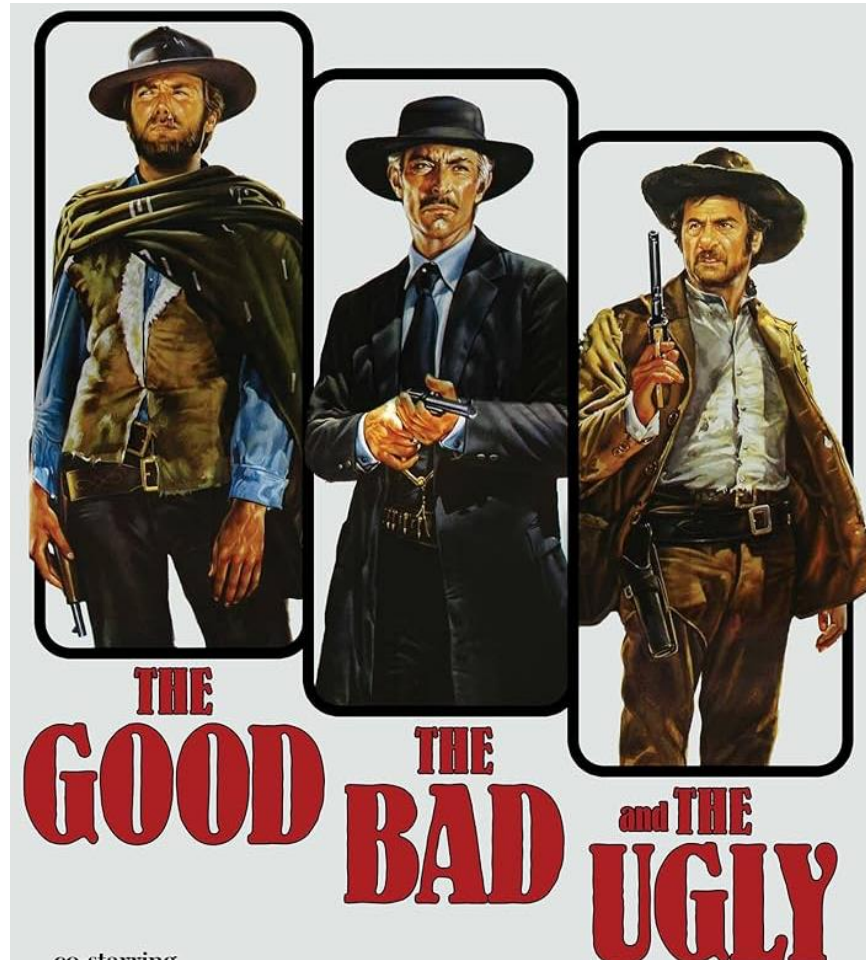


Cognitive Neuroscience: The Good, the Bad, and the Ugly



The next two weeks: Background and tools

- Today:
 - What is cognitive neuroscience?
 - Understanding empirical papers
- Next week:
 - Cognitive neuroscience methods

Reading question

According to Passingham, which of the following misunderstandings of brain imaging data shows a basic *difficulty with logic*?

- a. Coloured patches in the brain show an increase in brain cell (neuron) activity
- b. Images show all the areas where there was brain activation during the experiment
- c. Patterns of brain activation are the cause of a behaviour

Reading question

In her blog on how to read scientific papers, what does Jennifer Raff say about review articles?

- a. They are not peer reviewed
- b. They summarize multiple primary research articles
- c. They are a snapshot of a research field at the time of writing
- d. a & b
- e. b & c

The publication process

- Editorial decision:
 - Reject
 - Revise and resubmit
 - Accept with minor changes

After your paper comes out

I read your
article and
that was, like,
so cool



No time to
talk to you.
Must submit
other
manuscripts



Tips for reading scientific papers

- A very consistent format!
- Primary Research Articles
 - Introduction
 - Methods
 - Results
 - Discussion

Reading question

In her blog on how to read scientific papers, why does Jennifer Raff say to read the abstract last?

- a. So you're not biased by the authors' interpretation of the results
- b. So you can understand the Methods
- c. So that you understand the jargon
- d. None of the above

Tips for reading the introduction

Big question:

- Identify the big-picture question

Background:

- Summarize in 5 sentences or less what is already known
- What outstanding questions are left unanswered? (What is the “Knowledge Gap”)?

Research question:

- What is the precise research question being addressed in this one study?
What are the hypotheses if any?

Tips for methods, results, and discussion

Triage:

- What are most important experiments?
- Draw a diagram of them

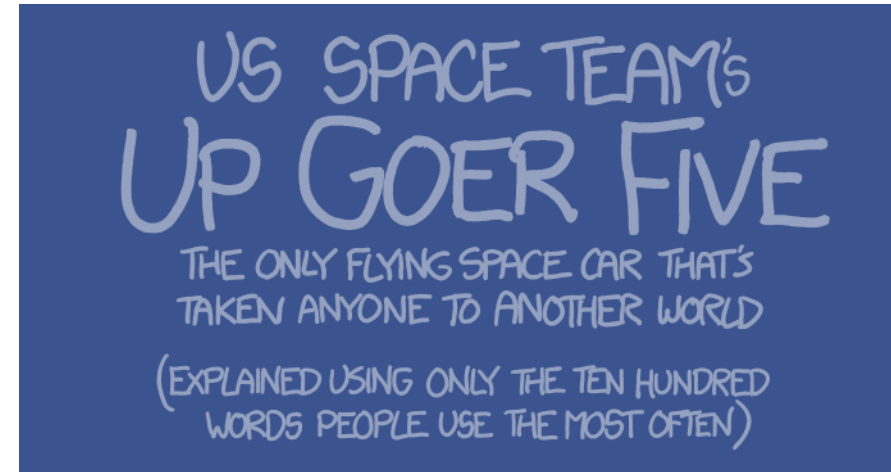
Summarize:

- Summarize what they did
- Summarize the main results

Evaluate:

- Discussion: Did they answer the specific question?
- Strengths and limitations?
- What are outstanding future questions?
- Then read abstract and translate into simple language

<https://xkcd.com/simplewriter/> (ChatGPT could help too!)



<https://xkcd.com/1133/>

Reading papers in the age of LLMs

- You need enough knowledge to prompt the LLM to give you the info that you actually need!
- Tools like Humata AI and ChatGPT with GPT-4o can summarize and answer questions about papers that you give it – **but be careful and don't just accept the results without checking!**
- <https://www.humata.ai/>

Summary so far

- We will mostly be reading papers in high impact journals
 - Exciting new findings published after peer review
 - Full of jargon and annoying formatting
 - Do the work to decipher them and you can judge for yourself what's legit
 - Be careful of LLMs misleading you or not being able to answer the questions properly

For exams

- Translate the jargon!
 - You will be expected to know what the researchers did and found – not just regurgitate terms
- Use SimpleWriter or ChatGPT to help explain all the things!
 - <https://xkcd.com/simplewriter/>

Questions?



See you next class!

- Methods of Cognitive Neuroscience Part 1:
Read Poldrack & Farah, 2015 (review paper!)
- Read the tips document too!
- Do the neuroanatomy module and complete the quiz for Jan. 23rd