

critical “unknown” (conclusion) that makes the paper matter at the relevant scale. Along the path, there are often clues given about the mystery behind the gaps; these clues lead to the untested hypothesis or undeveloped method of the paper and give the reader hope that the mystery is solvable. The introduction should not contain a broad literature review beyond the motivation of the paper. This gap-focused structure makes it easy for experienced readers to evaluate the potential importance of a paper—they only need to assess the importance of the claimed gap.

The last paragraph of the introduction is special: it compactly summarizes the results, which fill the gap you just established. It differs from the abstract in the following ways: it does not need to present the context (which has just been given), it is somewhat more specific about the results, and it only briefly previews the conclusion of the paper, if at all.

## Rule 7: Deliver the results as a sequence of statements, supported by figures, that connect logically to support the central contribution

The results section needs to convince the reader that the central claim is supported by data and logic. Every scientific argument has its own particular logical structure, which dictates the sequence in which its elements should be presented.

For example, a paper may set up a hypothesis, verify that a method for measurement is valid in the system under study, and then use the measurement to disprove the hypothesis. Alternatively, a paper may set up multiple alternative (and mutually exclusive) hypotheses and then disprove all but one to provide evidence for the remaining interpretation. The fabric of the argument will contain controls and methods where they are needed for the overall logic.

In the outlining phase of paper preparation (see Rule 9), sketch out the logical structure of how your results support your claim and convert this into a sequence of declarative statements that become the headers of subsections within the results section (and/or the titles of figures). Most journals allow this type of formatting, but if your chosen journal does not, these headers are still useful during the writing phase and can either be adapted to serve as introductory sentences to your paragraphs or deleted before submission. Such a clear progression of logical steps makes the paper easy to follow.

Figures, their titles, and legends are particularly important because they show the most objective support (data) of the steps that culminate in the paper’s claim. Moreover, figures are often viewed by readers who skip directly from the abstract in order to save time. Thus, the title of the figure should communicate the conclusion of the analysis, and the legend should explain how it was done. Figure making is an art unto itself; the Edward Tufte books remain the gold standard for learning this craft [7,8].

The first results paragraph is special in that it typically summarizes the overall approach to the problem outlined in the introduction, along with any key innovative methods that were developed. Most readers do not read the methods, so this paragraph gives them the gist of the methods that were used.

Each subsequent paragraph in the results section starts with a sentence or two that set up the question that the paragraph answers, such as the following: “To verify that there are no artifacts. . .,” “What is the test-retest reliability of our measure?,” or “We next tested whether  $\text{Ca}^{2+}$  flux through L-type  $\text{Ca}^{2+}$  channels was involved.” The middle of the paragraph presents data and logic that pertain to the question, and the paragraph ends with a sentence that answers the question. For example, it may conclude that none of the potential artifacts were detected. This structure makes it easy for experienced readers to fact-check a paper. Each paragraph convinces the reader of the answer given in its last sentence. This makes it easy to find the paragraph in which a suspicious conclusion is drawn and to check the logic of that