

INTRODUCTION TO ACADEMIC WRITING FOR MEDICAL STUDENTS

 Department for Key Skills and University Didactics Division for Student Affairs and Teaching



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- 1 Understand what "writing" is: writing as a process
- 2 Academic work academic writing
- 3 Drafting a project outline using the five paragraph method
- 4 Structure of an academic paper

OVERVIEW

- 5 Structuring material: what comes where
- 6 Reading strategies for academic primary source texts
- 7 Academic language: writing for the reader
- 8 Re-working revision through peer review

BENEFITS AND LIMITATIONS OF THIS COURSE



You should apply the concepts discussed in this course as directly as possible to the writing in your thesis.

Session leader:

Give input, introduce the tasks, lead discussions

Participants:

Select a topic to work with for the duration of the workshop (*let's pretend that...*)

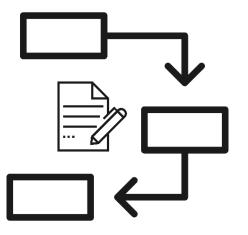


At English-speaking universities, writing workshops run for the entire year - we have 12 hours!

Homework and additional, self-directed practice



THE PROCESS MODEL OF WRITING



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WHAT HAPPENS WHEN WE "WRITE"?





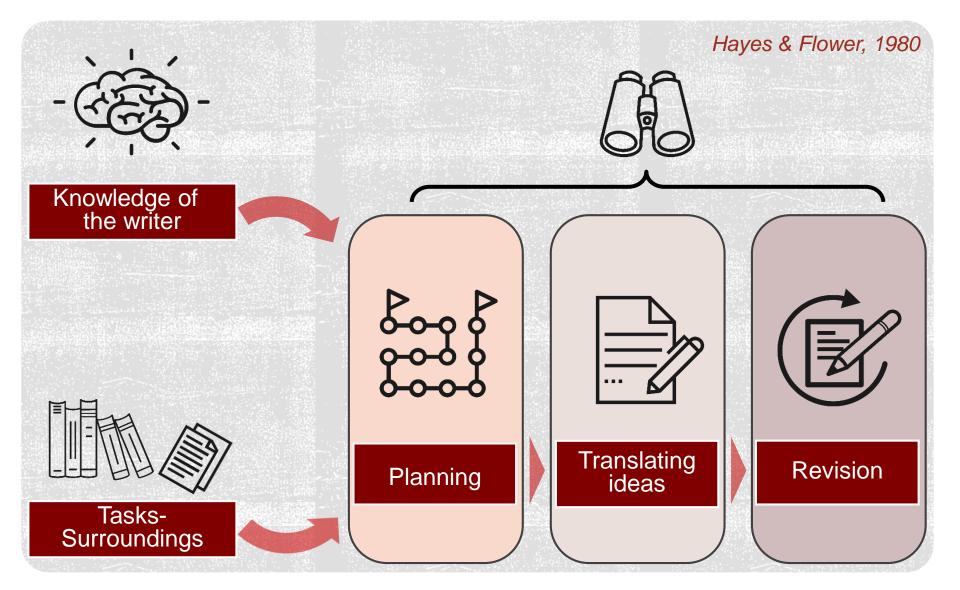
"When you start writing—and I think it's true for a lot of beginning writers—you're scared to death that if you don't get that sentence right that minute it's never going to show up again. And it isn't. But it doesn't matter—another one will, and it'll probably be better."

Toni Morrison, *The Sight of Memory*

- What happens when we write?
- Process Model of Writing Hayes & Flower (1980)
- Learn to write fluently by thinking of a writing as a process with distinct stages.

PROCESS MODEL OF WRITING





TIME FOR YOUR THOUGHTS



REFLECTION

Reflect on your experiences of writing:

- What do you find easy?
- What do you find more difficult?

THE STAGES OF ACADEMIC WRITING





Writing contract (with supervisor)	 Determine the requirements (content, style) What kind of support can you expect from your supervisor?
Planning	 Develop clear, precise questions Plan the content and your schedule
Development: research, data collection	 Literature search and selection Read, take excerpts, evaluate Documentation and interpretation of the data
Organisation of the material	 Map out a logical sequence for the argument (storyboard)
Translate your ideas: write a draft	 Translate the ideas from your planned structure into full written text Don't get hung up on style, grammar or spelling!
Re-work / edit the draft	 Content - is anything missing? Language - spelling, grammar, style Formalities - footnotes, citations, graphics

CONCLUSION



Differentiate between the different phases of the writing process:

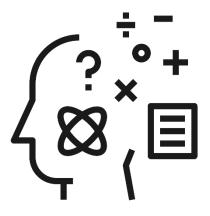
If you get "stuck", ask yourself which phase of the writing process you're in.

- Is the structure of the paper clear, or do you need to spend more time planning this?
- Have you collected the relevant data and analysed it?
- Do you need to review the text (language, grammar, spelling)?





SCIENTIFIC WORK – SCIENTIFIC WRITING



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DETAILED BREAKDOWN OF THE OBJECTIVES OF THIS CHAPTER

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- You're able to describe the role writing serves in the production of knowledge.
- This conception of writing as a form of cooperation amongst academics and researchers might influence what you try to achieve in your own writing.
- ...for example, simplicity, clarity, and an unambiguous use of language and structure.





RECOMMENDATIONS FOR ACADEMIC WORK FROM THE GERMAN RESEARCH FOUNDATION (DFG)

Recommendations from the DFG ("Self-regulation in Academia", January 1998)





Systematic self-critique

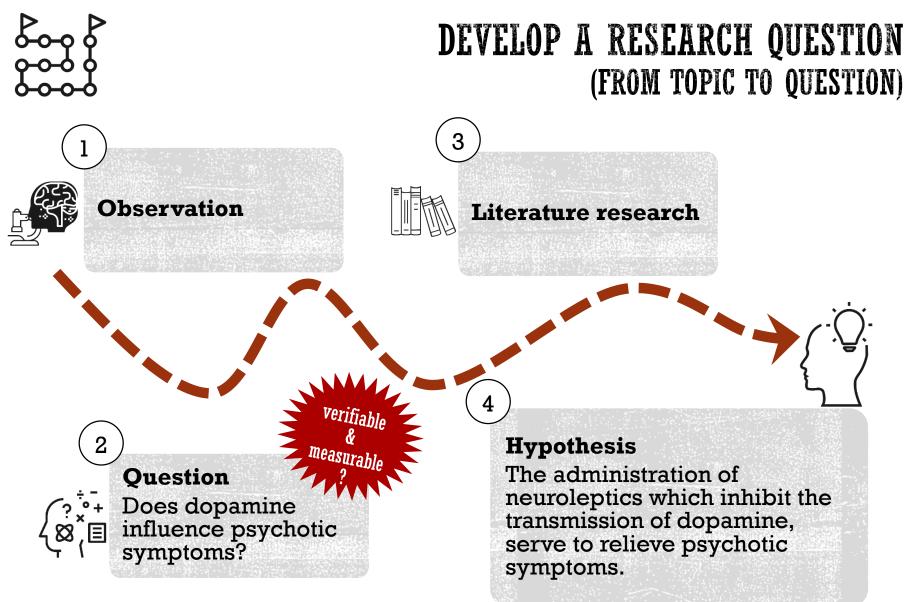


Honesty in regard to the significance of third-party contributions to your own work



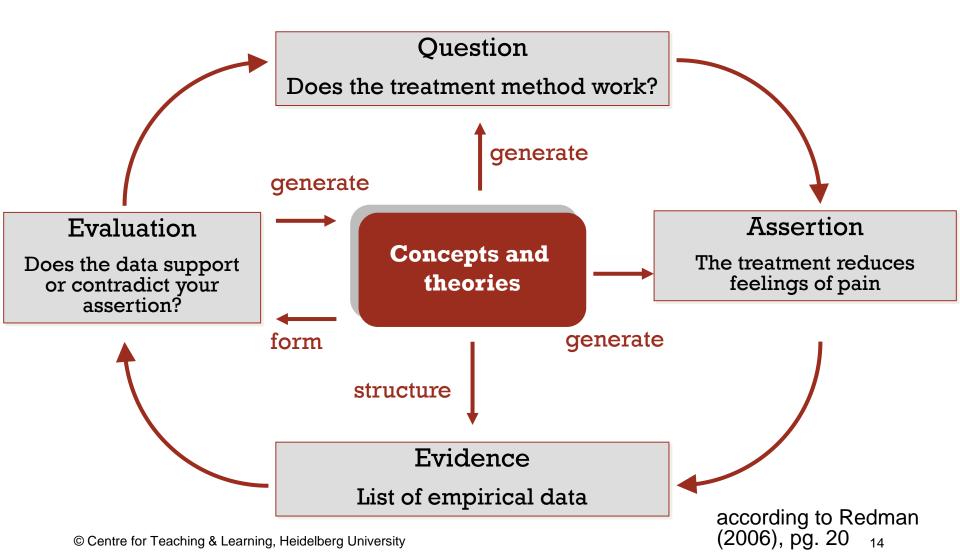
Publication of research results and clear indication of all conditions upon which their significance depend







CYCLE OF ACADEMIC KNOWLEDGE PRODUCTION



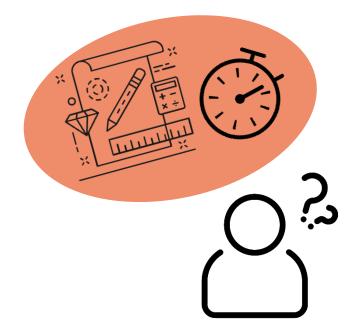


DRAFTING A PROJECT OUTLINE FOR YOUR DISSERTATION





A PROJECT OUTLINE IN ONLY 60 MINUTES



The 5 Paragraph Method:

You need...

...blank sheets of paper or a new word document

...pen

...alarm clock/timer

Now just get writing!





Explain to a friend, your grandma/grandpa... what it is you want to write about in your paper...

I'm looking into...

1.1:7 minutes





Step 2a

Formulate the description you just gave of your paper into one sentence, beginning with the words:

What I actually wanted to say is...

2.2:5 minutes





Step 2b

Formulate this sentence into a question Re-formulate this question multiple times to give at least 3 variants

2.3:7 minutes





Step 2b

Think about your questions:

Which of the questions seems most interesting to you?

- Would it be "measurable" / "verifiable"?
- This is the question you'll work with for the rest of this course.





Briefly describe:

- Who has already tried to answer this, or similar questions?
- What do you know about the "answers" they supplied?

2.4:10 minutes





What would you need to do in order to answer this question?

- What material would you need?
- Which methodology could be applied?
- What data would you need to collect?

2.5:10 minutes





Why would it be good to find an answer to the question you've posed?

- What do you hope to achieve by answering it?
- What result do you expect?
- Who would find the answer to this questions helpful and why?

2.5:5 minutes



TIME FOR YOUR THOUGHTS

<u>TASK</u>

Combine the excerpts from the Five Paragraph Method into an initial project outline and bring this with you to the next session! Evaluate your drafted text:

- What were your satisfied with?
- What is still missing from your ideas?
- What else do you need to do / read...
 - ...to find what out?



TIME FOR YOUR THOUGHTS

REFLECTION

Evaluation of the task:

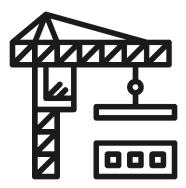
- What is the purpose of such a task?
- What did you notice during the writing process?
- Note down your thoughts in keywords

Time: 3 minutes

Combine the excerpts from the Five Paragraph Method into an initial project outline and bring this with you to the next session!



STRUCTURE OF AN ACADEMIC PAPER



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DETAILED BREAKDOWN OF THE OBJECTIVES OF THIS CHAPTER



- In this section we'll introduce you to the functions of the individual parts of an academic text.
 - ...this knowledge should help you remember the various words and phrases you can use in each part of a paper, and so make writing easier!



STRUCTURE OF AN ACADEMIC PAPER

What you need to ask yourself...

What is my paper about?Why is it important to answer this question?Who has researched this topic before?	intro- duction
What have I done?	material & methods
What have I found out?	results
What do my results mean and how does my work add to existing scholarship? How does my result answer the research question?	and discussion



STRUCTURE: INTRODUCTION

Function:



Where does your research sit in relation to existing discourse?

What **significance** does this have for my own research?



Is the way in which you've **derived** the question and hypothesis **convincingly** described and presented? Have you used **relevant literature**?



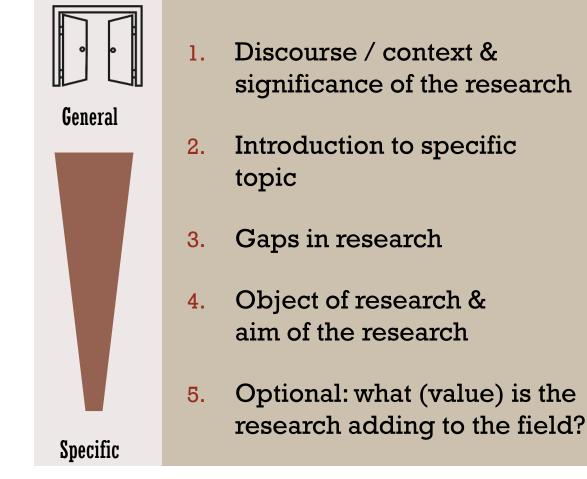
Is the contribution **new**?

Is it of **significance**?

Is it appropriate for publication in this journal?



LINGUISTS IDENTIFY 5 MAIN ELEMENTS IN AN INTRODUCTION (WEISSBURG & BUKER, 1990)







TIME FOR YOUR THOUGHTS

<u>TASK</u>

Analyse the introduction of this article (pg. 634-645).

Identify the main elements in the introduction (not necessarily in the order noted above!).

Underline the main sentences and signal words navigating you through the main sections.

Please pause the video!



Why?

- Demonstrate that you've taken existing scholarship into consideration!
- Prove the significance and relevance of your investigation!

How?

A) Prominent information: information prominent citation

Focus of the sentence is on the information

B) Prominent author: author prominent citation

Focus of the sentence is on the author of the information

C) "Weak" author: weak author citation

Idea from author(s) in first sentence - name of author(s) in the following



A) Information prominent citation

The extent of skin damage is dependent on two factors - the temperature and the period of contact with the source of heat (Zellweger, 1981).

Most common form of referencing





B) Author prominent citation

Important representative of a theory or field of research

The relationship between damage in the cells and the two factors temperature and time - were first recognised and elaborated by Moritz and Henriquez (1947).

Concurrent statement, prediction, further developments

The use of an ultrasound probe to estimate the depth of burns has meant that improvements in ultrasound devices over the last decades has opened further opportunity for research. Although Wachtel et al. (1986) didn't consider the probes particularly helpful for the purposes of diagnosis nineteen years ago, Cantrell et al. (1984) and Iraniha et al. (2000) reported that ultrasound could be used to estimate depth with an accuracy of over 90%.



C) Weak author citation

In comparison to other Laser Doppler Spectroscopy methods (Holloway et al. 1977; Stern et al., 1977), non-invasive Laser Doppler Flowmetry can be used to measure blood flow in tissue with a depth of 2 - 8 mm.





STRUCTURE: MATERIAL & METHODS

Function:

- Supports the results
- Indicates the quality of the results
- Does the paper comply with academic criteria?







HOW TO... TIPS FOR MATERIAL & METHODS

- Describe all of the information required to replicate the experiment / the investigation
- Complete sentences
- Formulate in the passive
 - Active: I measured the number of CD4 positive T-cells using a FACS analysis
 - Passive: The number of CD4 positive T-cells was measured using a FACS analysis
- Avoid unnecessary information and long descriptions of routine practices
- Cite published sources

Keep a detailed <u>Lab book</u> (including graphics) and update it regularly.





STRUCTURE: MATERIAL & METHODS

Function:

- Supports the results
- Indicates the quality of the results
- Does the paper comply with academic criteria?

Implementation:

- Detailed description of the methods used
- Make the consistency between the methods and results section explicit:
 - ... similar / same sequence as the results
 - ... similar / same subheadings or
 - ... introductory sentences in the method section, which relate to the aim of the investigation (why did you carry out the experiment? Reason, cause, in order to ...)
- No results in the methods section!

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STRUCTURE: RESULTS

Function:

- Describe results from the experiment
- Present evidence (visuals) for the question which you wish to answer.

Science is not data – data are the raw material of science

<u>No data:</u>

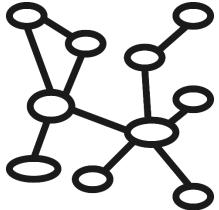
Study participants in the control group had an average blood pressure at rest of 85 +/- 5 millimetres of mercury (mmHg). In comparison, the 30 tennis players had an average blood pressure at rest of 94 +/- 3 millimetres of mercury (mmHg).

But results:

The average blood pressure at rest of the 30 tennis players was higher than that of the 20 study participants in the control group [94+/-3 (SD) vs. 85 +/- 5 mmHg, P < 0.002].



WHAT BELONGS WHERE IN THE INTRODUCTION? MIND MAPS AS STRUCTURING AIDS





OBJECTIVES OF THIS CHAPTER

Once you finished this chapter, you will be able to...



...organize your material so efficiently and purposefully that the line of reasoning for your text will become clear.



...generate a skeleton text for the *Introduction* and *Discussion* sections of your text using prompts.



MIND-MAPPING AS A TOOL





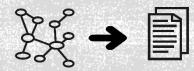
UTILISING PROMPTS FOR YOUR WRITING

- Beginnings of sentences/prompts instruct your writing, whereas headlines merely summarise the content of a text passage.
- Facilitate productive writing sessions by using prompts.

Example prompts for an Abstract

- It is known that ...
- The question arises ...
- To investigate this issue ...
- This study aims to ...
- The data collected were ...
- Statistical analysis of the data was conducted using ...
- The results showed ...
- Furthermore, it emerged that ...
- It can therefore be concluded ...

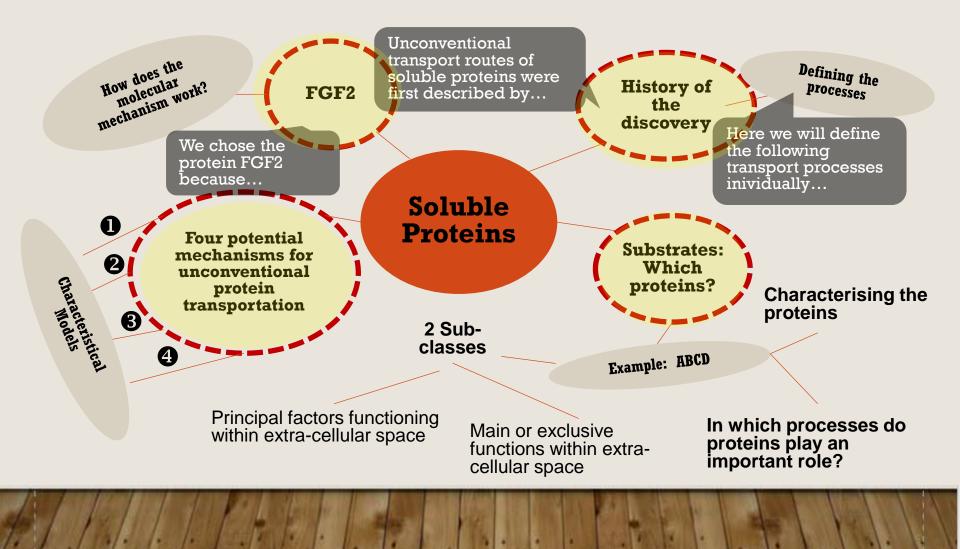
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Unconventional Transport Routes of Soluble Proteins





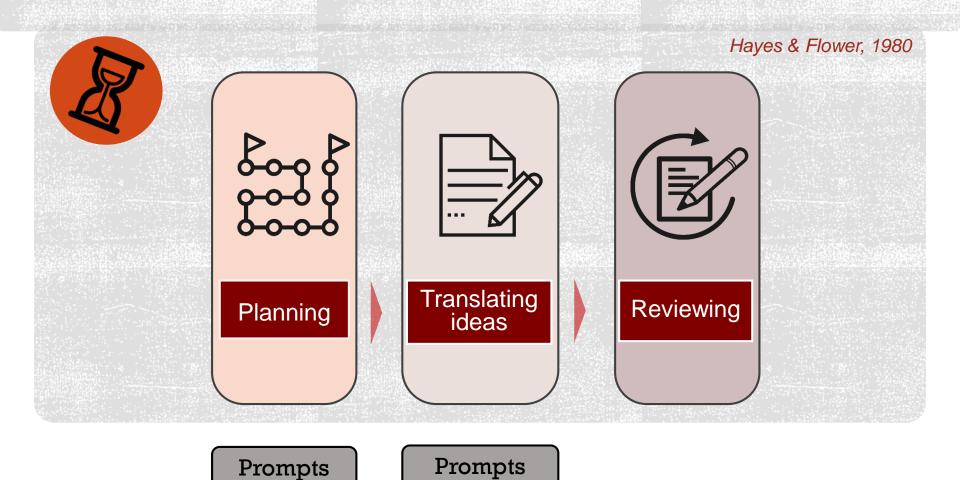
OUTLINE DERIVED FROM THE MIND-MAP

<u>Unconventional Transportation Routes of Soluble</u> <u>Proteins</u>

- The unconventional transportation routes of soluble proteins were first described...
- We will define the following transportation routes individually...
- We will cover the following proteins ...
- Examples are...
- The proteins can be characterised by...
- These proteins play a role in...
- Evidence for this can be found in ...
- We can distinguish the following subgroups...
- We can examine four potential mechanisms for an unconventional protein secretion ...
- "
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UTILISING PROMPTS FOR YOUR WRITING



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TIME FOR YOUR THOUGHTS

<u>TASK</u>

- Create a mind-map for the introduction of your project outline/project proposal.
- Use this mind-map to formulate/create prompts for a structural draft of your introduction.
- Reflect: How did mind-mapping and prompting work for you? What was helpful? What was not?

ZEIT FÜR IHRE EIGENEN GEDANKEN

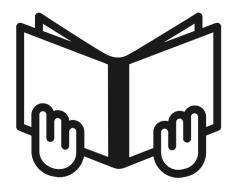
<u>AUFGABE</u>

Ihr Abstract: Arbeiten mit Prompts

- Analysieren Sie die Abstracts in AB X. Unterstreichen Sie Formulierungen, die den Beispiel-Prompts entsprechen. (Tandems)
- Können Sie diese oder andere Prompts für Ihr eigenes Abstract nutzen?



STRATEGIES FOR READING SCIENTIFIC PRIMARY TEXTS





INDIVIDUAL GOALS OF THIS CHAPTER

 You can differentiate between different types of literature



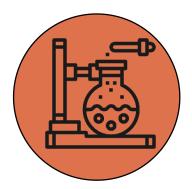
- You know what types of literature contain the information you need
- You will learn a method to read scientific primary texts and can apply this method to your work



TYPES OF LITERATURE



- e.g., academic papers
- Case descriptions
- Case history reports







- e.g., reviews articles
- Meta analyses





TIME FOR YOUR THOUGHTS

SELF-REFLECTION

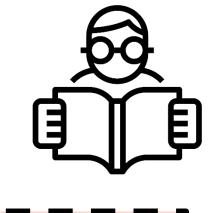
- How do you cope with reading scientific texts?
- Easily / with difficulty? ...Sufficiently?
- How do you approach texts?

Time 10 min



READING STRATEGIES FOR EMPIRICAL PRIMARY LITERATURE





 Guiding questions in the documents





QUESTIONS FOR EMPIRICAL PRIMARY LITERATURE



Π.

Determining the task

Read the title and the abstract:

- What question do the authors wish to answer?
- What findings are to be expected?
- Do the authors propose a model to explain a process?
- Is there a discussion on the relationship between the different variables?

Gain an overview

Read the introduction:

- What motivated the authors to complete this work?
- What are the main hypotheses?
- What was previously known about the topic or problem?
- What is the aim of this paper?





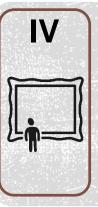
QUESTIONS FOR EMPIRICAL PRIMARY LITERATURE



Examine findings separately

Look at images, read image headers then read the text:

- Which variables were analysed?
- What were the fundamental findings in regard to the . relationship between independent (x) and dependent (y) variables?



Interpreting the data

Read the discussion:

- Did the findings support the hypotheses?
- What were the main findings?
- What still needs to be done?
- What do the findings mean for your own work? .



"Scim/scan" the Material and Methods sections

Read the sub-headings and main sentences in each paragraph: Which basic methods were applied?



STRATEGIES FOR READING PRIMARY LITERATURE

Take notes during first reading:

- What is unclear?
- Read the article multiple times and attempt to understand the difficult sections.
- If required, consult secondary literature sources
- If required, discuss these questions with the supervisor





TIME FOR YOUR THOUGHTS

<u>TASK</u>

You brought in an article that you researched for your own work

- You will find the suggested steps on reading a primary text in your documents.
- Apply these steps to your text and attempt to answer the questions <u>in writing</u>.

Time 25 min



TIME FOR YOUR THOUGHTS

SELF-REFLECTION

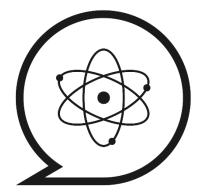
How did you cope with the reading when applying the strategy?

Easier - too complex





8. SCIENTIFIC LANGUAGE





INDIVIDUAL GOALS OF THIS CHAPTER

- You can name the fundamental conventions of scientific language...
- ...and apply these to your own work.

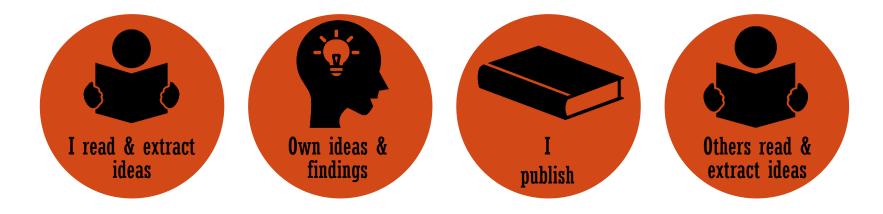






REQUIREMENTS OF SCIENTIFIC LANGUAGE

Scientific writing is a cooperative undertaking!



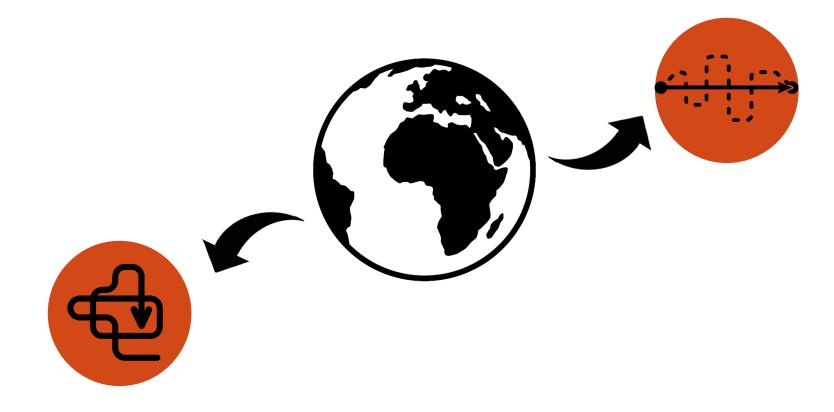
- A cooperation between researchers
- Unambiguous, concise & precise description of own methods & findings

\rightarrow <u>Reader-centric writing</u>





REQUIREMENTS OF SCIENTIFIC LANGUAGE







REQUIREMENTS OF SCIENTIFIC LANGUAGE

Reader-centric writing Precise formulations to avoid misunderstandings!

<u>general language</u>

- evaluative emotional subjective
- vague



Scientific language

- the same term for the same object
- use technical term
- make specific statements
- use clear formulations



<u>technical jargon</u>

- nominal style
- long sentences
- inappropriate complicated



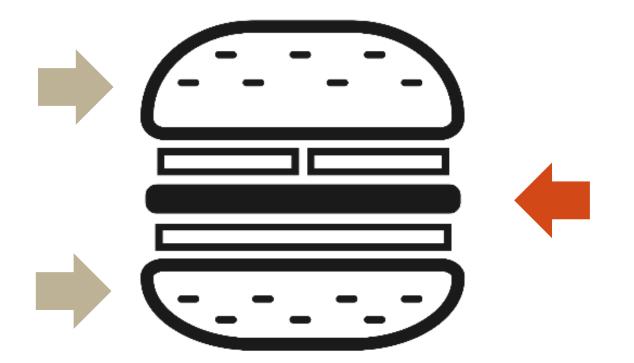
PROCEDURE: MULTIPLE REVIEWS

multiple rounds with different foci!





STRUCTURE OF PARAGRAPHS







STRUCTURE OF PARAGRAPHS

A paragraph contains <u>one</u> central idea

Main clause: What does the paragraph discuss? (What is the message?) Key words \rightarrow to explain the topic

Following clauses: Details \rightarrow describe, explain, support

Final clause: Summary/conclusion -> transition to next paragraph





READER-CENTRIC WRITING

Review the logic of your structure

Categorising and assessing information:

- Information to support the hypotheses
 Similarly, also, even in the case of, as well...
- Information that contradicts the hypotheses On the other hand, by contrast, contrasting...





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ORGANISED STRUCTURE: GUIDE

Orientation guide in the text

- Short introduction in the new paragraph to highlight how it relates to the previous paragraph:
 - Regarding the research questions, we have shown that...
- What can the reader expect from the paragraph?

In the following, we will present three approaches that... On the one hand... On the other hand... And finally... Similarly/also...on the other hand, in contrast to

• What is the resulting conclusion?

In conclusion, we can say...

• How does the conclusion relate to the next paragraph?

We will examine these statements in the next chapter in order to... © Centre for Teaching & Learning, Heidelberg University





SENTENCE STRUCTURE: Avoid complex sentences

Example:



Splitting verbs **is**, in German, **inherent to** complicated sentence structures.



Splitting verbs **is inherent to** complicated sentence structures in German.

Example:

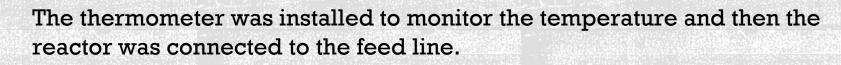


The reactor, in which the thermometer used for monitoring the temperature was previously installed, was connected to the feed line.



...

The reactor was connected to the feed line after the monitoring thermometer was installed.



Following: Ebel, H.F., Bliefert, C. & Greulich, W. (2006). Writing and publishing in the natural sciences. Wiley-VCH © Centre for Teaching & Learning, Heidelberg University





Sentences that are longer then 3 lines should be revised!

The examinations of the numerous patients were performed by the available doctors.

Delete fillers:

The examinations of the patients were performed by the doctors.

Avoid nominalisations: The patients were examined by the doctors.

Turn passives into actives: The doctors examined the patients.

Transitioning between shorter and longer sentences makes your language more rhythmical and exciting.

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SCIENTIFIC LANGUAGE

Delete redundancies

Everything that does not actively contribute to the development of your topic:

Fillers

- "As shown in Figure 1..."
- "Figure 1 shows..."

• Empty phrases, euphemisms, empty metaphors

- "The line of argumentation lacks a certain logical stringency."
- "The line of argumentation is not conclusive"

All turns of phrases that signal a **personal opinion** but cannot be justified:

obviously, naturally, unfortunately

Check your adjectives / adverbs:

absolute exception, absolute necessity, rich variety





SENTENCE STRUCTURE: VERBS

Avoid nominal style!

Five two-week old white pathogen-free laying hens were individually vaccinated with precisely 105 duck virus-infected tissue cultures.

 Avoid stringing nouns together (string of pearls) - use active verbs instead.



The use of X led to changes in Y.

) Using X changed Y.



SENTENCE STRUCTURE: WORDING IN THE ACTIVE VOICE

Use the active voice instead of the passive voice where possible (with the exception of the Methods section)

Example from an assessment

Original:

Various lines of evidence for Golgi-independent transport of membrane proteins to cell surfaces have been reported.

Revised by editors: active voice

Researchers have reported various lines of evidence for Golgiindependent transport of membrane proteins to cell surfaces.

Annu. Rev. Cell Dev. Biol. 2008. 24:X—X; doi:10.1146/annurev.cellbio.24.110707.175320 Copyright © 2008 by Annual Reviews. All rights reserved





Correct and unambiguous formulations

Use technical terminology:

calendula officinalis – not: marigold

Always use **the same term for the same object** (no stylistic variations):

- dose rate is always dose rate not: dosage quantity or amount
- gene genetic material

Correct **combinations of words** and word formations:

newborn calf serum - serum from a newborn calf





Clear formulations

Avoid semantic ambiguity:

Bank: financial institute or river bank?

Avoid syntactic ambiguity:

- After spending an hour in boiling water, I loaded the sample onto a gel.
- The patient was referred to a psychiatrist with severe emotional issues.

References to indexical information (information with a contextual meaning) must be **clear**

- Here, yesterday, tomorrow
- This, that, etc.

The patient presented with a high temperature, complained of a loss of appetite but otherwise seemed cognitively aware. This can be interpreted as a positive effect of the chosen intervention.





Avoid unclear formulations

" <u>Many fragments</u> developed while digesting EcoR I"	Fragments of what? How many? In comparison to what?
"The <u>change</u> in X led to"	Increase, decrease?
"The cells were in contact with the serum for 48 hours"	Air-borne contact? bathed therein? incubated therein?
"X shows a connection to Y"	Led to, increased, caused,
"The sample was <u>small"</u>	small = how small? small in comparison to what?





From a submitted text

This localization and the quantification by western blotting (Fig. 3D) indicated that wild type Ist2 and mutant Ist2 K931-K936A are **extremely stable** proteins.



Comment of the reviewer: avoid unspecific statements

Page 10, para 2, line 9 – The authors claim that wild-type Ist2 and the K931-936A mutant are "extremely stable". This is relative to what exactly? Most membrane proteins are stable for more than 3hrs!



TIME FOR YOUR THOUGHTS

SELF-REFLECTION

What was particularly important for me in this unit?

What do I absolutely need to consider when writing my next text?



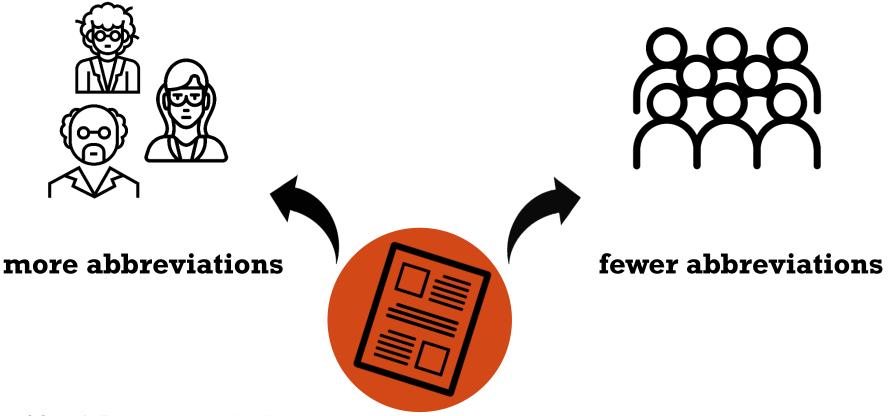
ABBREVIATIONS: WHEN AND HOW OFTEN?

This study measured the response of forearm blood flow (FBF) and forearm vascular resistance (FVR) after isometric handgrip exercise (IHE) and related them to plasma norepinephrine (NE) and epinephrine (E) in 12 normotensives (N) and 14 primary hypertensives (PH). IHE was performed at 30% of maximum voluntary contraction using a calibrated dynamometer. Systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), FBF, FVR, NE and E were measured in the resting arm before and after IHE. Preexercise **SBP** and **DBP** were higher in **PH** than in **N. FVR** was similar in **PH** and **N. NE** was higher in **PH** compared to other matched normotensives. After **IHE**, **SBP** and **DBP** were increased 18% and 19%, respectively, in **PH** and 16% and 255 in **N**. **HR**, **NE** and **E** were increased in **PH** and **N**.



ABBREVIATIONS: WHEN AND HOW OFTEN?

Depends on field and target group!





ABBREVIATIONS: WHEN AND HOW OFTEN?

Abbreviations...

For long or cumbersome terms
 Example: ethylenediaminetetraacetic acid (EDTA)

• For frequently occurring terms i.e. more than seven occurrences...

 No more than 2-3 abbreviations per paragraph common abbreviations do not count (e.g. DNA)

No non-standardised abbreviations



TIME FOR YOUR THOUGHTS

<u>HOMEWORK</u>

Write an outline for your entire project draft, a proposal for your thesis (4-5 pages)

Bring a printed copy to the next session for peer feedback.



TIME FOR YOUR THOUGHTS

SELF-REFLECTION

What was particularly important for me in this unit?

What do I absolutely need to consider - in terms of use of abbreviations - when writing my next text?



REVIEWING DRAFTS





TIME FOR YOUR THOUGHTS

SELF-REFLECTION: FEEDBACK AS A COMPONENT OF REVIEWS

Have you ever received feedback on your texts (not including grades)?

- Who gave you feedback and on what?
- How? (was it?) What did you do with that information?



INDIVIDUAL GOALS OF THIS CHAPTER

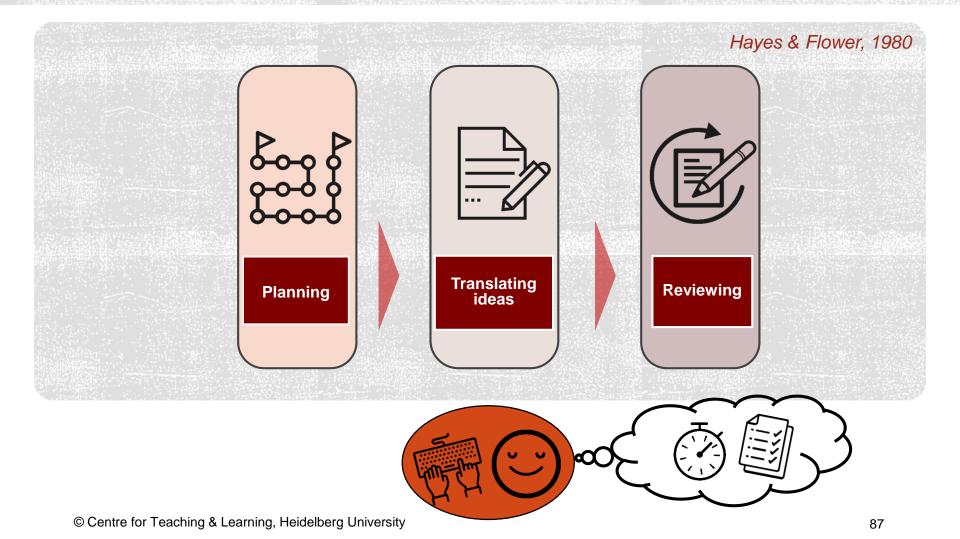
In this chapter, we want to present...

...allowing enough time for feedback to improve text reviewing





FEEDBACK IN THE WRITING PROCESS





WRITING AS A RECURSIVE PROCESS

Structuring ideas:

Collect ideas and develop the line of argumentation

Bring your ideas to paper

Translate your ideas into words and develop a draft version

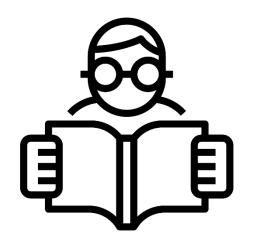
Get comments

<u>Review the draft text</u> Decide what to keep

Final version Finally: Spelling

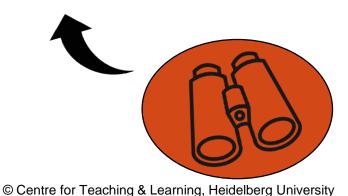


FEEDBACK - WHY?



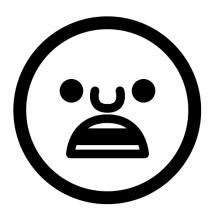
- Difficult to distance oneself from an own text
- Feedback from people who have no connection to text
 - Inconsistencies?
 - Ambiguous formulations?





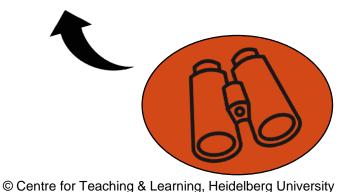


FEEDBACK - WHY?



- Difficult to distance oneself from an own text
- Feedback from people who have no connection to text
 - Inconsistencies?
 - Ambiguous formulations?







FEEDBACK - HOW?

1. Before starting: Agree on the goal

- Check line of argumentation? Spelling and grammar?
- At what stage are you in the writing process?
- How much time is allocated for the reviewing process?
- How much time does the reader have?

2. Giving feedback:

- Written not verbal (comments on the side)
- What is unclear formulate questions

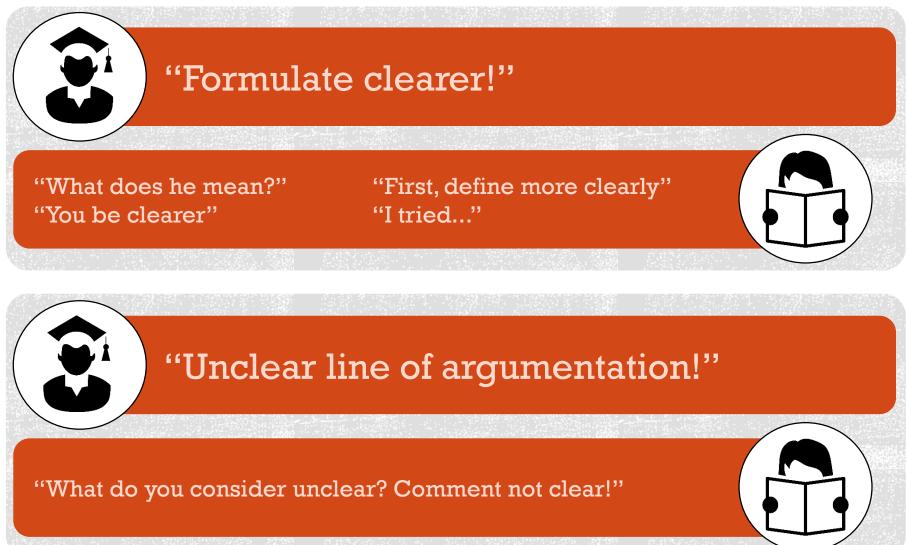
3. Receiving feedback:

Which parts of the feedback will you accept? Why?



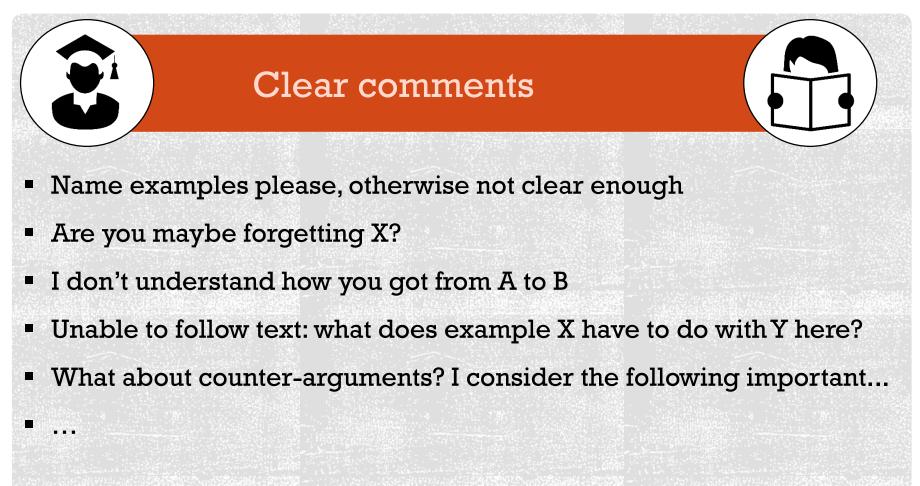
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REVIEWING: AS PRECISE AS POSSIBLE





REVIEWING: AS PRECISE AS POSSIBLE





EXAMPLE:

Which data?

How exactly are these used in different ways?

Findings = data? Where is the difference?

Does that work?

On the use of data and facts

Data and facts are used in different ways in science. They often have a dual function in texts. This allows scientists to underline their importance in specific contexts. Scientific findings are classified and assigned to numerous categories in an attempt to create clarity. At the same time, the data and facts described in the texts have an independent and, in their uninterpreted form, associative meaning. In the text production process, scientists attempt to minimise these associative aspects.