

## Reading a scientific article

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One often starts out in life reading fiction, which is often read in a certain way. In reading fiction the words are the focus, and illustrations absent or of secondary importance. One typically reads in a linear fashion, from start to finish. Also, one does not have an expectation as to what will be encountered at what point (new characters, for example, can be introduced at any time). During one's education in many disciplines, such as history and philosophy, aspects of this reading approach are reinforced, and it could be natural to approach scientific literature in a similar way. However, a different reading approach is used and needed

Journal articles are one of the most common types of scientific literature. There are perhaps four significant differences with how such material is read.

- 1)** Scientific articles are typically highly and predictably organized so that the reader expects to find certain elements in a certain order. Typically, in order of presentation these are: a) abstract, b) introduction, c) methodology, d) results, e) discussion, f) conclusions, g) acknowledgements, h) references cited. Section headings provide important markers for each component. Other structures exist, but this one is very common, and very successful at conveying necessary information.
- 2)** Illustration of all types (maps, graphs, flow diagrams, photos ...) are key components and often an intense focus of reader scrutiny. Some readers may consider them more important than the words! This raises the question as to how does one read non-textual elements? Experience will help you with this, but the important point is that one needs to read more than just words. Pattern recognition is a major part of such "reading".
- 3)** Scientific articles are often read in a highly non-linear way, jumping around, and coming back to different elements as need be. The abstract is typically the first focus, as it summarizes the major elements of the paper. After that, however, the order will depend highly on the reader's experience and interests. If familiar with the methodology, a reader may very well skim or skip this part. Commonly, key figures in the results section can often be an early focus. Some may proceed to the conclusions. The discussion is typically read last because in order to understand the discussion you have to have read the following discussions. The fact that scientific articles are highly structured facilitates this reading style, because one can easily find the element of particular interest.
- 4)** Finally, journal articles can be relatively dense (both conciseness and clarity are valued) and the ideas complex. The reader is usually expected to have a certain level of command of the discipline. For these reasons, one often has to read some sections multiple times and think hard in order to understand them. Reading a paper 2-3 times to really get a command of its content is not unusual. Per page, one must allow significantly more reading time.

In summary, when reading scientific journal articles one typically does so with distinct expectations as to the organization, with a focus on the figures, in a non-linear way, and in a repeated fashion until the level of desired understanding is gained.