

Characteristics of Scientific Academic Writing

1. Strong, straightforward organization.

The paper has a short introduction and conclusion which guide the reader's expectations and summarizes the main points. Paragraphs usually begin with a topic sentence and then develop and justify it in the paragraph body. This strong organization facilitates scanning and speed-reading the paper.

2. Structure strongly dependent upon logic; possibly even mathematical formalism.

Topics in the body of the paper follow each other in logical progression. A reader's expectations about the content and ordering of topics should never be disappointed. For instance, if the author mentions that the speed of the sorting algorithm is very important in this application, the reader should expect to learn why or how she knew this, and then later, what algorithm was chosen and what others were considered and rejected, and why. Similarly, arguments should build from basic to more complex, without omitting steps or adding distractions.

3. Acknowledges alternative theories or approaches in a respectful way.

Even in a paper meant to persuade, other schools of thought must be acknowledged in a fair, complete, and generally respectful way. The author must convince the reader that he is aware of, and has thoroughly understood, all other viewpoints and seriously considered them. Thus, unlike in most of the political rants one hears these days, presentation of alternative viewpoints strengthens, rather than weakens, the argument at hand.

4. Has a clear and consistent sense of audience.

Underlying the entire presentation is a clear and consistent set of assumptions about what the reader does and does not already know about the subject. Sometimes some of these assumptions are given explicitly in the introduction, perhaps even with references to materials to read if necessary. More often, the assumptions are implicit in the kinds of readers to whom the material will be delivered. In any event, the level is consistent: the paper does not tediously belabor simple things in one place while assuming esoteric detail somewhere else.

5. Avoids statement of opinion, and clearly identifies aspects which require more scientific validation.

In a scientific academic paper, both writer and reader should be interested only in what can be proven as a result of experiments or logical reasoning based on observations, experiments, and results demonstrated in other scientific papers. If an author speculates, it must be in the context of proposing that new studies should be done to test the validity of the speculation. Scientific authors should avoid opinion and even "loaded" words which imply a judgment, such as "...H. Gordon's misinformed work (1993) about ant colonies..."

6. Carefully documents sources, not only for quotations but for ideas and theories.

This is of course a characteristic of all academic writing, but in scientific writing it is even more important, since scientific readers are likely to want to investigate works that form a background for the current one, and since the writer's argument is strengthened by appeal to many outside authorities. Although specific formats for this vary among different publications, the works cited are usually collected into a *List of References* at the end of the paper, and may be referred to by author's name and year in the text, as shown in these examples:

"H. Levinson (1978) defined stress through the use of two main concepts: the ego-ideal and the self-image."

"It can place an employee at risk of distress if it is too intense, frequent, or chronic (Selye, 1976b)."

The relevant entries in the List of References for the above quotes are:

Levinson, H. (1978). A Psychoanalytic View of Occupational Stress. *Occupational Mental Health*, 3(2), pp. 2-13.

Selye, H. (1976a). *Stress in Health and Disease*. Boston: Butterworth.

Selye, H. (1976b). "Forty Years of Stress Research: Principal Remaining Problems and Misconceptions." *Canadian Medical Association Journal*, 115, pp. 53-56.