4/15/11: Discussion notes for Week 3

Results section:

We started to talk about this last week (review basic concepts from last week, and hand out photocopies of Ch 4 from Harmon and Gross, 2010).

It is difficult to say how to structure a results section because a lot depends on the type of data you are presenting.

Generally:
- You should limit your results section to presenting the information that is needed to support your interpretation.
- The inferences that can be made directly from your data should be discussed in your result section. For example, let’s say you measure a tracer, like radiocarbon, to quantify the uptake rate of carbon by phytoplankton. You would not only describe your radiocarbon data in the results section, but you could also discuss how you calculated uptake rate using the radiocarbon data.
- Limitations of your data should also be discussed in your results section. For example, the statistical analyses that you used to determine if there were significant differences between experiments, or with time, could be described in your results section.
- One structure that might work, depending on the nature of your data is (from Katz, 2009):
  
  a. General observations: The results begin with a panoramic view of the research setting, or of the large scale trends in the data.
  b. Specific observations: The results then zooms in to focus on the data about your key variables, and it presents this data in the arrangement that you created during your exploratory analysis.
  c. Case studies: The results ends with one or two examples, showing specific details of individual observations.

NOTE: This structure WILL NOT work for all papers. In many cases, it works better to organize your results section so that you present your data in the order in which you discuss it (in your discussion section). It usually works best to present the large important trends/results/patterns in the data first, and then more detailed features afterwards.
**Data Tables:** These are generally good for several purposes (from Alley, 1996):

- To present numerical data. The advantage over graphs is that tables can include a high degree of accuracy. If you need to emphasize actual numbers, for the purposes of accuracy, tables can be really effective. This is true particularly if you need to compare a set up numbers to each other.

- To present short parallel descriptions that otherwise would have to be listed in the text. For example, if you had a series of 10 experiments for which you changed different sets of parameters for each experiment, a table might be an effective way of showing your experimental design. Or if you had different outcomes for each experiment, a table could be a good way of displaying the important conditions of your experiment, and the main outcomes.

In designing a table, it often works best to sort or organize the table so that the left-hand column contains the main context of the data. In other words, in many cases you want the reader to understand the results within an certain context; use the left-hand column to provide that context. For example, the left-hand column could be time, distance, experiment number, size, concentration (typically the independent variable), and the data in the columns to the right contain the important information (typically the dependent variable).

**Figures and illustrations:** These are the main way to provide a visual understanding of your data to the reader. It is hard to be general about rules and best-practices for figures, but here are some tips (from Alley, 1996):

Clarity: Like language, your figures should be trying to make a point as clearly as possible. This means that your figures should not only convey the information intended, but should also NOT convey any unintended information that might mislead or confuse the reader.

Precision: The precision of your figures should reflect the precision of your language. Try not to present figures that are a lot more complex than the concepts described in the text. If you describe a feature or attribute of your data, the reader should not struggle to see that feature when they look at your figure.

Fluidity: There should be fluidity between your text and your figures; the contents of your figure should not be surprising once you read the text and vice versa. What you say in the text should be consistent with what is in the figure. Placement of figures should made sense with the flow of the text.
Familiarity: When making your figures, you should consider what your readers know and don't know. The reader should not be frustrated because they don't understand your figures, even after reading the text. For example, don't use unexplained or unusual parameters without explaining them in the text/figure caption. Don't forget to add scale bars if you show an image of something that is unfamiliar.

Discussion section:

We started to talk about this last week (review basic concepts from last week, and hand out photocopies of Ch 4 from Harmon and Gross, 2010).

There is no standard structure for discussion sections. This section is often centered on making comparisons to other knowledge in the field. It often centers on using the data to test a theory/idea. It is very important to generate a really good detailed outline for this section.

Framing your methods:


For Results, Discussion and Methods: See Ch 4 and 6 from Harmon and Gross (2010) handed out in class, and go over checklists at the end of each chapter to see if you hit all the points on the checklist.
Some tips about VERBS

Passive of Active voice:

Passive (the subject is passive – it doesn’t do anything, rather something is done to it. It uses some form of the verb ‘to be’ with a past participle verb; was measured, was analyzed, were found, were collected, etc).

Active (the subject of the sentence is active; the subject does something rather than something being done to it).

For example:
The person carried the book. (active)
The book was carried by the person (passive)

Passive is often used in the methods section because you typically want to avoid the use of the first person. Because the methods involves work that the authors did, it is hard to avoid the use of first person while using the active voice.

“The samples were analyzed”, rather than “I analyzed the samples”.

I think it is preferable not to use first person in the method section; therefore, you need to use passive voice.

In the rest of the paper, you will in most cases want to avoid using the first person, but you will likely be switching between active and passive voice. It is not wrong to use the passive voice. It is most important to put the contextual subject at the beginning of the sentence, and that might mean having to use passive voice.

For example:
“The pH of the water was reduced by the addition of more carbon dioxide”. (passive)
“The addition of carbon dioxide resulted in lower pH values”. (active)

Both of these are correct, but you need to select which one to use based on the point you are trying to make, and on what you explained previously.

If you measured a reduction in pH (the context) and need to explain why it changed, then the first sentence is the one you want to use. If you added carbon dioxide (the context) and need to explain what occurred, then the second sentence is the one you want to use.
**Present of Past tense:**

You will likely be switching between present and past tense, but some general patterns are:

When you refer to your own work, particularly if they were a set of experiments that you performed, you are often going to be using past tense to describe your results:
“The pH dropped due to the addition of carbon dioxide in the first experiment, but not in the second one”.

When you refer to published work, especially when it is being considered as established knowledge, you will be using present tense:
“pH of seawater drops when carbon dioxide is added (reference, 2009)”.

However, there will be cases when you use present tense when describing your data (as opposed to what happened in one of your experiments). This is because your data exists as a permanent entity with attributes, even if it was collected in the past:
“The pH values from experiment #1 indicate that carbon dioxide is a weak acid”.
“The observed sea surface temperatures measurements are similar to those calculated with the numerical model”.

Likewise, you may have to use past tense when describing published work:
“The pH dropped in our experiment, but it increased in another experiment performed at higher altitude (reference, 2009)”.

So, there are no strict rules about past versus present tense. Just use past tense to describe something that happened in the past, and present tense to describe either accepted knowledge or existing data/information.