

# Scientific communication

## Neuroscience M1

### Research article 101

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# Introductions before the introduction

- Sample size?
- Responses?
- Your analysis?
- 1 Hypothesis?
- 2 Hypotheses?

## **The next 10 days**

learn to be strategic about scientific communication!

- Spoken interaction – relevant tasks for preparing your presentation
- Strategies for the 2 years ahead - observe, identify and collect – build your repertoire
- Mime and mine – using relevant models
- Mix and mingle
- **2 writing tasks** – Moodle after the intensive course – 20%
- Espace Langues Carreire

# What is scientific writing?

- In your groups look at the examples you have been given – separate them into two groups
- Popularised science journalism
- Research article
- Discuss how you came to your decision

# Can you unjumble the titles?

lack  
by  
us  
distracted  
sleep  
why  
makes  
of  
emotionally  
everything

neural  
impaired  
control  
without  
neutrality  
losing  
basis  
the  
of  
emotional  
sleep

- Why lack of sleep makes us emotionally distracted by everything
  - *New Scientist, 25/09/15*
- Losing Neutrality: The Neural Basis of Impaired Emotional Control without Sleep
  - *The Journal of Neuroscience, 23/09/2015 1394-13205*

# What is a research article (RA)?

## What is it for?

What are the different parts?\*

Why do students read RAs?

Why do researchers read RAs?

Which section do you read first?

Which section has the most complex language?

Which sections are the easiest to understand?

Why are RAs difficult to understand?

How do you know if an RA is good?

When is an RA bad?

How long is an RA?

\*Clue – there are possibly 15...

# IMRAD structure and paratext

- Introduction
- Methods
- Results
- Discussion
- Journal title
- Date
- Title
- Authors
- Affiliations
- Abstract
- Tables
- Figures
- Acknowledgements
- References
- Correction



# IMRaD

- Introduction (why the authors decided to do this research),
- Methods (how they did it, and how they analysed their results),
- Results (what they found),
- Discussion (what the results mean).

# How should students read Ras?

- Abstract
  - Discussion
  - Introduction
  - Materials and methods
  - Results
- *Highlight summary sentences*
  - *Highlight key information*
  - *Underline things you need to check/look up*
  - *Take notes (method for this?)*
  - *Paraphrase/summarise*



## HOW TO READ SCIENTIFIC PAPERS

Much of a scientist's work involves reading research papers. Because scientific articles are different from other texts, like novels or newspaper stories, they should be read differently. Here are some tips to be able to read and understand them.

### 1 SKIM



First get the "big picture" by reading the title, key words and abstract carefully; this will tell you the major findings and why they matter.

- Quickly scan the article without taking notes; focus on headings and subheadings.
- Note the publishing date; for many areas, current research is more relevant.
- Note any terms and parts you don't understand for further reading.

### RE-READ 2

Read the article again, asking yourself questions such as:



- What problem is the study trying to solve?
- Are the findings well supported by evidence?
- Are the findings unique and supported by other work in the field?
- What was the sample size? Is it representative of the larger population?
- Is the study repeatable?
- What factors might affect the results?

If you are unfamiliar with key concepts, look for them in the literature.

### 3 INTERPRET



- Examine graphs and tables carefully.
- Try to interpret data first before looking at captions.

- When reading the discussion and results, look for key issues and new findings.
- Make sure you have distinguished the main points. If not, go over the text again.

### SUMMARIZE 4



- Take notes; it improves reading comprehension and helps you remember key points.
- If you have a printed version, highlight key points and write on the article. If it's on screen, make use of markers and comments.

[www.mcgill.ca/research4life](http://www.mcgill.ca/research4life)

An initiation rite

Novices and Experts

## Typical linguistic and stylistic features

- Work together to organise the RA extracts you have.
- Match each quote to a section.
- *Introduction*
- *Materials and Methods*
- *Results*
- *Discussion*

# What observations can you make ?

- *Introduction*
- *Materials and Methods*
- *Results*
- *Discussion*

# What makes scientific writing “difficult”?

- Distance between subject and verb
- Lots of nominalizations (*saps reader energy*)
  - *We performed an analysis of the data – zzz.....zzz.....*
  - *We **analysed** the data – (“actions speak louder than words”)*
- Poor flow - misplacement of old /new information
- Excessive use of the passive voice
- Novice status in the community
- Nuance and argument – modals, hedging etc.

# Features of the different sections of the RA.

- Sleep plays a key role in protecting our emotional well-being. A single night of sleep deprivation (SD) is known to trigger emotional difficulties (Pilcher and Huffcutt, 1996; Anderson and Platten, 2011), leading to increased subjective stress and anxiety (Minkel et al., 2012) and enhanced sympathetic reactions to unpleasant stimuli (Zhong et al., 2005; Franzen et al., 2009).



- Despite emerging links between sleep loss and emotional reactivity, it remains unclear how sleep modulates cognitive control of emotion and its resulting emotional profile. Given previous indications of prefrontal and limbic vulnerability to sleep loss, we aimed to directly examine the effect of sleep on cognitive control of emotion, using two complimentary cognitive–emotional tasks (recorded using fMRI and EEG), while manipulating sleep in a within-subject design.

# The CARS (Create a Research Space) model for writing academic introductions (John Swales, 1990)

## ■ Move 1: Establishing a territory

Step 1	Claiming centrality and/or
Step 2	Making topic generalizations and/or
Step 3	Reviewing items of previous research

## ■ Move 2: Establishing a niche

Step 1a	Counter-claiming or
Step 1b	Indicating a gap or
Step 1c	Question-raising or
Step 1d	Continuing a tradition

## ■ Move 3: Occupying the niche

Step 1a	Outlining purposes or
Step 1b	Announcing present research
Step 2	Announcing principal findings
Step 3	Indicating Research article structure

- *Participants.* Eighteen adults (age range, 23–32 years; mean, 26.8  $\pm$  3 years; 10 females) completed a repeated-measures crossover design. Participants were healthy with no history of sleep, neurologic, or psychiatric disorders (assessed using a detailed medical history questionnaire). Normal sleep–wake patterns were further validated using actigraphy and subjective sleep logs, as detailed below.

# The Materials and Methods section

- may not be emphasized in the RA
- may be placed in a later section of the article
- It may be in smaller print
- Background knowledge is presumed = *tough for novices!*
- Past tenses, mostly passive forms....
- Objectives and actions....

***To identify changes in functional connectivity as a function of sleep, a psychophysiological interaction (PP) analysis was conducted separately...***

- After SD, amygdala activity no longer differentiated between distractors, responding equally to both neutral and negative distractors ( $t(16)_{0.1}$ ; for the right amygdala,  $t(16)_{0.38}$ , both  $p_{0.7}$ ).
- Furthermore, the change in ACC–amygdala connectivity was significantly correlated with the decrease in accuracy scores after SD ( $r_{0.63}$ ,  $p_{0.007}$ ). These results are depicted in Figure 6.

## Results section

- Language similar to MM
- Past tenses – passives
- Reference to figures

*Furthermore, the change in ACC– amygdala connectivity **was significantly correlated with the decrease in accuracy scores after SD** ( $r_{0.63}$ ,  $p_{0.007}$ ). **These results are depicted in Figure 6.***

# Discussion Sections – are cyclical

8 moves	
1. Background Information	To strengthen, remind reader of key points
2. Statement of results	Start of the cycle
3. (Un)expected Outcome	Comment on expected or unexpected outcome
4. Reference to previous research	For comparison or support
5. Explanation	Explaining a surprising result
6. Exemplification	Examples to support explanation
7. Deduction / Hypothesis	To make a claim for generalizability of results
8. Recommendations	Suggestions for future research

- Such an encompassing effect of SD on the threshold for emotional activation, expressed in both limbic and task-related regions, **could imply** the involvement of PFC dysregulation. As mentioned above, the PFC is particularly vulnerable to sleep loss, and its medial regions are known to play a key role in emotion regulation via top-down modulation of limbic regions, such as the amygdala (Davidson, 2002; Sotres-Bayon et al., 2004).



## Discussion: Expect to find modal verbs

- These findings **may** further suggest that neutral stimuli **could be** regarded as emotionally ambiguous (Cooney et al., 2006), with their processing dependent on intact cognitive control of emotion. If so, processing of neutral stimuli **could shift** toward emotional saliency as the threshold for limbic activation is altered by sleep loss.
- Scientific use of MAY versus COULD?
- It may rain
- The road could become dangerous if it rains.

## ... and hedging

- A hedge is an intentionally noncommittal or ambiguous statement. Hedging mitigates or weakens the certainty of a statement.

# Examples of Hedges

- **X has been associated with** poor sleep quality, though this topic **might be** an avenue for future research.
- **It is also possible that** sleep-deprived persons may have some level emotional reactivity
- A **potential** bias **may also exist** for caffeine consumers...
- Loss of cognitive control of emotion **is thought to** occur
- There **is also potential for** mediation of increased anxiety..
- The period of reactivity **appears to** range from ...

# Passive voice

- A man was arrested in connection with the murder.
- The patient was heavily sedated.
- The samples were centrifuged.
  
- Western blot is performed.
- Western blot was performed.
- Western blot is being performed
- Western blot has been performed.
- Western blot will be performed.

# Signposting is important... linkers and cohesive devices



- eg. The aim of the present study was to ....
- Here we report on...
- As mentioned above
- Taken together, these findings...
- Furthermore,...
- Moreover,
- Despite emerging links.... It remains unclear

# Make your own collection...

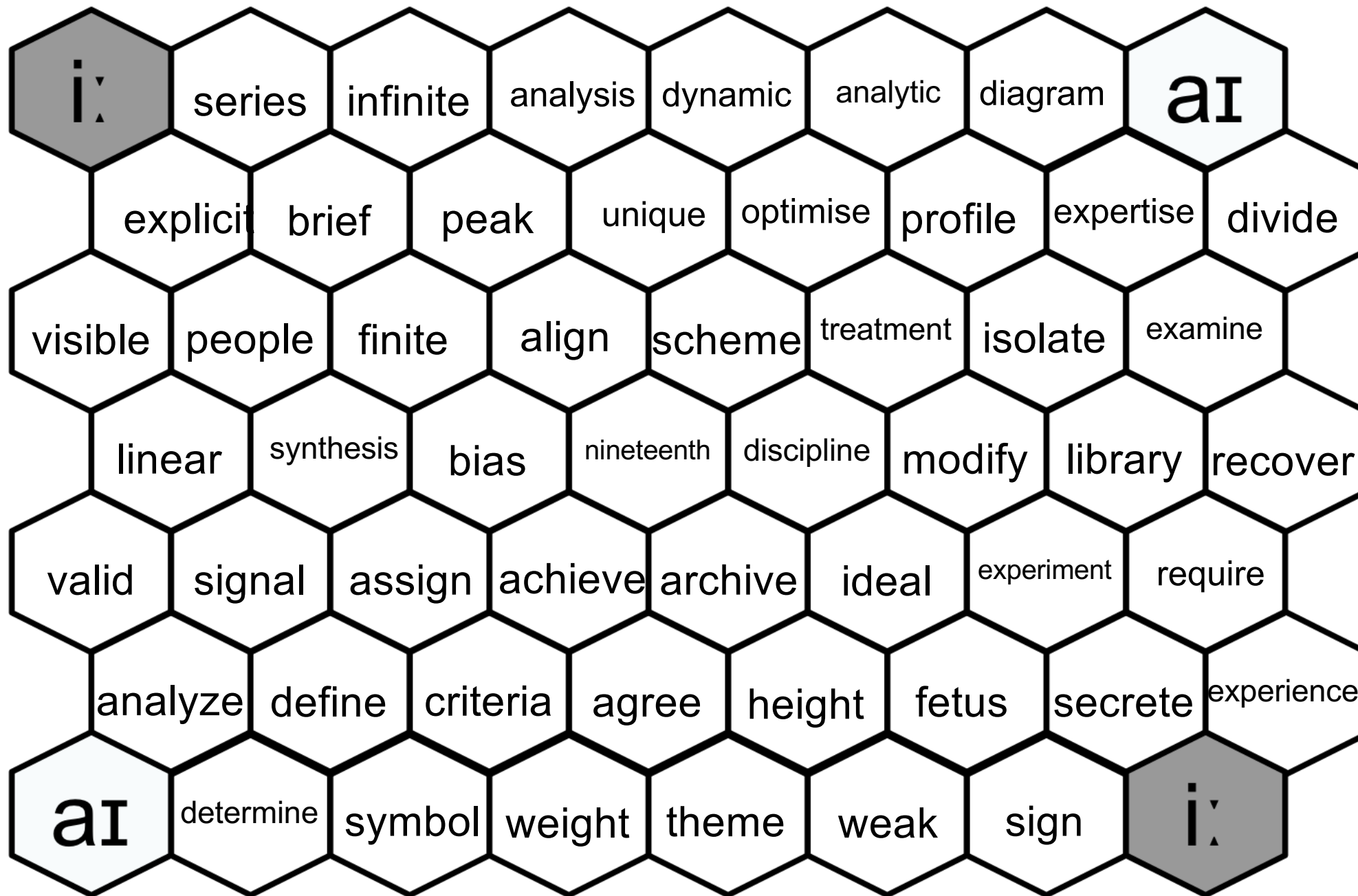
<b>ADDING</b>  and as well as moreover furthermore in addition too on top of that another point is	<b>SEQUENCING</b>  first, firstly, first of all second, secondly.. third next meanwhile now subsequently	<b>ILLUSTRATING</b>  for example such as for instance in the case of as shown by illustrated by take... one example is..
<b>COMPARING</b>  similarly likewise as with like equally in the same way	<b>QUALIFYING</b>  but however although unless except apart from as long as if	<b>CONTRASTING</b>  whereas alternatively unlike on the other hand conversely having said that nevertheless however
<b>CAUSE AND EFFECT</b>  because because of as a result of consequently therefore thus owing to due to	<b>SUMMARY</b>  in short on the whole in other words on the whole overall generally in general in brief	<b>EMPHASIZING</b>  above all in particular especially significantly indeed notably

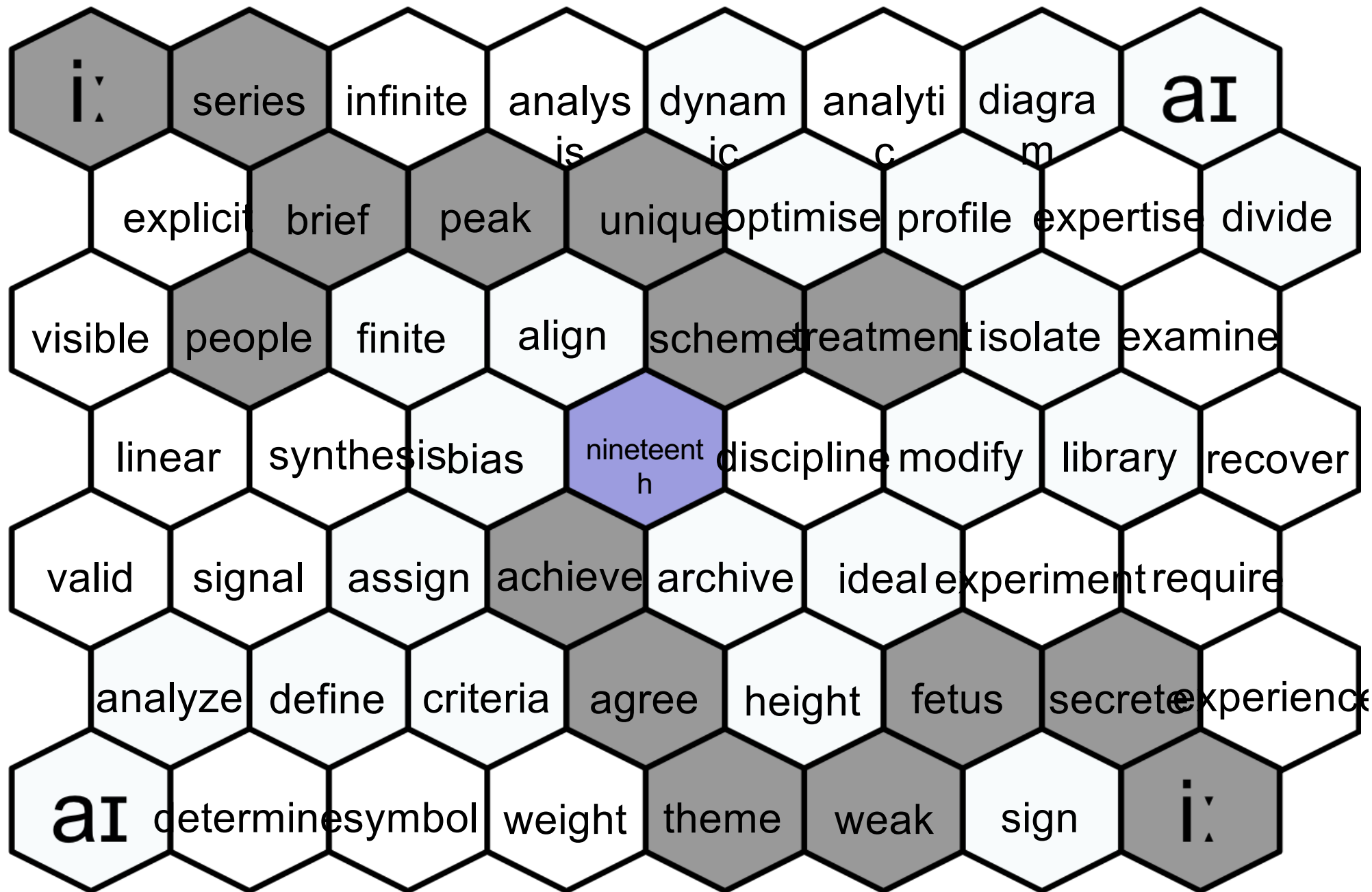
# The sounds of scientific English....

# Vowel puzzle...

I	sit
i:	seat
aɪ	site







- Sleep deprivation has been shown recently to alter emotional processing possibly associated with *reduced frontal regulation*. Such impairments can ultimately fail adaptive attempts to regulate emotional processing (also known as cognitive control of emotion), although this hypothesis has not been examined directly. **Therefore**, we explored the influence of sleep deprivation on the human brain using *two different cognitive–emotional tasks*, recorded using fMRI and EEG. Both tasks involved irrelevant emotional and neutral distractors presented during a *competing cognitive challenge*, **thus** creating a continuous demand for regulating emotional processing. **Results** reveal that, **although** participants showed enhanced limbic and electrophysiological reactions to emotional distractors regardless of their sleep state, they were specifically unable to ignore neutral distracting information after sleep deprivation. **As a consequence**, sleep deprivation resulted in similar processing of neutral and negative distractors, **thus** disabling accurate emotional discrimination. **As expected, these** findings were further associated with a decrease in *prefrontal connectivity patterns* in both EEG and fMRI signals, reflecting a profound decline in cognitive control of emotion. **Notably**, such a decline was associated with lower REM sleep amounts, supporting a role for REM sleep in overnight emotional processing. **Altogether, our findings suggest** that losing sleep alters emotional reactivity by lowering the threshold for emotional activation, leading to a maladaptive loss of emotional neutrality.