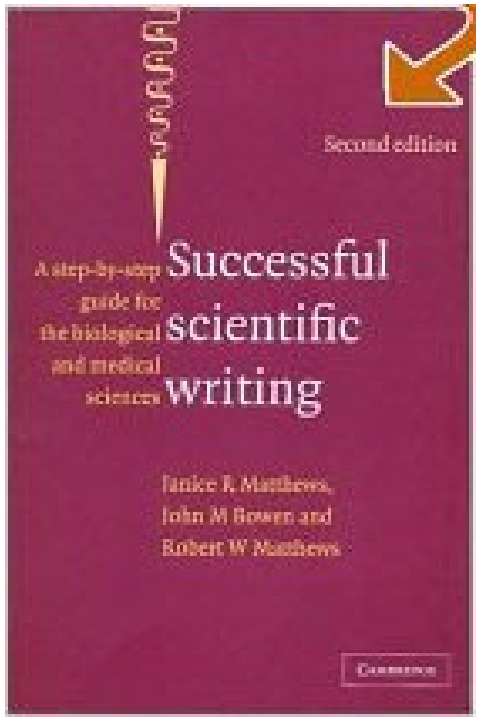
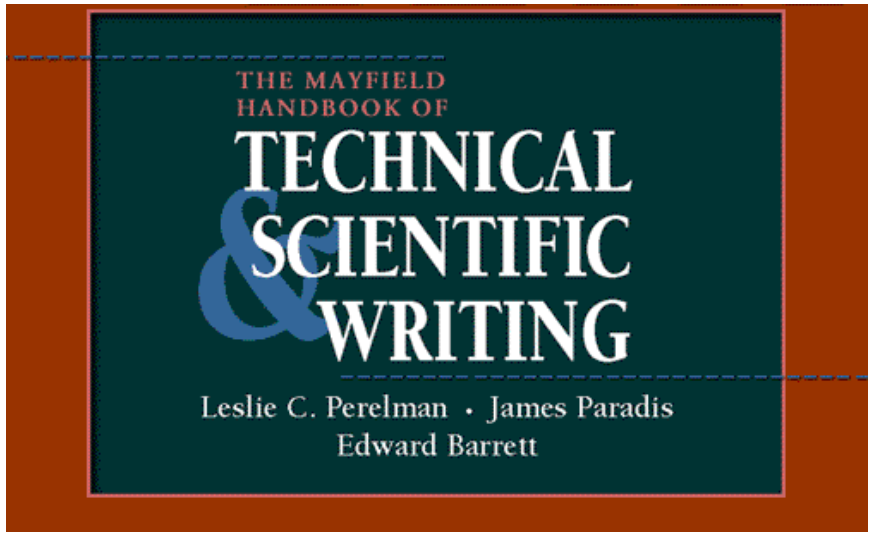
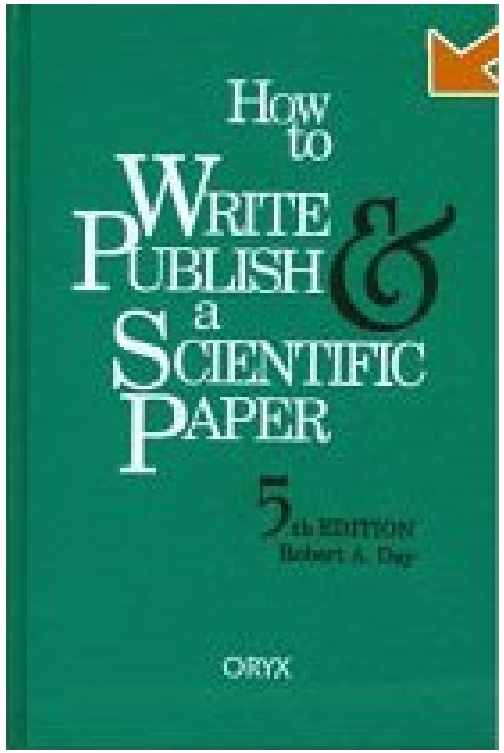
(Perché e)
Come si scrive
(e si pubblica...)
un lavoro scientifico

Roberto Danovaro







Perché Pubblicare?

(ma soprattutto perché leggere?)

… it is difficult to do good science, write good scientific papers, and have enough publications to get future jobs…. E. Robert Schulman

Come si trova il tempo per pubblicare e per leggere?

Si deve trovare, sempre! Anche in Bagno

Quanto Pubblicare?

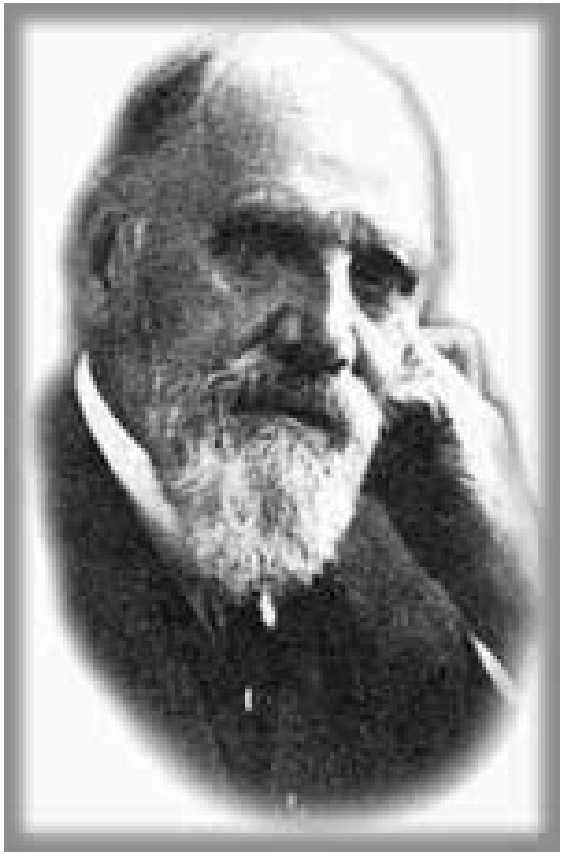
Risposta: tanto, molto + rispetto al passato

- 15 anni fa si diventava Prof ordinario con 50 pubblicazioni (o 2-3 libri)
- Oggi si diventa ricercatori con 30-50 pubblicaz.

“In science, the credit goes to the man who convinces the world, not the man to whom the idea first occurs”

Quindi battere il ferro, essere in grado di pubblicare su riviste a alto impatto

The better you write, the more people will take notice



Sir Francis Darwin
(1848 - 1925)

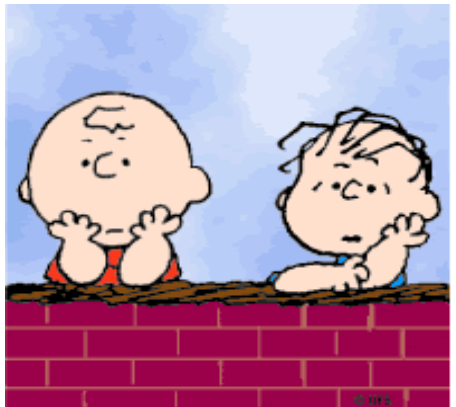
Cosa pensano gli Editors in Chief delle grandi riviste Elsevier

An international editor says:

"The following problems appear much too frequently"

- Submission of papers which are clearly out of scope
- Failure to format the paper according to the Guide for Authors
- Inappropriate (or no) suggested reviewers
- Inadequate response to reviewers
- Inadequate standard of English
- Resubmission of rejected manuscripts without revision

Paul Haddad, Editor, *Journal of Chromatography A*



Cosa suggeriscono (in breve) gli Editors in Chief

...and my own publishing advice is:

- Submit to the **right journal**
- Submit to **one journal** only
- Do **not** submit "salami" articles
- Pay attention to **journal requirements** and structure
- Check the **English**
- Pay attention to **ethical standards**
- Ask your **colleagues** to proof read the article
- Be **self-critical**

Dove Pubblicare?

Data report ?	NO
Congressi ?	NO
Riviste nazionali ?	NO
Riviste Internazionali	SIIIIIII

Quante riviste internazionali monitorate esistono?

No one knows how many scientific journals there are, but several estimates point to around 30,000, with close to two million articles published each year

La scelta della rivista:

un dedalo di possibilità

Sulla base dell'Impact Factor?

Sul Prestigio?

Is my paper local, national or international ?

International journals (SI journals): also several levels (examples from the field of aquatic sciences)

1. General top level (Science, Nature, PNAS)

Of very wide interest (world press)
Top research, but especially spectacular
New discovery,
new method new paradigm
IF= >25-30

2. International journals, intermediate level

– Hypothesis-driven
– Required:
- Not purely descriptive
- Including replication, appropriate statistical analyses
- Of more than local/ national interest
- Of interest for a wide scientific audience

3. More specialised international journals (Crustaceana, Aquatic Insects)

– More rigorous in scope, less difficult regarding general interest

– Depending on the field, pure descriptive work can be accepted

– For example:

- pure alpha-taxonomy,
- 1-year limnological cycles,
- 1-parameter models,…

National, Museum journals

– Eg.: inventories of nature reserves, pure alpha taxonomy, new species for national fauna,…

Local

– Short notes on faunistic or floristic observations, general natural history,…

All of these are worthwhile!!! BUT….

Same research, different way of presenting…

Example: one year cycle of phytoplankton in a lake

- Description, no replica's, no statistical analyses, only raw data presented = National or local journal
- Replicate sampling, results of statistical analyses = International specialised journals

- Hypothesis-testing (eg.: Hutchinsons paradox of plankton), multiple lakes, controlled field experiment = International general journals
- Use of space craft + satellite to explore the bottom of the oceans = Nature or Science!

Why aim for high level publication?

- Higher dissemination, higher impact in scientific world

- Better use of research funding

- Senior scientists:
- Higher chances for research funding
- Higher chances for promotion

- PhD Students:
  - higher chances to find positions
  - Responsibility of supervisor!

The hierarchy of journals and publications

A. Journal with peer reviewing, with IF

- Both national and international
- Some research institutions require
- Higher than a particular IF (eg > 2)
- Top 10 or 25% of your particular field

B. Peer review, no IF

- National, museum journals,…

C. No peer review, no IF

- Some local journals
- Some books, chapters in books
- Many webpages!!!

A. Grey literature

- Abstracts for conferences (oral or poster)
- Theses, reports,…

Towards the Open Access Publishing

Traditional way of publishing:

– authors publish in scientific journals,

– publishers sell these journals to libraries,

– access is limited to subscribing individuals/ institutions

- Libraries pay for access, sometimes subscription + page charge…

Traditional publishing at present

– Paper journals

– Paper plus electronic access

– Electronic access only

=> All access restricted to subscribers

Open Access Publishing

– Authors publish in an electronic journal

– Authors pay for publication costs (> 1500 USD per accepted manuscript, depending on journal)

– OR: member institutes pay a fee

– Electronic journal is open access

=> No subscription restrictions

<u>Costs shift from Library => Author</u>

– Too expensive

Example: 1 journal costs 8000 USD/ yr to the library

– 10 authors publish in open access journal: It will cost 15,000 USD

– In addition, cost is unpredictable per year…

Open Access Publishing

PRO:

- Unlimited access of all papers to the scientific community
- Allows for full text mining

CONTRA:

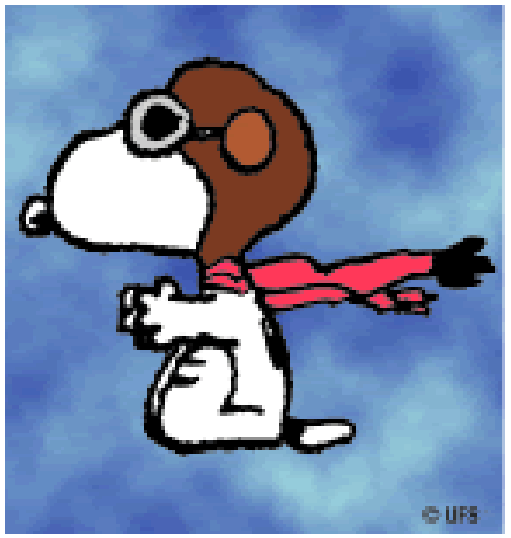
- Will not reduce costs
- Scientific community continues to pay
- Apparently does not reach all that much larger an audience

Subscription model or open access model ?
The future will tell….
=> Scientific publishing market is very volatile ….

Institute for Scientific Information

What does Impact Factor measure?

Impact Factor® (IF) measures the frequency that a journal is cited by other journals. However, IF fails to distinguish between original and review article citation rates.



By mixing "*apples and oranges*", IF rates do *NOT* measure the true value of journals reporting scientific advances since innovative research is published only in original articles.

Since review articles receive over 3 times as many citations as original articles, journals consisting of a large percentage of reviews have inflated rating scores.
Therefore, IF can be a distorted and misleading indicator!

Cos'è il Citation Index?

Cos'è l'Half Citation time?

High impact factors for …

Papers describing new methodology

Review papers

Opinion papers

Papers in journals

- With fast publication
- Which are widely available AND widely read

Electronic, web-based journals

- Attracting high level authors
- ….

Other (editorial) tricks: ....

Impact factors are biased

Eugen Garfield

– IF cannot be used to compare

Disciplines,

Institutes,

Individual Researchers,….

– 50% of papers in ISI database never gets cited

0nly 0.1% of papers > 200 citations

– IF = journal, not

Individual paper

Individual scientists

=> yet, IF are used to evaluate individual scientists, departments, etc….

Open Access and Impact Factor

The "open access advantage" has at least three components:

(1) a citation count advantage (as a metric for knowledge uptake within the scientific community),
(2) an end user uptake advantage, and
(3) a cross-discipline fertilization advantage

Come Pubblicare?

1. Conta l'idea ?
2. Copiare è giusto ?
3. E' meglio scrivere direttamente in inglese?
4. Conta il nome degli autori?
5. Conta L'Istituzione in cui lavorano?

Per pubblicare bene ci vuole l'Ipotesi Scientifica

"Predictive power [is] the strongest evidence that the natural sciences have an objective grip on reality"

1. Fare qualcosa di nuovo
2. Attaccare i paradigmi principali
3. Usare la migliore tecnologia
4. Fare Ipotesi forti
5. Esplicitarle e testarle

Types of papers

Correspondence
News and views
Ideas
Opinion
Note /Letter / Short research
Article
Review

Ricerca Bibliografica:

come essere sicuri di non scoprire l'acqua calda

1. Data Bases (Scopus, Web Of Science)
2. Internet (https://scholar.google.com/)
3. Pubblicazioni e Testi recenti

Scientific Writing

Be sure to spend at least 50% of your working time reading, writing and typesetting the paper so that the manuscript is accurate, tables and Figures look nice, data of the tables and figs match with those reported in the results, that the references in the text are present in the list, that the journal format is respected. Do not wast (reader/reviewer) time in describing useless results. The English shoud by scietifically accurate, but fluent. Discuss in comparison with other papers and do not make inferences or speculations. (R. Danovaro, AIOL-SItE Lecture 2021

Se tu non pubblichi a sufficienza tu non sarai mai capace di stare nel mondo scientifico.

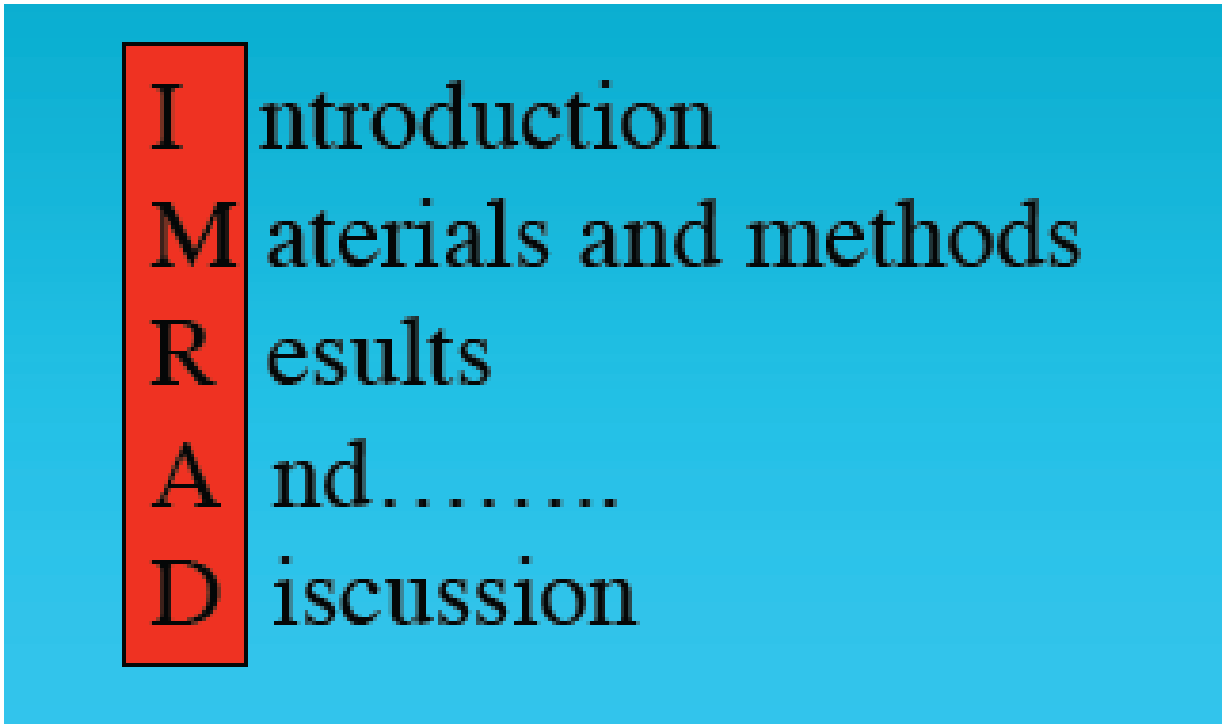
Nessuno raggiunge grandi livelli senza lavorare 15 ore al giorno (spesso anche Sabato e Domenica)

Se non lavori tanto altri lavoreranno tanto e avranno più chance di prendere una posizione stabile nella ricerca.

Organisation of a primary research paper

(primary= new data, not a Review or metanalysis)

introduced by American National Standards Institute in 1979



IMRAD expanded
Organisation of a primary research paper

- Title (page)
- Abstract
- Introduction
- Material and methods
- Results
- Discussion
- (Conclusions)
- Acknowledgements
- References
- Tables and Figures, including captions *(not in the main text)*
- (Appendices)

Organisation of a primary research paper:

- INTRODUCTION
  - What did you do? Why did you do it?

- MATERIAL AND METHODS
  - How did you do it?
- RESULTS
  - What did you find?

- DISCUSSION
  - What does it mean ?
- CONCLUSIONS take home mess

Il Titolo

Dire tutto in modo breve (be short!)

Titolo ad effetto**: Is the deep in diet?**

A title should be the fewest possible words that accurately describe the content of the paper.
Omit all waste words such as “
A study of ...", "Investigations on ...", "Obser
“Studies on....” - “Characterisation of ....”

Indexing and abstracting services depend on the accuracy of the title, extracting from it keywords useful in cross-referencing and computer searching.

An improperly titled paper may never reach the audience for which it was intended, so be specific. If the study is of a particular species, name it in the title.

If the inferences made in the paper are limited to a particular region, then name the region in the title.

How to choose a title…

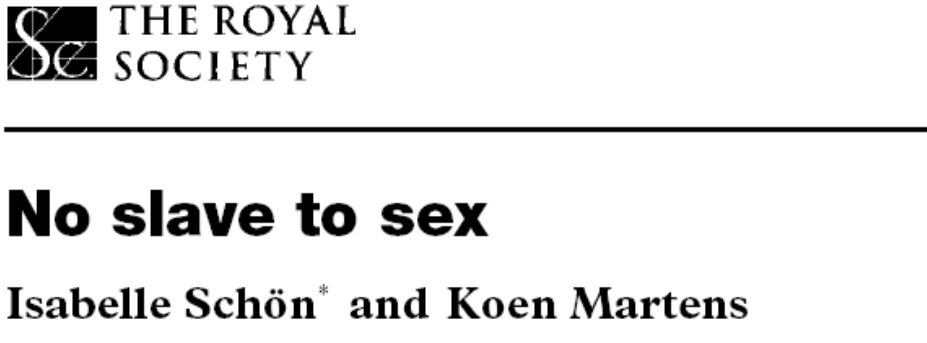
First impressions are powerful: make them count! Two approaches to attract attention

- Correct and concise

Long (boring): "*Absence of allelic divergence shows that there is no Meselson effect in an ancient asexual ostracod*" OR

- Catchy: – "*No slave to sex*"

- Catchy title, but not very informative as to content
- If you like to reach a wide audience
- Some of your colleagues will NOT like this sort of TV
- Advertisement …



Authors (and Authors' position):

quando l'ordine è importante...

Essere il primo nome
(il più possibile, almeno 40% dei lavori)

L'ordine alfabetico (MAI)

Secondo nome (eventualmente con dicitura *equally contributed* con il primo per due che hanno dato contributo equivalente e vale come primo nome)

L'ultimo nome (solo per capo scuola)

Penultimo nome (chi vuole cedere il passo a nuovi capiscuola)

Abstract

Must HAVE content: NOT "these results are discussed"
1. Research question, hypothesis to be tested, general context
2. Major methodologies
3. Major results (no raw data!)
4. Major significance of these results (for example: hypothesis rejected or not)
=> In some journals, these sections are numbered

Keyword List

used by the indexing and abstracting services, in addition to those already present in the title.
Judicious use of keywords may increase the ease with which interested parties can locate your article.

SOME EXAMPLES OF WRONG SCIENTIFIC WRITING

"A large mass of literature has accumulated on the cell walls of staphylococci."

From a MS submitted to the editor for publication in *J. Bacteriol.*

"….He presented evidence that women who smoke are likely to have pulmonary abnormalities and impaired lung function at the annual meeting of the American Lung Association."

(From a Press release)

English is short: in Italian we use too many words

- It should be mentioned that… NO
- It should be noted that … NO
- It should be pointed out that … NO

⇒"It should be mentioned that the pH was low." NO
=> "The pH was low." YES

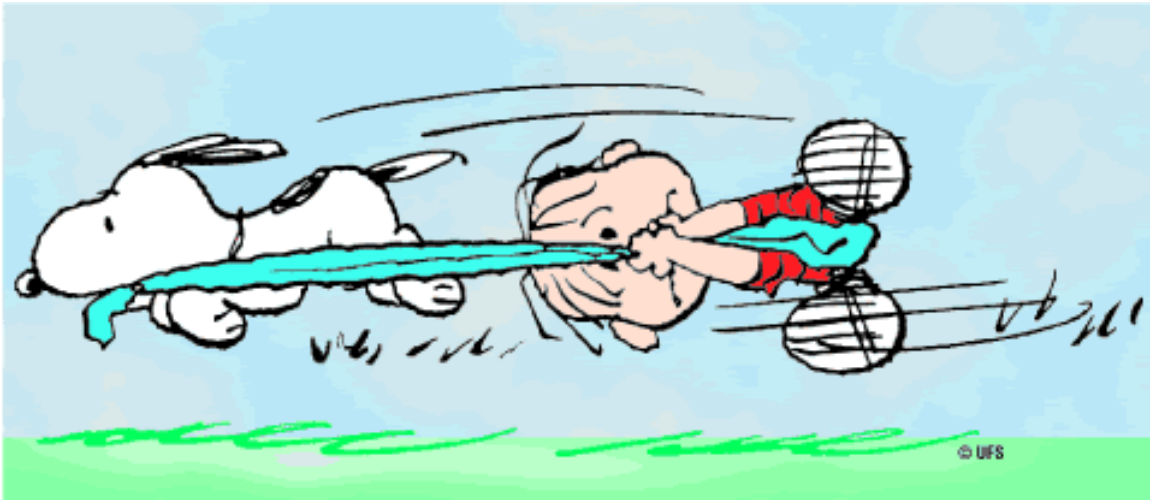
Punctuation

Woman without her man is a savage.
Woman, without her man, is a savage.
Woman - without her, man is a savage.

1. Introduction

Scientific papers are an important (though poorly understood) method of publication. They are poorly understood because they are not written very well. An excellent example of the latter phenomenon occurs in most introductions, which are supposed to introduce the reader to the subject so that the paper will be comprehensible even if the reader has not done any work in the field.

At the end of the introduction you must summarize the paper by reciting the section headings. A good introduction is constructed as a **Thriller** … you should be able to intrigue the reader (and the Reviewer of course!)



Introduction

1. Problema generale.

2. La letteratura pertinente (cosa è stato già detto?)

3. Utilissimo evidenziare quello che rimane da scoprire o che è controverso
4. How you think to approach the problem
5. Cosa prometti di fare
6. Alcuni preferscono preannunciare i risultati principali

Ad esempio:

"Parmenter (2016) and Chessman (2018) studied the diet of Chelodina longicollis at various latitudes and Legler (2018) and Chessman (2010) 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, 2018; Chessman, 2018), whereas C. longicollis is reported to have a diverse and opportunistic diet (Parmenter, 2016; Chessman, 2010)".

British English or American English?

- 60 million British versus 250 million North Americans…
- Use British English for European journals
- Use American English for American journals

=> Be consistent in 1 paper!!!

Some examples…

American	British
meter	metre
liter	litre
gray	grey
-ized	-ised
sulfer	sulpher
fetus	foetus

Materials and Methods

Si danno i dettagli di come hai condotto il lavoro in modo che possa essere effettuato da altri (che possano ottenere gli stessi risultati). Per studi di campo è necessario descrivere lo *Study Site*. Generalmente alcuni autori descrivono l'area in generale nelll'Introduzione e nei dettagli in M&M. Sub-headings "Study Site", "General Methods" and "Analysis" possono essere utili.

Equipment and materials available off the shelf should be described exactly (Licor underwater quantum sensor, Model LI 192SB) and sources of materials should be given if there is variation in quality among supplies. Modifications to equipment or equipment constructed specifically for the study should be carefully described in detail. The method used to prepare reagents, fixatives, and stains should be stated exactly, though often reference to standard recipes in other works will suffice.

L'ordine di presentazione è cronologico. Se il metodo è nuovo (unpublished), devi dare ancora più dettagli. Se è gia stato pubblicato su uno standard journal basta dare la literature reference. Precisione nelle misure e includere gli errori. Metodi statistici ordinari si usano senza commenti. Metodi avanzatirichiedono una citazione.

Material and Methods

Watch how you write things…

– “After standing in boiling water for an hour, I loaded the sample on a gel…..” Ouch…

– “The sample was kept at room temperature…”

In London or Pataya ????

– “Blood samples were taken from 48 informed and consenting patients….. the subjects ranged in age from 6 months to 22 years.” (Pediatr. Res. **6:26 1972)** Clever kids!

Give exact origin of chemicals, biological materials …

Use SI units throughout

The hardest rule of all…

Do not put results in “material and methods”
Do not put results in “discussion”
Do not describe methods in “results”
Do not describe methods in “discussion”
Do not discuss results in “material and methods”
Do not discuss results in “results”

Results: how not to do it…

“In this experiment, one third of the mice were cured by the test drug, one third were unaffected by the drug and remained moribund, and the third mouse got away.”

(Reputedly from a MS submitted to *Infection and Immunity)*

Results

In the results section you present your findings. Present the data, digested and condensed, with important trends extracted and described.
Because the results comprise the new knowledge that you are contributing to the world, it is important that your findings be clearly and simply stated.

The results should be short and sweet, without verbiage.

Non dire: "*It is clearly evident from Fig. 1 that bird species richness increased with habitat complexity*".

Dire piuttosto:

"Bird species richness increased with habitat complexity (Fig. 1)".

However, do not be too concise. The readers cannot be expected to extract important trends from the data unaided. Few will bother. Combine the use of text, tables and figures to condense data and highlight trends. In doing so be sure to refer to the guidelines for preparing tables and figures below.

Discussion

… hardest section to get right…

Discuss YOUR results in the framework of those reported in the pertinent literature

Avoid the "squid technique"…. the author, doubtful about his facts or reasoning, retreats behind a protective cloud of ink.

In the discussion you should discuss the results.

- What biological principles have been established or reinforced?
- What generalizations can be drawn?
- How do your findings compare to the findings of others?
- Are there any theoretical/practical implications of your work?

When you address these questions, it is crucial that your discussion rests firmly on the evidence presented in the results.

Discussion

Continually refer to your results (but do not repeat them).
Most importantly, do not extend your conclusions beyond those which are directly supported by your results.
Speculation has its place, but should not the basis of the discussion.

Be sure to address the objectives of the study in the discussion and to discuss the significance of the results (**controlla l'introduzione e le promesse fatte**).

Don't leave the reader thinking "So what?". End the discussion with a short summary or conclusion regarding the significance of the work.

Conclusions

The conclusion section is very easy to write: all you have to do is to take your abstract and change the tense from present to past. It's considered good form to mention at least one relevant theory only in the abstract and conclusion. By doing this, you don't have to say why your experiment does (or does not) agree with the theory, you merely have to state that it does (or does not).

We (meaning I) presented observations on the scientific publishing process which (meaning that) are important and timely in that unless I have more published papers soon, I will never get another job. These observations are consistent with the theory that it is difficult to do good science, write good scientific papers, and have enough publications to get future jobs.

Acknowledgements

Si ringraziano coloro che hanno letto e corretto il lavoro (inclusi referees se sono noti). Chi ha fatto analisi o contribuito in qualche modo al lavoro (se non tra gli autori)
Il capo per non aver rotto i ……

Il contributo di ricerca (Ministero, Comunità Europea) … molto importante ….

References

All references to the literature must be followed immediately by an indication of the source of the information that is referenced.

"*A drop in dissolved oxygen under similar conditions has been demonstrated before* (Norris, 2021)."

"*Williams (1921) was the first to report this phenomenon*"
". . . . . *as discussed in detail by Ramsay* (1983)."

If two authors are involved, include both surnames,
"*The dune lakes of Jervis Bay are not perched in the generally accepted sense (Smith and Jones 2020)*.",

However if more than two authors are involved, you are encouraged to make use of the *et al.* convention. It is an abbreviation of Latin meaning "and others".
"*The significance of changes in egg contents during development is poorly understood (Webb et al., 1986).*"

More References

Do not use the *et al.* abbreviation in the reference list at the end of the paper (except when requested, for instance in Nature for more than 5-10 authors).

If two or more articles written by the same author in the same year are cited, then distinguish between them using the suffixes a, b, c etc in both the text and the reference list (e.g. Smith and Jones, 2019a; - b).

If you include in your report, phrases, sentences or paragraphs lifted verbatim from the literature, it is not sufficient to simply cite the source. The reference list should contain all references cited in the text but no more. Include with each reference details of the author, year of publication, title of article, name of journal or book, volume and page numbers.

Formats vary from journal to journal, so when you are preparing a scientific paper for an assignment, choose a journal in your field of interest and follow its format for the reference list. Be consistent in the use of journal abbreviations.

Tables

- DO include a caption and column headings that contain enough information for the reader to understand the table without reference to the text. The caption should be at the head of tables
- DO organize the table so that like elements read down, not across.
- DO present the data in a table or in the text, but never present the same data in both forms.
- DO choose units of measurement so as to avoid the use of an excessive number of digits.
- DON'T include tables that are not referred to in the text.
- DON'T be tempted to "dress up" your report by presenting data in the form of tables or figures that could easily be replaced by a sentence or two of text. Whenever a table or columns within a table can be readily put into words, do it.
- DON'T include columns of data that contain the same value throughout. If the value is important to the table include it in the caption or as a footnote to the table.
- DON'T use vertical lines to separate columns unless absolutely necessary.

Figures

- DO include a legend describing the figure (succinct yet sufficient to interpret the figure without reference to the text). The legend should be below the figure.
- DO provide each axis with a brief but informative title (including units).
- DON'T include figures that are not referred to in the text.
- DON'T be tempted to "dress up" your report by presenting data in the form of figures that could easily be replaced by a sentence or two of text.
- DON'T fill the entire A4 page with the graph leaving little room for axis numeration, axis titles and the caption.
- DON'T extend the axes very far beyond the range of the data. For example, if the data range between 0 and 78, the axis should extend no further than a value of 80.
- DON'T use colour, unless absolutely necessary. It is very expensive, and the costs are usually passed on to the author. Colour in figures may look good in an assignment or thesis, but it means redrawing in preparation for publication.

Summarizing

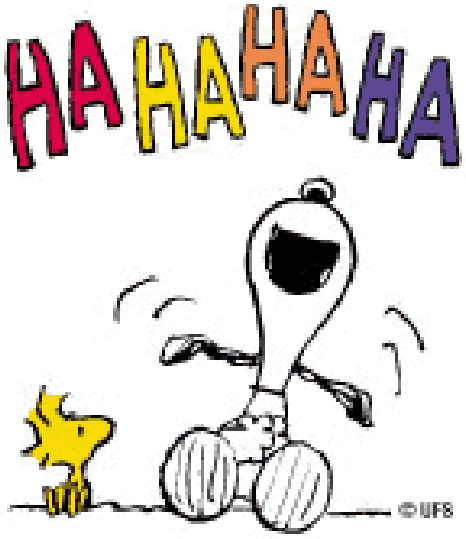
One paper = one story
Use simple words and phrases
Use correct English
Not purely descriptive
For wide, international audience
Use correct structure of manuscript
- guidelines of journal
- IMRAD

Pay attention to Title and Abstract!

Refereeing

Rejection is a fact of life..
Editors judge individual manuscripts, NOT personal standing, careers, …
Referees try to help authors free of charge

=> **Please respond respectfully**

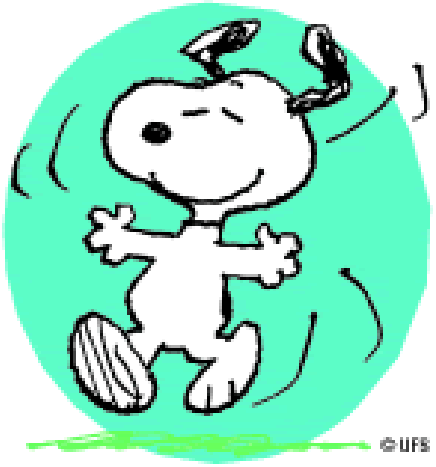


Editors send ms to referees (usually 2)
Peer review – Peers = your colleagues
Suitability for specific journal
Scientific content
Technical quality (English, figures,…)

Reviews / Referaggio

Esempi di risposta:

1. Acceptance
2. Minor revision
3. Major revision
4. Rejection



Percentuale di rejections ...
Esempi di rejections …..
La re-submission
Lettera di accompagnamento: come rispondere ai referees

CONCLUSIONI

Non disperarti se ti rifiutano un lavoro succede anche ai migliori

Succede anche di avere un lavoro rifiutato 5-7 volte (a me è successo)

All'inizio succederà almeno nel 50% dei casi (se sei sotto questa soglia sei già bravo/a!)

Se correggi bene un lavoro rifiutato dalla rivista, il lavoro risulterà migliorato e potrai pubblicarlo anche meglio

I commenti dei reviewers sono un patrimonio fondamentale per migliorare la nostra RICERCA sia per il lavoro da correggere sia per non fare gli stessi errori nei futuri lavori:

LEGGILI BENE - USALI BENE