

## WRITING TIPS SERIES

# Effective writing and publishing scientific papers, part V: results

### 1. What you should know

The results section of an article presents a clear, concise, and objective description of the findings from a particular study and is mostly written in the past tense. The findings are presented without interpretation, as this should occur in the discussion section only. You may think of the results section as mirroring the methods section: For every method (what you did), there should be a corresponding result (what you found) and vice versa. A common order of elements is: recruitment/response, characteristics of the sample, findings from the primary analyses, secondary analyses, and any additional (unexpected) findings. Ideally, the results section is a dynamic interplay between text and figures/tables; the most important data will be shown in both. Tables and figures are particularly useful to present larger quantities of data (see part 7 of this series on “Tables and figures”).

The word “significant” is often used in everyday language to stress something that is important or substantial, but in a scholarly article, it is probably better to use the words “statistically significant” if you want to report a difference proven by a statistical test. Although the reporting of *P*-values is very common in the medical literature, interpretation of findings based solely on *P*-values can be misleading and is therefore discouraged. The 95% confidence interval not only contains the information from *P*-values but also additionally shows the direction of the treatment effect (whether toward harm or benefit), the size of the effect estimate, and its degree of precision.

### 2. What you should do

Keep the story line of your paper in mind: Findings in the results section should match and answer the research questions from the introduction, using the procedures explained in the methods section. Retaining this focus will help you to be more concise, that is, to decide which findings to present and which to leave out.

Start the results section with a description of the recruitment/response of participants, or rather the yield of other procedures by which you obtained the data for your analyses. In prospective research, such as randomized controlled trials, it is particularly useful to present a flow chart of the recruitment procedure and the response of participants to treatment or measurement events (this typically becomes Figure 1 of your paper). The next step is to describe the characteristics of the study sample. Data on the sample can be presented very efficiently in a table (typically

Table 1) and should include basic demographic characteristics as well as the major clinical and lifestyle variables.

Use more tables and figures to support the main text of the results section. As with all information from tables and figures, you should not repeat this information in its entirety in the text but only highlight the findings that support your hypothesis and those which are unexpected.

Begin a new paragraph for the results from the primary analyses. These should be presented early in the results section to stress their importance. Also use a new paragraph for results from secondary analyses. End the results section, if applicable, with a short paragraph on any additional (unexpected) findings. Make it clear that these findings result from ancillary (post hoc) analyses and are intended to generate new hypotheses. Avoid words such as “remarkably” or “strikingly,” which imply an interpretation of the findings. Use similar sentences and words to present similar results and do not try to find new ways to write the same (i.e., synonyms), as this will only confuse the reader.

Always use the same order when presenting data. For example, always report findings from the experimental group before those from the control group. Provide effect sizes, such as odds ratios or relative risks, together with their 95% confidence intervals. Never report results with *P*-values only. Make consistent use of meaningful decimals for reported figures. So unless you have a very large sample size (let us say  $N > 1,000$ ), present numerical values with one decimal place. Furthermore, present measures of central tendency together with their appropriate measures of variability: mean (standard deviation) or median (interquartile range). Always present the absolute number of cases in addition to relative measures (e.g., “The percentage was 22% (33/150) in the intervention group compared with 15% (23/150) in the control group”).

#### Checklist for the results section

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- Write the results section in the past tense.
  - Structure roughly into: recruitment/response, sample characteristics, primary analyses, secondary analyses, and ancillary analyses.
  - Match the results section with the methods section.
  - Present findings without interpretation.
  - Highlight findings from tables and figures in the text.
  - Present estimates with 95% confidence intervals.
  - Consider providing additional results in tables and figures as web-only supplementary material.
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