Picky Notes on Scientific Writing

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The principal goal in scientific writing is to make a clear presentation of objective data to test a hypothesis or address a problem. The best scientific writing is clear, precise, and concise. Although entire books have been published on writing and grammar, the following guidelines are mistakes that I frequently see in students' papers. I admit that some of the rules below might be a matter of style and personal preference - *but follow them anyway.*

1. Do not use contractions (e.g., "don't") in formal writing.
2. Do not use the following terms:
   - *In order to*: write *to.*
   - *Impact*: *impact* is a physical collision, do not use it to replace the verb *affects* or the noun *effect.*
   - *Utilize*: write *use.* Nobody says 'utilize', it sounds like an effort to be sophisticated.
3. Use first person, active voice: "I established the study to..." is usually preferable to 'The study was established to...". That being said, interesting writing will include a combination of first person and passive language. The current rule-of-thumb is that scientific papers should be 70% active voice/30% passive voice.
4. When making comparisons, complete the comparative statements. Comparative adjectives are used to compare differences between the two objects they modify (larger, smaller, faster, higher). They are used in sentences where two nouns are compared, in this pattern: Noun (subject) + verb + comparative adjective + than + noun (object).
   - The effect of sunlight on seedlings was stronger. **wrong**
   - The effect of sunlight on seedlings was stronger than the effect of fertilization. **correct**
5. When quantifying an object, use the word *number* if it can be counted (number of fish) and use the word *amount* if the measurement is continuous (amount of iron ore).
   - Conducting night patrols and building bonfires will result in the fewest amount of elephant raids. **wrong**
   - Conducting night patrols and building bonfires will result in the fewest number of elephant raids. **correct**
6. Do not use *what* as a relative pronoun.
7. Do not end sentences with a preposition.
8. Do not use the following informal verbs or anything like them.
   - "From the data, we *see...*"
   - "We *looked* at the data..."
   - "The data were normally distributed, so we *went with...*"
   - "We *got* statistical signficance."
9. In most cases, it is not necessary to add *respectively* at the end of a sentence (e.g. "Oxygen, nitrogen and hydrogen detector flows were set at 85, 7, and 4 mL/min, respectively".)
10. The word 'data' is *plural*, conjugate verbs accordingly. The word 'data' is *plural.* Repeat after me, the word 'data' is *plural.*

11. Be careful to maintain verb tenses within paragraphs and sections of papers. If you start the section with past tense, maintain past tense.

12. Use the word 'between' when you are talking about two subjects and 'among' when you are referring to more than two subjects.

    - There was no difference in mean tree height between lowland and montane forest.
    - There was no difference in mean tree height among the three forest types.

13. Use spell check! Spell check is also available in RStudio, so use it.

14. Write about your subject and include statistics and figures as evidence for you statements. Do not make the figure or statistical analysis the subject of the sentence, in most cases.

- **Good**: "Scientists who use correct grammar make salaries 50% greater than those who do not ($F_{2,150} = 12.3, p < 0.001, R^2 = 0.975$)."
- **Bad**: "Figure 3 shows that scientists that use good grammar make more money."
- **Bad**: "Our regression model demonstrated that…".
- **Bad**: "The results show…" - ugh.

15. When reporting numbers and statistics, be mindful of the number of significant digits you report (i.e, do not calculate a mean to 10,000 decimal places when the original data were measured to the tenths).