Academic Writing

IMRAD, scientific principles
Literature research

Albert-Ludwigs-Universität Freiburg

UNI FREIBURG

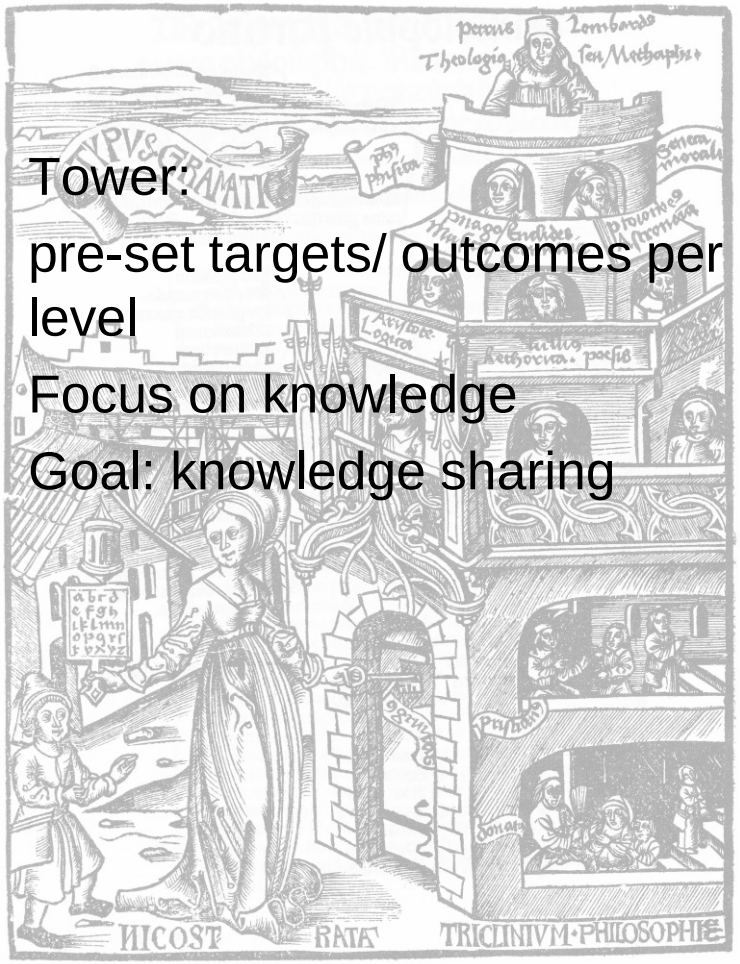
08.02.2022

Julius Fenn, M.Sc.

Imagining learning at the university

vs.

Imagining learning at the university



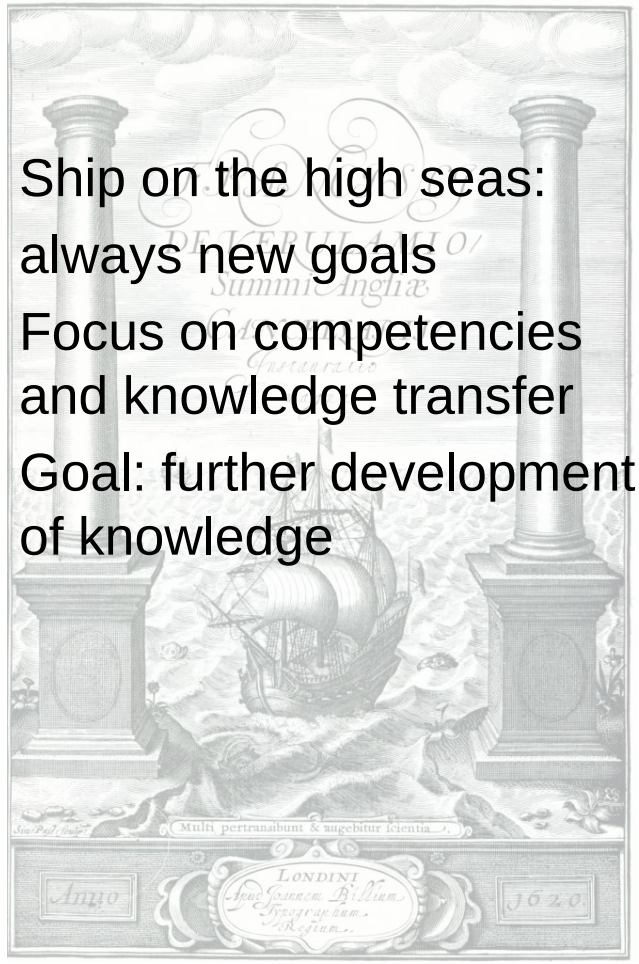
Tower:

pre-set targets/ outcomes per level

Focus on knowledge

Goal: knowledge sharing

vs.



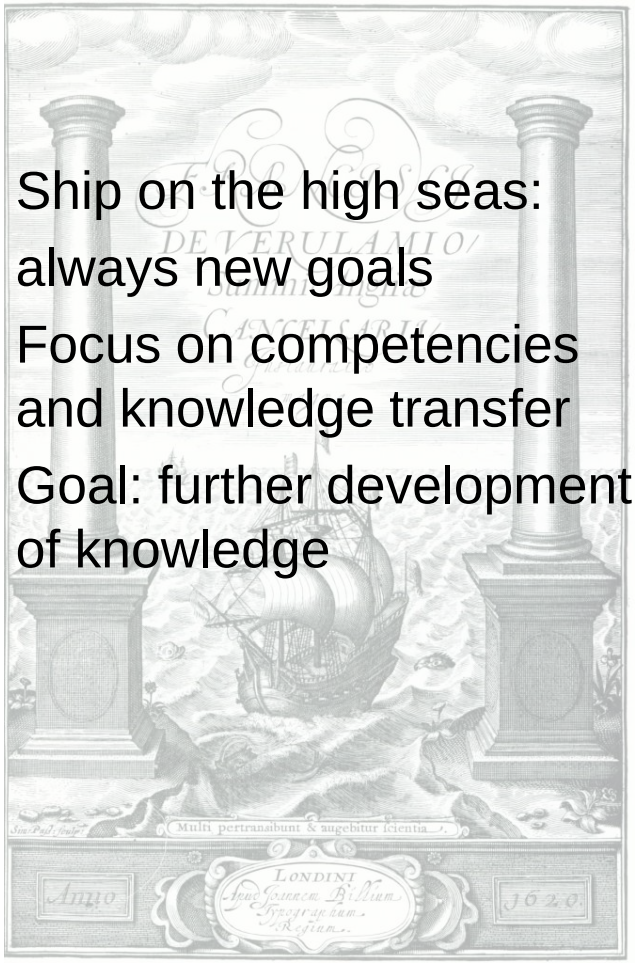
Ship on the high seas:

always new goals

Focus on competencies and knowledge transfer

Goal: further development of knowledge

Imagining learning at the university



Ship on the high seas:
always new goals

Focus on competencies and knowledge transfer

Goal: further development of knowledge

own active elaboration

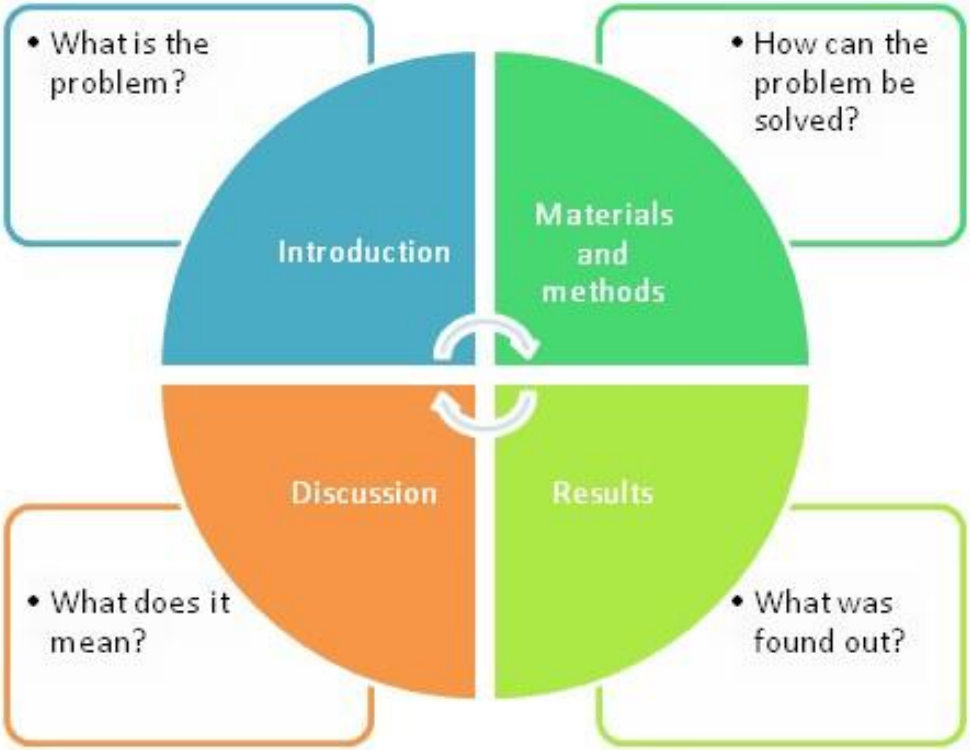
Competence acquisition & knowledge transfer

IMRAD, scientific principles

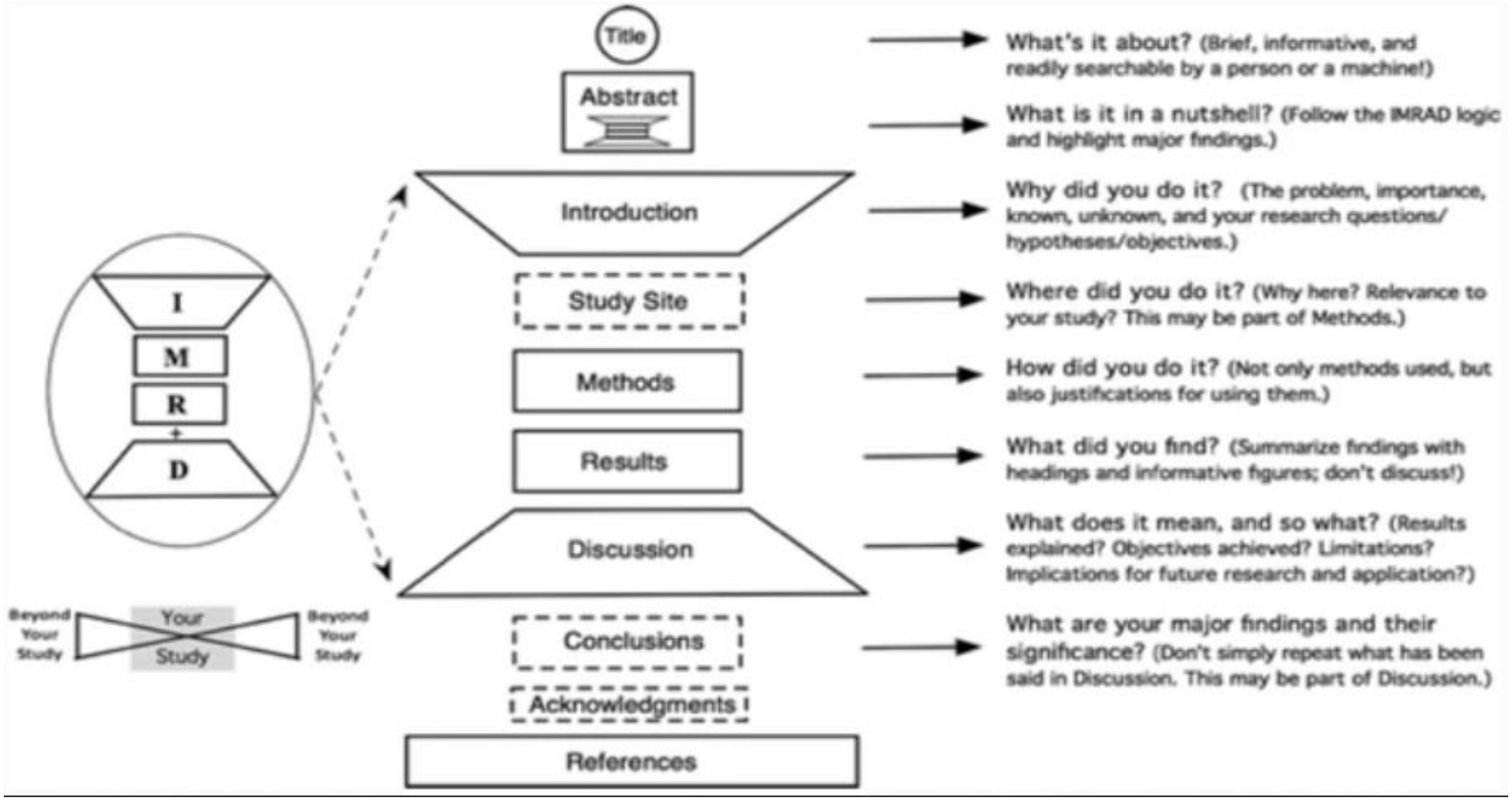
See Ilias -> Forum -> „Writing your report“

IMRAD

“IMRaD” format refers to a paper that is structured by four main sections: Introduction, Methods, Results, and Discussion



IMRAD

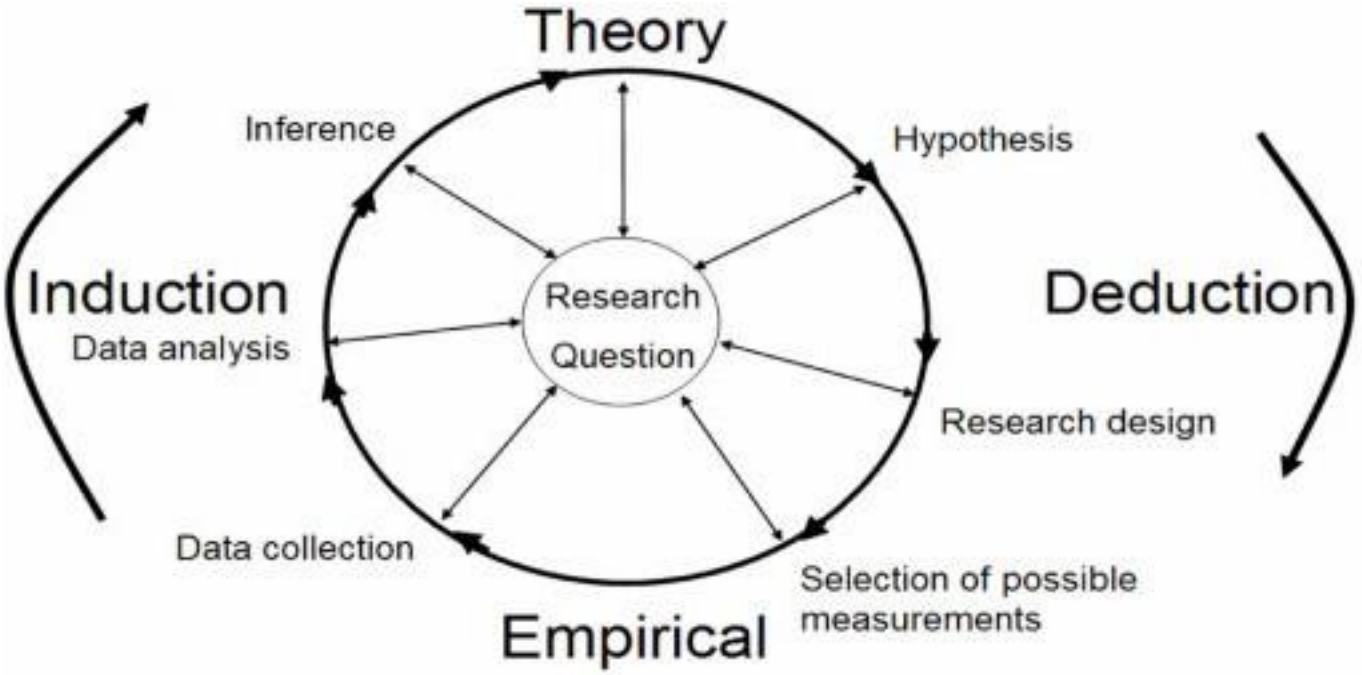


size of each box is roughly proportional to the relative length of each section (from Wu, J. (2011). Improving the writing of research papers: IMRAD and beyond. *Landscape Ecology*, *26*(10), 1345-1349.)

- **IMRAD** has only four sections: introduction (I), methods (M), results (R), and discussion (D)
  - Introduction: Why did you do it in the first place?
  - Methods: How did you do it exactly?
  - Results: What did you find?
  - Discussion: What does it mean after all and so what?

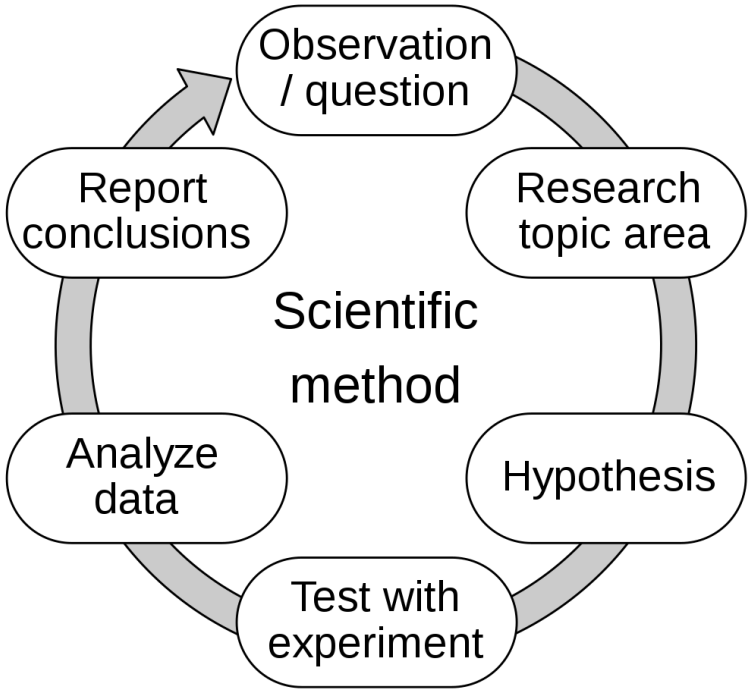
IMRAD close to scientific method

- **Deductive reasoning** works from the more general to the more specific: begin with thinking up a theory about our topic of interest and then narrow that down into more specific hypotheses that we can test
- **Inductive reasoning** works from specific observations to broader generalizations and theories: begin with specific observations and measures, begin to detect patterns and regularities, formulate some tentative hypotheses that we can explore, and finally end up developing some general conclusions or theories



IMRAD close to scientific method

- scientific method: empirical method of acquiring knowledge



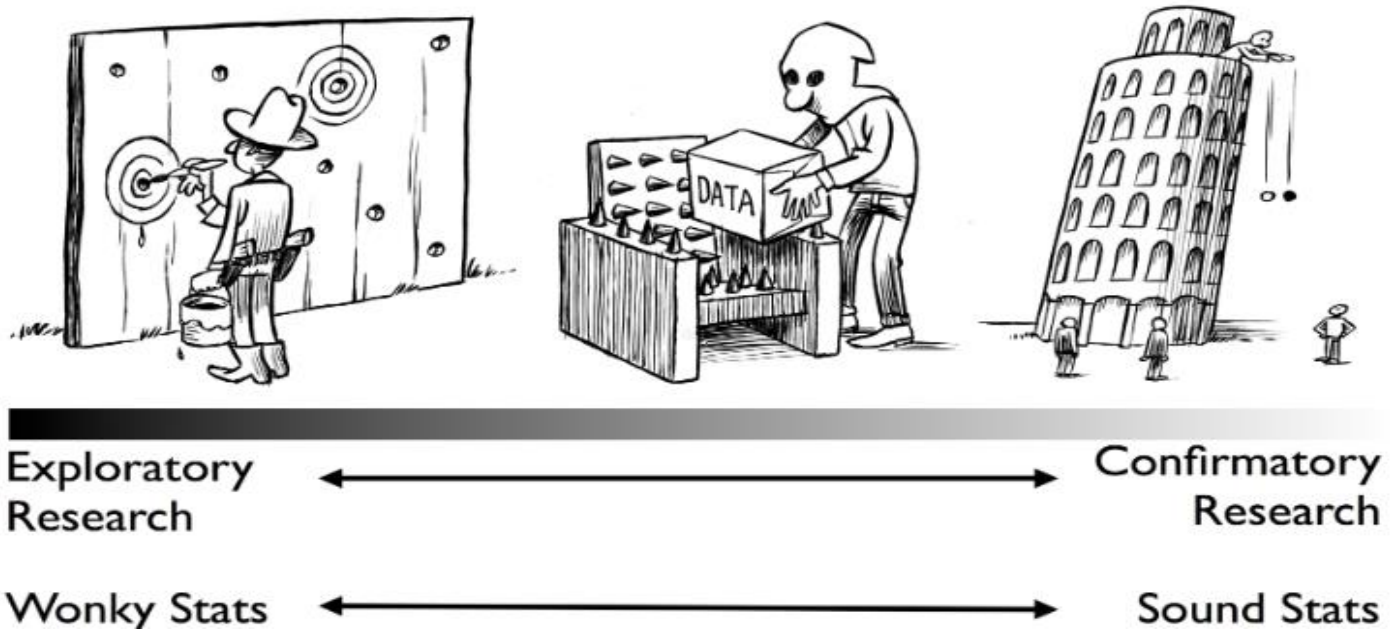
How to formulate a hypothesis?

- Please read: http://aditi.du.ac.in/uploads/econtent/HYPOTHESIS_FORMULATION_AND_TESTING.pdf

- **Confirmatory research**: Hypothesis needs to be structured before the data-gathering, data-analysis and interpretation phase of the research!
- well-grounded hypothesis indicates that the researcher has sufficient knowledge in the area to undertake the investigation

- You need to be clear how to frame a hypothesis:
  - Consider the example of a simple association between two variables, Y and X.
    - Y and X are associated (or, there is an association between Y and X).
    - Y is related to X (or, Y is dependent on X).
    - As X increases, Y decreases (or, increases in values of X appear to effect reduction in values of Y).

Exploratory vs. confirmatory research

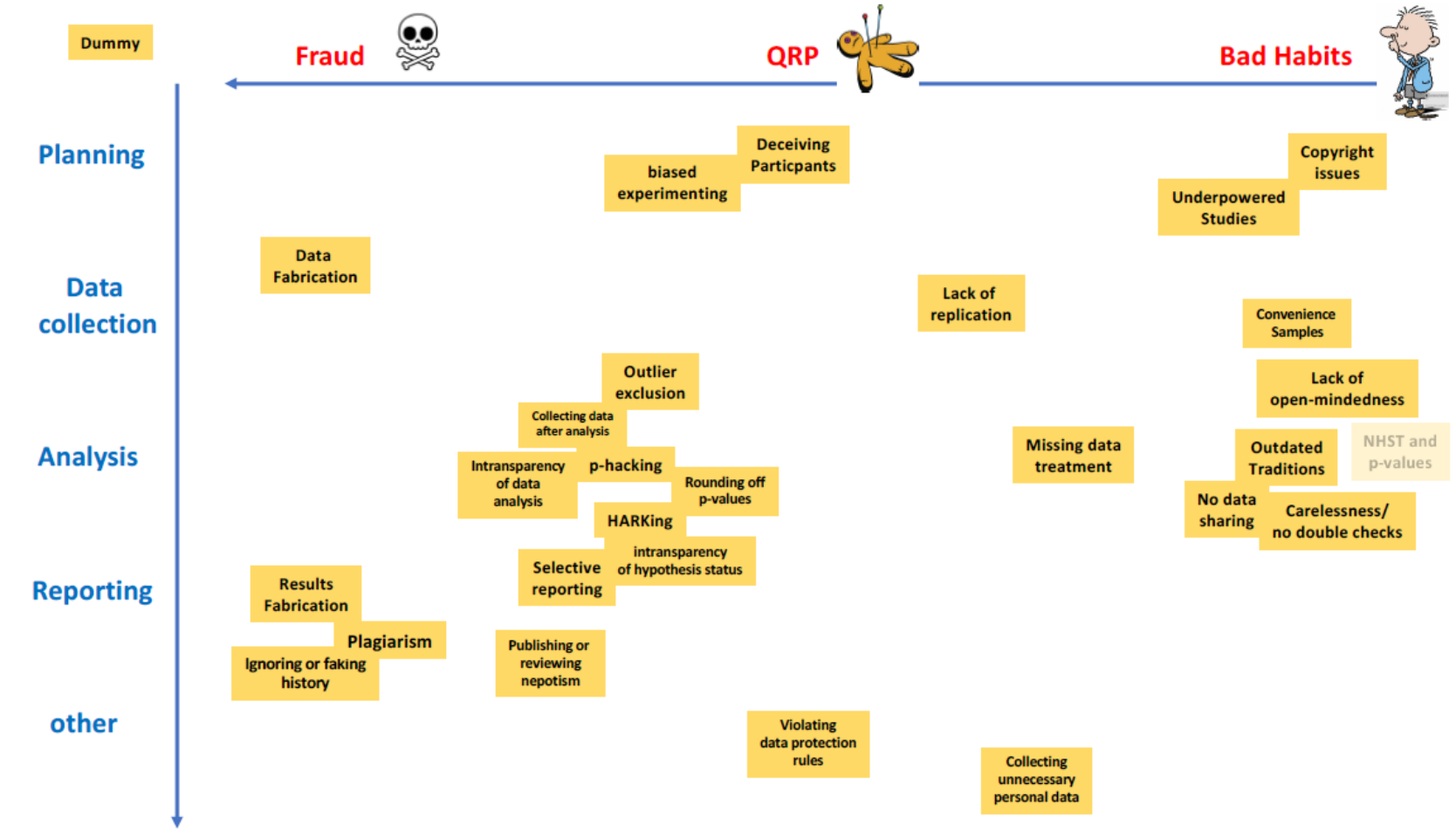


Call for pre-registrations

see: https://www.cos.io/initiatives/prereg

Wagenmakers, E. J., Wetzels, R., Borsboom, D., van der Maas, H. L., & Kievit, R. A. (2012). An agenda for purely confirmatory research. *Perspectives on Psychological Science*, *7*(6), 632-638.

Questionable research practices



Literature research

1. prepare research

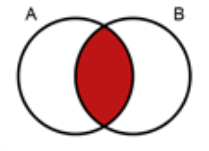
1. Define the topic area and thus the search area precisely.
2. Orientate oneself in the topic and collect the first search terms
3. Extend the list of search terms and make it more accurate

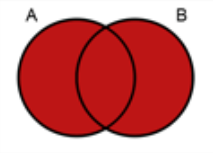
Search terms can be combined to find the desired literature as accurately as possible, for example:

obedience AND (systematic OR synthesis OR meta-ana)*

Boolean operators

Boolean operators are tools to combine several search terms according to logical criteria in your search request in a search engine or database query:

- The AND operator: two search terms combined with AND result in all articles containing both terms. 

- The operator OR: two search terms combined with OR, results in all articles containing one of the two terms. 

- The NOT operator: two search terms separated by NOT, results in all articles containing the first term but NOT the second; example: "eye movements" NOT saccades 

How to use Google Scholar: https://www.wur.nl/en/article/How-to-use-Google-Scholar.htm

2. search for literature

There are three central databases (increasing number of sources, but lower data quality):

- Web of Science: www.webofknowledge.com
- Scopus: https://www.scopus.com/
- Google Scholar: https://scholar.google.com/

3. obtain literature

Articles / books / ... that cannot be downloaded directly via a free link on the search platform or database can be procured in the following ways:

- Direct procurement on the internet: Often articles can be found as PDFs via a simple Google search
- Libraries / interlibrary loan: see, for example, the article delivery service Elsevier at https://www.ub.uni-freiburg.de/nutzen-leihen/fernleihe-und-dokumentlieferdienste/aufsatzlieferdienst-elsevier/
- Asking the author: If an article cannot be obtained in any other way, a request to the author often leads to success
- …

4. evaluate literature

Only a few relevant criteria are mentioned here:

Actuality

- Date of publication: Is the article current enough?
- For books: Is there a more recent edition?

Qualification of the authors

- Are the authors qualified and recognised in the relevant field?

Source/publisher

- Has the article been published in a journal or other scientific publication?

Relevance visible from abstract, table of contents, …

- Is the work really thematically relevant according to the abstract?
- Does the article correspond to the searched topic in terms of method and content?

Academic writing

Why write?

- Cumulative generation of knowledge
  - to share ideas and results (science is a public good)
  - to leave a record of research which can be added to by others
  - to legitimize the research (receive independent verification of methods and results)
- • Joining the scientific community
  - to receive due recognition for ideas and results
  - to attract interest from others in the area, form collaboration
  - to receive expert feedback on results and ideas

With whom to write

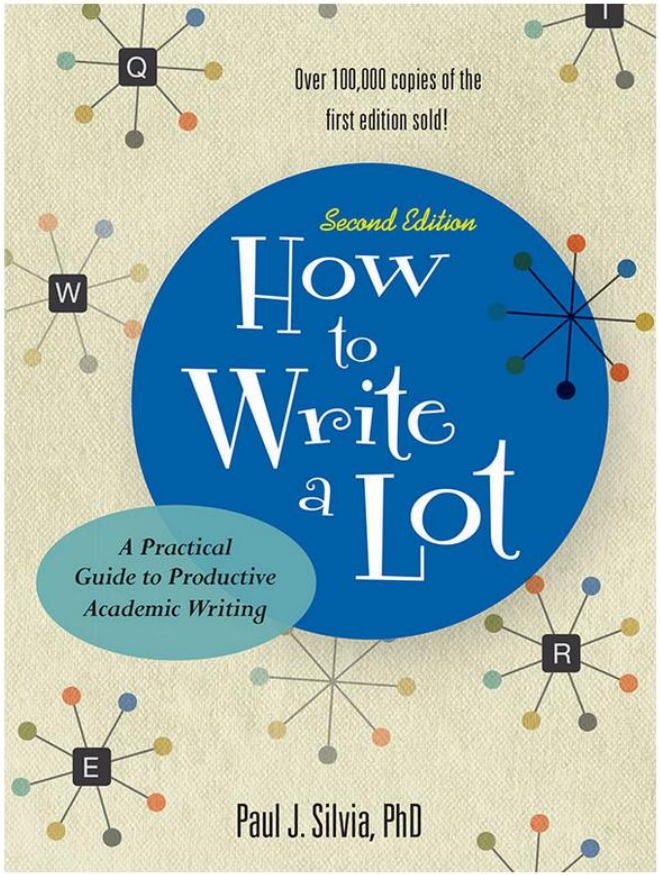
- Team up with colleagues who can do what you cannot
  - Generating ideas for studies; coming up with theories/models
  - Methods: Bayesian stats, SEM, modeling, simulations…
  - Data: webexperiments, eye tracking, strategic interaction…
- • even simply re-use of existing datasets
- • but are not so good at what you do well

When to write

- Most often heard: “Can’t find time to write”
- Silvia: “it is not something you find, it is something you must take!”

- set up a **schedule** and monitor your progress
- Choose a good time (undistracted and clear headed) and establish a routine
- No email, phone, twitter etc.

- positively reinforce yourself
- Identify a goal for each writing session
- + reward yourself when you reach it



Rhetorical modes

Rhetorical modes = modes of discourse

- describe the variety, conventions, and purposes of the major kinds of language based communication

- Narration (e.g. Biography, Novel)
  - to tell a story, narrate an event
- Description (e.g. Poetry)
  - to (re --)create, invent, or represent a person, place, event,
- Exposition (e.g. Journalism, Academic)
  - to explain, inform, demonstrate, or describe
- Argumentation (e.g. Advertising, Manifesto, Assessment)
  - to persuade of an idea or point of view (and possibly urge into action)

Good writing

- What makes a well written piece of scientific writing?
  - given the purpose of **explanation by evidence**

Clarity (explanation) which requires

- a straightforward, self contained story for a particular audience
- good organization & structure -> the outline
- logical coherence -> paragraphs (and transitions)
- writing simply and directly -> good style

Accuracy (evidence) which requires

- all necessary information (in the “right” place) defining
  - what is the subject & thesis and why
  - the nature of the “facts” and evidence (and how they came about!)
  - the conclusion (vis à vis alternatives)

Accuracy in (an empirical) science

- ≠ “truth” or proof
- = use of appropriate reasoning & methodology

- appropriate -> matter of judgment and thus justification
  - In psychology, there is never only one “correct”
    - theory or framework, hypothesis to derive from a given theory
    - way to measure or manipulate a construct
    - statistical procedure or test
    - …
- So, the criterion for accuracy can only be to say what (exactly!) was done and why
  - so that informed others can form a judgment and/or independently verify (reproduce/replicate)

Read: Kane, M. (2012). Validating score interpretations and uses. *Language Testing*, *29*(1), 3-17, https://journals.sagepub.com/doi/full/10.1177/0265532211417210

The story / central message

- **= one single central message**
  - carries through the entire paper (= the backbone)
    - reflected in the title, prominent in the abstract,… main conclusion

- a clear paper contains
  - everything necessary to convey the central message and nothing more (unlike a good novel with sub plots etc.)
  - think about take home message: what readers remember, talk about, (should) cite you for

Writing an outline

1. Main message / story, a preliminary title and the target audience / journals
2. Outline: Make a list of 1 sentence points = core-points outline (not focus on citations, just thoughts)
3. Talking yourself through it and fix order of core-points
4. Full-outline: Expanding core-points
    1. add sub-points
    2. most important citations / references
    3. adapt language & terminology for target audience
    4. specify transitions (how points relates to the next; use only *therefore, specifically, however*)

> The outline provide the map for the reader

5. test your outline

Writing a paragraph

every 1 sentence points = core-points gets translated to a

- **Paragraph** = unit of composition, 1 paragraph for 1 topic / thought / argument
  - Topic sentence (begin): main thought / core message of paragraph
  - Body: specifications, examples, arguments, etc.
  - Conclusion (end): in conformity with beginning