

# Guide to understanding scientific writing. II. Common Phrases (Part 2: the non-Latin ones)

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***Prologue:** Reading a scientific paper can be daunting and frustrating, especially if you are unfamiliar to the various conventions of scientific writing. This multipart series of articles is designed to introduce the virgin reader to these idiosyncrasies and decrease communication barriers between science and the public.*

So, we've already talked about some popular Latin phrases used in scientific writing in [Part 1](#) of our examination of common phrases (which is Part II of our guide to scientific writing). Now, we'll look at some common non-Latin phrases.

As before, we have ordered these phrases based on their frequency of use according to a Google Scholar search (see [here](#) for more details).

## First Principles (1.61 million results)

*What does it mean?* – The fundamental or foundational concepts of a scientific field.

*How is it used?* – There are typically two ways in which “first principles” is used. The first is when the authors are offering their suggestions for what the “first principles” of a particular discipline ought to be. Consequently, we now have “first principles” of [typography](#) (“The graphic structure of a document should reflect its conceptual structure”, and “Sequences of characters make up words”), [public finance](#) (“exceeding taxable capacity [is] a diminution of economic welfare”) and [interaction design](#) (“Test all designs on your oldest expected user population” and “use font sizes that are large enough to be readable on standard displays”).

The second class of usage is when authors state that their theory, research or hypothesis is based on “first principles”. The main problem here is that authors often neglect to explicitly state the first principles to which they are referring [e.g., “[The model is shown to be consistent with the first principles of thermodynamics.](#)” (emphasis ours {we bolded the period})]. This usage is far more common among scientists. In fact, we propose that one of the first principles of using the phrase “first principles” is neglecting to define the first principles.

*Why is it used?* – To make ridiculous claims sound unimpeachable. Even the most outlandish assertions can be made to sound magnificent by invoking “first principles.” To wit:

“The hypothesis that man is the hybrid spawn of chickens and pigs, is, of course, no more than an extension of the first principles of barnyard hybridogenesis.”

## Data not shown (902,000)

*What does it mean?* – The authors have the data that support a particular claim, but they are choosing not to show them.

*Wait, what?* – Yes, that’s right. The data exists, but you’re not allowed to see it. It’s a fucking secret, asshole.

*Why is it used?* – Historically, this phrase was a technique to save valuable page space in paper journals. Usually, the data “not shown” pertained to a minor aspect of the research and the authors decided not to show it due to the cost of journal space. However, with the advent of computers and the Internet and their seemingly infinite storage size (i.e., tubes), one would expect the use of this phrase to have decreased.

*Has it?* – Not really; According to Google Scholar, 25% of the instances of “data not shown” have occurred since 2003 (the year that the online-only journal PLoS Biology launched).

*Then why is this phrase still in use?* – There are at least three possible reasons: 1) old habits die hard and scientists have become accustomed to paring down their results, 2) some journals may have not figured out the whole Internet thing yet (*Journal of Printed Matter*, we’re looking at you!) and 3) scientists have something to hide.

*Are you suggesting the continued use of this phrase could lead to a mistrust of scientists?* – Hardly! Americans have, and will always have, full trust in their scientists (data not shown!).

**See review by (143,000) and see reviews by (84,600)**

*What do they mean?* – these are used to direct the reader to another academic paper that is a literature review of the particular topic the author was discussing. The second phrase, being plural, implies that there are multiple reviews on the topic. That’s how plurals work.

*Wait, what is a “literature review”? Is it like a movie review?* – Although the idea of a website like RottenTomatoes for scientific papers is appealing (RottenSolanums ©<sup>®</sup>™), a literature review (aka, review paper) is not at all similar to a movie review. A literature review is when authors summarize a whole bunch of currently published papers that deal with a particular topic (e.g., the effect of coffee on brain function). The authors only summarize the findings of the papers, and do not rate or critically evaluate them. Here,

**1 Actually, some data is shown.**

let’s compare and contrast:

Literature review style: “recent papers by Ferkle and Frump demonstrate how lead can poison frogs.”

Movie review style: “While all the frog poisoning is a nice touch, Ferkle and Frump’s apparent lack of enthusiasm for killing frogs is hard to dismiss. Figure 2 – a pile of dead frogs – almost redeems the paper, but one leaves with the distinct impression that the authors care more about testing hypotheses than they do about conveying the primal thrills of amphibicide. We rate this paper 2 petri dishes out of a possible 4.”

*So how are these phrases used?* – When a scientist wants to make a claim, they are expected to provide some evidence. Often, that evidence is in the form of a reference to another paper that specifically studied that topic. So a scientist claiming that coffee is good for the brain will reference (or “cite”) a previously published paper that may have done an experiment on the effects of coffee on mice. If instead that paper is a review paper, they would then write, “see review by Jones 1999.” Scientists love to cite review papers.

*Why is that?* – There are at least two reasons. The first is that review papers are highly regarded by the scientific community. A claim coming from a review paper is given more weight than a claim coming from just one study, because the review paper draws its conclusion from a multiplicity of studies.

*What’s the second reason?* – A common convention of scientific writing is that any non-trivial claim must be supported by a citation to either a review paper or at least three different studies (see [The Rule of Three](#)). Because no one wants to spend an afternoon looking for papers to cite, finding a review paper on a particular topic is like realizing someone just made fresh coffee in the faculty lounge.

**As cited by (36,800)**

*What does it mean?* – The author is citing a paper that was cited by another paper.

*How’s it used?* – At least two main ways, one legitimate and one not so much. The legitimate use is when one does not have reasonable access to a particular paper that you believe supports a particular claim you want to make. Your restricted access must be reasonable (e.g., the paper is in a language that you cannot read,

or the only available version of the paper is a print copy located in the warehouse at the end of *Raiders of the Lost Ark*).

The not-so-legitimate way that “as cited by” is used is when the author sees that Paper A cites Paper B as evidence to support a claim, and decides to also cite Paper B (usually without checking if Paper B actually does support the claim). In this case, the author writes, “Paper B (as cited by Paper A)”. Now if Paper B is bogus or doesn’t really provide great evidence, the use of “as cited by” in this situation allows the author to shift the blame from themselves to the author of Paper A: “Hey, maybe you should check your references a little more closely next time, author of Paper A!” In practice, this rarely happens. Most scientists will just pretend to have read paper B.

### **Results were qualitatively similar (5,560)**

*What does it mean?* – An alternative method was used to collect or analyze data and the conclusion was the same as that of the original method.

*How’s it used?* – As with “data not shown”, this is mostly used as a space-saver. The art of conducting a scientific experiment and analyzing its results

involves many side-tests and alternative calculations for reasons ranging from the legitimize (e.g., quality control, dealing with missing data) to the not-so-legitimate (e.g., ‘every analysis is a practice run until I get a significant *P*-value’, ‘look, the *P*-value is significant if I log-log-sqrt-arcsin-boxcox(x+1) transform the data!’). Rather than going into further detail about the results of all these tests, authors merely write, for example, “the results were qualitatively similar if we removed these two outliers.”

*Why say “qualitatively”? Why not just say “results were similar”?* – There are two possible types of results: 1) quantitative (e.g., average height of males and females) and 2) qualitative (e.g., males are taller than females). By saying “the results were qualitatively similar” after an alternative method of data analysis, authors mean that the overall inference was the same (e.g., males are still taller than females), but the exact numbers are different (e.g., by 4.5 inches, not 4.4 inches).

### **Results were quantitatively similar (250)**

*How’s it used?* – By some very confused scientists.