

# An introduction to (scientific) writing

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This course wants to support you in writing your academic papers. If you have specific questions, please ask at any time!

# Writing a text is like functional programming

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- **Writing**

- paragraphs
- each paragraph develops one central idea
- each paragraph returns the conclusion of that central idea
- each paragraph starts with the conclusion of the previous one
- paragraphs can have side effects!!

- **Functional programming**

- functions
- each function has one basic task
- each function returns one value
- a function can take the return value of another function as its argument
- functions can have side effects!!

# Writing a text is like functional programming

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- Semantic maps are an exciting research tool for investigating and comparing the grammatical functions of language. Among the many applications of the methodology, a particularly interesting approach is to use semantic maps to identify recurrent grammaticalization pathways. For example, Haspelmath (2003:234) offers a semantic map of typical dative functions with directionality of possible changes. Maps like these make clear and verifiable predictions about the evolution of grammatical categories across languages.
- One of the underlying hypotheses of such maps is that they represent a universal and contiguous conceptual space and that grammaticalization reflects extension or movement of categories along connected regions in this space. Haspelmath (2003:232) writes that if “a semantic map has been tested on a sufficient large number of languages [...] from different parts of the world, we can be reasonably confident that it will indeed turn out to be universal [...].” A similar view has been defended as the Semantic Maps Connectivity Hypothesis (Croft, 2001:96). In sum, languages are hypothesized to diverge in terms of grammatical categories, but to share a universal conceptual space.

# Writing a text is like functional programming

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- **Introductory** or **transition** words or sentences

More recently, however, the universal status of semantic maps...

- **Topic** sentence (summarizes the central idea)

... the universal status of semantic maps has become a matter of debate.

- **Body** (evidence, specifics, examples, ...)

For example, Cysouw (forthcoming) writes that his attempts to find a single and unique semantic map for person marking never led to satisfying results. Instead, he found that several semantic maps are possible depending on the level of analysis ...

- **Concluding** sentences (often reflects the central idea again)

Cysouw therefore calls for a different use of semantic maps in which the number of attestations of a particular function is taken into account.

# Writing a text is like functional programming

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- **Class assignment:** write a follow-up paragraph
  - Artificial Intelligence (AI) is a broad field, and means different things to different people. It is concerned with getting computers to do tasks that require human intelligence. However, having said that, there are many tasks which we might reasonably think require intelligence - such as complex arithmetic - which computers can do very easily. Conversely, there are many tasks that people do without even thinking - such as recognizing a face - which are extremely difficult to automate. AI is concerned with these difficult tasks, which require complex and sophisticated reasoning process and knowledge.
- **Remember:**
  - > introduction or transition words
  - > topic sentence (central idea)
  - > body (elaborating, evidence, examples, ...)
  - > concluding sentence(s)

# Writing a text is like functional programming

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- Artificial Intelligence (AI) is a broad field, and means different things to different people. It is concerned with getting computers to do tasks that require human intelligence. However, having said that, there are many tasks which we might reasonably think require intelligence - such as complex arithmetic - which computers can do very easily. Conversely, there are many tasks that people do without even thinking - such as recognizing a face - which are extremely difficult to automate. AI is concerned with these difficult tasks, which require complex and sophisticated reasoning process and knowledge.
- People might want to automate human intelligence for a number of different reasons. One is simply to understand human intelligence better. For example, we may be able to test and refine theories of human intelligence by writing programs which attempt to simulate aspects of human behaviour. Another reason is simply so that we have smarter programs and machines. We may not care if the programs accurately simulate human reasoning, but by studying human reasoning we may develop useful techniques for solving difficult problems.

Excerpts taken from: Cawsey, Alison (1997). *The Essence of Artificial Intelligence*. London: Prentice Hall. p. 1.

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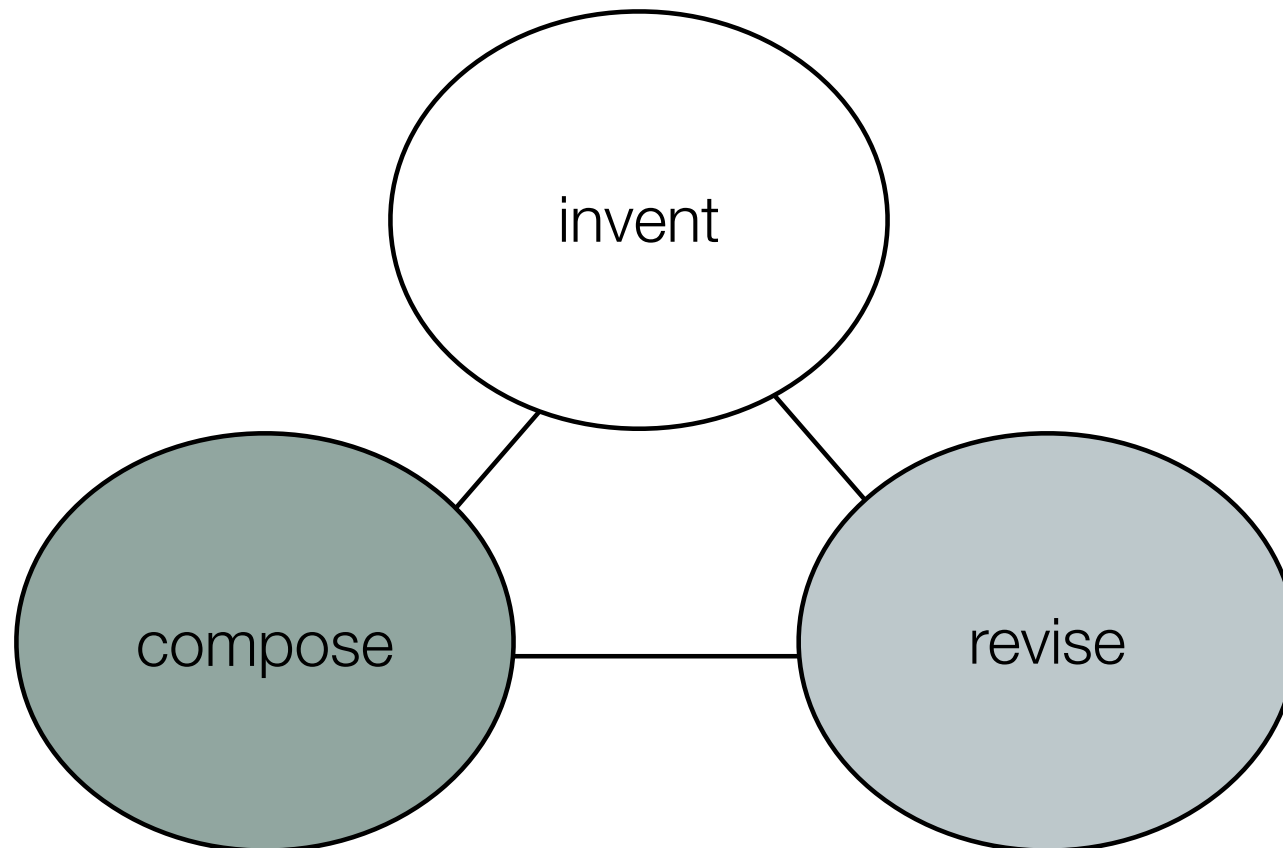
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- The writing process
- Research and citation
- Practical advice and exercises

## 1. The writing process

What do we do when we write?

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## Inventing

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- Schedule the writing process and show **discipline**
  - If you run away once, you keep running away

- Answer the following questions:
  - Purpose?
  - Audience?
  - Genre?
  - Style?
  - Research?

- Invention **strategies**:
  - Ask critical questions
  - Freewrite & brainstorm
  - Map & cluster
  - Keep a journal

*dictionaries, relations, comparison, similarities, ...*  
*write all thoughts down without revising*  
*visualize relationships*  
*write down research and personal ideas*

## Inventing: developing an outline

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- **Always** develop an outline **before** writing
  - Parallelism
  - Coordination
  - Subordination
  - Division
  
- **Parallelism:** all headings should have same structure (e.g. starting with a verb)

I. Choose desired colleges	I. Choice of desired colleges
II. Prepare application	II. Preparation of application
  
- **Coordination:** headers on the same level must be equally significant
  - I. Visit and evaluate college campuses
  - II. Visit and evaluate college websites
    - a. Note important statistics
    - b. Look for interesting classes

## Inventing: developing an outline

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- **Subordination:** From general to specific
  - I. Describe an influential person in your life
    - a. Favorite teacher
    - b. Grandparent
  
- **Division:** each heading is preferably divided in two or more parts
  - I. Compile resume
    - a. List relevant coursework
    - b. List work experience
    - c. List volunteer experience
  
- Inexperienced? Use **standard** structures, such as the problem structure:
  - I. What is the problem?
  - II. Why is it a problem?
  - III. What causes the problem?
  - IV. What can we do about it?

## Inventing: developing an outline

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- **Class assignment:** write an outline

- I. What is the problem?

- II. Why is it a problem?

- III. What causes the problem?

- IV. What can we do about it?

- Answer the following questions:

- Purpose?

- Audience?

- Genre?

- Style?

- Research?

- Invention **strategies:**

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## Outlining a scientific paper (1)

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- **Title** + subtitle (optional) + keywords (optional)
  - Make a **specific** title
  - Use important **keywords**
  - **Complement** the title in the subtitle (don't repeat it)

**Analogy and multi-level selection in the formation of a case grammar.**

A case study in Fluid Construction Grammar.

(author's name + affiliation)

**Keywords:** grammar evolution, origins of language, emergent grammar, cognitive linguistics, argument structure

## Outlining a scientific paper (2a)

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- **Abstract**
  - **Most important** part of the paper
  - Under the title, before the start of the actual text
  - Summarizes the whole paper in max. 500 words (for long papers)
  - Readers will decide to check your paper **only if they are interested in the abstract**
  - Get to the point, no detailed account, use buzzwords
  - No citations in an abstract

## Outlining a scientific paper (2b)

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- **Abstract**

- Language can be viewed as a complex adaptive system which is continuously shaped and reshaped by the actions of its users as they try to solve communicative problems. To maintain coherence in the overall system, different language elements (sounds, words, constructions) compete with each other for global acceptance. This paper examines what happens when a language system uses systematic structure, in the sense that certain meaning-form conventions are themselves parts of larger units. We argue that in this case multi-level selection occurs: at the level of the elements (e.g. tense affixes) and at the level of higher units in which these elements are used (e.g. phrases). Achieving and maintaining coherence in the population under these conditions is non-trivial. This paper shows that it is nevertheless possible when agents take multiple levels into account both for processing meaning-form associations and for consolidating the language inventory after each interaction.

## Outlining a scientific paper (3)

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- **Introduction**

- What is this? *set the context*
- Why am I reading this? *state why your paper is important and relevant*
- What is your claim? *state the central claim of your paper*
- What should I expect? *write the structure of your*

- **Body** (from general to specific), e.g.:

- What is the challenge / problem? *general information*
- What have other researchers done before? *summary and overview*
- What system did we implement? *getting more specific: showing*
- How did the system perform? *describe supporting details: data*
- What can we learn from this? *discuss the significance of results*

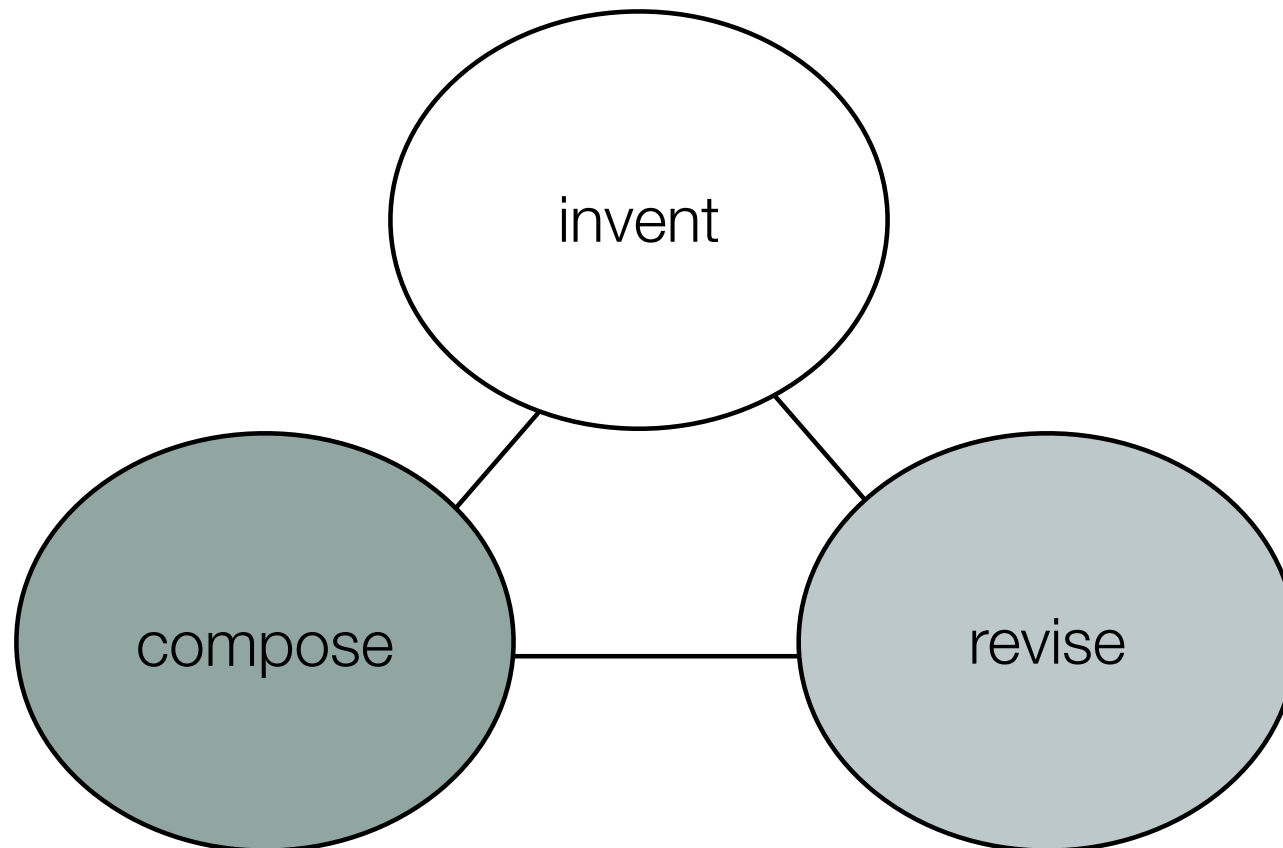
- **Conclusion** (always contains a summary, but never new information)

- What have you done in this paper?
- What were the most significant results?
- Optionally: future work

## 1. The writing process

What do we do when we write?

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## Composing a text

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- Write good **paragraphs** (see introduction)
- Use **style tips** (see tips later in this course)
- What to do if I have a **Writer's block**?

## Composing a text

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- **Symptom:**

- You started writing a text without making an outline and now you're stuck

- **Cure:**

- Haven't you listened? Go and write that outline!
- Use the invention strategies

## Composing a text

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- **Symptom:**

- You find the topic boring

- **Cure:**

- Try to find an aspect of the topic that interests you
- Have discipline and think of the reward afterwards

## Composing a text

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- **Symptom:**

- You hate writing

- **Cure:**

- Get over it! Writing is an essential form of communication
- You can postpone, but you cannot escape, so start writing
- Develop a writing schedule

## Composing a text

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- **Symptom:**

- You feel too stressed to write

- **Cure:**

- Desk gymnastics (get up and stretch your legs)
- Don't "command" yourself to calm down, just try to focus on calming images or words
- However, do not run away from the assignment

## Composing a text

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- **Symptom:**

- You are not happy with the result or you feel like you cannot express your ideas properly

- **Cure:**

- Force yourself to write without proofreading, however bad it might be
- Sometimes it helps to retype your last paragraph
- Writing is not solitary: talk about your texts with colleagues and friends
- Break up the process in different and smaller steps

## Composing a text

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- **Symptom:**

- I'm stuck at the introduction or abstract

- **Cure:**

- You cannot complete the introduction in the beginning!
- Skip the introduction and begin in the middle

## Composing a text

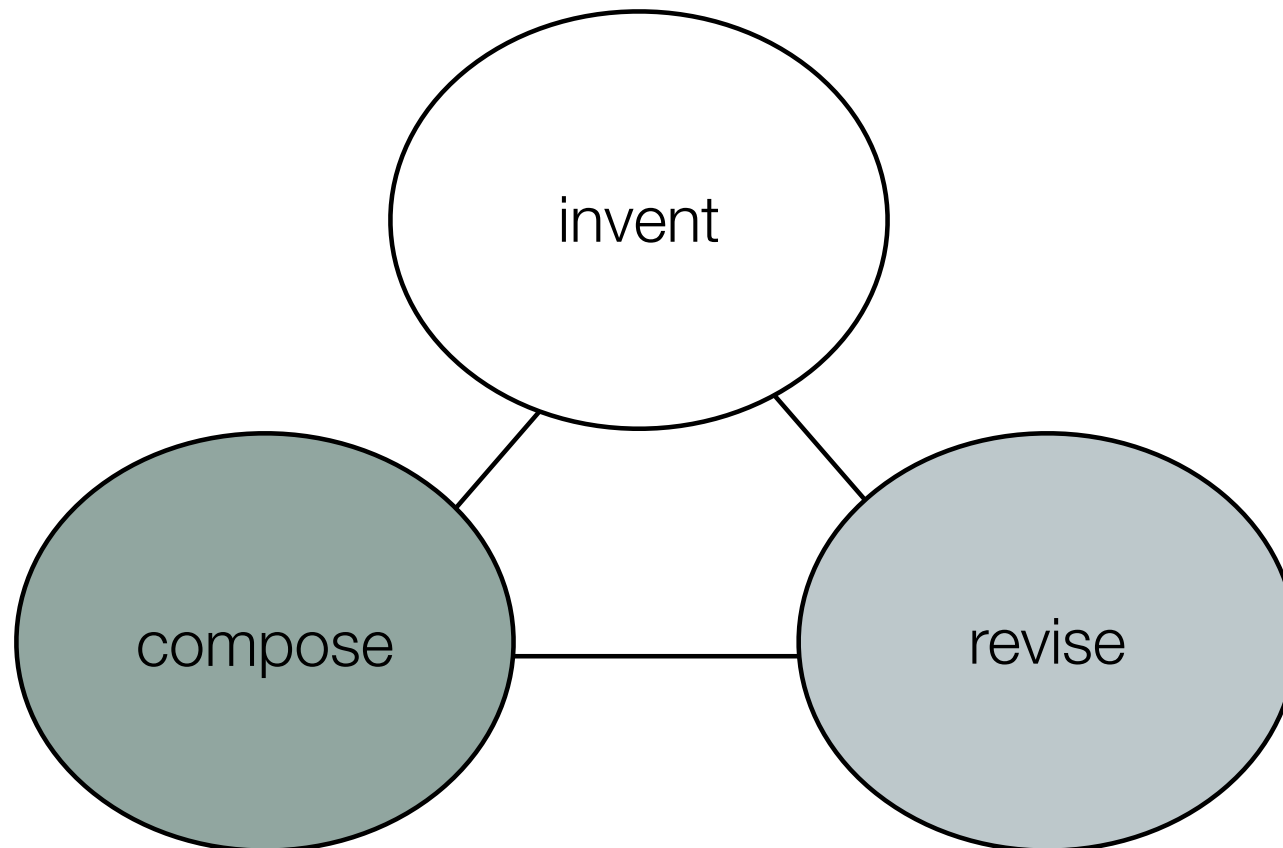
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- **Other advice:**
  - Talk first, write later (and don't forget to tape yourself)
  - Play a role
  - Imagine a specific reader

## 1. The writing process

What do we do when we write?

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## Revising

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- **Proofreading:** not as simple as you thought it would be!
  - Take a break!
  - Take enough time!
  - Be awake!
  - Read out loud. Seriously.
  - Ask others to read it.
  - If you have the time: read backwards
- **Common pitfalls**
  - Do not rely on the spelling checker by itself
  - Mind double words (only detected if you read out loud)
  - Only focus on one thing: either spelling or cohesion/content  
(both is **impossible**)

## Revising

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- Things to look out for
  - Do your sentences have a “subject”      *The students were listening.*
  - Do your sentences have complete verbs?      *The students were listening.*
  - Is the punctuation clear?
  - If you hesitate while reading out loud, there is probably something wrong

## Revising

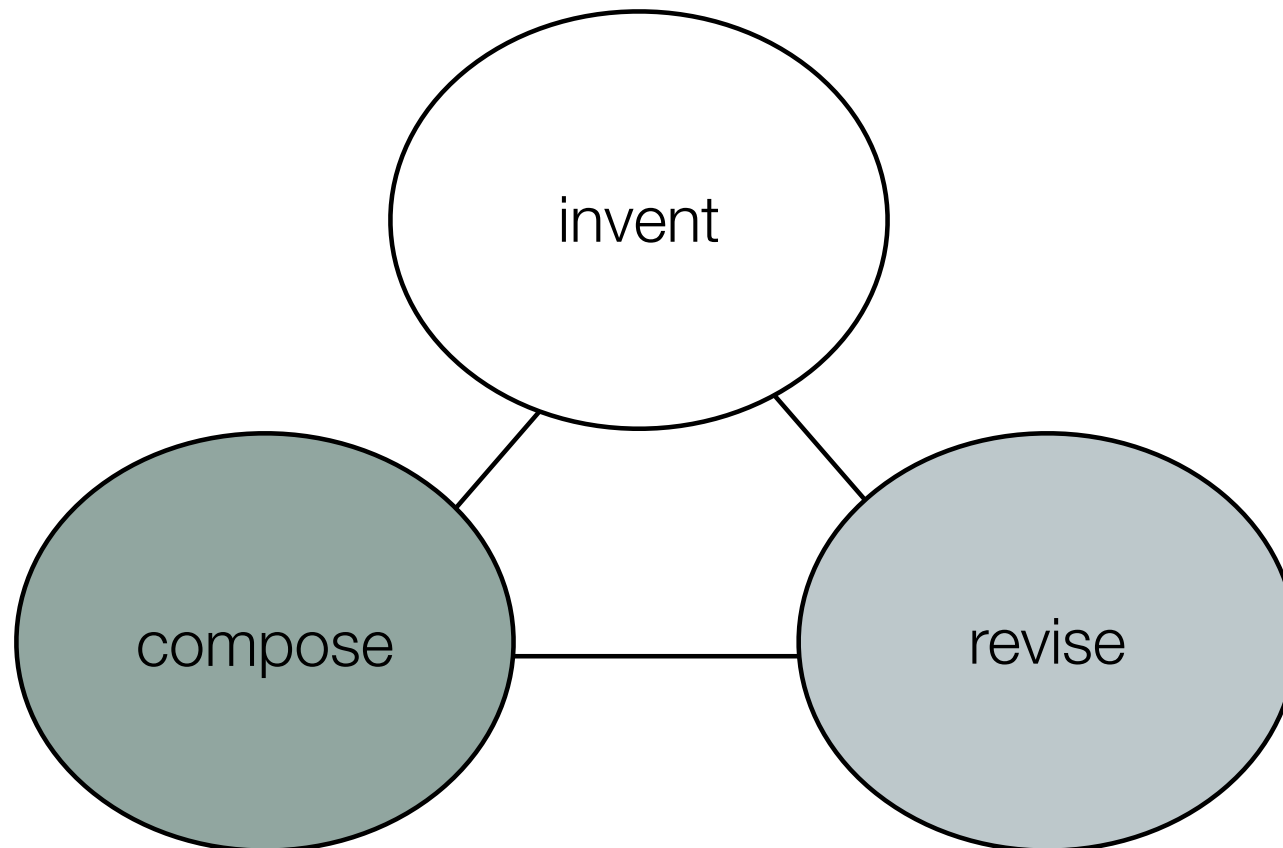
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- Revising for **coherence**
  - Underline the **theme sentence** of each paragraph
  - If you only read the theme sentences, does the structure make sense?
- Do your sentences “**hang together**”?
  - Transition words?
  - *therefore, however, next, in the previous paragraph, thus, ...*
- **Kill your darlings**
  - If parts of your text are not directly relevant to reaching the conclusion of the paper, they have to be cut out even if you think they are beautifully written!
  - Save your darlings for later (so it hurts less to cut them out).

## 1. The writing process

What do we do when we write?

---



## The writing process

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- Writing takes **time**
- Use invention strategies and outlines
- Keep in mind **the purpose** of your text
- No order in invent-compose-revise, but constantly switching back and forth

# Table of contents

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- The writing process
- Research and citation
- Practical advice and exercises

### Researching a topic

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- Writing about a topic requires research
  - library
  - internet
  - colleagues / research members / professors
  - ...
- Avoid **plagiarism**
  - your papers will by definition contain ideas taken from other people
  - your reader **ALWAYS** has to be able to find out which ideas are yours, and which ideas belong to others
  - your reader **ALWAYS** has to be able to verify your sources
- If you get caught for plagiarism, your paper will be flunked

### Researching a topic

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- So: avoid plagiarism by citations and references
- **Citation 1: direct citation**
  - You can mark a direct citation by giving it a separate font and paragraph, and putting it between quotation marks;
  - If you do not want to cite the whole quote, you can leave out a part by using the following: [...]
  - You have to cite **exactly** as it is written in your source
  - If your source made a spelling or other mistake, you write [sic] to indicate that it was not your error
  - You have to include page numbers whenever possible, so keep a journal and notes!
  - If you add a remark, you also put it between square brackets and add your initials.

### Researching a topic

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- **Example Citation 1:**

- “The genetic evolution models [...] put the selectionist pressure at the level of fitness [...]. Agents are endowed with an artificial genome that determines how they should communicate [...]. Potential innovation takes place at the moment this genome is transmitted from parents to children [my stress, RVT]. Because genome copying involves crossover and possibly mutation, variation is inevitable [...].”  
(Steels, van Trijp and Wellens, 2007: p. 425)

### Researching a topic

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- **What if I cite a quote which was quoted by someone else?**
- You quote the original source, and then write the source where you took the quote from:
- Steels, van Trijp and Wellens, 2007: p. 425; quoted from De Beule, 2008: p. 23

### Researching a topic

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- **Citation 2: direct citation in the text**
  - You can also directly cite someone in your text
  - You have to make the quote fit your text using square brackets
- Examples:
  - Steels, van Trijp and Wellens (2007) write that “genetic evolution models [...] put the selectionist pressure at the level of fitness” (p. 425).
  - A model of genetic evolution “put[s] the selectionist pressure at the level of fitness” (Steels, van Trijp and Wellens, 2007: p. 425).

### Researching a topic

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- **Citation 3: paraphrasing**
  - If you do not cite your source, but paraphrase his/her/their ideas, you still have to refer to their paper!
- Examples:
  - According to Steels, van Trijp and Wellens (2007), models of genetic evolution use a fitness function for guiding the selectionist process of the language (p. 425).
  - Models of genetic evolution use a fitness function for guiding the selectionist process of the language (Steels, van Trijp and Wellens, 2007:p. 425).

### Researching a topic

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- **Citation 4: for more details**

- If you make a claim about a certain topic or refer to other research, you cite the most important sources in that area so your reader can learn more about these topics.

- Examples:

- Research on artificial language evolution now covers a wide range of topics, such as emergent vocabularies (Steels, 1996), vowel formation (Oudeyer, 2006) and grammar (van Trijp, 2008).
  - This paper examines how artificial language evolution can explain phenomena observed in natural languages (see Steels, 2007, for more on this methodology).

### Researching a topic

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- **Question:** I am summarizing a book/article in my paper, do I have to write the full citation each time I refer to the same source?
  - The first time: yes                    *e.g.*    (Steels, 1995:p. 12)
  - From then on:                            *e.g.*    (ibid., at p. 15)
  - However: it must always be clear who you are referring to! If you refer to a different source in between, the next time you have to repeat the full citation again!
  - You can also number your reference list and only use numbers

### Researching a topic

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- Cite **only authoritative** work!
  - e.g. The Spanish Wikipedia wrongly wrote that the new Nobel prize winner of literature (Jean-Marie Gustave Le Clezio) died of a heart attack when he found out he won the prize.  
(*De Morgen*,  
<http://www.demorgen.be/dm/nl/994/Weirdo/article/detail/445950/2008/10/09/Spaanse-Wikipedia-kondigt-dood-Nobelprijswinnaar-aan.dhtml>  
consulted on 10-10-2008)
- Scientific readers will **always** check your bibliography / reference list
- The reference list reveals whether you did good research on the topic or not!

# References / Bibliography

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- Advice: use LaTeX for your papers (typesetting program that creates PDF files)
- Combine LaTeX with Natbib  
(automatically typesets your bibliography and in-text references)
- Create a reference list containing BibTeX records
  - `@article{allen83maintaining,  
 Author = {Allen, James F.},  
 Journal = {Communications of ACM},  
 Number = {11},  
 Pages = {832--843},  
 Title = {Maintaining Knowledge about Temporal Intervals},  
 Year = {1983}}`
- For internet sources: include the URL and the last day you consulted the page!

### Researching a topic

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- When are citations / references **not** needed?
  - Your own words / knowledge / images / ...  
(however, self-citation is sometimes needed)
  - “common knowledge”
  - Generally accepted facts  
*e.g. Computers can be used for solving complex mathematical tasks.*

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- The writing process
- Research and citation
- Practical advice and exercises

## Practical advice and exercises

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- Always keep to the **KISS** principle
  - **Keep**
  - **it**
  - **simple**
  - **stupid**

### 3. Practical advice and exercises

## Practical advice and exercises

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- Go from old to new information
  - Not so good: *Lately, most movies I've seen have been second-rate entertainment, but occasionally there are some with worthwhile themes. The rapid disappearance of Indian culture [NEW] is the topic of a recent movie I saw [OLD].*
  - Good: *Every semester after the final exams are over, I'm faced with the problems of what to do with books of lecture notes [new information]. They [old] might be useful some day, but they just keep piling up on my bookcase [new].*

### 3. Practical advice and exercises

## Practical advice and exercises

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- Use parallel structures (**consistency**)
  - Not so good: *In Florida, where the threat of hurricanes is an annual event, we learned that it is important (1) to become aware of the warning signs, (2) there are precautions to take, and (3) deciding when to take shelter is important.*
  - Good: *In Florida, where the threat of hurricanes is an annual event, we learned that it is important (1) to become aware of the warning signs, (2) to take precautions, and (3) to decide when to seek shelter.*

### 3. Practical advice and exercises

## Practical advice and exercises

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- Verbs! Give me verbs!  
(part 1: avoid using too many nouns in a row)
  - Not so good: *This report explains our investment in growth stimulation projects.*
  - Good: *This report explains our projects to stimulate growth in investments.*

### 3. Practical advice and exercises

## Practical advice and exercises

---

- Verbs! Give me verbs!  
(part 2: avoid using verbs as a noun)
  - Not so good: *The implementation of the system was successful.*
  - Good: *The system was implemented successfully.*

### 3. Practical advice and exercises

## Practical advice and exercises

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- Avoid negative sentences or multiple negation
  - Not so good: *Less attention is paid to commercials that lack human interest stories than to other kinds of commercials.*
  - Good: *People pay more attention to commercials with human interest stories than to other kinds of commercials.*

### 3. Practical advice and exercises

## Practical advice and exercises

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- To be or not to be? Use action words instead!  
(do not overuse “be” as a main verb)
  - Not so good: *One difference between television news reporting and the coverage provided by newspapers **is** the time factor between the actual happening of an event and the time it takes **to be** reported. The problem **is** that direct coverage **is** physically impossible for newspapers.*
  - Good: *Television news reporting **differs from** that of newspapers in that television, unlike newspapers, **can provide** direct coverage of events as they **happen**.*

### 3. Practical advice and exercises

## Active versus passive voice

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- Use the **active voice** for the majority of your sentences

*Active:       The dog jumped onto the boy.*

*Passive:     The boy was jumped on by the dog.*

- Example:

- Do not write: *The methodology that was used for this experiment...*

- But write: *This experiment uses the methodology of...*

- Exercise: put the following sentence in the active voice:

- Mistakes were made in my research.

- I made mistakes in my research.

## Active versus passive voice

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- **Sometimes** use the passive voice
  - If you don't know the "agent" or "doer" of an event
  - If you want to be indirect
  - Sometimes for breaking the rhythm of active sentences
  - If you want to keep writing about the same topic in a longer piece of text  
e.g. *The system consisted of two pan-tilt cameras hooked to two different computers running LISP. It processes the information of the cameras in real time and was designed to ...*

### 3. Practical advice and exercises

## Final advice

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- It is allowed to use “I” or “we” when writing scientific papers
- Write in a coherent and clear way  
(formal, but still very close to how you would “speak” about it)
- **Kill your darlings** (do not write more than necessary)  
**KISS**-principle (Keep it simple stupid, but not too stupid)
- Introduce variation in sentence length
- One paragraph = one main idea
- **Any specific questions or comments?**

These slides were based on course materials from the OWL online writing lab. Please check:

<http://owl.english.purdue.edu/owl/>