller, Molly Costanza-Robinson, and James K. Jones. Oxford University Press, USA: New York, **2008**. (Paperback: $44.04; Hardcover: $119.38; Amazon, accessed 01/19/10).

Scientific Writing: Articles I

Posted at http://web.missouri.edu/~glaserr/RG_T_SS10.html

ADVANCED MATERIALS

ESSAY

Whitesides' Group: Writing a Paper**

By *George M. Whitesides**

1. What is a Scientific Paper?

A paper is an organized description of hypotheses, data and conclusions, intended to instruct the reader. Papers are a central part of research. If your research does not generate papers, it might just as well not have been done. "Interesting and unpublished" is equivalent to "non-existent".

Realize that your objective in research is to formulate and test hypotheses, to draw conclusions from these tests, and to teach these conclusions to others. Your objective is not to "collect data".

A paper is not just an archival device for storing a completed research program; it is also a structure for *planning* your research in progress. If you clearly understand the purpose and form of a paper, it can be immensely useful to you in *organizing* and conducting your research. A good outline for the paper is also a good plan for the research program. You should write and rewrite these plans/outlines throughout the course of the research. At the beginning, you will have mostly do *not* agree on the outline, any text is useless. Much of the *time* in writing a paper goes into the text; most of the *thought* goes into the organization of the data and into the analysis. It can be relatively efficient in time to go through several (even many) cycles of an outline before beginning to write text; writing many versions of the full text of a paper is slow.

All writing that I do—papers, reports, proposals (and, of course, slides for seminars)—I do from outlines. I urge you to learn how to use them as well.

2.2. How Should You Construct an Outline?

The classical approach is to start with a blank piece of paper, and write down, in any order, all important ideas that occur to you concerning the paper. Ask yourself the obvious questions: "Why did I do this work?"; "What does it mean?"; "What hypotheses did I mean to test?"; "What ones did I actually test?"; "What were the results? Did the work yield a

Scientific Writing: Articles II

Posted at http://web.missouri.edu/~glaserr/RG_T_SS10.html

AMERICAN Scientist

FEATURE ARTICLE

The Science of Scientific Writing

If the reader is to grasp what the writer means, the writer must understand what the reader needs

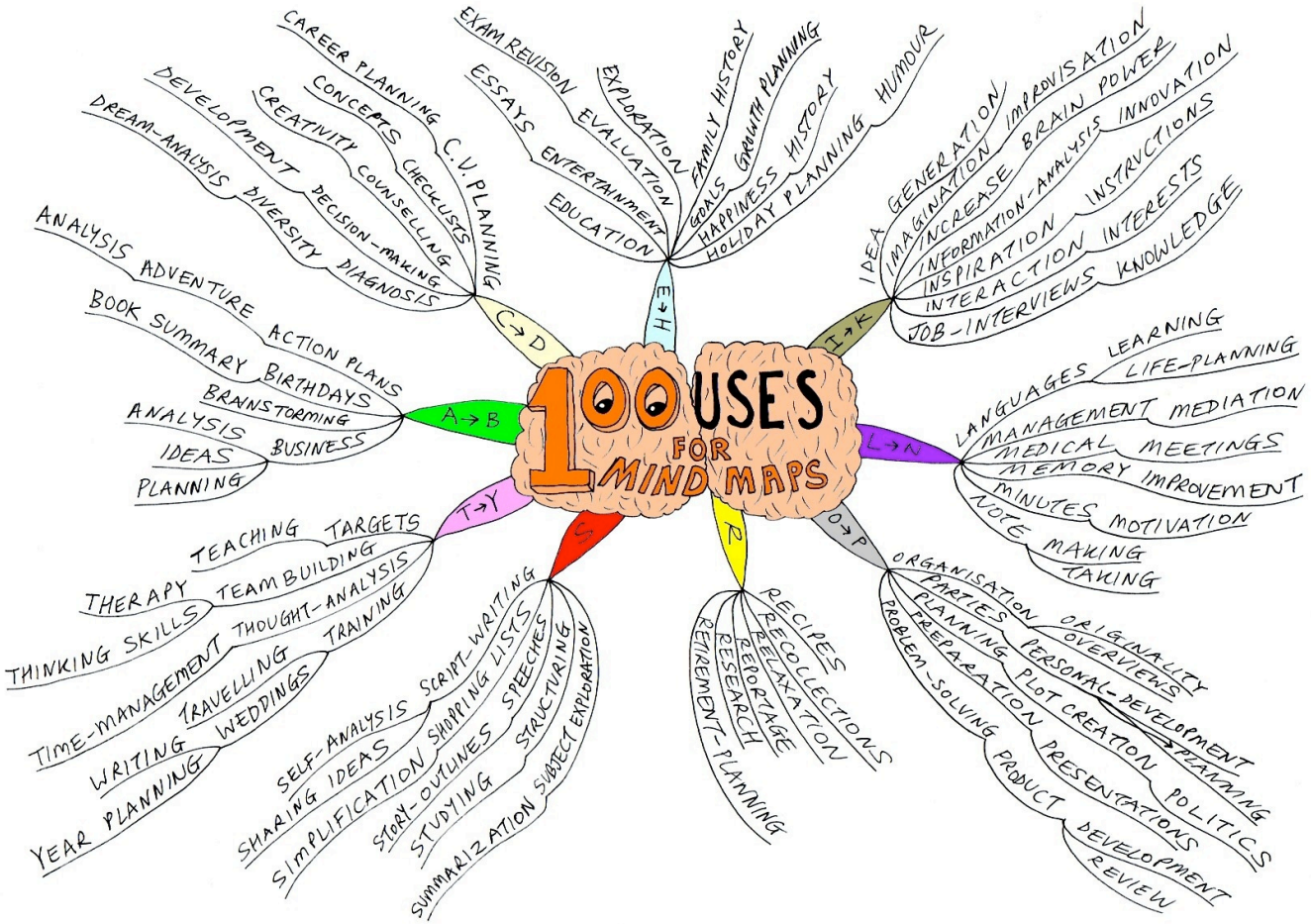
George Gopen, Judith Swan

This article was originally published in the November-December 1990 issue of American Scientist.

Science is often hard to read. Most people assume that its difficulties are born out of necessity, out of the extreme complexity of scientific concepts, data and analysis. We argue here that complexity of thought need not lead to impenetrability of expression; we demonstrate a number of rhetorical principles that can produce clarity in communication without oversimplifying scientific issues. The results are substantive, not merely cosmetic: Improving the quality of writing actually improves the quality of thought.

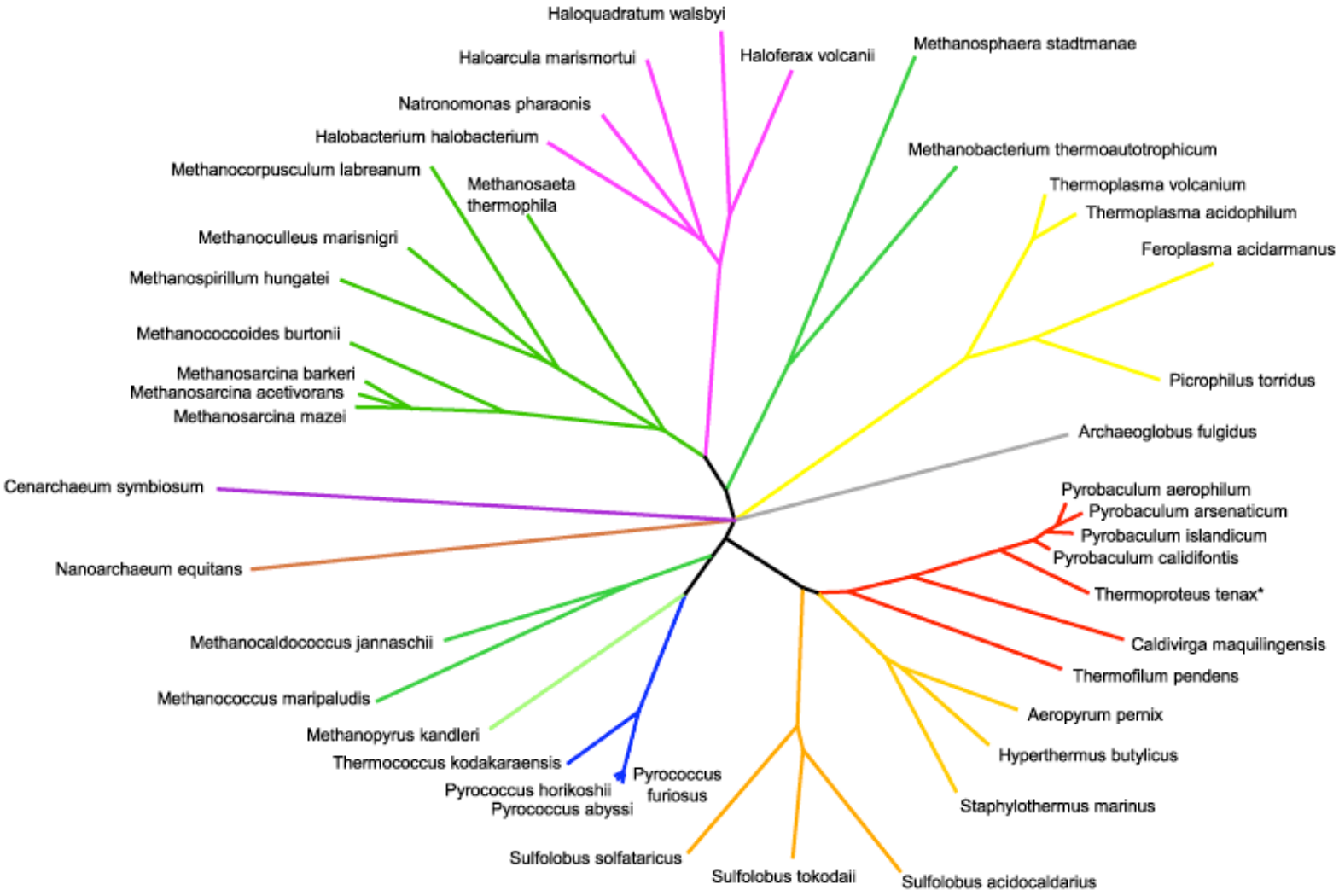
The fundamental purpose of scientific discourse is not the mere presentation of information and thought, but rather its actual communication. It does not matter how pleased an author might be to have converted all the right data into sentences and paragraphs; it matters only whether a large majority of the reading audience accurately perceives what the author had in mind. Therefore, in order to understand how best to improve writing, we would do well to understand better how readers go about reading. Such an understanding has recently become available through work done in the fields of rhetoric, linguistics and cognitive psychology. It has helped to produce a methodology based on the concept of reader expectations.

Outlining: Mind Mapping I



© Paul Foreman http://www.mindmapinspiration.com

Outlining: Mind Mapping II



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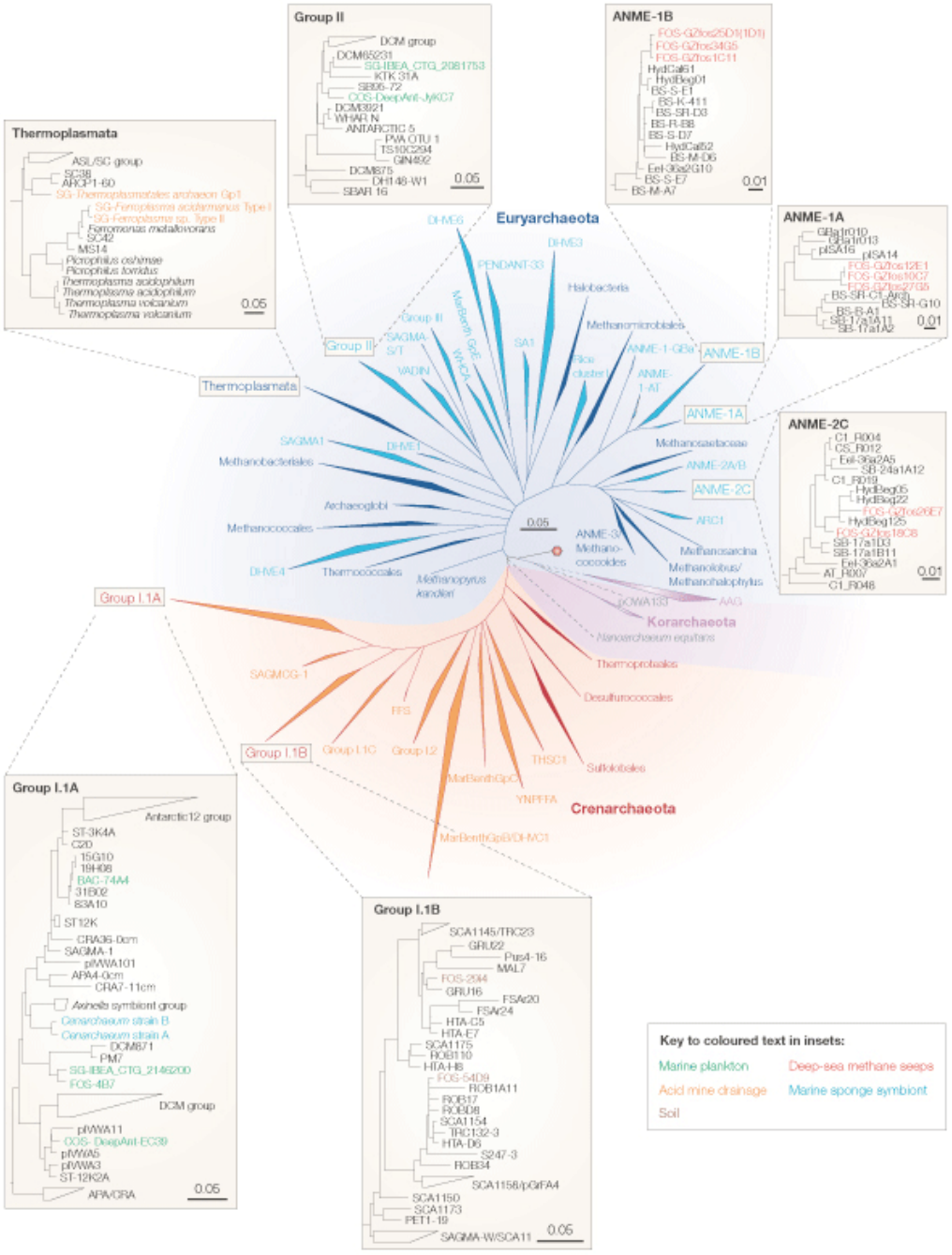
Outlining: Mind Mapping III



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Outlining: Mind Mapping IVa

A Methylaspartate Cycle in Haloarchaea

Maria Khomyakova,* Özlem Bükmez, Lorenz K. Thomas, Tobias J. Erb,† Ivan A. Berg‡

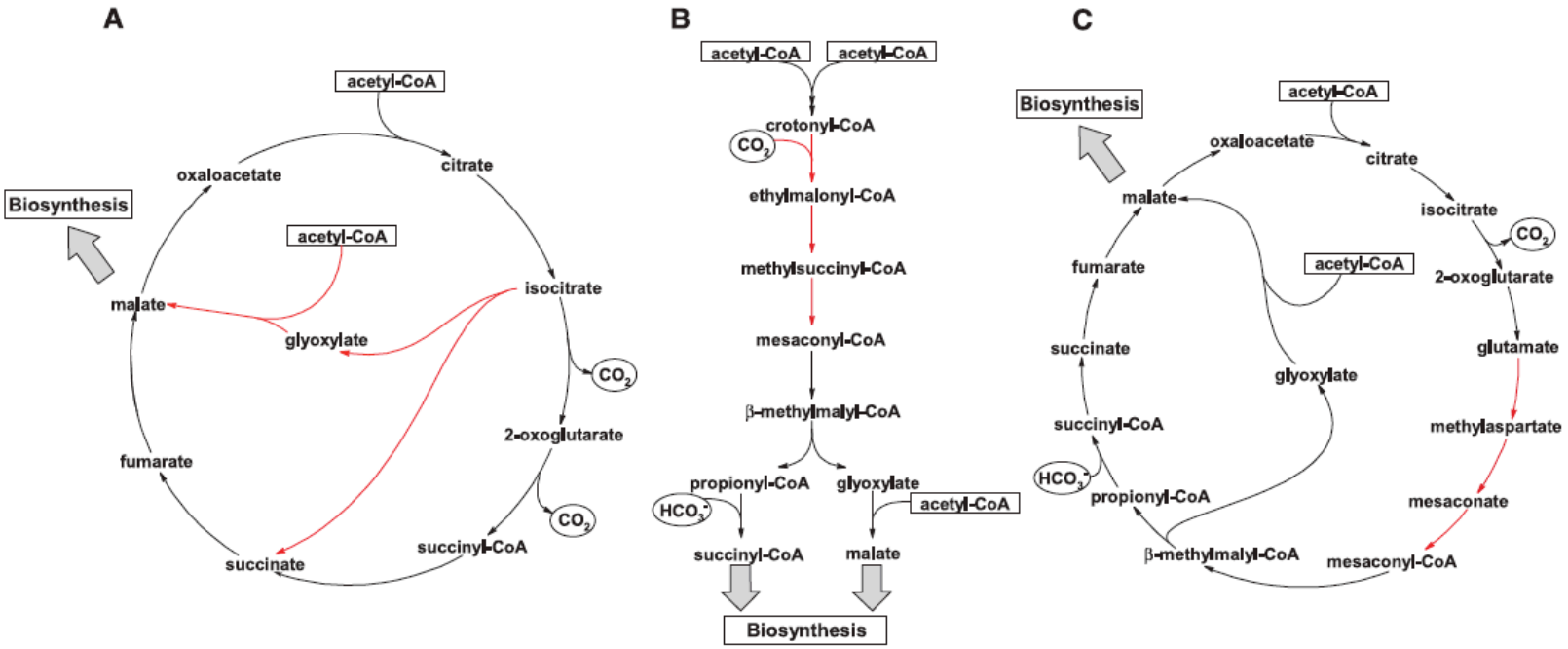
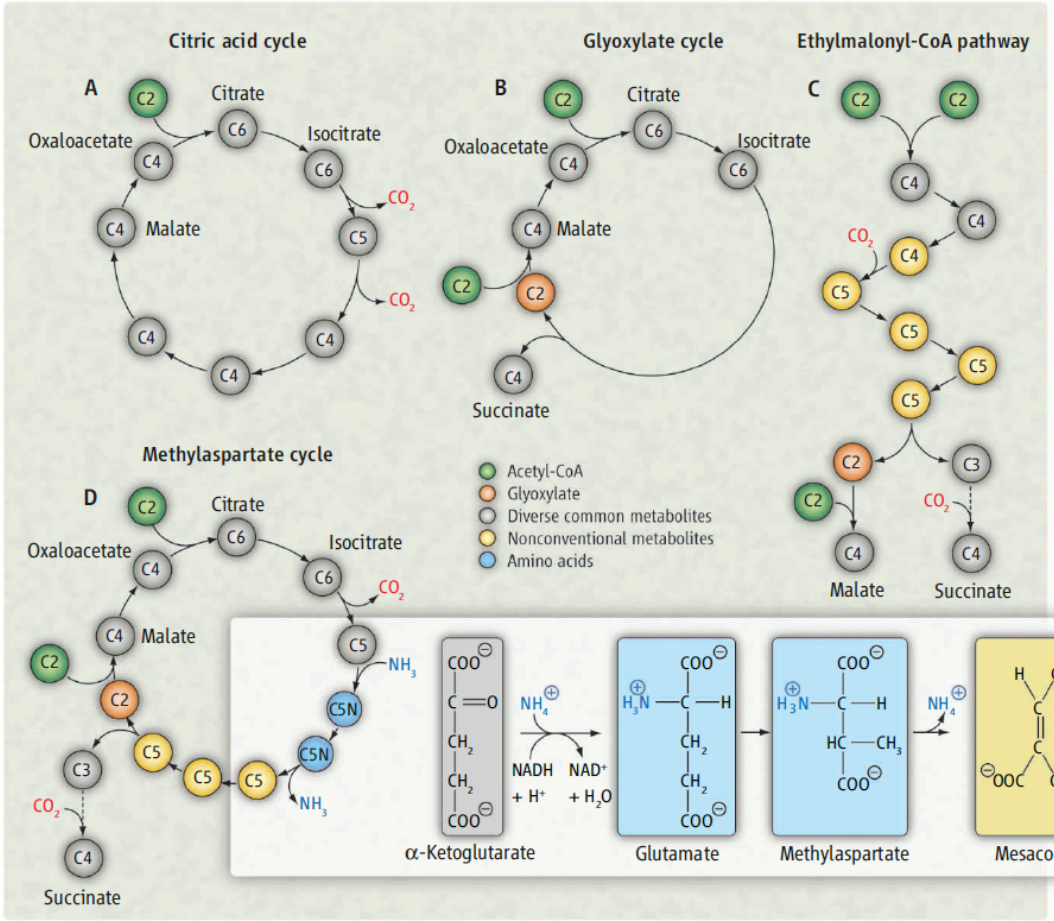


Fig. 1. Anaplerotic pathways of acetyl-CoA assimilation. (**A**) The glyoxylate cycle and the citric acid cycle, (**B**) the ethylmalonyl-CoA pathway, and (**C**) the proposed methylaspartate cycle. The key reactions of the anaplerotic pathways are shown in red. A pathway similar to the methylaspartate cycle has already been suggested for *Protaminobacter rubrum* (now *Methylobacterium extorquens*) (*28*). However, *Methylobacterium* does not have glutamate mutase and methylaspartate ammonia-lyase genes (*29*) and uses the ethylmalonyl-CoA pathway for acetyl-CoA assimilation (*10*, *11*, *30*).

Outlining: Mind Mapping IVb



Acetate assimilation pathways. (**A** to **D**) Steps likely to involve more than one enzyme and intermediate are shown with dashed arrows. The expanded region of (D) shows the reactions involving nitrogenous compounds. Common metabolites formed in the cyclic pathways are at the same absolute positions for comparative purposes.

as a carbon and energy storage compound (*8*). Thus, high intracellular levels of glutamate could be used as a signal to activate the methylasparate pathway when growing on acetate or other compounds whose metabolism forms acetate as an intermediate.

Another noteworthy feature of this pathway is the versatility of the enzymes it uses: Each of the enzymes is found in other characterized metabolic pathways (*6*). The authors note that the methylaspartate cycle can be thought of as a "metabolic patchwork" of existing enzymes, which have been assembled to accomplish a new and necessary sequence of metabolic transformations for acetate assimilation in an environment rich in salt and nitrogen.

The origin of the enzymes recruited for this pathway is also of interest. Analysis of gene sequences reveals that the key enzymes are genetically related to enzymes from the bacterial domain of life rather than the archaeal domain to which *H. marismortui* belongs. This suggests that the enzymes were

Outlining: Mind Mapping V

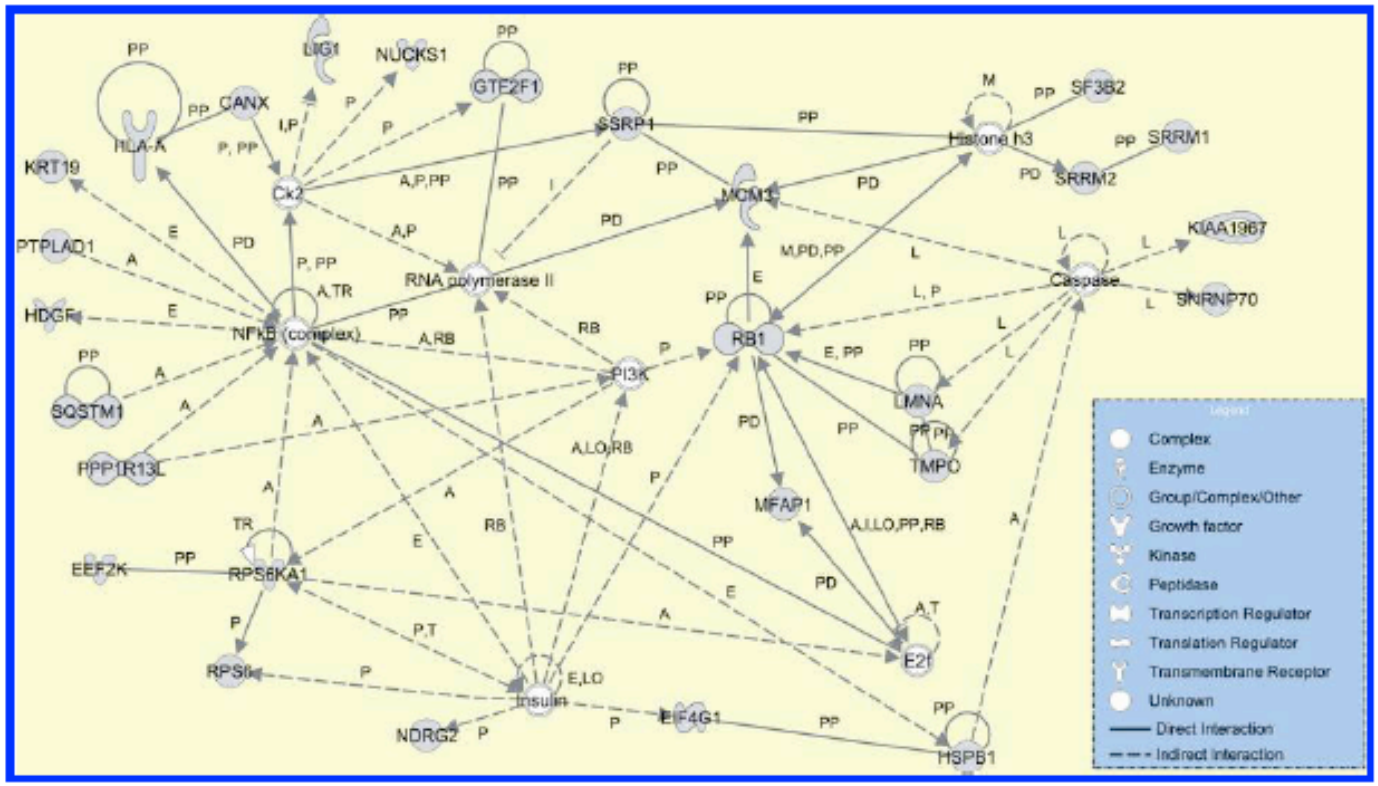


Figure 3. De novo interaction network analysis of proteins exhibiting altered phosphorylation levels in response to SM. Phosphoproteins from Table 4 of the Supporting Information were analyzed using IPA software to construct de novo interaction pathways as determined from published literature. Phosphoproteins colored gray were altered by at least 2-fold in response to SM, whereas proteins colored white were not detected in our study as exhibiting any quantitative phosphorylation change. A high confidence score of 62 was determined for this interaction map by IPA. See Table 4 of the Supporting Information for IPI numbers corresponding to each protein. Interactions shown: acts on (closed arrowhead), translocates to (open arrowhead), inhibits (T-junction), inhibits and acts on (closed arrowhead and T-junction), and binding only (simple line). "Acts on" and "inhibits" edges may also include a binding event. Abbreviations used for interactions as determined by IPA: A, activation; E, expression; I, inhibition; LO, localization; M, modification; P, phosphorylation; PD, protein−DNA interaction; PP, protein−protein interaction; L, proteolysis; RB, regulation of binding; T, transcription; and TR, translocation.

From Mind-Maps to Lists

Describe the Network Attractors (Hubs)
Initially Focus on Main Connecting Paths (Major Routes)

Data resources from OAG Sep.2007
Created and copyright-owned by GCW consulting

PEK = Beijing

CTU = Chengdu

CAN = Guangzhou

SHA = Shanghai

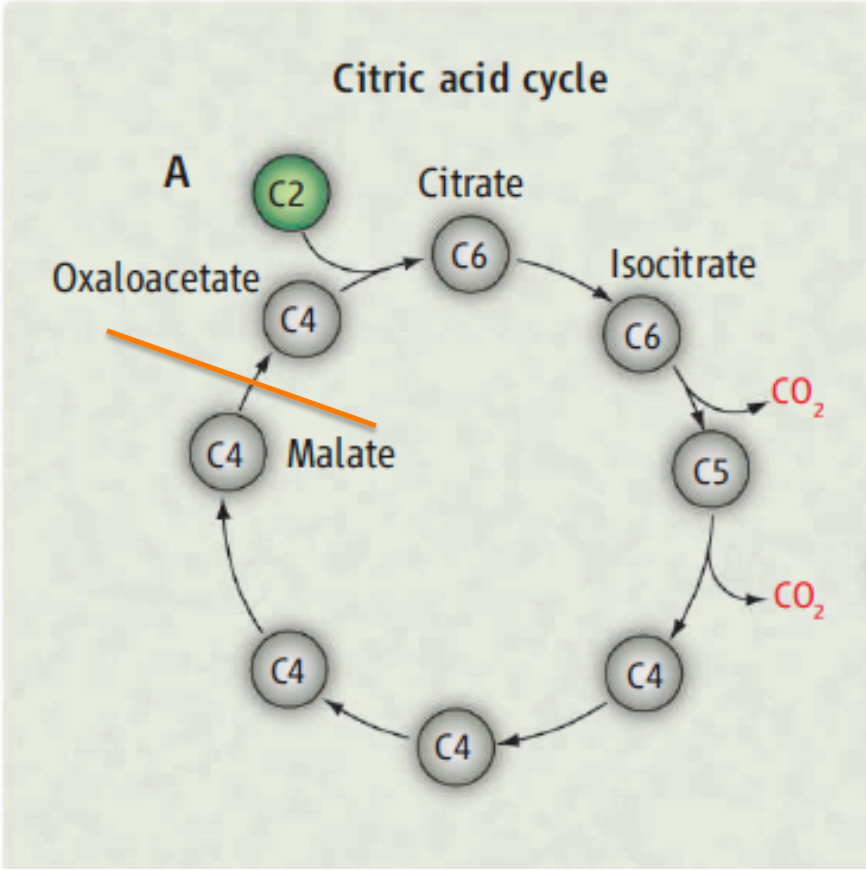
From Mind-Maps to Lists

Disconnect Cycles to Linear Sequences

Open a cycle at a “natural breaking point”.

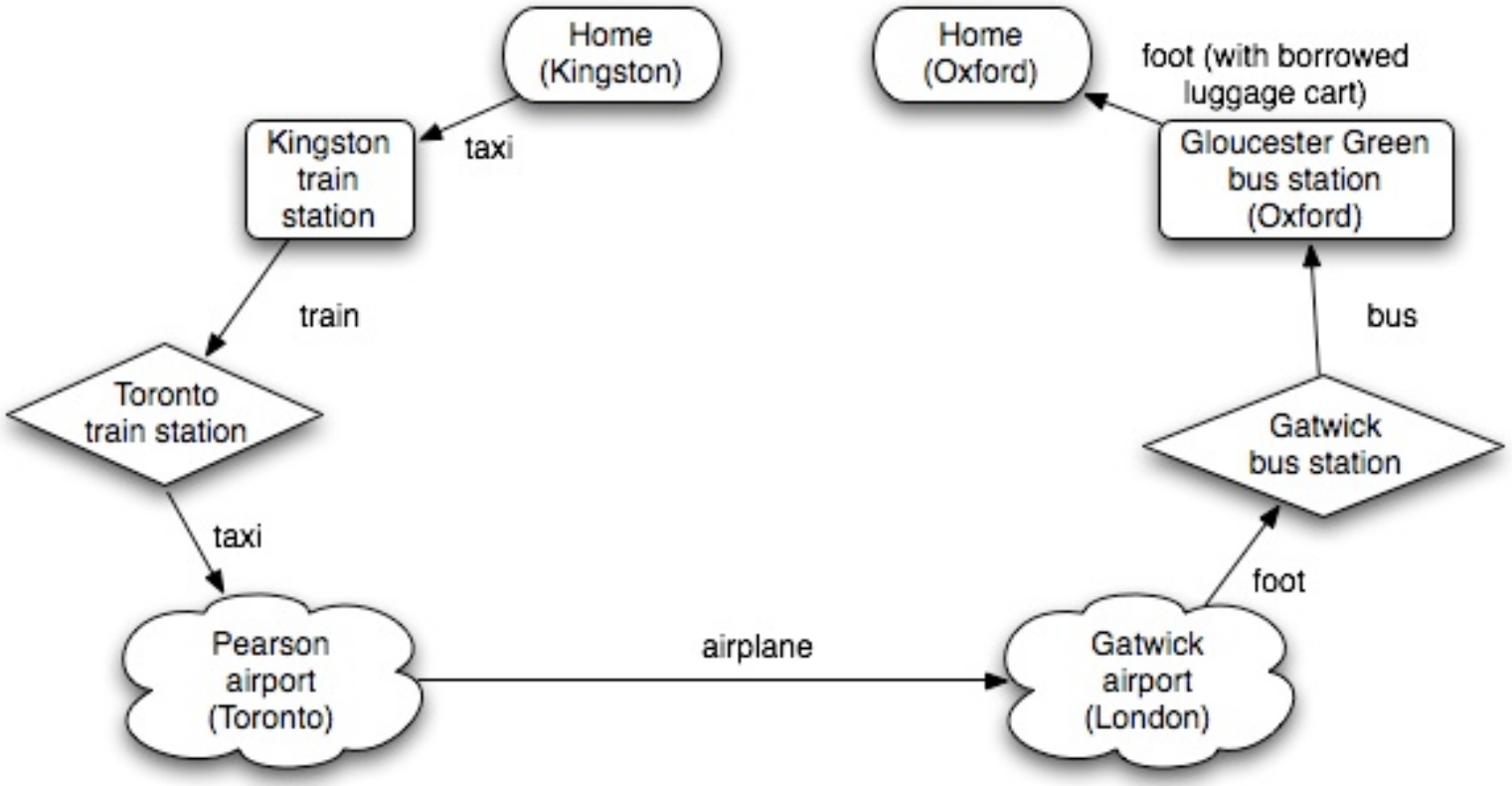
If there are several possible options, select the one that best serves your needs.

If you select a non-obvious breaking point, then say so and justify your choice.

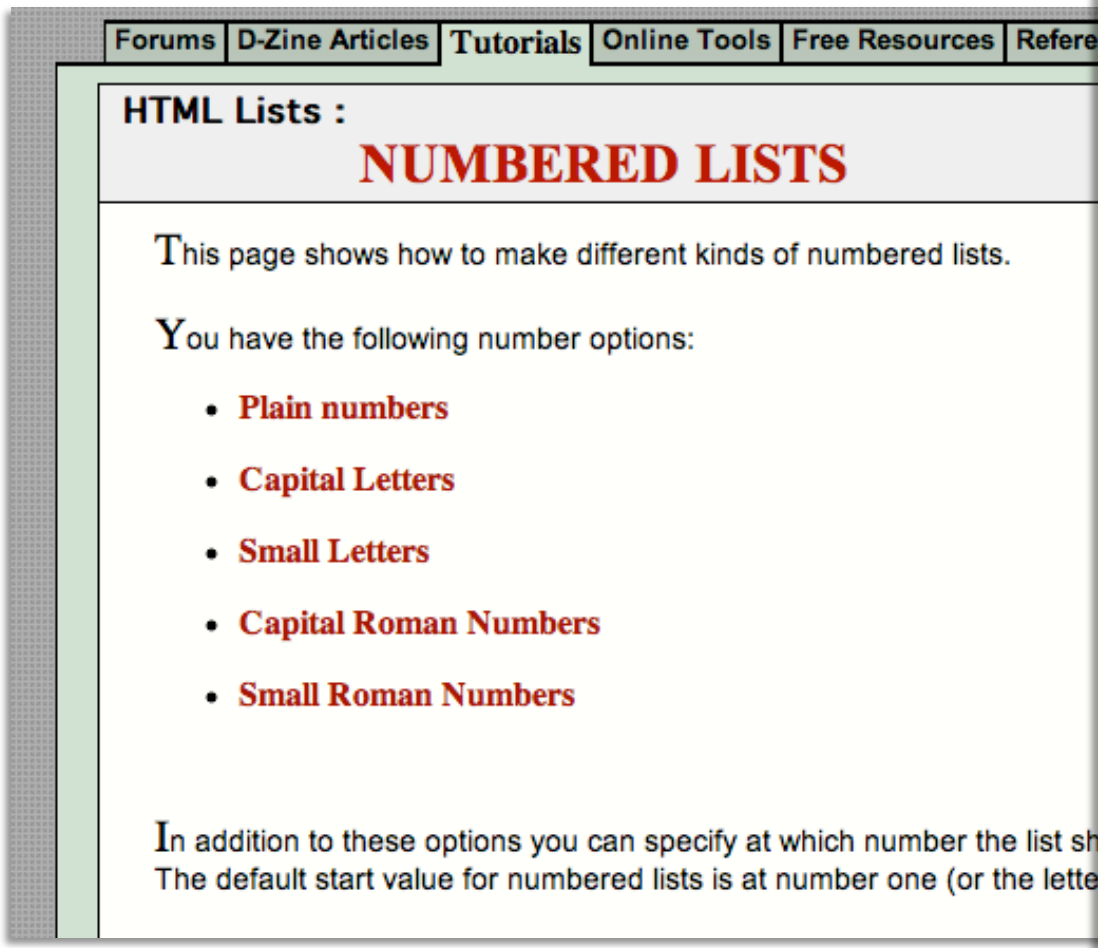


From Mind-Maps to Lists

Sequence and Connection



Outlining: Lists I



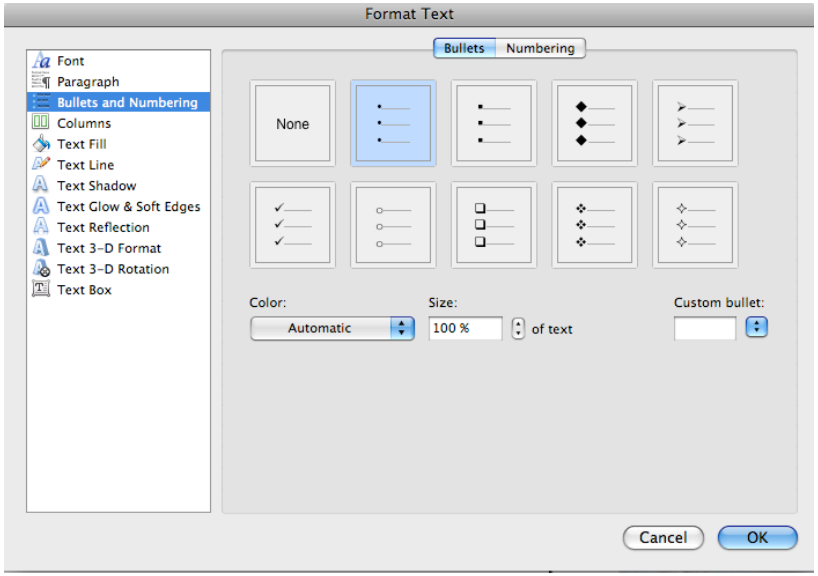
HTML-CODE	EXPLANATION / EXAMPLE

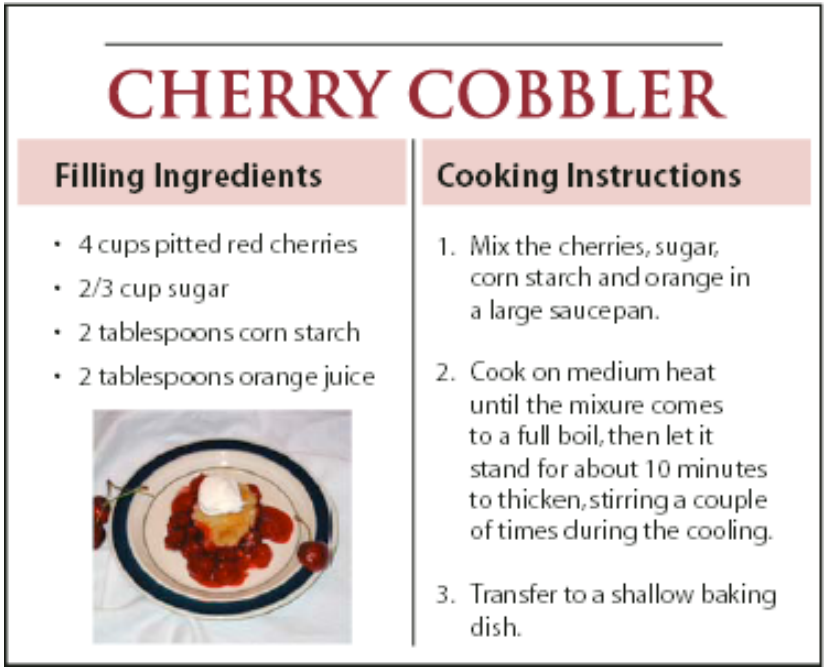
`<ol>`
`<li>text</li>`
`<li>text</li>`
`<li>text</li>`
`</ol>`
	Makes a numbered list using the default number type:
	1. text
	2. text
	3. text

`<ol start="5">`	Starts a numbered list, first # being 5. 5. This is one line 6. This is another line 7. And this is the final line
`<ol type="A">`	Starts a numbered list, using capital letters. A. This is one line B. This is another line C. And this is the final line
`<ol type="a">`	Starts a numbered list, using small letters. a. This is one line b. This is another line c. And this is the final line
`<ol type="I">`	Starts a numbered list, using capital roman numbers. I. This is one line II. This is another line III. And this is the final line
`<ol type="i">`	Starts a numbered list, using small roman numbers. i. This is one line ii. This is another line iii. And this is the final line
`<ol type="1">`	Starts a numbered list, using normal numbers. 1. This is one line 2. This is another line 3. And this is the final line
`<ol type="I" start="7">`	An example of how type and start can be combined. VII. This is one line VIII. This is another line IX. And this is the final line

Outlining: Lists II

- ♡ Numbered Lists
- ♡ Bulleted Lists
- ♡ Alphabetic Lists





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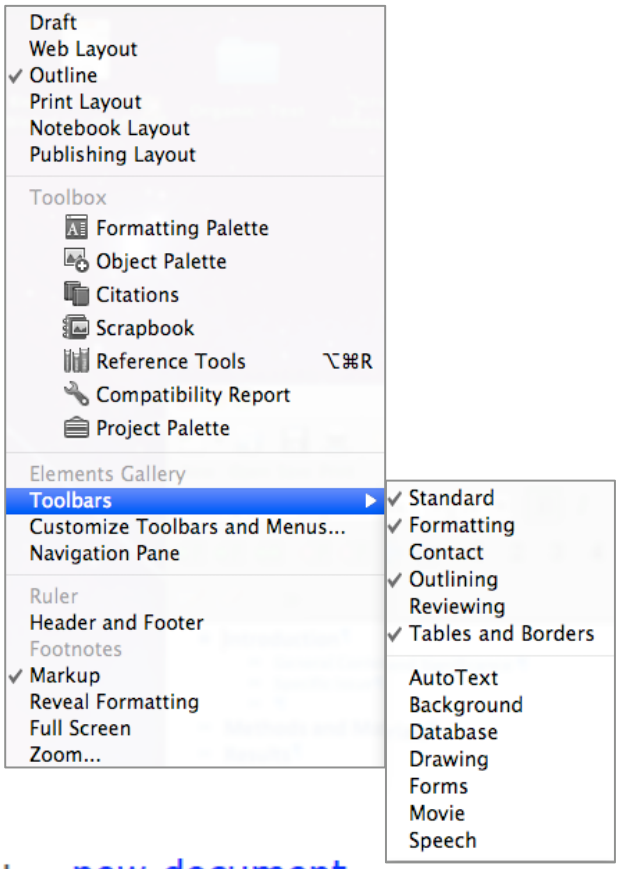


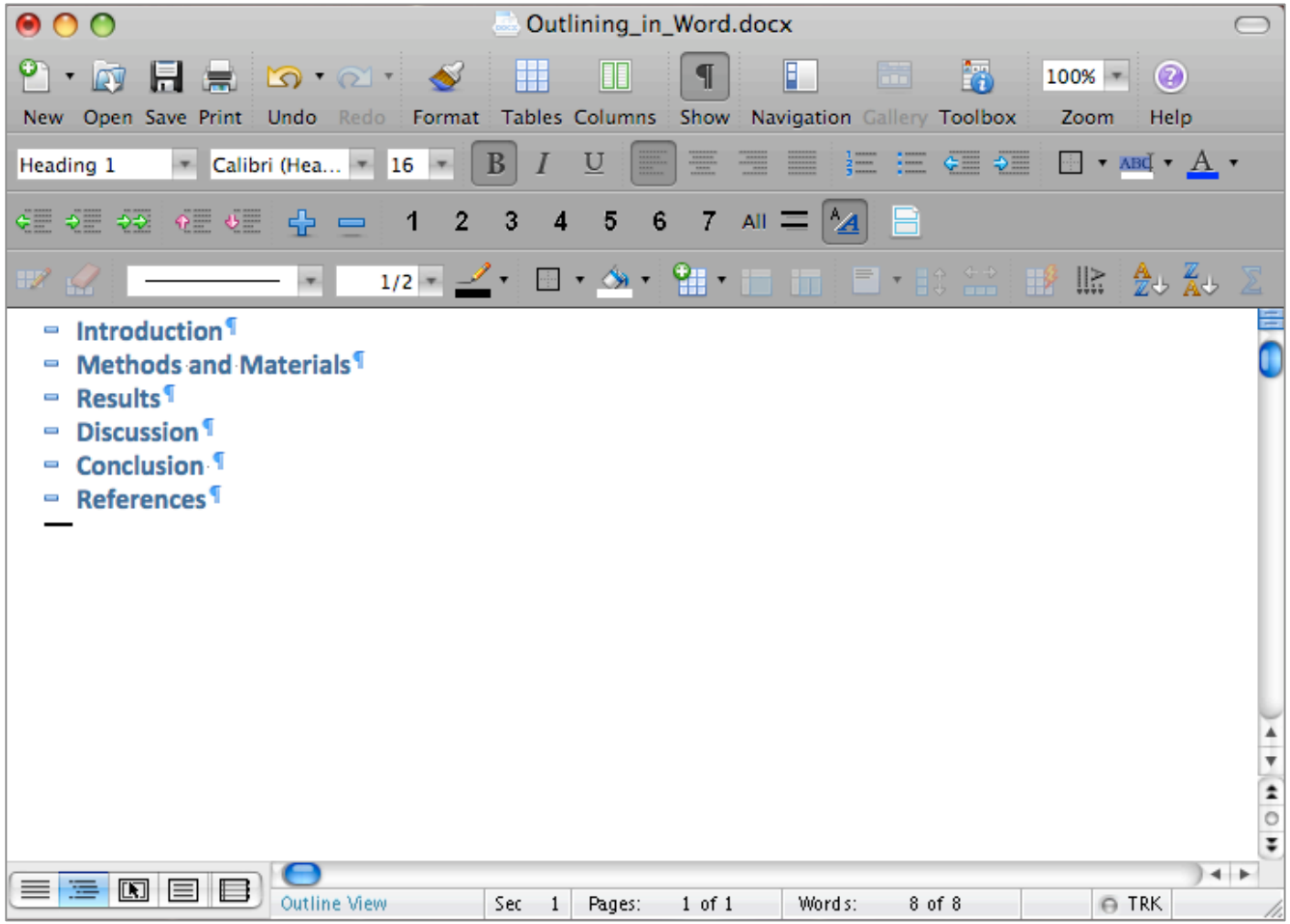
Outlining: Lists III

In Word

1. Create a new document.
2. Make sure Outline view has been selected. The Outline toolbar should appear on your screen (pre-Word 2007) or the Outlining tab of the ribbon should be selected (Word 2007).
3. Start typing your document. The paragraphs you enter will be a first-level head (formatted with the Heading 1 style).
4. Adjust the heading levels of your paragraphs by clicking the left and right arrow keys on the Outline toolbar or on the Outlining tab of the ribbon.

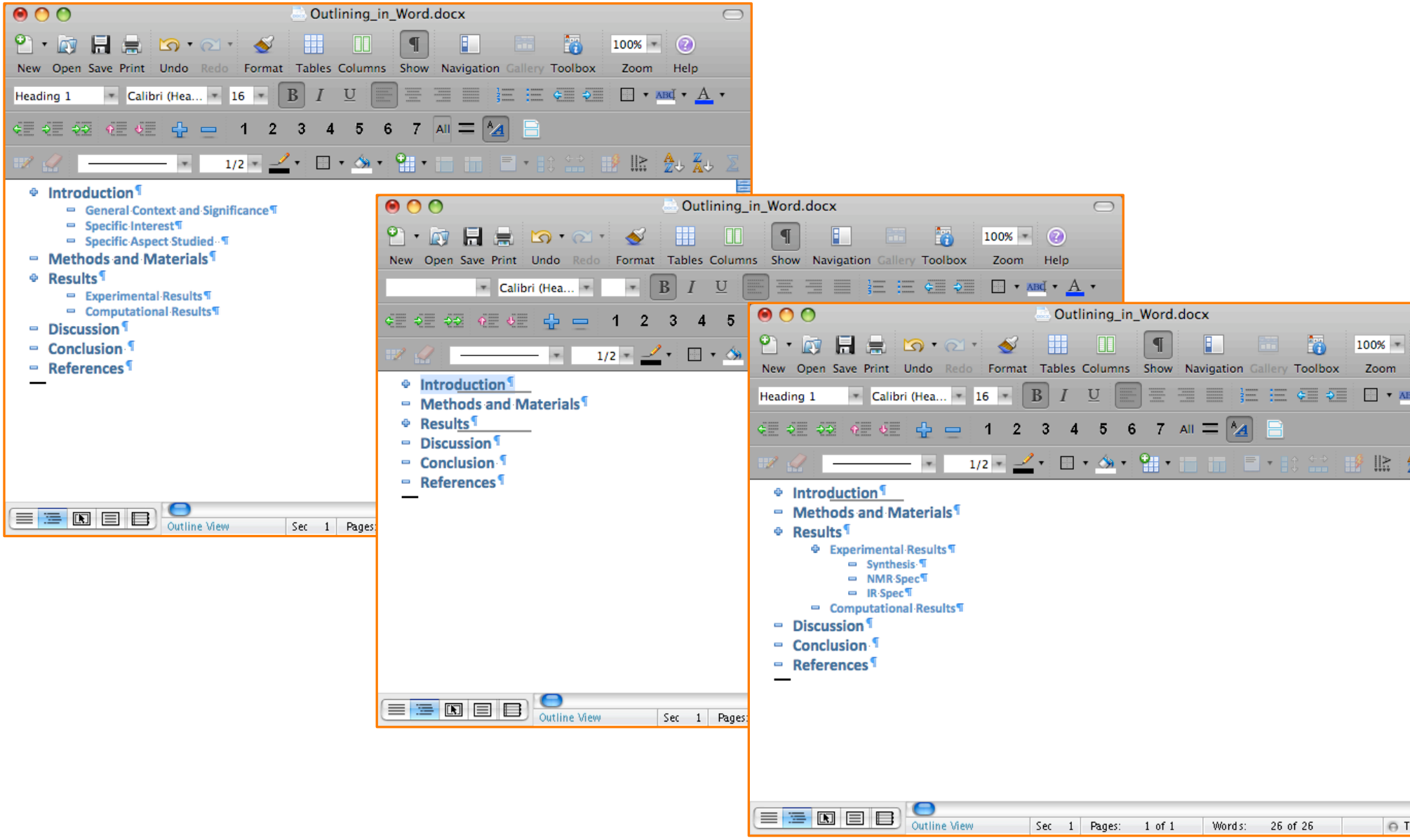
Outlining: Lists IV

In Word



Outlining: Lists V

In Word



Stereotyped Format

Here, that's a good thing!

- Title
- Abstract
- Introduction
- Materials & Methods
- Results
- Discussion
- Conclusion
- References

5. Be thoughtful.
6. Last item.

-- As you progress.

1. Start here!
2. What done? How?
3. Explain, examine.
4. Think hard!

-- As you progress.

Schemes & Figures

• Title	
• Abstract	Graphical Abstract
• Introduction	1-2 Schemes
• Materials & Methods	Maybe Scheme/Figure?
• Results	Figures (results)
• Discussion	Figures (data analysis) Schemes (data explanation)
• Conclusion	Scheme?
• References	