

# Week 1 Intro

## Two Types of Thinking (Cannot do both thinking)

- Focused Thinking: analyze/examine, problem solving
  - Diffused Thinking: new ideas
- Suggestion: when learning new things, one should go back and forth between two thinking modes

## Procrastination, Memory and Sleep

### Procrastination

#### 📌 Tools: Pomodoro

When people really don't want to do something, the brain part dealing with pain is activated. However, when they start working, that neurodiscomfort will disappear.

### Abstract Concepts

#### 🔥 Practice more

Practice will help building neuron pattern - more practice -> more familiar with those abstract concepts

**Correct way: Focus - focus less and using diffuse mode - focus**

### Memory

- Long-term memory
  - Need repetition to store in this memory
  - Spacious
  - Need practice to move item in long-term memory to working memory
- Working memory: memories that you're current using for processing information
  - holds 4 chunks of information

#### 🔥 Spaced Repetition

Repeating what you're trying to retain over a number of days (instead of repeating 10 times in one evening)

## Sleep

- Sleep allows brain to wash away toxins
- Important for memory and learning
  - brain consolidate and strengthen neuron patterns during sleep
  - dreaming helps understanding difficult materials, etc.

Neurons in hippo increases even in adulthood when:

1. rats are put into an enriched environment (surrounded by people)
2. exercising

# Week 2 Chunking

## Chunking

- Pieces of Information bound together through meaning or use = a group of neurons that fire together
- Brain loses the ability to bound chunks when you're angry or stressed
- learning -> growing chunks

## How to form a chunk

1. **Focus attention** on the information you want to chunk
2. **Understand** the basic idea you're trying to chunk
  - Need to do/review it after understanding
3. Gaining context (when to use this chunk) - **Practice** and understand the bigger picture

## Illusions of Competence

### Recall

- Recalling is better than re-reading and re-studying
- Retrieval process is helping the learning process
- Re-studying is only useful if we applied spaced repetition (re-reading after a period of time)
- Recalling outside your usual place of study (ex. study room) helps strengthen your understanding

### Illusions of Competence

⚡ **Wrong: Looking at the solution and think you understand it** >

**Correct way:** need practice

⚡ **Highlight a lot of paragraphs and think you understand the main idea** >

**Correct way:** Read the text first and then mark the main idea  
Mark as less as you could (one sentence per paragraph)

Write the key idea in the margin

## Testing and Mistakes

- Test on the material you learned - similar to recalling
- Mistakes are helpful for learning

### Retrieval Practice

Retrieve info from your brain helps learning

**Use Flashcards** - [iDoRecall.com](https://www.idorecall.com)

## Motivation

- Neuromodulators - chemicals that influence how a neuron responds to other neurons
  - Acetylcholine - Important for focused learning
  - Dopamine - controls motivation & decision making
    - reward learning
    - is released when we receive unexpected rewards
    - predict future rewards
  - Serotonin - affects social life & risk taking
    - low serotonin - more risk taking
    - high serotonin - high social ranking
- Emotions are interfered with learning - **Amygdala** and hippocampus together regulates emotions and memory, decision making, etc.

### Comments

懂了, 用Ti = 用focused mode of think = Sequential Thinking

用Ni = 用diffused mode of thinking = Hollistic Thinking

但是Ni不一定准, 一般还是还是要靠Ti

## Other techniques

- **Overlearning**
  - Meaning: Practice after you've master what you can
  - Help promotes automaticity

- Repetitive overlearning during a single study session is a waster of time
- **Deliberate learning:** Deliberately focus on the more difficult things (instead of overlearning)
  - Helpful than repetitive overlearning
- **Einstellung**
  - Initial thoughts (based on acquired knowledge) is misleading and can block your way to the correct solution
- **Interleaving**
  - Jump between different strategies and chapters
  - Helps understanding when to use a strategy
  - Prevent **Einstellung**
- **Jump into the water before they can swim**
  - Take the exercise before learning the concepts or listen to the lectures
  - Do not help mastering the concept - not really creating chunk connections

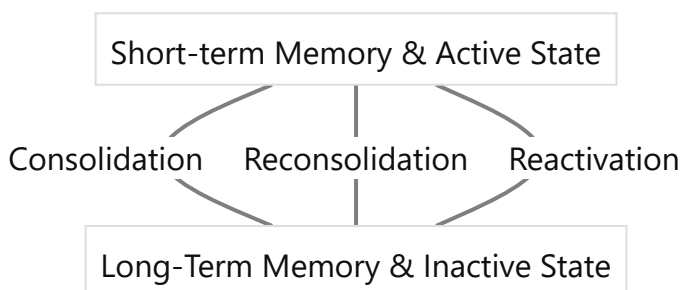
# Week 3 Procrastination and Memory

## Procrastination

- Pomodoro
- Habits save energy
  1. The cue
    - Watch for procrastination cues, and minimize the cue, put away distractions
  2. The routine
    - Rewire the routine after the cue
    - Commit to certain routines each day
  3. The reward
    - Reward yourself with either sense of accomplishment or other physical rewards
    - Delay rewards until you finished the tasks
  4. The belief
    - Believe that you can do it
- Focus on process instead of product
  - Don't focus on finding the solution to the assignment, but on 25 min process
  - Pomodoro
- Weekly tasks and daily to-do the evening before & plan quitting time (e.g. quit at 5 pm)
- Tackle the least favorite tasks in the morning
- Have backup plans for procrastination

## Memory

- Visualize memory is helpful
- Create meaningful groups and abbreviations



## Memory Palace

- Use some place that you're familiar with
- Use this place as a notepad to store concepts
- Useful for remembering unrelated items (grocery list)

Using creative techniques (abbreviations, memory palace, etc.) can help long-term learning as well

## Week 4 Unlocking your potential

### Tip 1: give brain physical exercise ▼

This would help new neurons survive in hippocampus

### Tip 2: Practice makes perfect

Brain parts mature at different times. After critical period, practice would still train the brain, but will require longer time.

## Create metaphor or analogy

- Metaphor and visualization can help learning and understanding important concepts
- Useful in getting people out of Einstellung
- Helping in retaining memory

## Random stuff

- Having a larger working memory can lead to Einstellung or being less creative
- Tackling the hardest part of concept can lift average brains into gifted brains
- Imposter Syndrome is common
- We can change our brain by changing how we think
- Take responsibility of what you learn (learning outside of the classroom)
- Perseverance is important
- Left brain: solve problems and make sure all things are **NOT** changing; right brain: questioning status quo
  - If you complete the homework and never check again, you're not using parts of your brain
- To catch mistakes, brainstorm with teammates who focus on the same area
  - When study group becomes socializing group, better find another group

## Tests

### Test Checklist >



- Did you make a serious effort to understand the text?
- Did you work with classmates on homework problems?
- Did you attempt to outline every homework problem solution before group discussion?
- Did you participate actively in homework group discussions?
- Did you consult with the instructor when you're having troubles?
- Did you understand ALL of your homework problem solutions?
- Did you ask in class for explanations of homework problem solutions that weren't clear to you?
- Did you have a study guide?
- Did you attempt to outline lots of problem solutions quickly?
- Did you go for the study guide and problems with classmates and quiz one another?
- Did you attend the review session?
- *Did you get a reasonable night's sleep before the test?*

- First start with hard problems (diffuse mode). If you're having trouble with it within first one/two minutes, jump to a easy problem. After finishing the easy problem, go to another difficult problem, etc.
- Need to have the self discipline to switch when stuck on a difficult problem
- When stressed
  - shift thinking: I'm afraid -> I'm excited
  - Momentarily turn attention to breathing
  - Have a plan B for worst case
- Check from back to front