

How to Use Active Voice in the Sciences

For the better part of the twentieth century, passive voice held sway in the sciences, and science journals by and large shunned the first person—singular or plural. But it was not always thus. “When on board H.M.S. ‘Beagle,’” Darwin writes at the start of *On the Origin of Species*, “I was much struck with certain facts in the distribution of the inhabitants of South America,” and he continues in this direct manner for several hundred pages of close observation and argument. Slowly, science journals are returning to a preference for the active voice, and university science departments are following suit, though they have lagged behind somewhat. Several influential science journals—*Science*, *Nature*, and the *British Medical Journal*, among others—are quite explicit in this preference. Some, such as *Physical Review*, are more indirect, stating a preference for “clear, simple sentence structure.”

Drawing on examples from contemporary science journals, this handout identifies some key strategies for injecting more active voice into your science reports.

Even if your course requires you to use passive in the Methods section, do not shy away from active in the other sections

There’s a good reason for preferring active constructions outside of the Methods section. Let’s compare two passages from the same issue of *Molecular Biology*, both written in the passive voice. The first is from an Introduction:

More than 50 LRRK2 mutations are known now. All of the mutations (mostly, missense mutations) **were found** in heterozygote, segregated with the disease and were not detected in a control sample. In addition, **LRRK2 mutations were not detected** in other neurological disorders. **Autosomal dominant PD was demonstrated** to result not only from the most common G2019S mutation, but also from at least five other mutations.

The problem here is that the reader has no way of knowing from the sentences themselves who was responsible for each of the findings. Was it the same person in each case or different ones? What was their specialty? What technical means did they use to achieve their results? All this remains vague.

By contrast, in the Methods section we at least know that the authors of the article were the agents in each and every step:

Nucleotide sequences were analyzed using the Staden 1.53 software package. **Alignment was performed** using the ClustalW program provided in the MEGA package v.5. **The number of haplotypes (h), haplotype (Hd), and nucleotide (π) diversity were evaluated** using DnaSP 5.10 program.

Learn some basic techniques for introducing active voice outside of the Methods section

You may refer directly to the authors:

Nambu et al. have reported a theoretical study of wake formation in the presence of a magnetic field parallel and perpendicular to the ion flow direction. (Introduction, *European Physics Journal*)

In your literature review, you can attribute results from across a range of sources while keeping your sentence active and conveying useful information about the nature of those sources:

. . . while **a large body of literature has explored** large-scale geographical patterns, and **several recent papers have studied** disease dynamics in a metapopulation framework, **few empirical studies have focused** on the patterns and mechanisms behind disease clusters at small spatial scales (“disease foci”), especially in wild host-pathogen systems. (Introduction, *Ecology*)

You may also use the sections of your own report or a graph or figure as the subject of your sentences:

The results of this study showed that severe hypothermia did not develop in either group. (Discussion, *Journal of Obstetric, Gynecologic, & Neonatal Nursing*)

Table 1 shows the frequencies of the study design criteria of included studies by sponsorship source. (Results, *PLOS Biology*)

If there is a good reason for using the passive voice, by all means use it

You may want to draw attention to the object, not the subject:

The differentiation of two intra-island, ecologically differentiated subspecies in the Azores is not supported by the molecular data, which suggest instead an inter-island geographic pattern in the molecular data. (Discussion, *American Journal of Botany*)

There may be no known or obvious subject:

Many devastating pathogens are passively dispersed, and their epidemics are characterized by variation that is typically attributed to environmental factors. (Abstract, *Ecology*)

You may not be able to identify the subject with precision because you're referring to a consensus:

Two mechanisms have been widely accepted to account for the SERS effect, chemical enhancement, and electromagnetic enhancement. (Introduction, *Analytical Chemistry*)

In the Materials and Methods section, sticking to the active voice can become monotonous. Many science writers therefore move between the two voices to introduce sentence variety:

To develop the model **we worked** through a series of increasingly sophisticated scenarios. **We first obtained** a solution for two bodies interacting via the gravitation force with the position of the larger body fixed. **A MATHCAD program was written** to integrate Newton's second law using the Runge-Kutta fourth-order algorithm, and **the results were compared** with the analytic solution. Then **we allowed** the larger body to move, thereby examining the relative motion of two mutually interacting bodies. (*American Journal of Physics*)

Note that there are ways to vary sentence structure other than alternating between the two voices. Using complex rather than simple declarative sentences can help you better spell out the logic of your experiment while retaining the concision and directness of active voice:

We analyzed comparisons 1-4 using both our full data set and a conservative (truncated) data set that uses one randomly selected observation for each pair of competing species per response variable. **Because these two data sets only specify** the native/exotic status of the focal herbivore (i.e., the competing species can be either a native or exotic species), **we repeated** our analysis of the full data set when it was divided into four categories: native focal species and native competitors only, native focal species and exotic competitors only, exotic focal species and native competitors only, and exotic focal species and exotic competitors only. **Asking the same questions** using these three data sets **allows us to fully explore** the exotic/native question across multiple ecological contexts. (Methods, *Ecology*)

Remember that scientific publications are not always reliable models for grammar and style

Learn to be a discerning reader. In particular, be on the lookout out for the confusion that can arise from the needless use of passive voice. Active voice allows you to avoid two of the most common sentence-level issues in science papers:

1. Existential “it” combined with passive voice:

It is now realized that the vast majority of the genome is transcribed. (Introduction, *Trends in Cell Biology*)

2. Dangling modifiers:

To assess the depression of mitochondrial UC function, CPS1 and OTC **activities were measured** in liver homogenates. (*Disease Models & Mechanisms*)

The introductory modifier, “To assess ...,” needs to be followed by the agent that is doing the assessing (“we measured ...”). Often, using active voice is the only way to “undangle” the modifier.