Programa de Pós Graduação em Ecologia

# Redação Científica na Língua Inglesa

(Scientific Writing in the English Language)

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## Aula 3:

## The outline, writing the Introduction and Methods
## Use of the passive voice, although vs. while, because vs. since, only

Trabalho final: Redação de artigo

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# Assignments from last class

1. Outline “The Science of Scientific Writing”
2. Outline of your paper
3. Abstract for “The origin of antitumor activity in sea anemones”
4. Rewrite two paragraphs about your thesis

# Outline

An outline is:

- A logical, general description.
- A schematic summary.
- An organizational pattern
- A visual and conceptual design of your writing.

- Compare your abstracts

# Writing the Introduction I

- Speaking generally, the introduction proceeds through several transitional sentences, leading the reader to the specific question you hope to answer with your study.
- Much or all of it should be written in the present tense: you will be referring primarily to the question(s) you **are** investigating, and to what **is** known about the subject.
- Never in the future. Avoid expressions like "This study will examine
- Outline what has been done before by citing truly pertinent literature, but do not include a general survey of semirelevant literature.
- State how your work differs from or is related to work previously published. Demonstrate the continuity from the previous work to yours.

# Writing the Introduction II

- Rules suggested by Robert Day ("How to Write …"):
  (i) It should present first the nature and scope of the problem investigated
  (ii) It should review the pertinent literature to orient the reader.
  (iii) It should state the method of the investigation (?)
  (iv) It should state the principal results (??)
  (v) It should state the principal conclusions (???)
- Some editors think that the principal results and conclusions should be summarized in the Introduction.
- This practice is advocated by Day (1983). Most biologists disagree, arguing that such a summary appears in the abstract and should not be repeated in the Introduction.
- You should avoid the practice except when writing for a journal that requires it.

# Common mistakes I

- A complete review of the subject.

  Remember: the Introduction is meant to introduce the reader to your research, not summarize and evaluate all past literature on the subject (which is the purpose of a review paper). Many of the other studies you may be tempted to discuss in your Introduction are better saved for the Discussion, where they become a powerful tool for comparing and interpreting your results.
- Too much detail on what you did in your study, adding information that belongs in the Materials and Methods section or in the Results section.

# Common mistakes II

- Cite authors and their areas of study in general terms without mentioning their major findings.
- Ex:

"Parmenter (1976) and Chessman (1978) studied the diet of *Chelodina longicollis* at various latitudes and Legler (1978) and Chessman (1983) conducted a similar study on Chelodina expansa “.

"Within the confines of carnivory, *Chelodina expansa* is a selective and specialized predator feeding upon highly motile prey such as decapod crustaceans, aquatic bugs and small fish (Legler, 1978; Chessman, 1984), whereas C. longicollis is reported to have a diverse and opportunistic diet (Parmenter, 1976; Chessman, 1984)".

# Common mistakes II

- The latter is a far more informative lead-in to the literature, but more importantly it enables the reader to clearly place the current work in the context of what is already known.
- An important function of the Introduction is to establish the significance of the current work: Why was there a need to conduct the study?

# Hypotheses

- The hypothesis is the explanation you are proposing for certain observations.
- It should be accompanied by a prediction of results expected under certain conditions if the hypothesis is correct.

Ex.:

If competition lowers reproductive output, then fruit size should be smaller when tree density increases.

Although the water economy of a number of species of amphibians have been studied, the majority of these investigations have been interspecific in nature (Smith et al., 1998). Such studies have often sought to elucidate adaptive differences among species (Schmid, 1965; Ralin and Rogers, 1972; Gillis, 1979). Although developmental stages of amphibians often occupy different habitats, corresponding changes in ecophysiological parameters have been relatively unstudied.

The red-spotted newt (*Notophthalmus viridescens*) has a more complex life cycle than many amphibians. Following a brief larval development, these organisms metamorphose and become terrestrial salamanders (efts). After spending up to seven years in this habitat, these subadults go through a second metamorphosis to become aquatic adults (newts) that spend the remainder of their lives in water (Conant, 1975).

In view of the difference in habitats occupied by these two stages it was hypothesized that newts and salamanders should differ in terms of their water economy. Specifically, terrestrial efts should have lower rates of evaporative water loss and be more tolerant to dehydration than aquatic newts.

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# Final message for the Introduction

- Move from general to specific: problem in real world ⇒ research literature ⇒ your study.
- Engage your reader: answer his/her questions, "What did you do?" "Why should I care?"
- Make clear the links between problem and solution, question asked and research design, prior research and your study.
- Be selective, not exhaustive, in choosing studies to cite and amount of detail to include.
- In general, the more relevant an article is to your study, the more space it deserves and the later in the Introduction it appears.

# Writing the Methods I

- Provide enough detail for a colleague to repeat your study and reproduce the results. Remember that your results must be reproducible.
- Usually authors will describe the study region in general terms in the Introduction and then describe the study site and climate in detail in the Materials and Methods section.
- Use past tense to describe what you did.
- What to avoid:
  - Don't include details of common statistical procedures.
  - Don't mix results with procedures.

# Writing the Methods II

- Explain why each procedure was done, i.e., what variable were you measuring and why?
- Example:
- Dificult to understand: First, I removed the frog muscle and then I poured Ringer's solution on it. Next, I atttached it to the kymograph.
- Improved: I removed the frog muscle and poured Ringer's solution on it to prevent it from drying out. I then attached the muscle to the kymograph in order to determine the minimum voltage required for contraction.

# Writing the Methods III

- Experimental procedures and results are narrated in the past tense (what you did, what you found, etc.) whereas conclusions from your results are given in the present tense.
- Always use the singular "I" rather than the plural "we" when you are the only author of the paper.
- If you had a complicated protocol, it may helpful to include a diagram, table or flowchart to explain the methods you used.

# Writing the Methods IV

- Do not put results in this section. You may, however, include preliminary results that were used to design the main experiment that you are reporting on.

  Ex. "In a preliminary study, owls were observed for one week, when 73 % of their locomotor activity occurred during the night. Thus, all subsequent experiments were done between 11 pm and 6 am."

- Mention relevant ethical considerations. If you used human subjects, did they consent to participate? If you used animals, what measures did you take to minimize suffering?

# Bad use of the passive voice

- Overabundance of the passive voice in sentences of self-protective business interests, magniloquent educators, and bombastic military writers, who use the passive voice to avoid responsibility for actions taken.

*"Cigarette ads were designed to appeal especially to children"*

places the burden on the ads — as opposed to

*"We designed the cigarette ads to appeal especially to children,"*

*"The President was advised that certain members of Congress were being audited"*

rather than

*"The Head of the Federal Police advised the President that her agency was auditing certain members of Congress"*

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# But the passive voice exists for a reason

- In scientific writing, where the actor is not really important but the process or principle being described is of ultimate importance.
- Instead of writing *"I poured 20 cc of acid into the beaker,"*

  we would write *"Twenty cc of acid is/was poured into the beaker."*
- The passive voice is also useful when describing a process in which the details of are much more important than anyone that does the action:

  *"The first coat of primer paint is applied immediately after the acid rinse."*
- The individual doing the experiment is therefore relatively unimportant and usually is not the subject of the sentence.

# Which of the two sentences in each set sounds better to you? Why?

| **active** | **passive** |
|---|---|
| The dispatcher *is notifying* police that three prisoners have escaped. | Police *are being notified* that three prisoners have escaped. |
| Surgeons successfully *performed* a new experimental liver-transplant operation yesterday. | A new experimental liver-transplant operation *was performed* successfully yesterday. |
| "Authorities *make* rules to be broken," he said defiantly. | "Rules *are made* to be broken," he said defiantly. |

# Which sentence sounds better to you? Why?

"In a preliminary study, owls were observed for one week, when 73 % of their locomotor activity occurred during the night. Thus, all subsequent experiments were done between 11 pm and 6 am ."

"In a preliminary study, I observed the owls for one week, and found that 73 % of their locomotor activity occurred during the night, and so I conducted all subsequent experiments between 11 pm and 6 am."

# Which of the two sentences in each set sounds better to you? Why?

- The report was read by Betty.
  Betty read the report.
- A decision was made to stop the project.
  We decided to stop the project.
- The passive voice should be avoided.
  Avoid the passive voice.
- Scientists conduct experiments to test hypotheses.
  Experiments are conducted by scientists to test hypotheses.

The active voice makes for more forceful and interesting writing.

# ➢ Rewrite the following sentences

Before the semester was over, the new nursing program had been approved by the Curriculum Committee and the Board of Trustees.

With five seconds left in the game, an illegal time-out was called by one of the players.

The major points of the lesson were quickly learned by the class, but they were also quickly forgotten by them.

For several years, Chauncey was raised by his elderly grandmother.

An unexpected tornado smashed several homes and uprooted trees in a suburb of Knoxville.

I was surprised by the teacher's lack of sympathy.

Tall buildings and mountain roads were avoided by Raoul because he had such a fear of heights.

# Examples of Material and Methods

Good Example:

- *Twenty-five µl of each sample were loaded onto a 10% polyacrylamide gel and subjected to electrophoresis for one hour at 120V.*
  (Note that the number 25 is spelled out because it begins a sentence and the abbreviation for microliters is used; everything is in third person and past tense.)

Bad Examples:

- *Take 25 µl of each sample and load them on a 10% polyacrylamide gel.*
  (Do not tell the reader what to do, tell them what you did)

- *Next I would take 25 µl of each sample and load them on a 10% gel.*
  (Avoid the first person; write in third person and past tense)

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# Examples of Material and Methods

More bad examples:

1. *Load 25 µl of each sample on a 10% polyacrylamide gel.*
2. *Run the gel at 100 V for 30 minutes*
3. *Transfer the gel to nitrocellulose for one hour at 70V.*

(Don't make lists; describe what you did in a sentence)

- *25 µl of each of the 3 samples were then loaded on a 10% polyacrylamide gel.* (Don't start sentences with numbers or abbreviations; also spell out numbers less than 10)

- *Then we ran the proteins on a gel.* (Slang)

# Use statements in positive form

| | |
|---|---|
| He was not very often on time. | He usually came late. |
| He did not think that studying Latin was much use. | He thought the study of Latin useless. |
| *The Taming of the Shrew* is rather weak in spots. Shakespeare does not portray Katharine as a very admirable character, nor does Bianca remain long in memory as an important character in Shakespeare's works. | The women in *The Taming of the Shrew* are unattractive. Katharine is disagreeable, Bianca insignificant. |

# ➢ Put statements in positive form

- *This reaction is not uncommon*
- *This transition was not unexpected*
- *This strategy is not infrequently used*
- *This result is not unlikely to occur*

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# Watch the placement of “only”

- It has different meanings in different places in the sentence.
  - *Only the largest group was injected with the test compound.* (Meaning: and no other group)
  - *The largest group was only injected with the test compound.* (Meaning: and not given the compound in any other way)
  - *The largest group was injected with only the test compound.* (Meaning: and no other compounds)
  - *The largest group was injected with the only test compound.* (Meaning: there were no other test compounds)

# “Although” instead of “While”; “because” instead of “since”

- “While” and “since” have strong connotations of time. Do not use them where you mean “although”, “because”, or “whereas”.

  *Since solvent reorganization is a potential contributor, the selection of data is very important.*

  Because solvent reorganization is a potential contributor, the selection of data is very important.

- *While the reactions of the anion were solvent-dependent, the corresponding reactions of the substituted derivatives were not.*

  Although the reactions of the anion were solvent-dependent, the corresponding reactions of the substituted derivatives were not.

- Also: The reactions of the anion were solvent-dependent, but (or whereas) the corresponding reactions of the substituted derivatives were not.

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# Final comments

- Get their attention early; provide evidence of why it is interesting (i.e., why it should be published) in the introduction.
- Most readers make up their mind at the first bite, i.e., within 15minutes of reading a paper.
- If the reader loses interest from reading the introduction, he/she might postpone reading the paper.
- Emphasize the importance of the paper being written, but not at the expense of others. They are probably your referees and they are sensitive.
- When mentioning the works of other persons, avoid using negative terms.

  Examples:
  - "The deficiency of Smith's approach is..."
  - "The problems of these papers..."
- Avoid predominantly citing your own works. The referees may think you are a self-centered clod. There are others who have contributed to the literature.

# Final comments

- Do not be apologetic. You may acknowledge the limitations of the approach only once in the conclusion, but do not apologize for what the paper cannot do.
- The more you mention what the paper does not do, the less contribution it seems to make to the literature.
- Read, but no exhaustively. It can interfere with your own thinking and writing.
- It is impossible to read every paper ever written on a subject.
- Remember your goal is to write and publish a paper, not to read
- everything.
- You have other important things to do (e.g., watch your children grow, a good movie)!
- If you read the most important papers on a topic, you should have enough material to write yours. Now add your own ideas to this base of knowledge.

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# Assignments

- Rewriting (if necessary)
- Rewrite the passage eliminating wordiness
- Find a published article that contains examples of the topics we have seen, for instance:
  - Inappropriate title
  - Jargon and wordiness
  - Excessive use of passive voice (or correct use of it)
  - Inappropriate pronouns (Since, while instead of Because, although)

  Bring the article next class pointing the examples and be ready to point out the problems.

- Write the first draft of the Introduction of your final paper.
- Read chapters I and II of Strunk and White for discussion next week.

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