

---

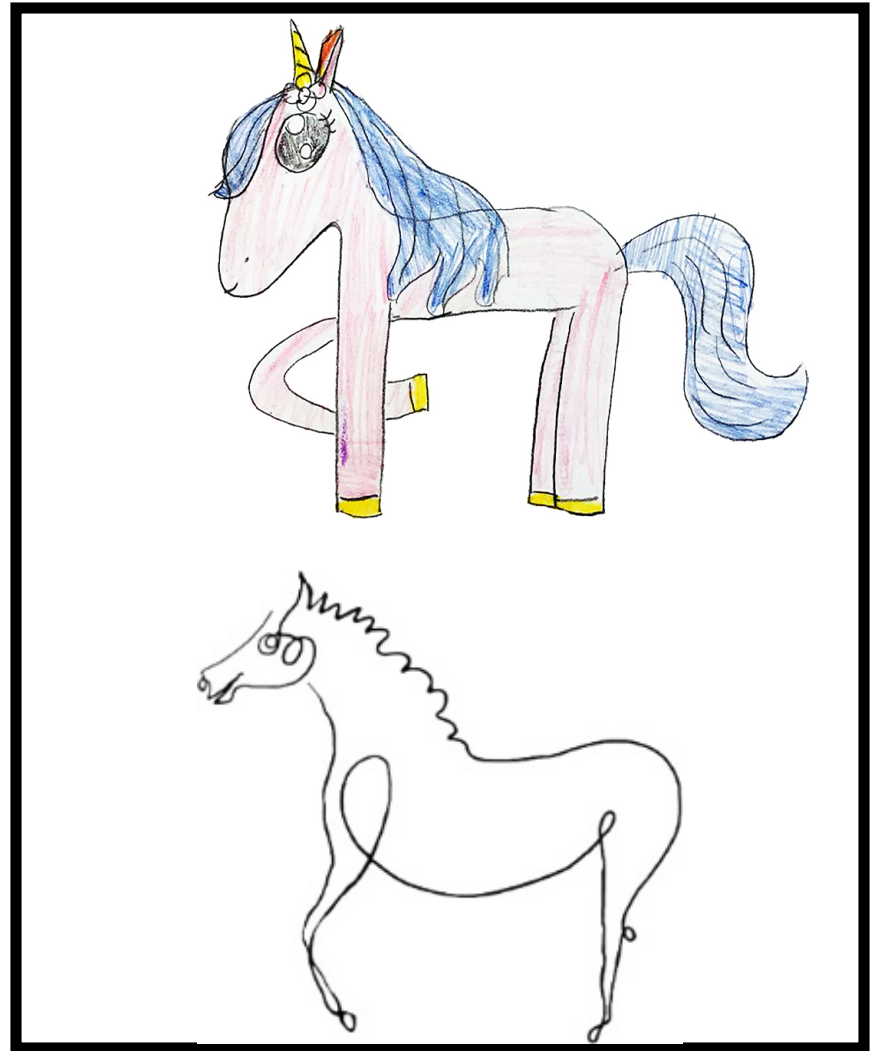
**Translation**

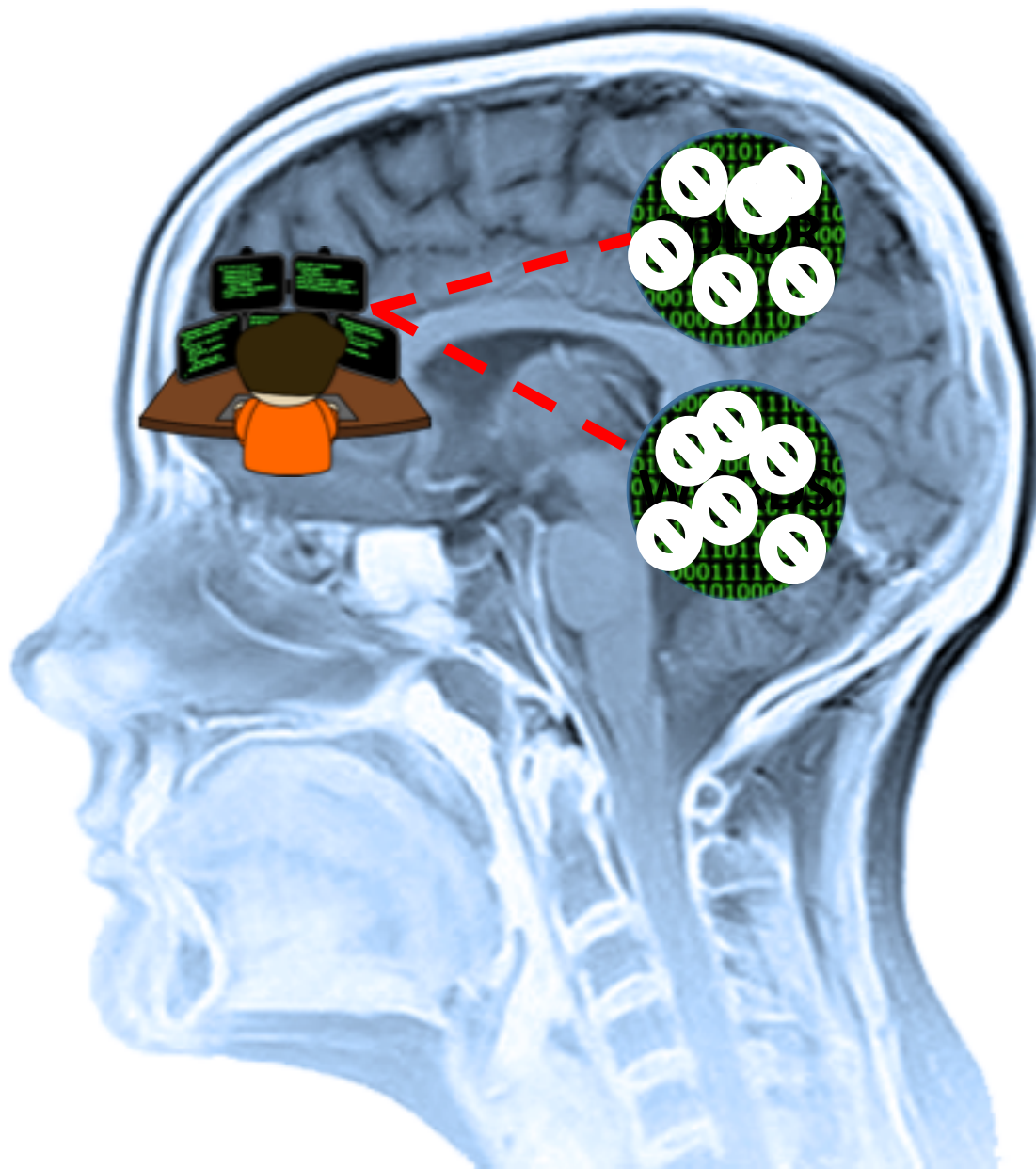
*Prescriptive*



## The Point

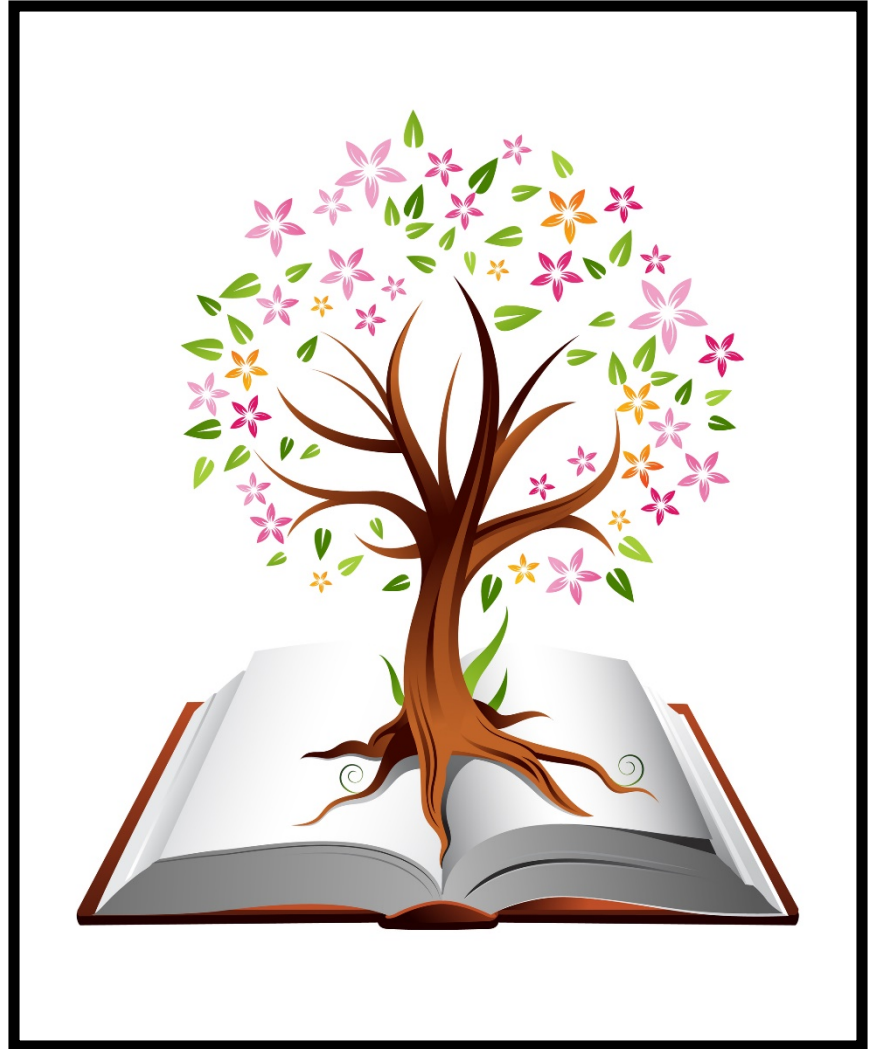
*Knowing the WHY allows  
you to MEANINGFULLY  
personalize, modify,  
adapt, and create  
techniques.*





---

# Stories





---

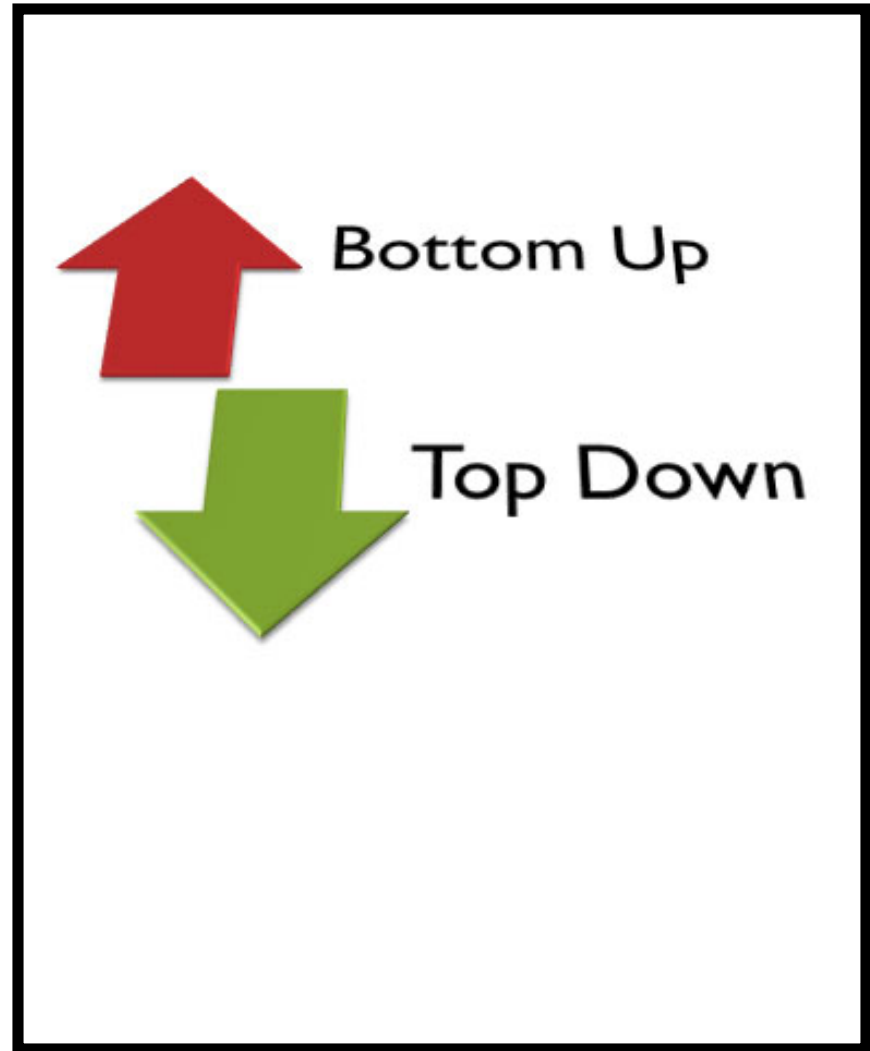
# The Brain

*Phase 5*

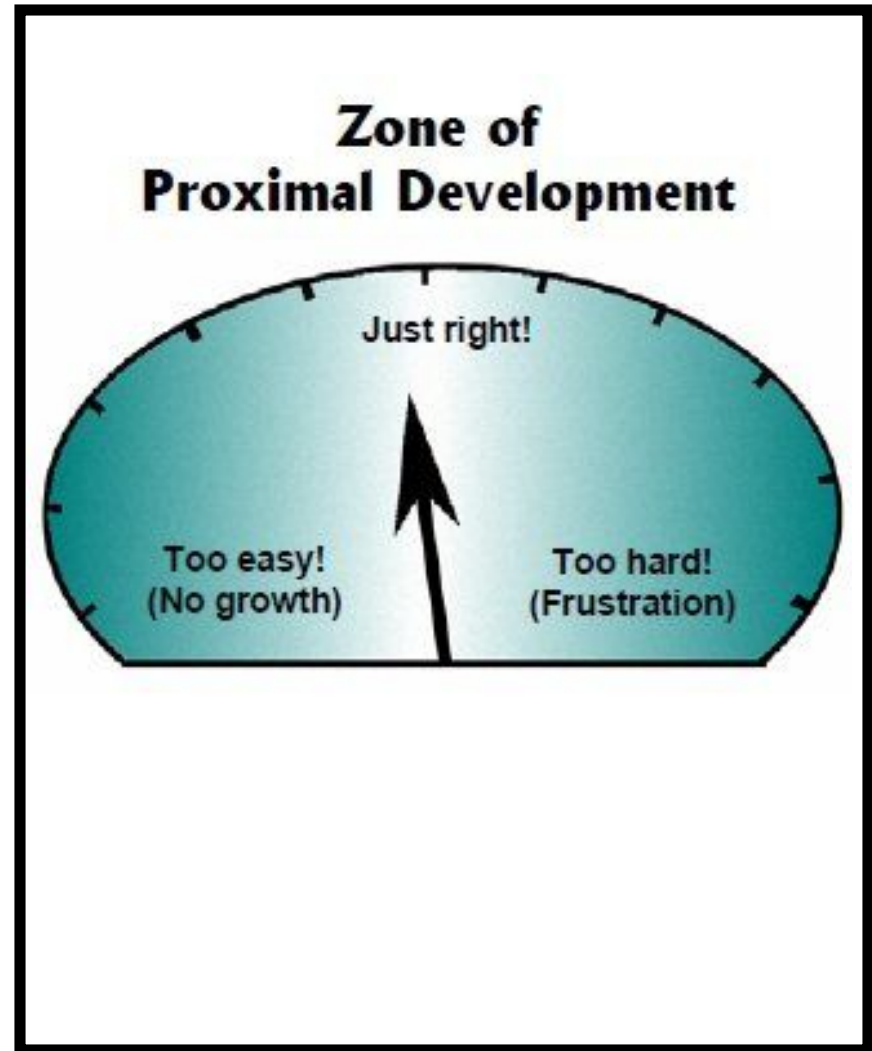


---

Bottom Up /  
Top Down



ZPD



# Form Follows Function



---

## Learning Objectives

*VERB*

*PURPOSE*



# Basic Learning Process

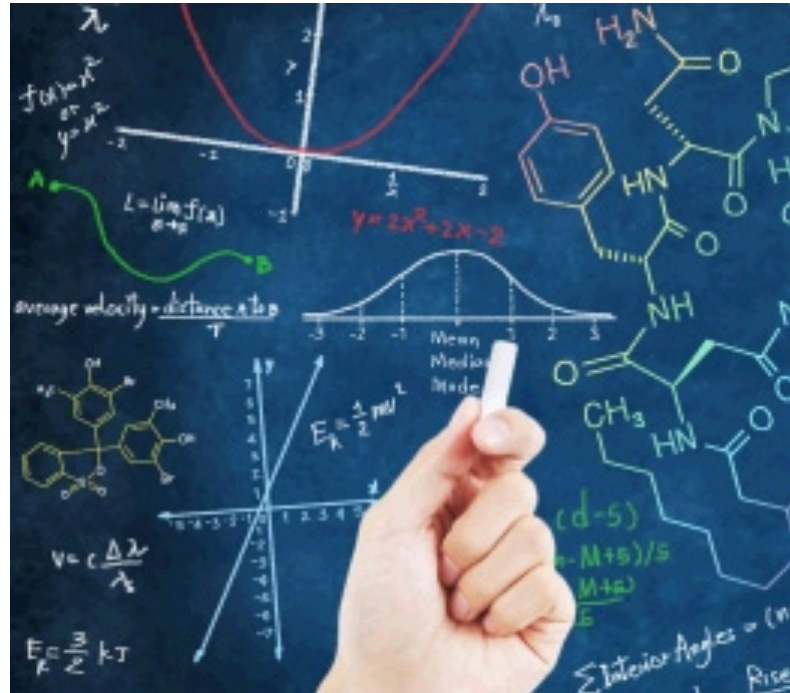
*Retrieval (Surface)*

*Comprehension (Deep 1)*

*Analysis (Deep 2)*

*Utilization (Deep 3)*

*Transfer*





Remember...



---

**You are an Expert!**



---

# PEN Principles

Jared Cooney Horvath

*PhD, MEd, BAMF*



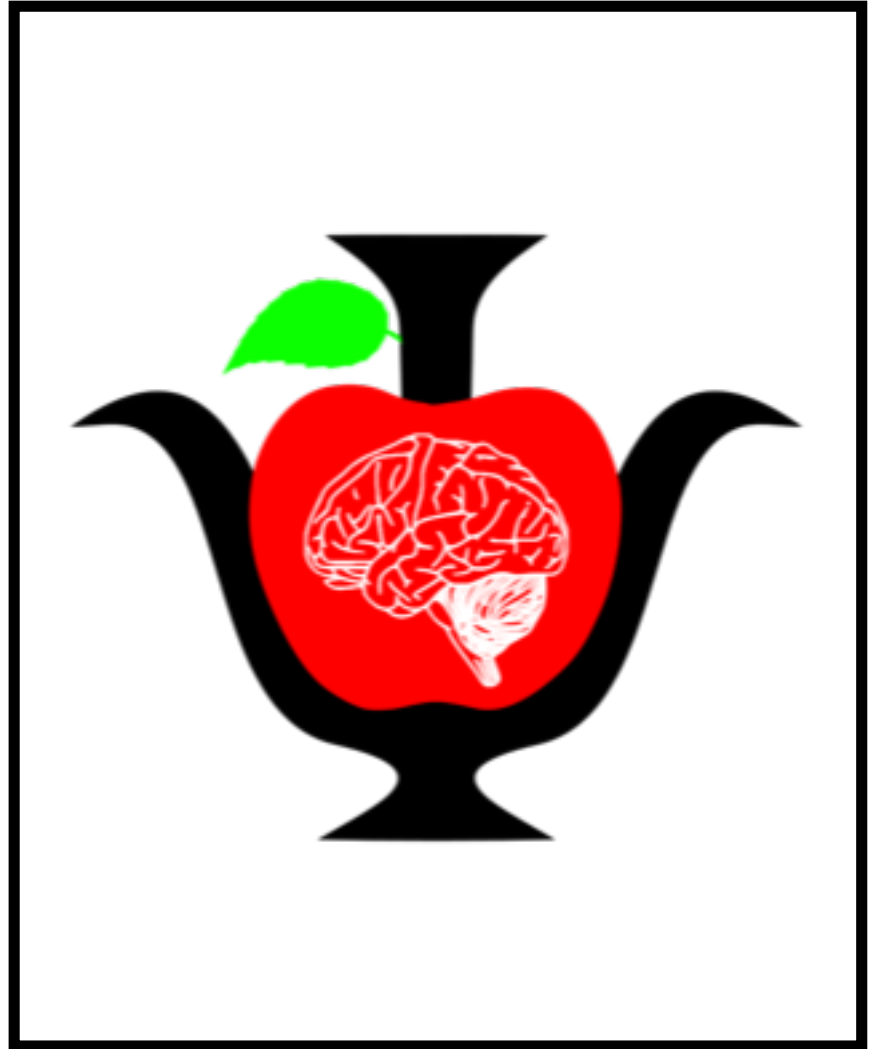
The Science of Learning Group

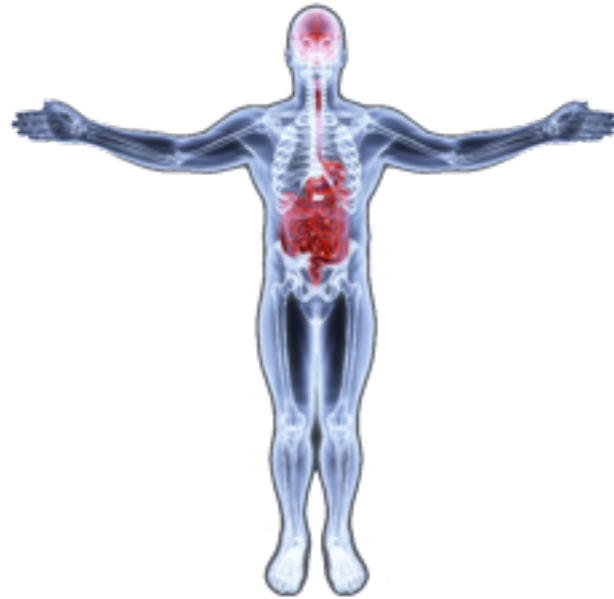
*[www.scienceoflearning.com.au](http://www.scienceoflearning.com.au)*

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## PEN Principles

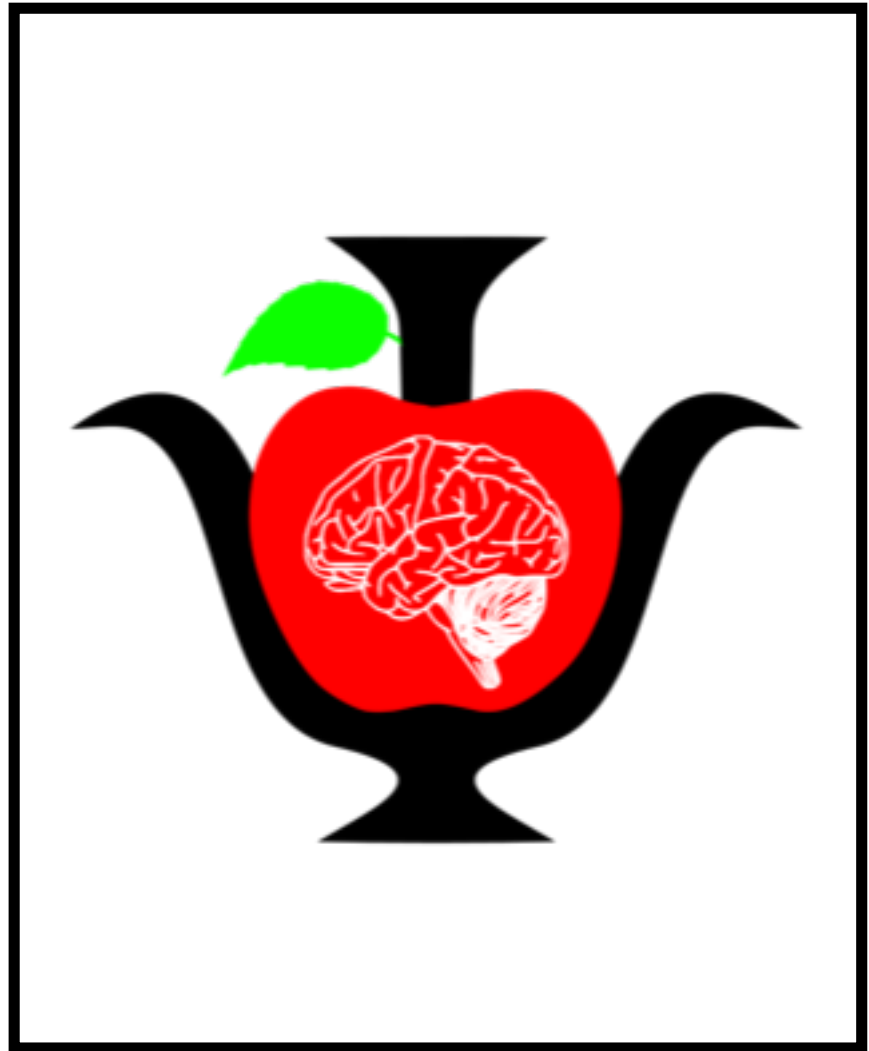




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## PEN Principle #1

*Written Text and Spoken  
Word Do Not Mix*





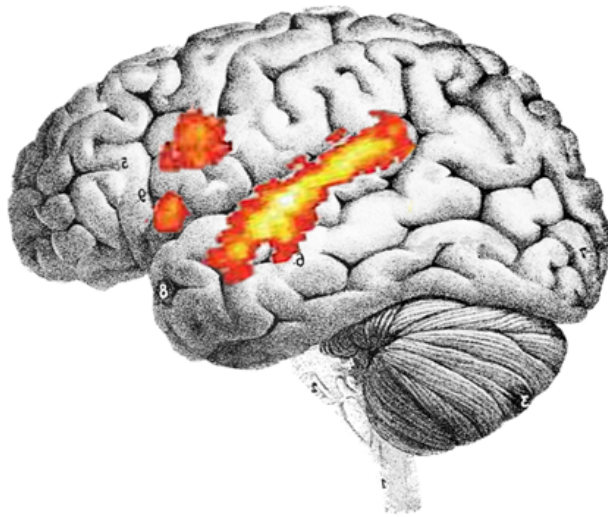
---

Listen Up



---

# Listening to Speech



---

Part 2...



---

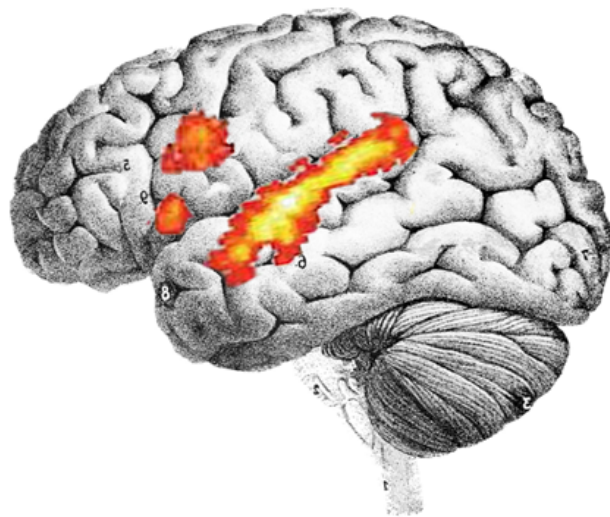
**Crying a little is of no use  
You must cry until your pillow is soaked  
Then you can get up and you can dance  
You can jump in the shower and  
Splash, splash, splash.**

**You can throw open your window  
and sing, Ha ha ha!  
And if people down below say  
"Hey, what's going on up there"  
You can sing out "Happiness was hiding  
in the last tear, and I wept it!"**

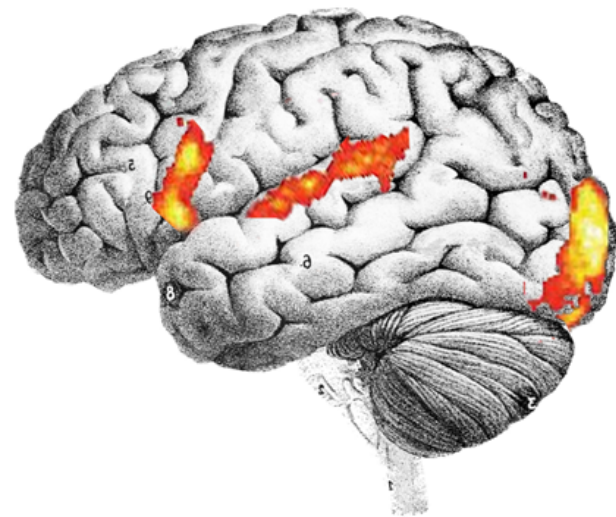


---

# Listening to Speech



# Reading



---

**before modern language everything was  
written like this with no spaces or  
punctuation the only way to read it  
fluently was out loud  
in fact if you listen right now  
you are probably whispering this aloud  
to yourself**

---



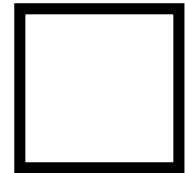
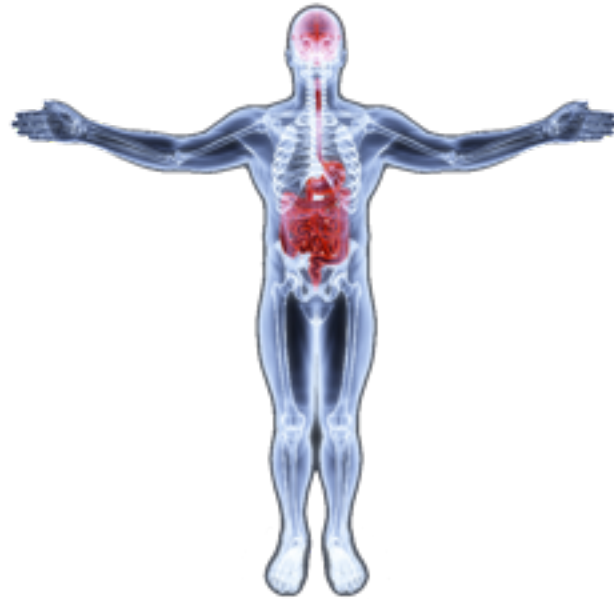
---

**HELLO IM MORGAN  
FREEMAN**

**AND YOU JUST READ THAT IN MY  
VOICE**

memeshappen.com

---



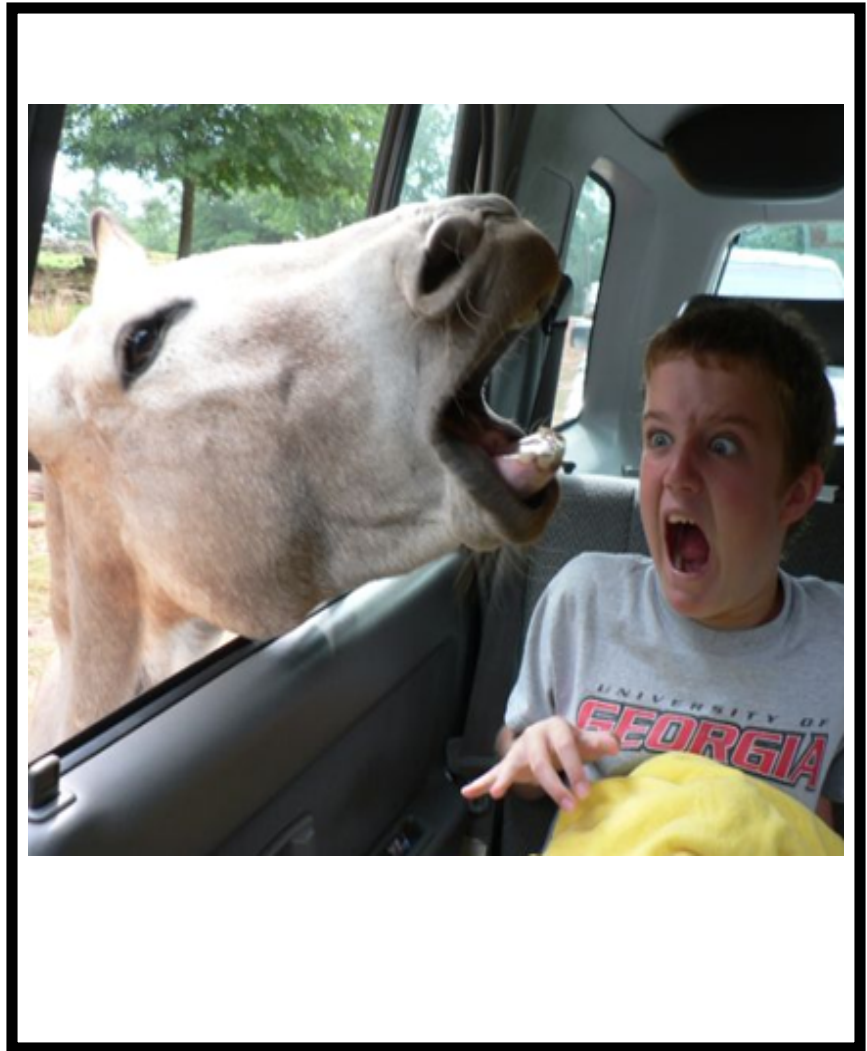
Over to You



---

Attention

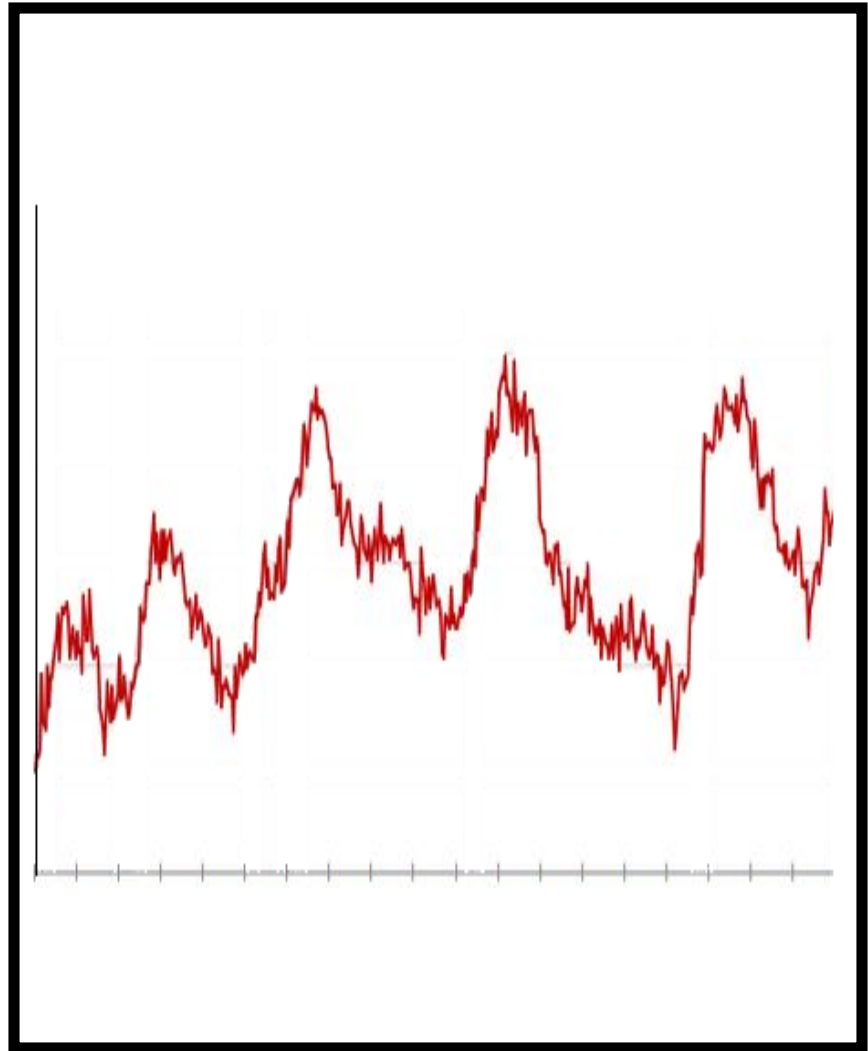
-The Alerting Network



---

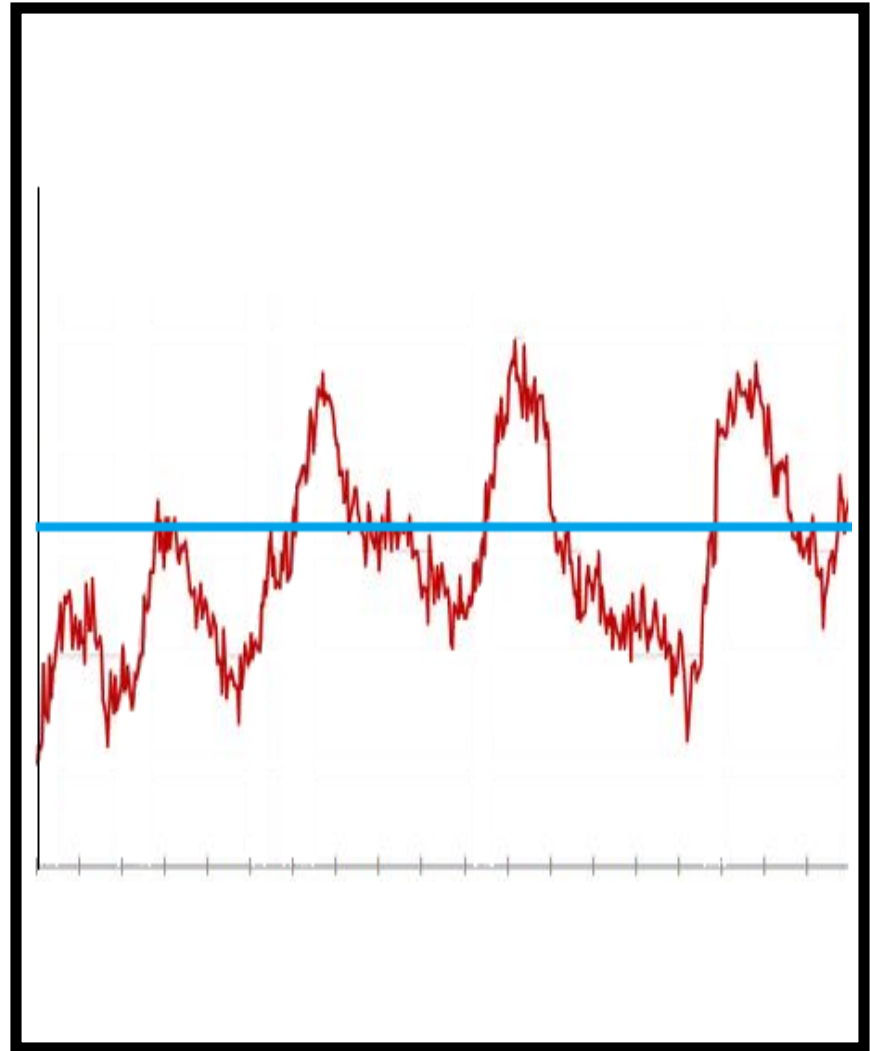
## Attention

-The Alerting Network  
*threshold*



## Attention

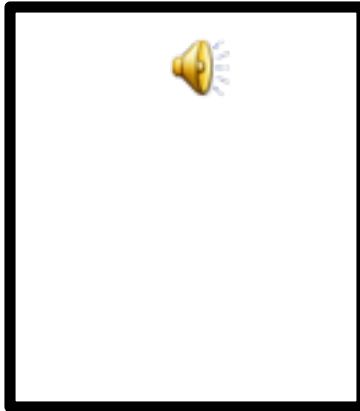
-The Alerting Network  
*threshold*





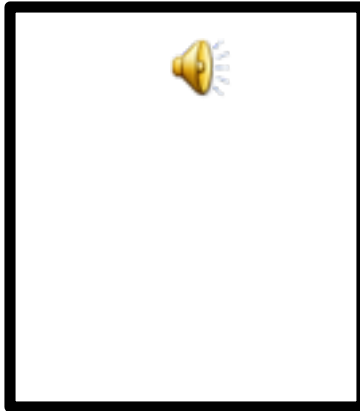
# Can You Hear It?

8,000 Hz



# Can You Hear It?

10,000 Hz



# Can You Hear It?

12,000 Hz



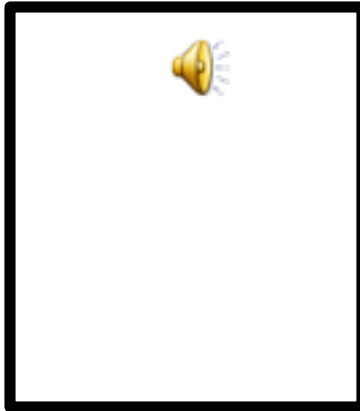
# Can You Hear It?

14,000 Hz



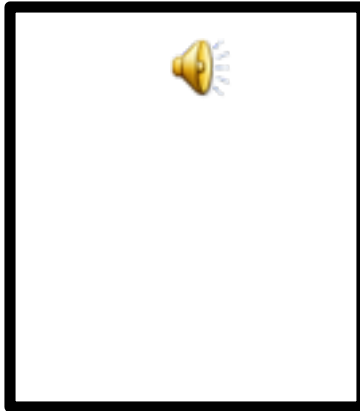
# Can You Hear It?

15,000 Hz



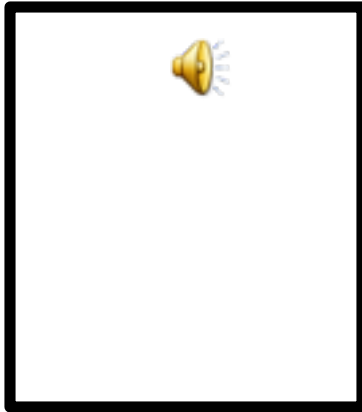
# Can You Hear It?

16,000 Hz



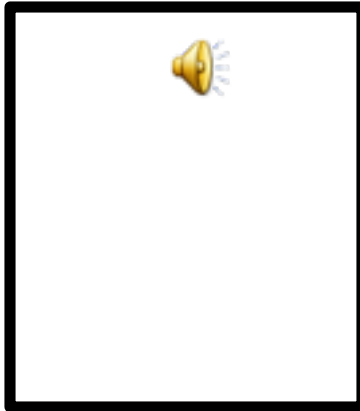
# Can You Hear It?

17,000 Hz



# Can You Hear It?

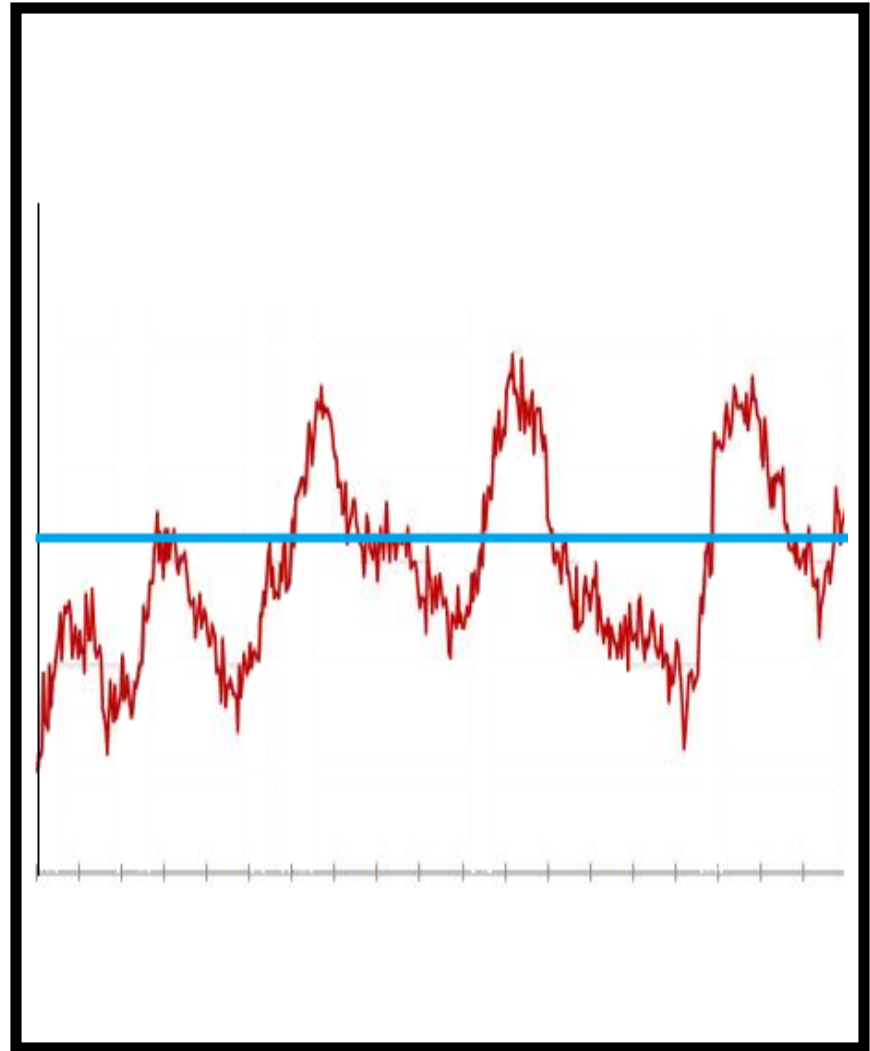
18,000 Hz





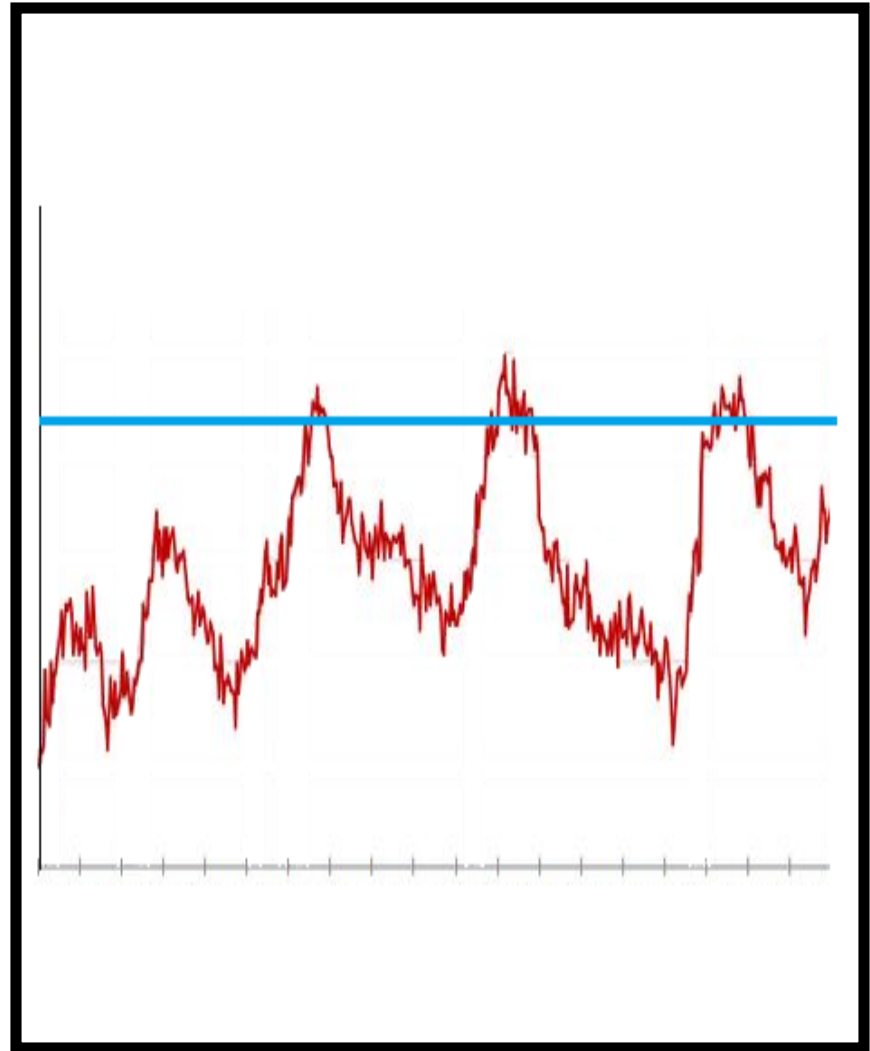
## Attention

-The Alerting Network  
*threshold*



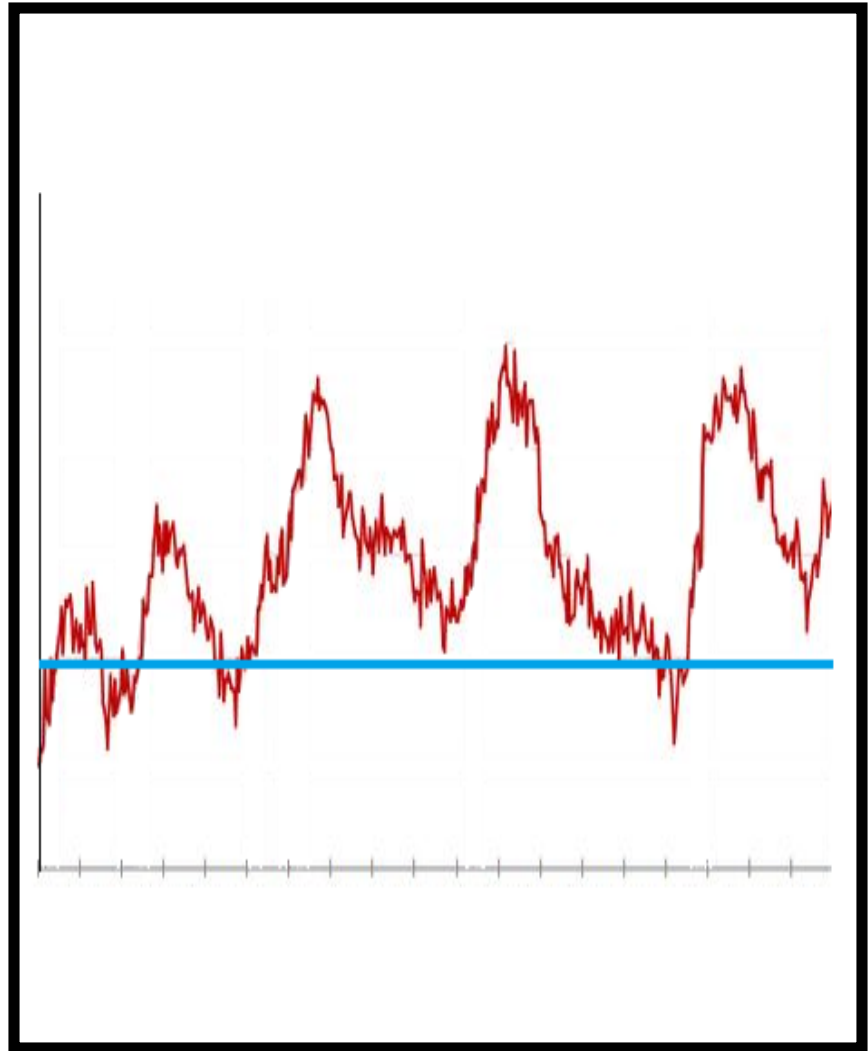
## Attention

-The Alerting Network  
*threshold*



## Attention

-The Alerting Network  
*threshold*



---

## Attention

- The Alerting Network  
*threshold*  
*optimal arousal*



---

## Attention

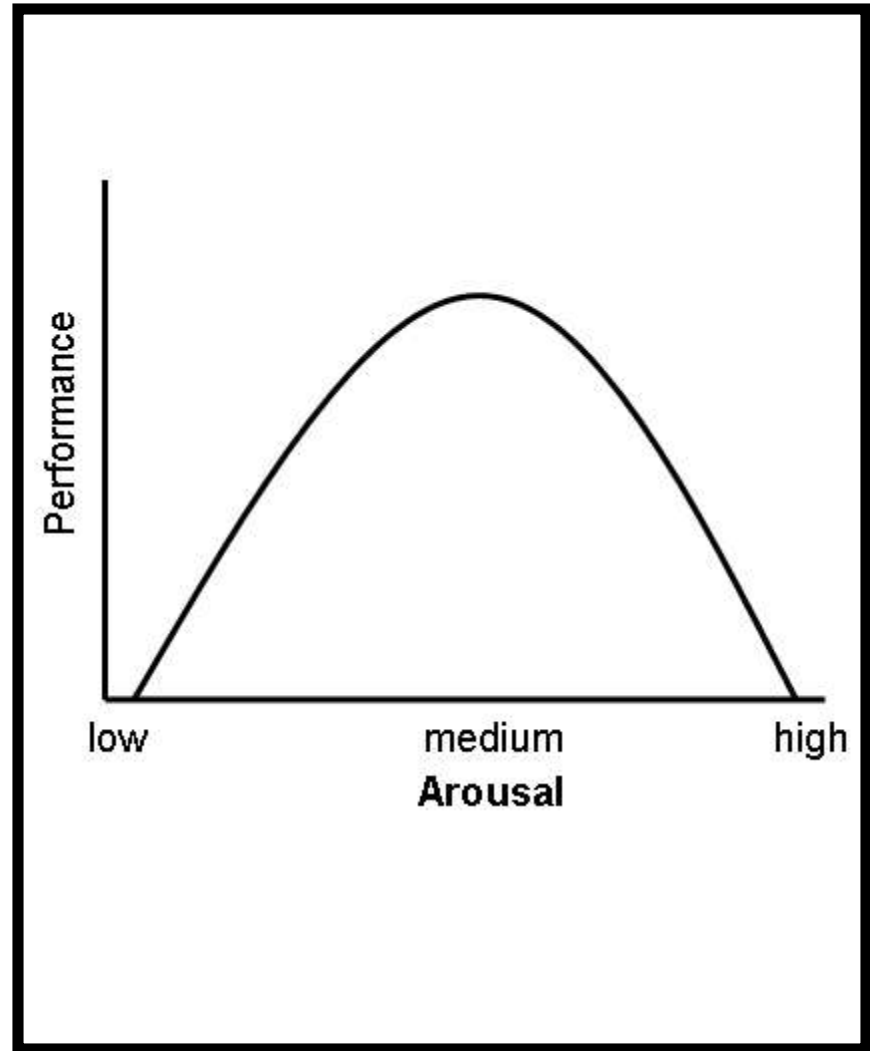
- The Alerting Network  
*threshold*  
*optimal arousal*



---

## Attention

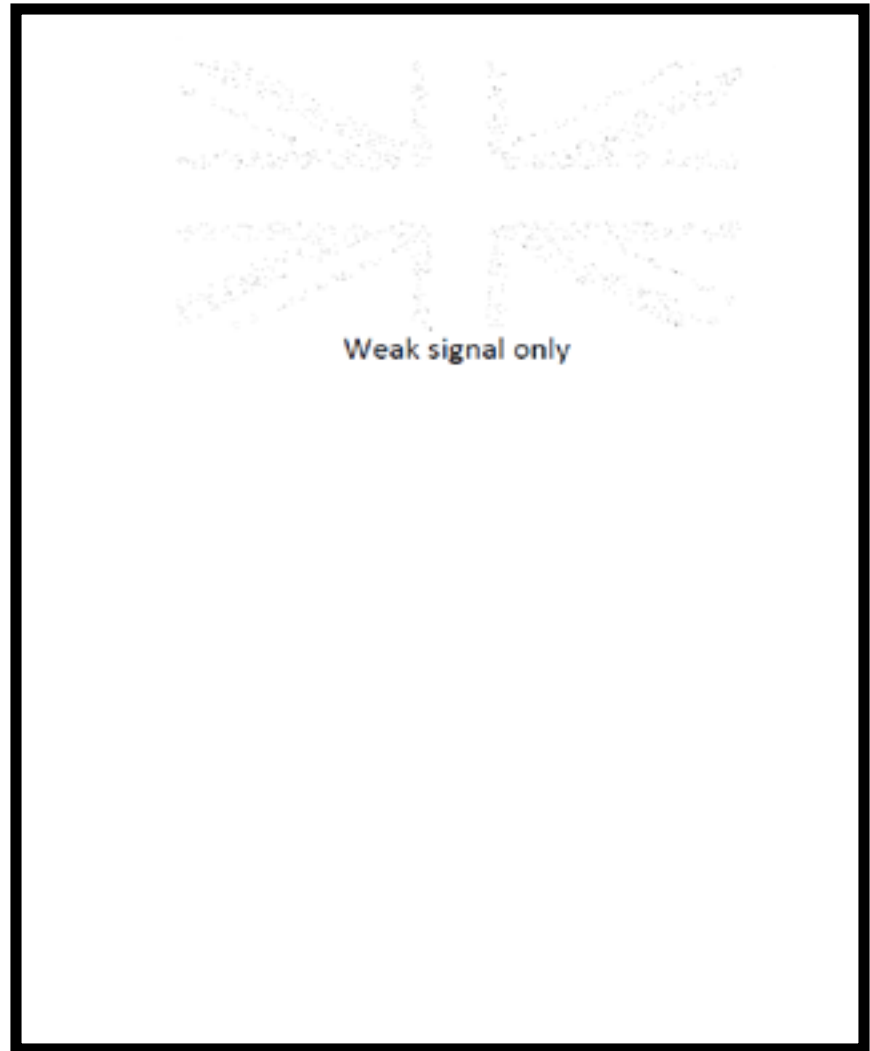
- The Alerting Network  
*threshold*  
*optimal arousal*



---

## Attention

- The Alerting Network  
*threshold*  
*optimal arousal*  
*engagement*



## Attention

- The Alerting Network  
*threshold*  
*optimal arousal*  
*engagement*



Weak signal only

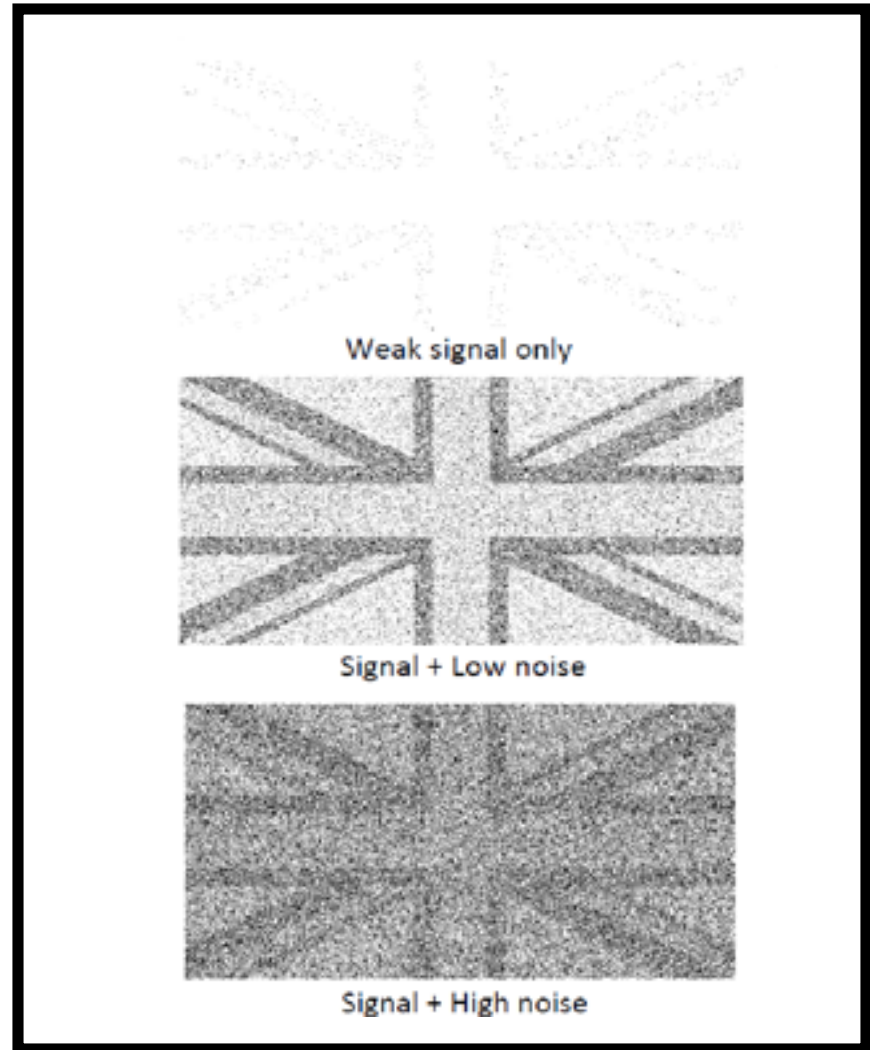


Signal + Low noise



## Attention

- The Alerting Network  
*threshold*  
*optimal arousal*  
*engagement*



---

## Attention

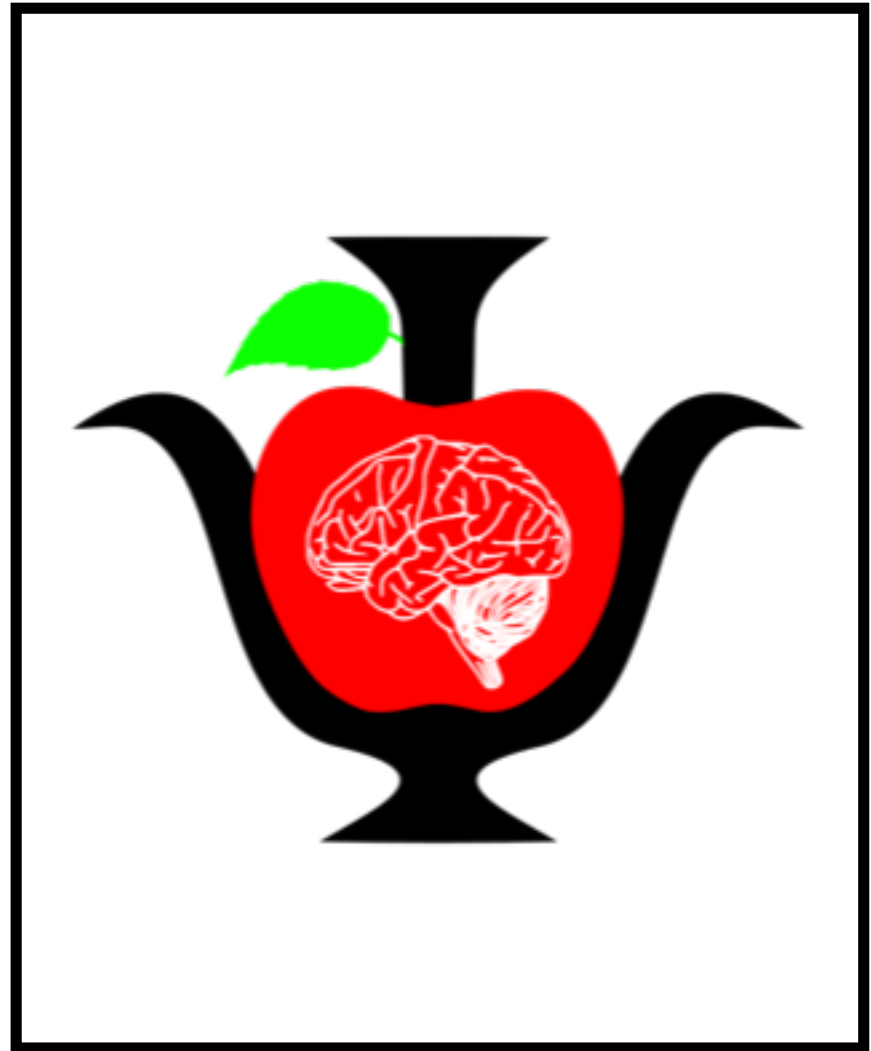
- The Alerting Network  
*threshold*  
*optimal arousal*  
*engagement*

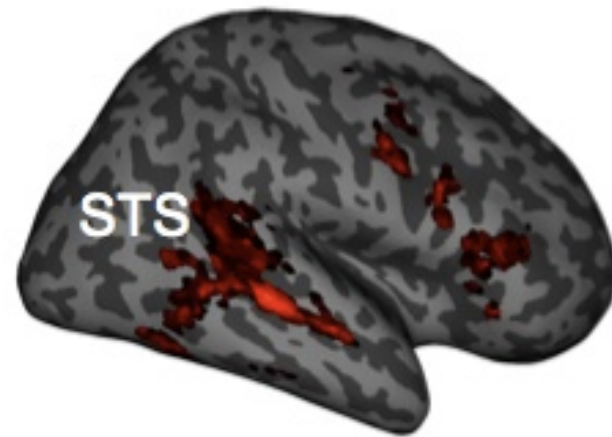
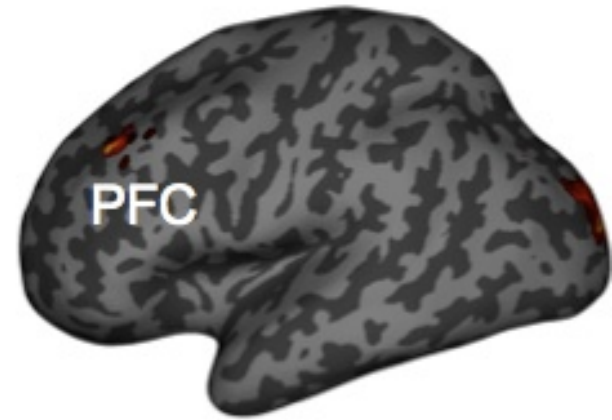


---

## PEN Principle #2

*Visual Images and  
Spoken Word Mix Well*





---

Recall



10%

---

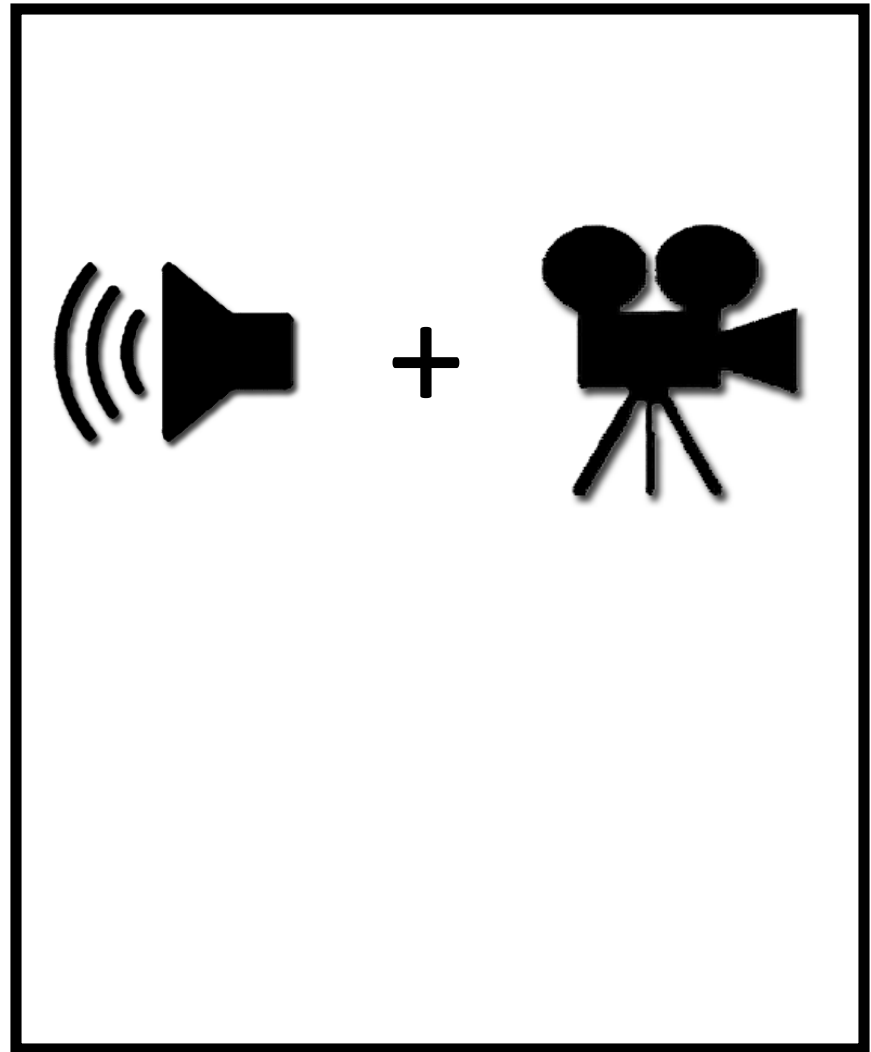
Recall



35%

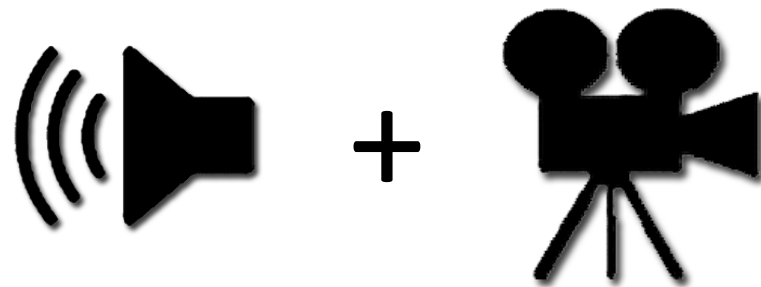
---

Recall



---

Recall



65%

---

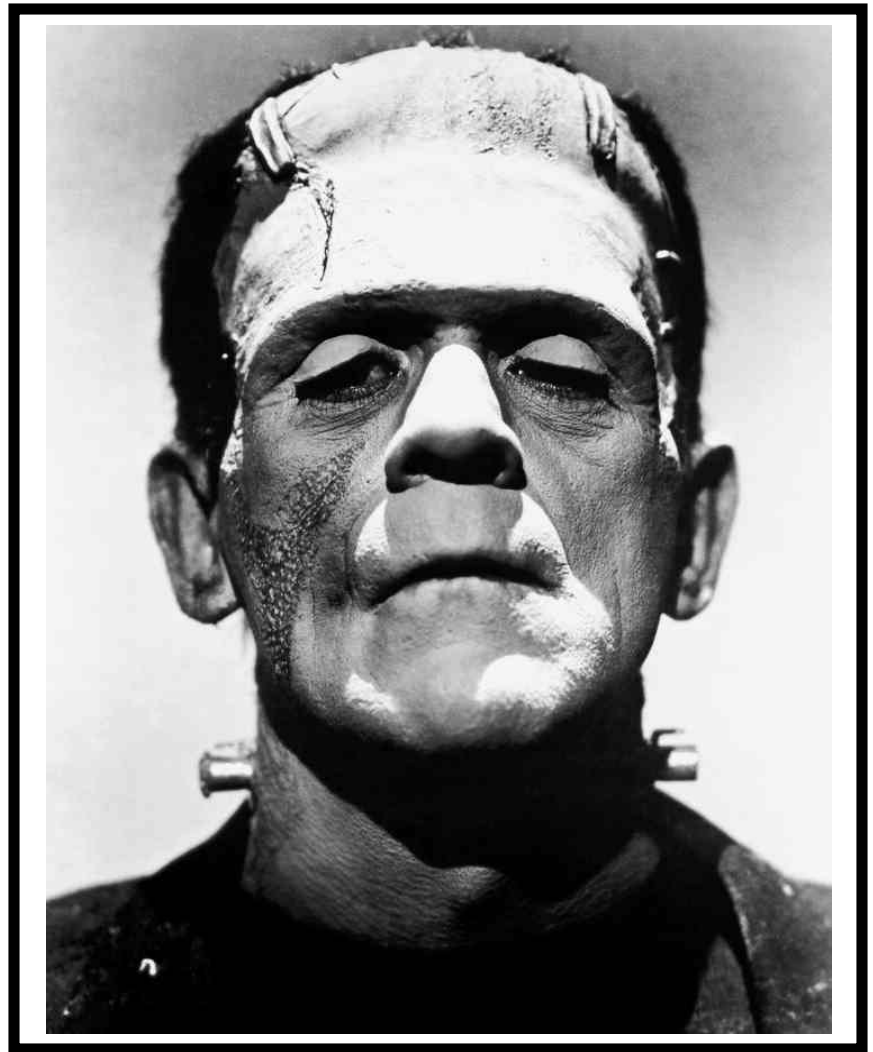




---

“His limbs were in proportion and I had selected his features as beautiful. His yellow skin scarcely covered the work of muscles and arteries beneath; his hair was of a lustrous black, and flowing; his teeth of a pearly whiteness, but these luxuriances only formed a more horrid contrast with his watery eyes, that seemed almost of the same color as the dun-white sockets in which they were set, his shriveled complexion and straight black lips.















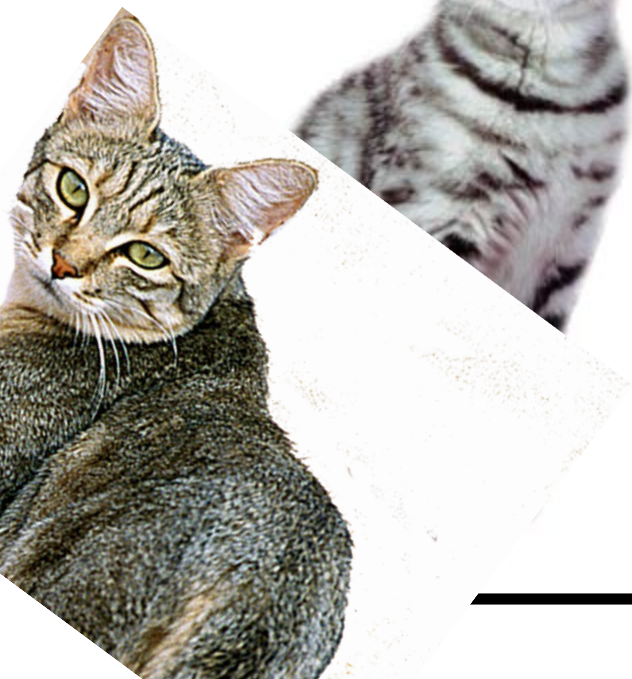




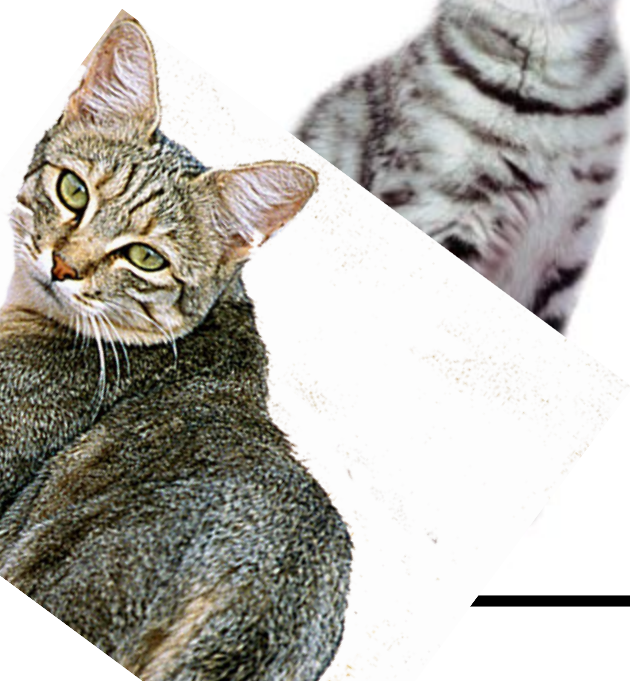












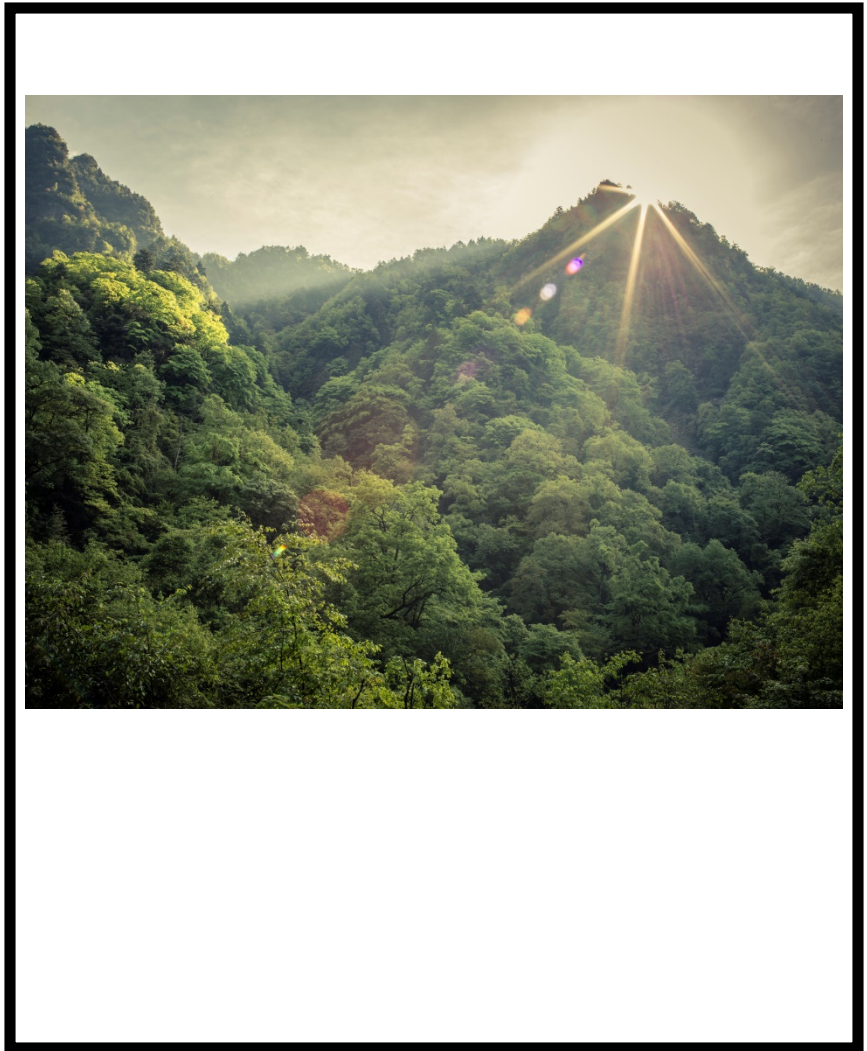


# Graphs & Statistics

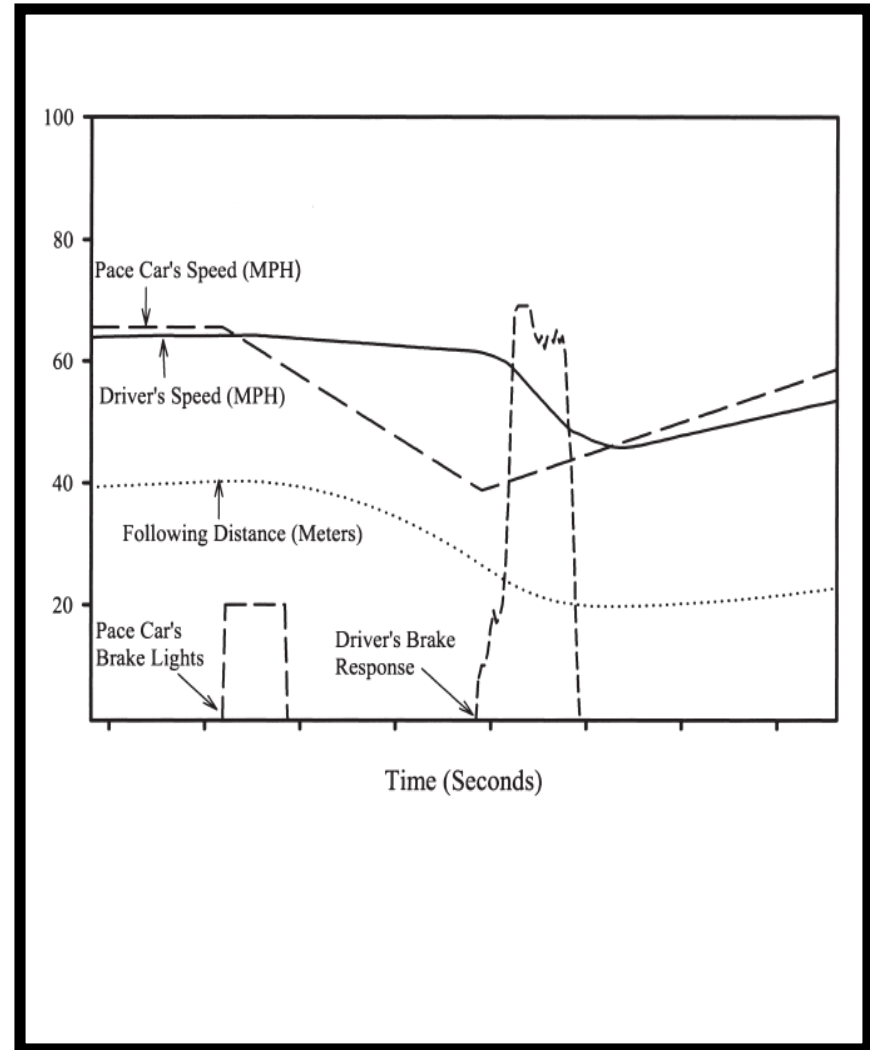


---

Gist



# Gist Vs Specifics





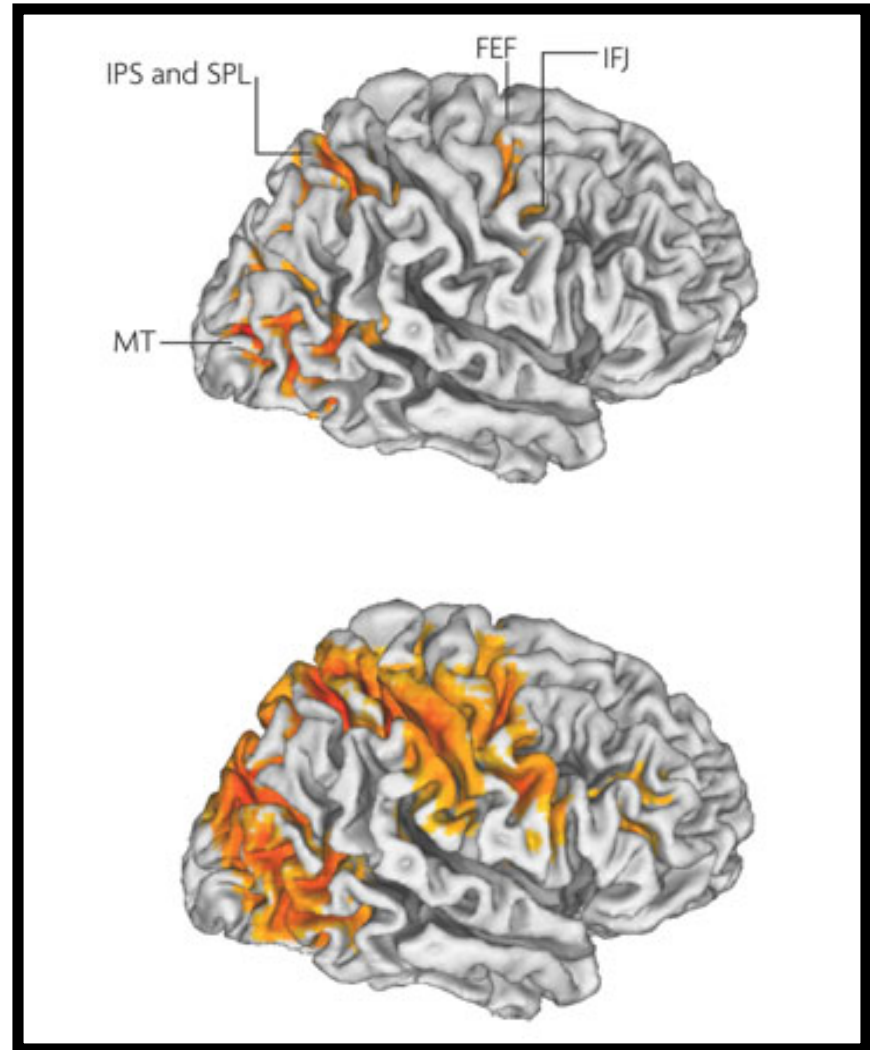
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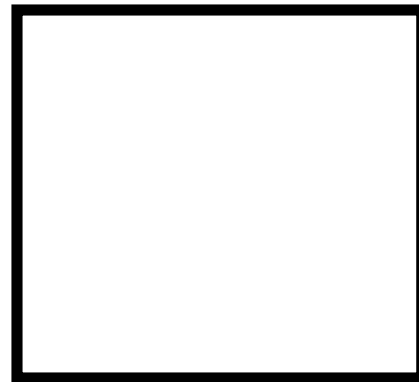
Time to point!

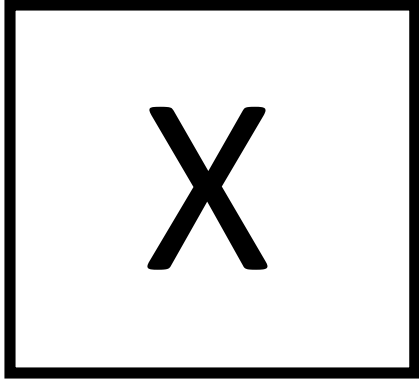


# Attention

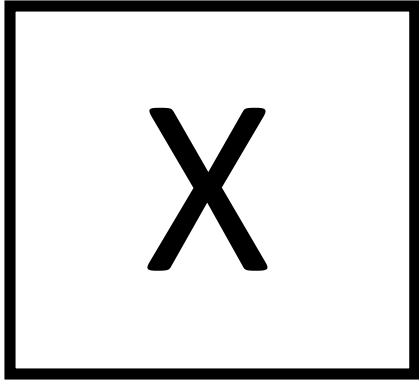
## *Dorsal Network*



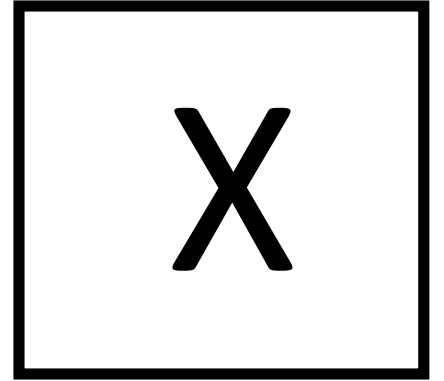








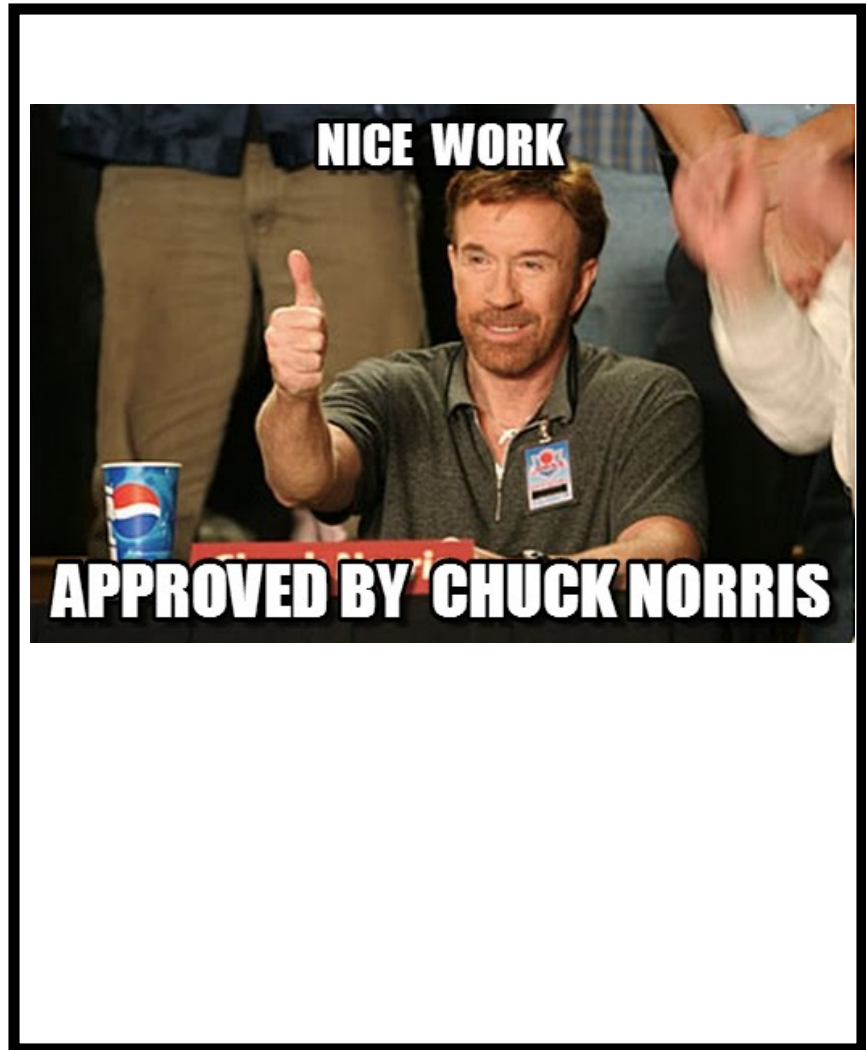


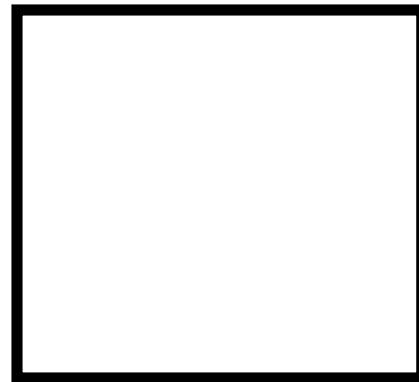


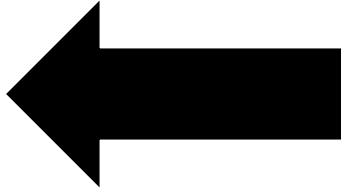


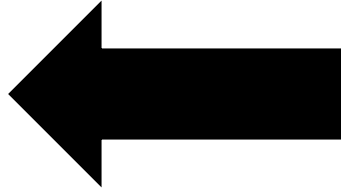
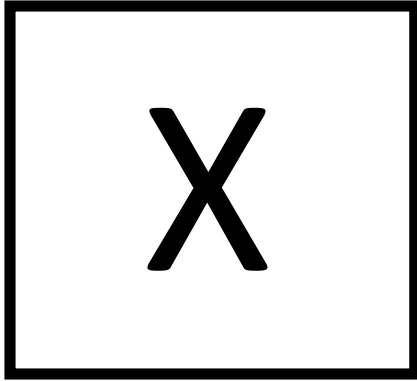
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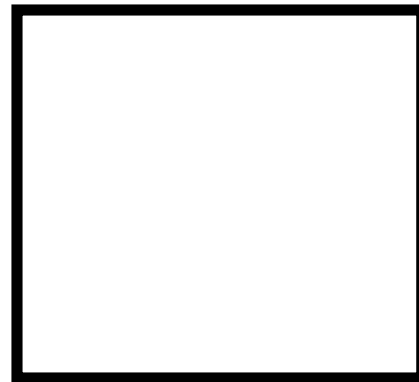
Dorsal



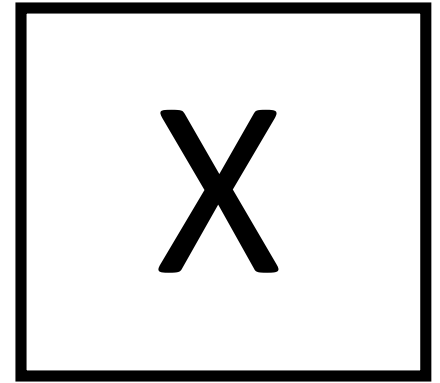


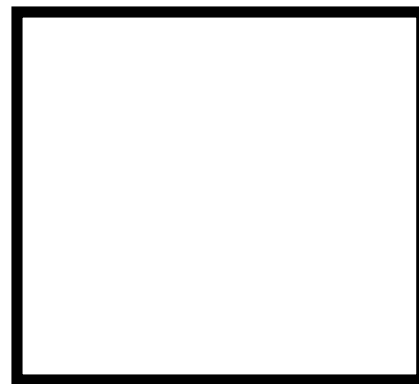




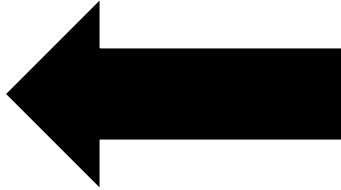


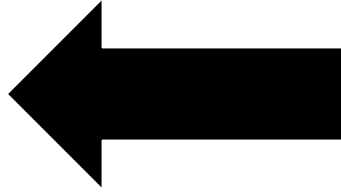
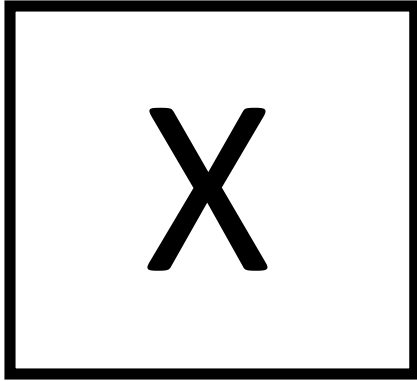












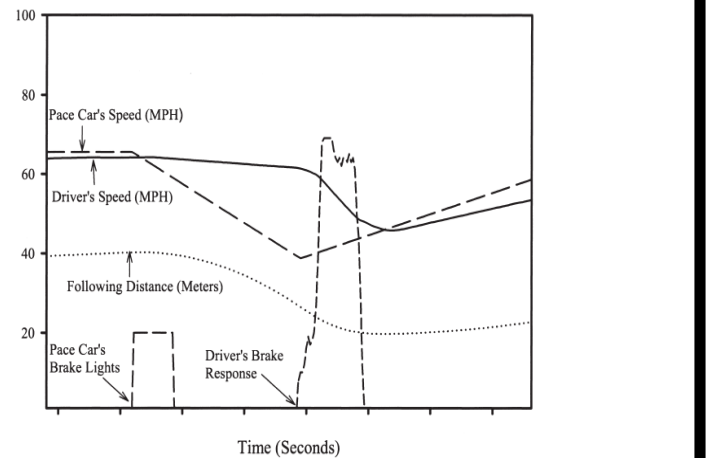
---

Dorsal

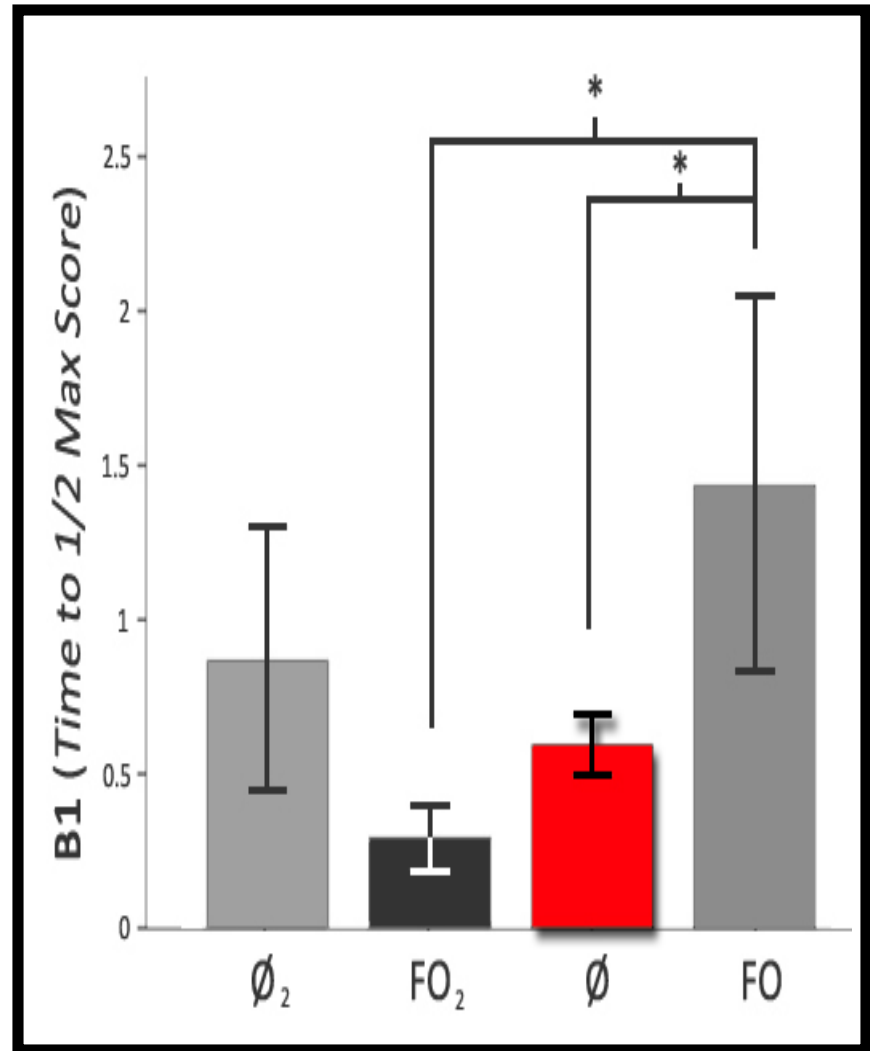


# Dorsal

|                             | Alcohol    | Baseline   | Cell Phone |
|-----------------------------|------------|------------|------------|
| Total accidents             | 0          | 0          | 3          |
| Brake reaction time (ms)    | 779 (33)   | 777 (33)   | 849 (36)   |
| Maximum braking force       | 59.8 (0.7) | 58.7 (2.6) | 55.5 (3.0) |
| Speed (mph)                 | 52.8 (2.0) | 55.5 (0.7) | 53.8 (1.3) |
| Mean following distance (m) | 26.0 (1.7) | 27.4 (1.3) | 28.4 (1.7) |
| SD following distance (m)   | 10.3 (0.6) | 9.5 (0.5)  | 11.8 (0.8) |
| Time to collision (s)       | 8.0 (0.4)  | 8.5 (0.3)  | 8.1 (0.4)  |
| Time to collision < 4 s     | 3.0 (0.7)  | 1.5 (0.3)  | 1.9 (0.5)  |
| Half recovery time (s)      | 5.4 (0.3)  | 5.3 (0.3)  | 6.3 (0.4)  |

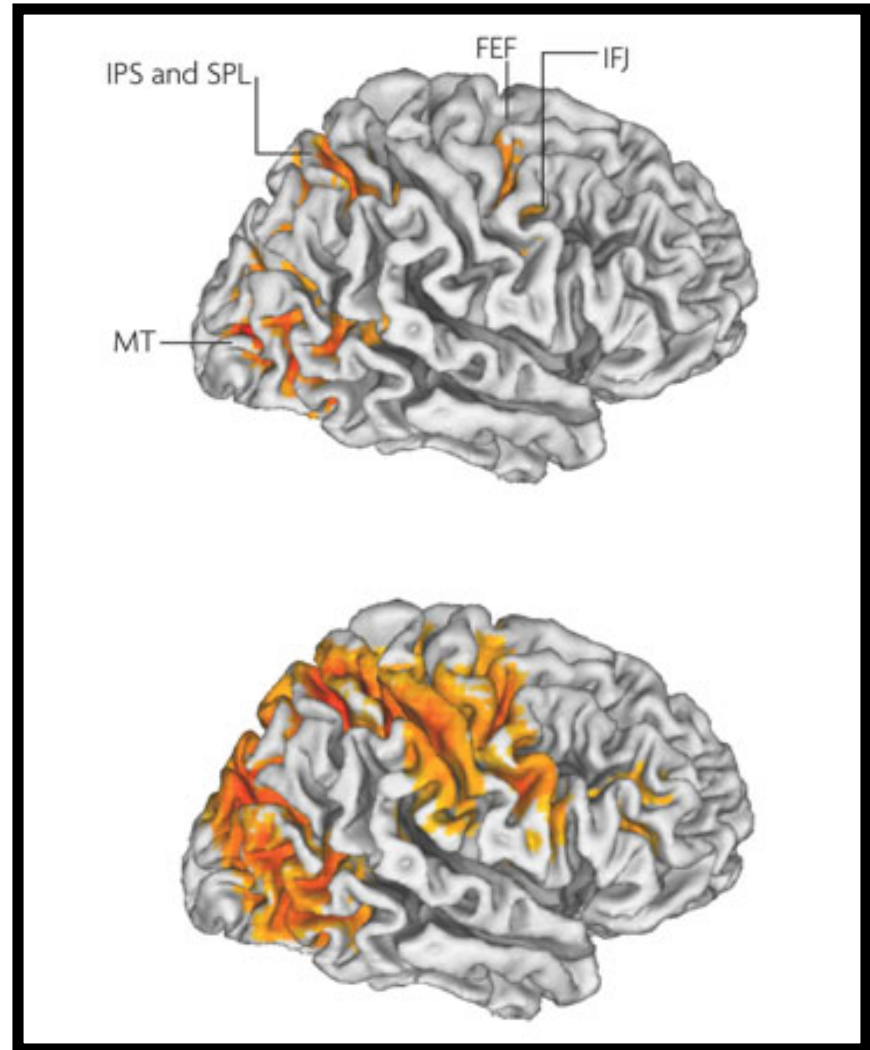


Dorsal

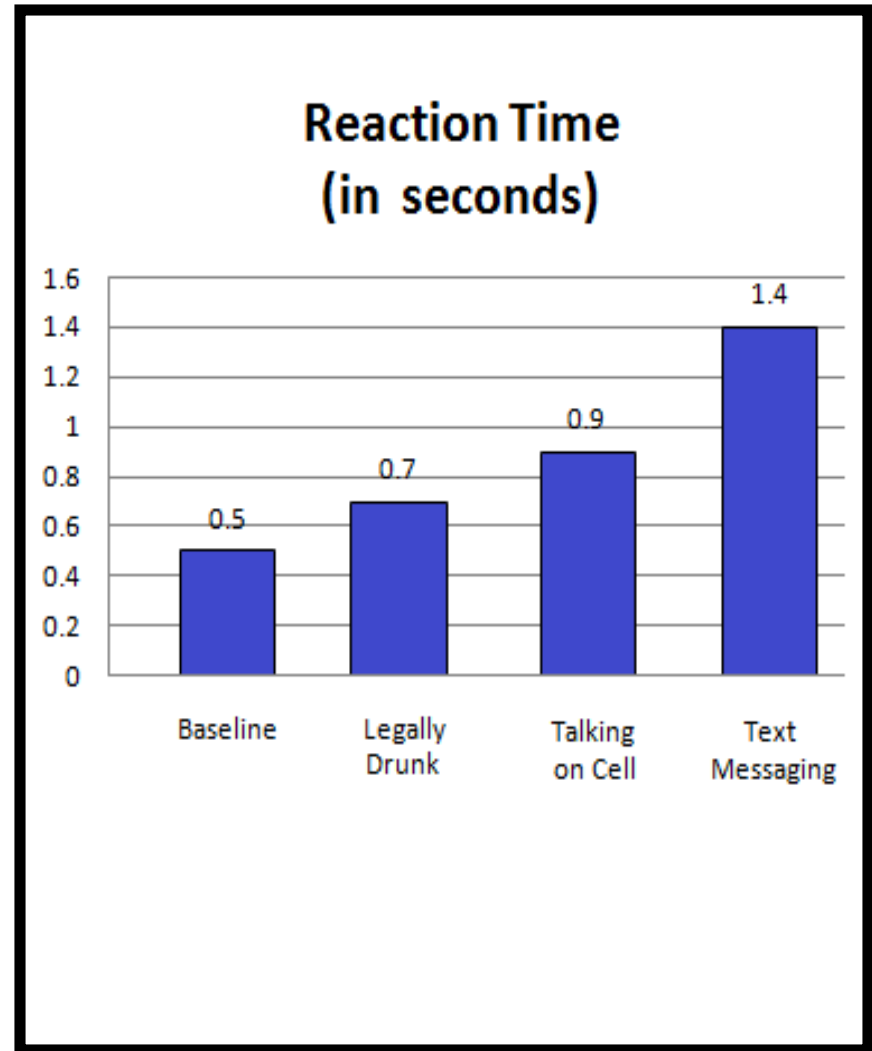


# Attention

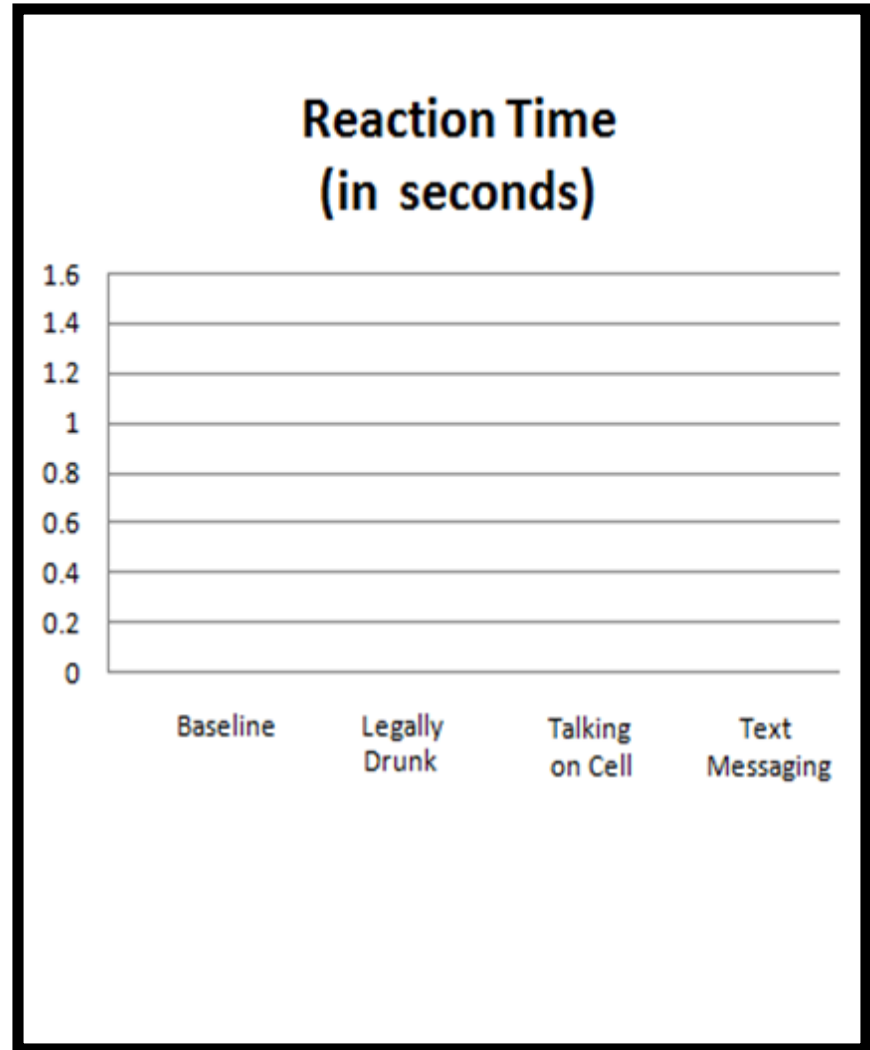
## *Ventral Network*



Ventral

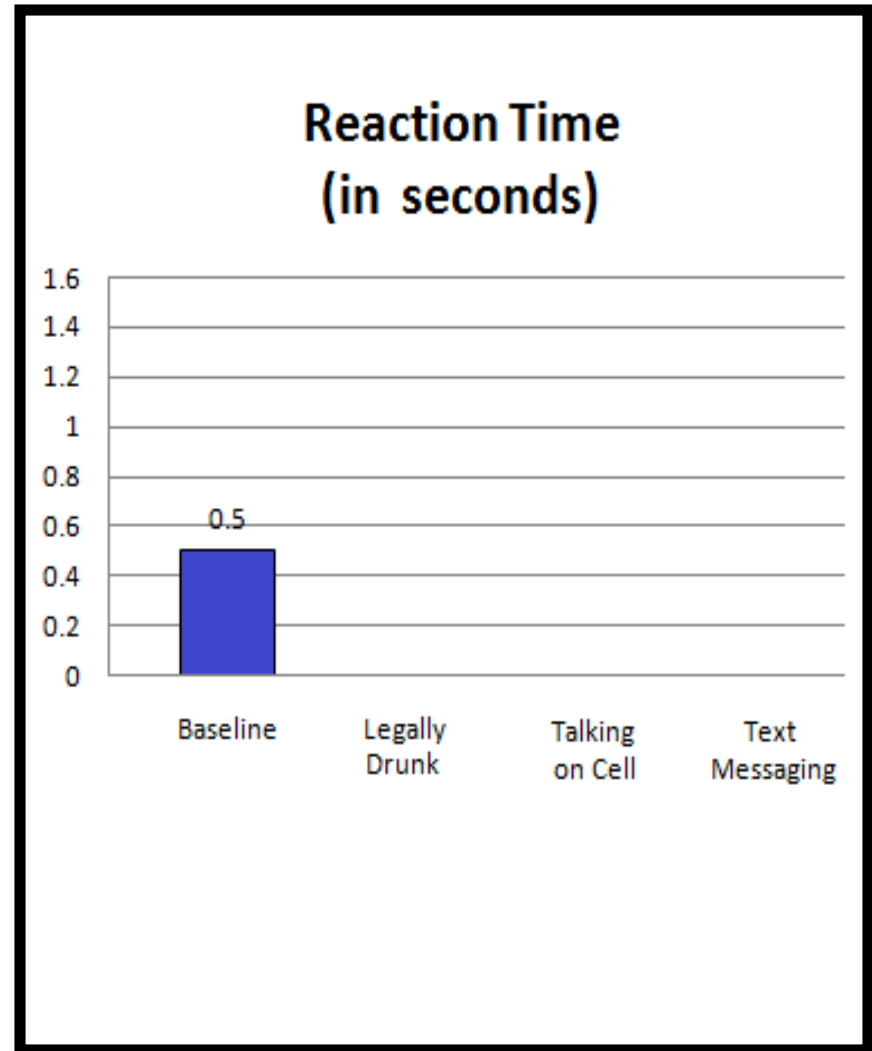


Ventral

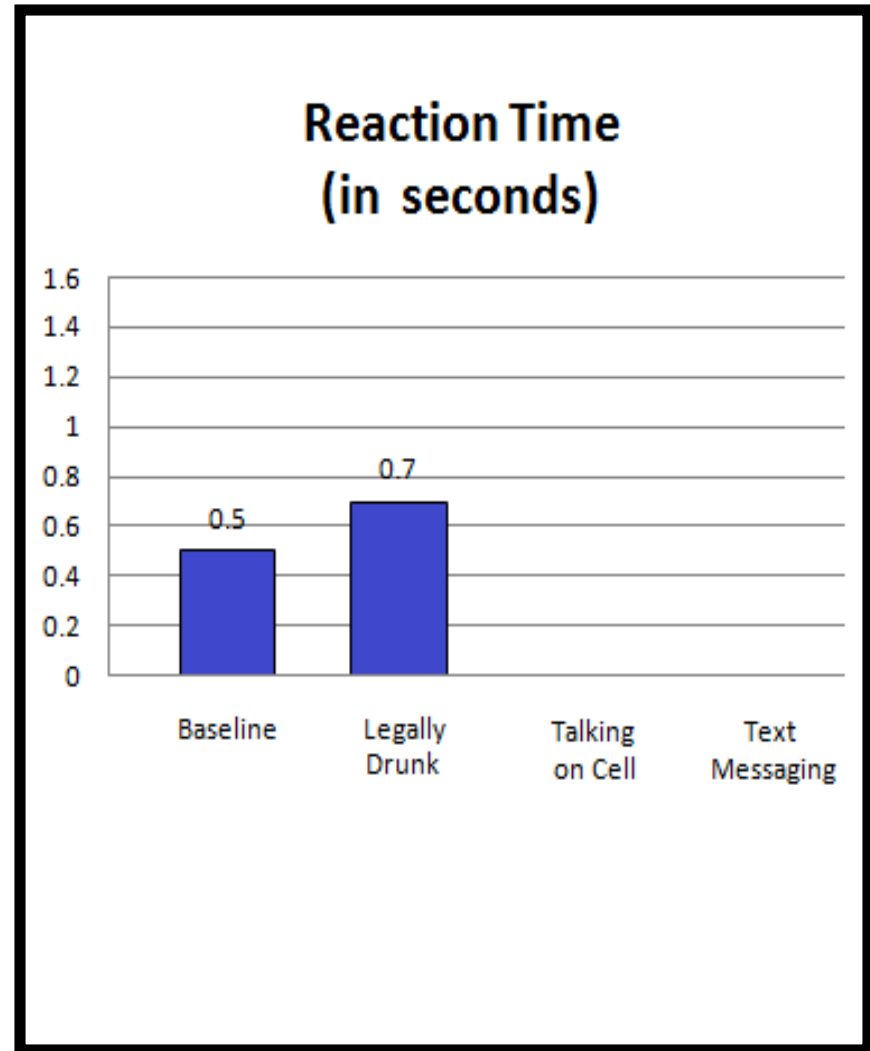




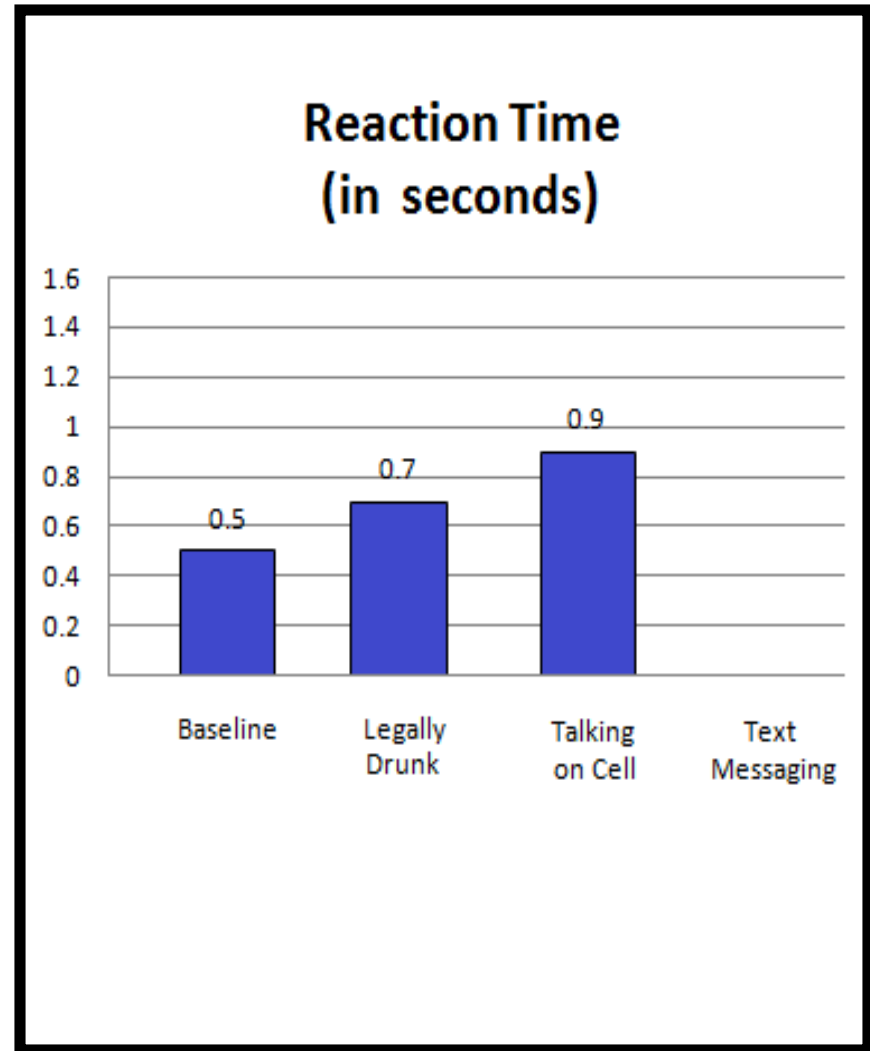
Ventral



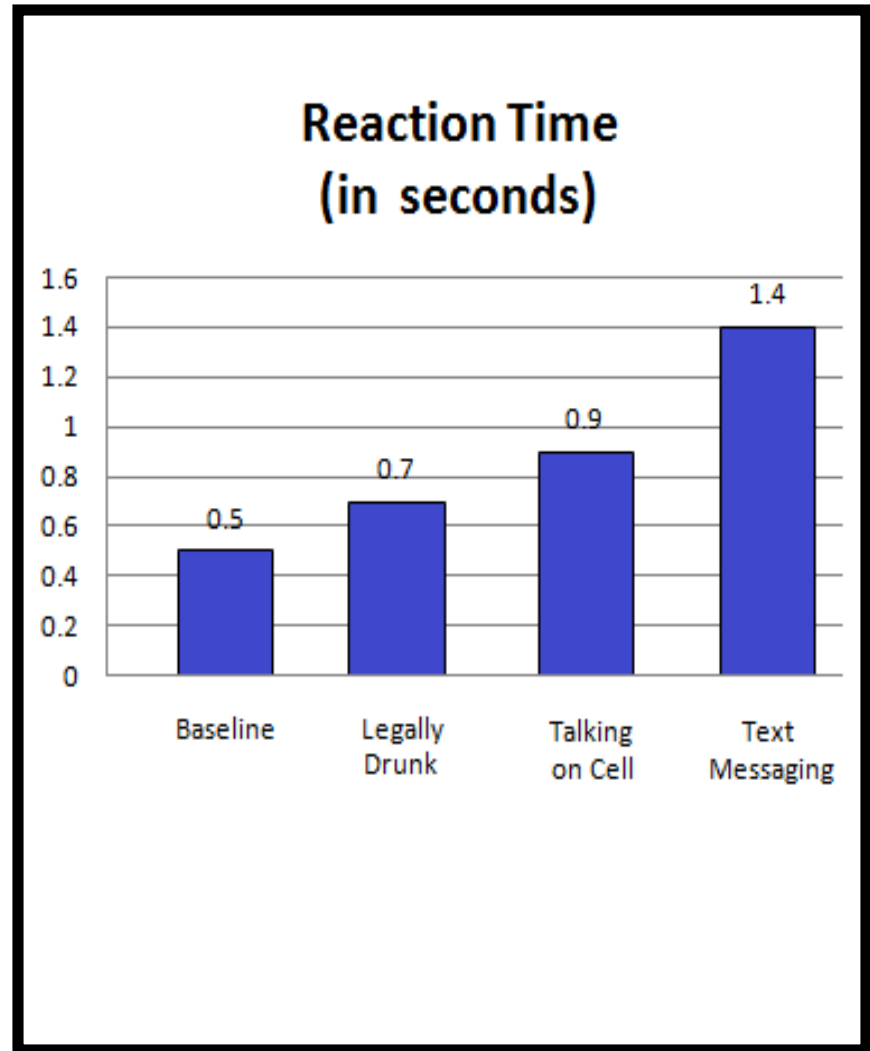
Ventral



Ventral

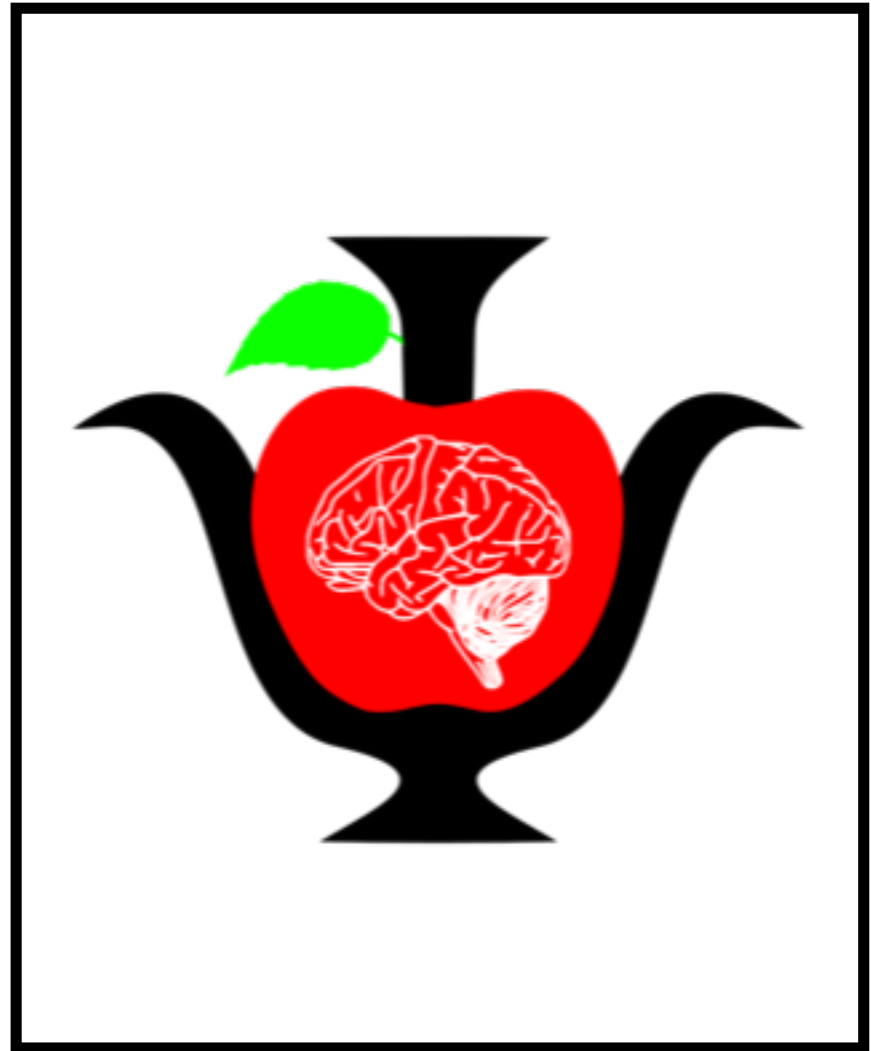


Ventral



PEN Principle #9

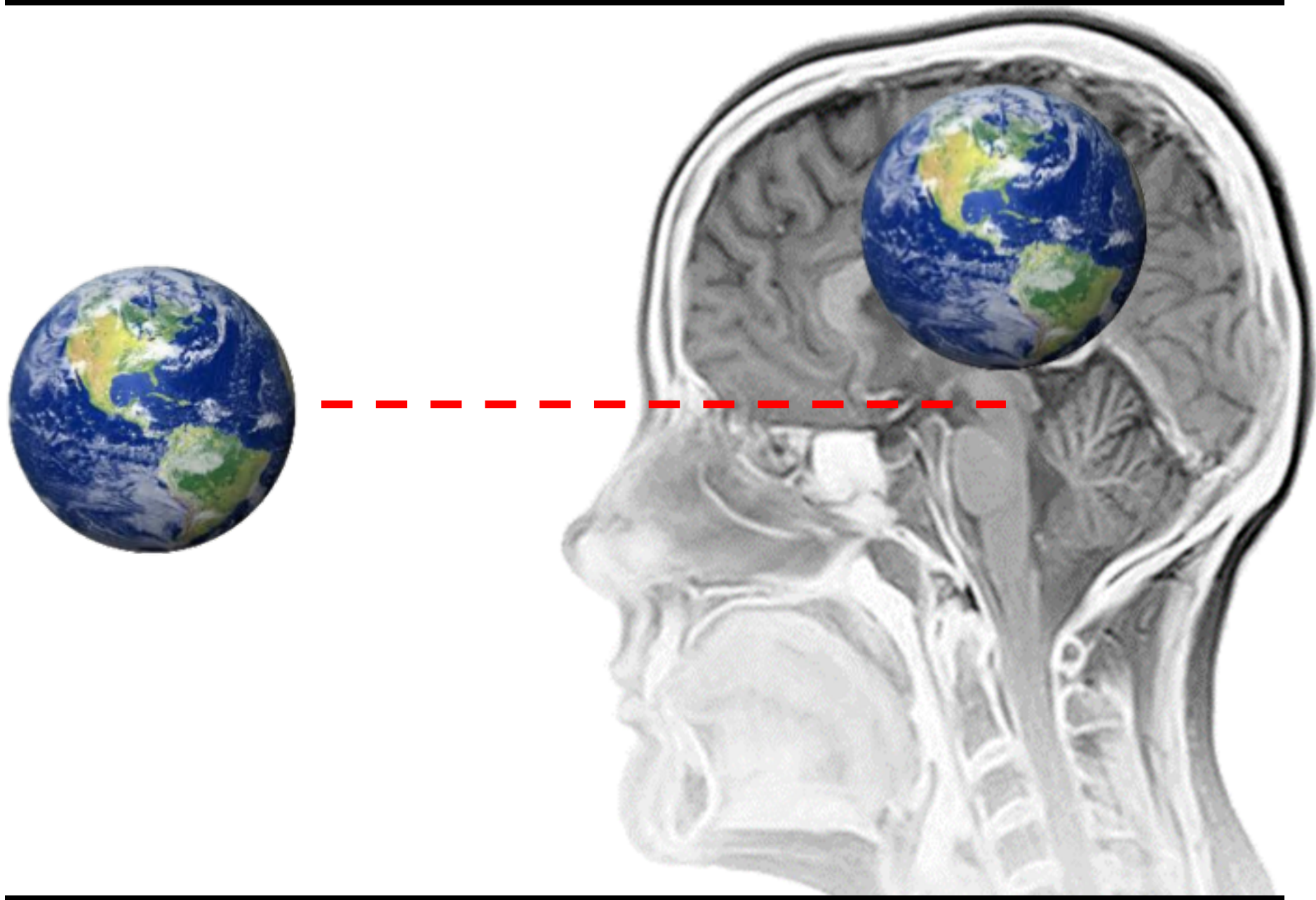
*Active Recall trumps  
Passive Review*

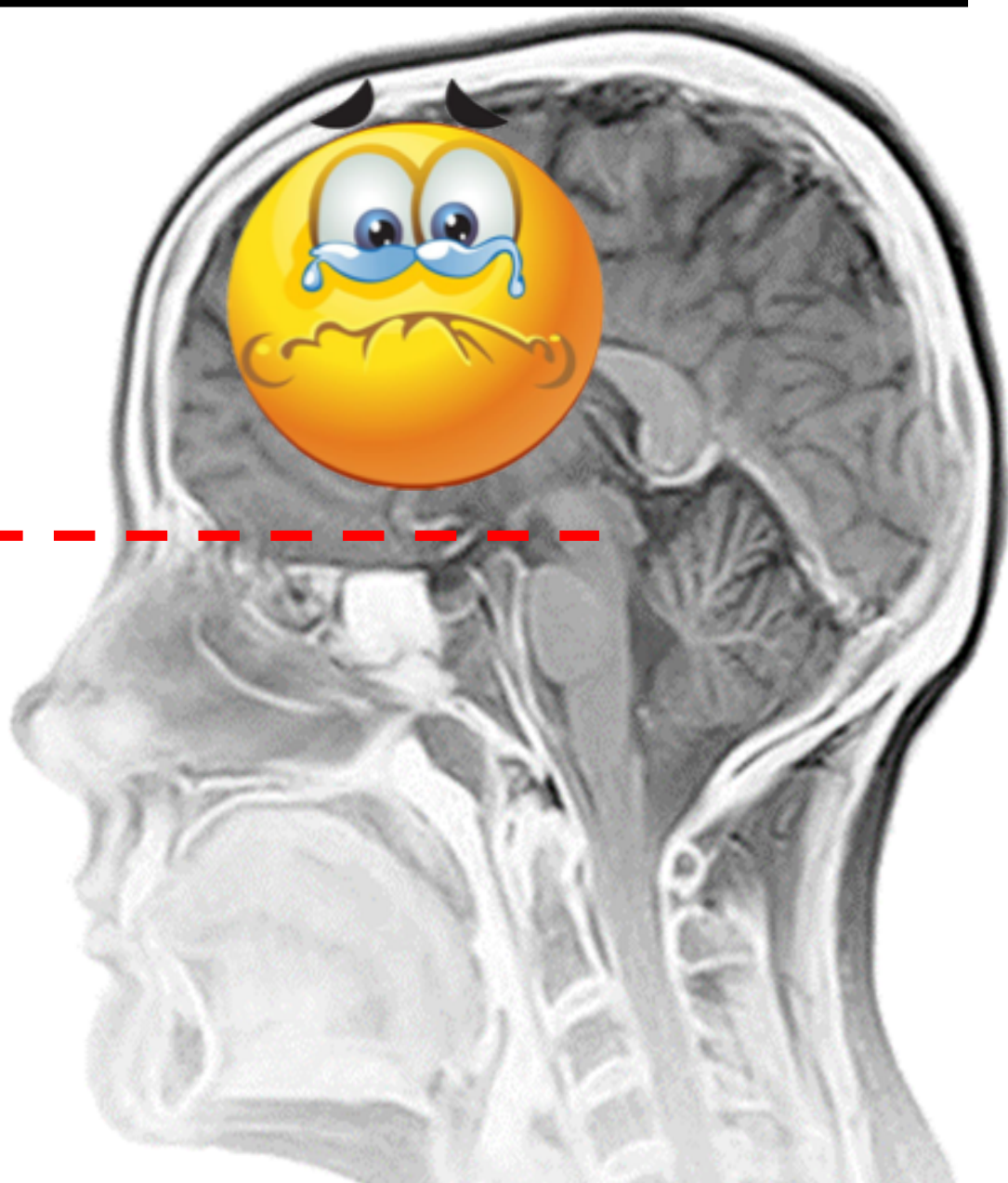
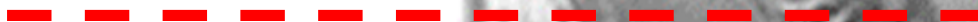


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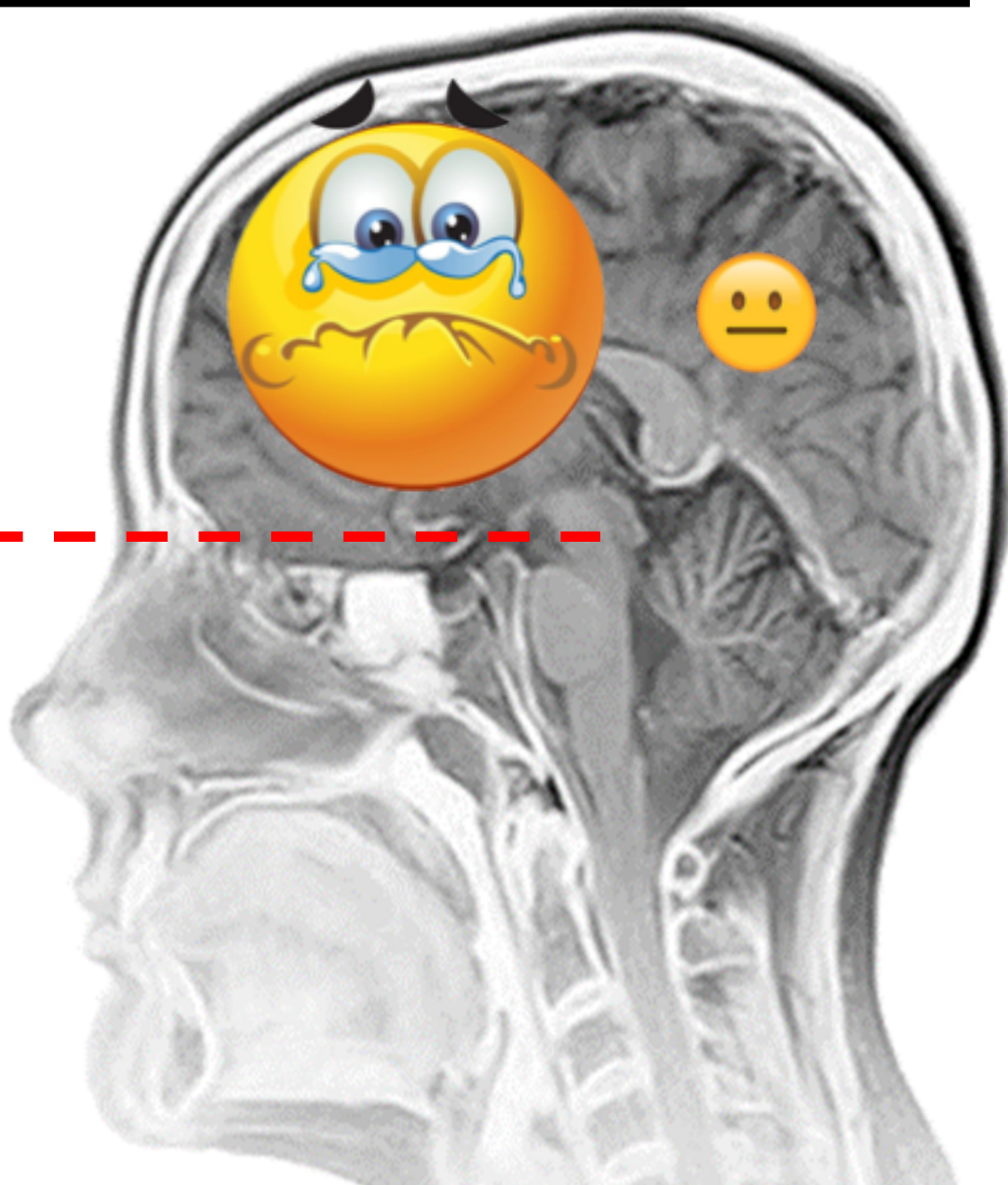
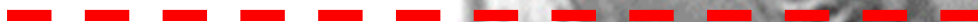
**Remember...**











---

# Finish These...



---

*Stress*

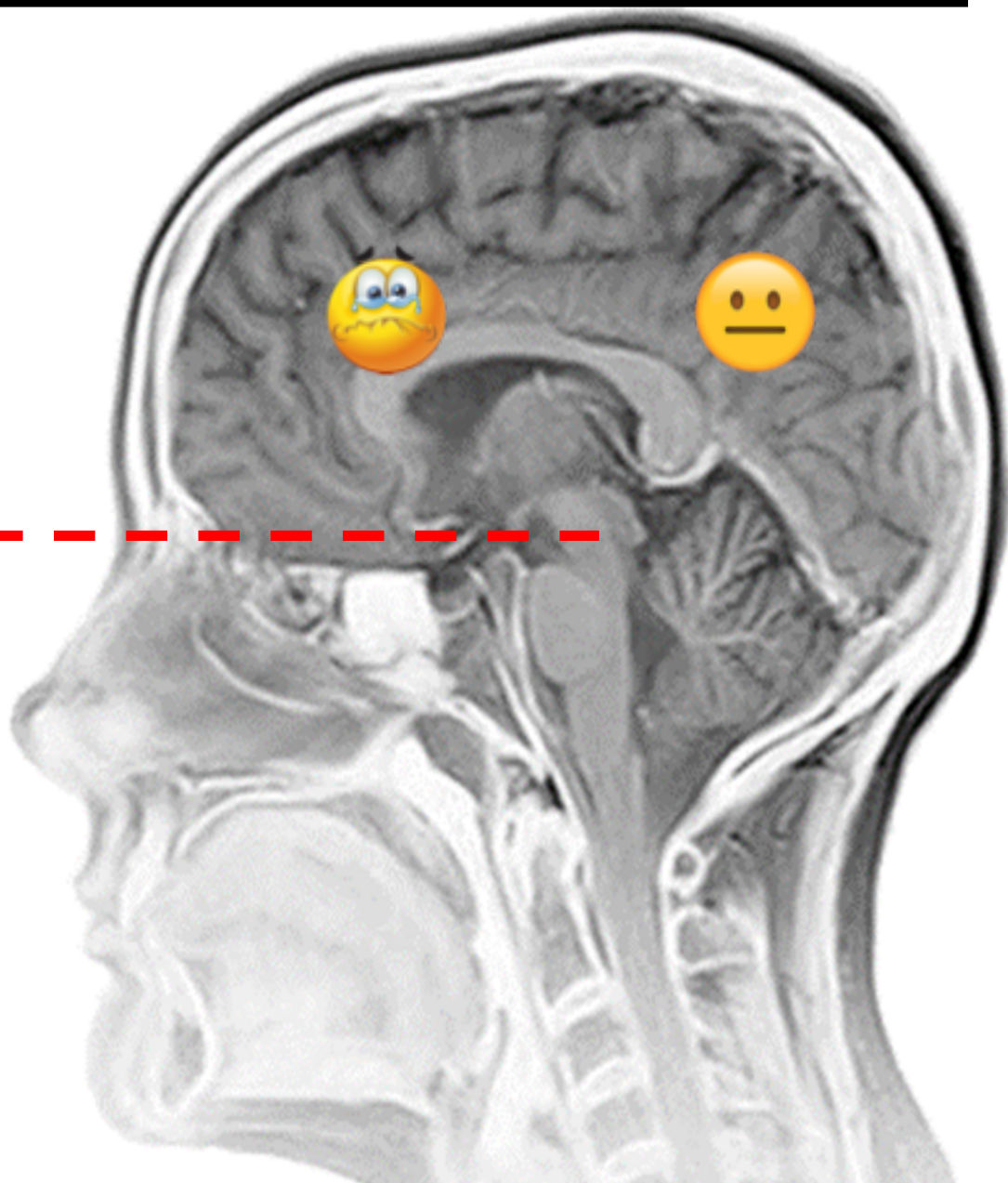
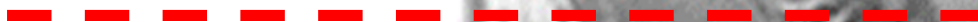
*Anxiety*

*Fear*

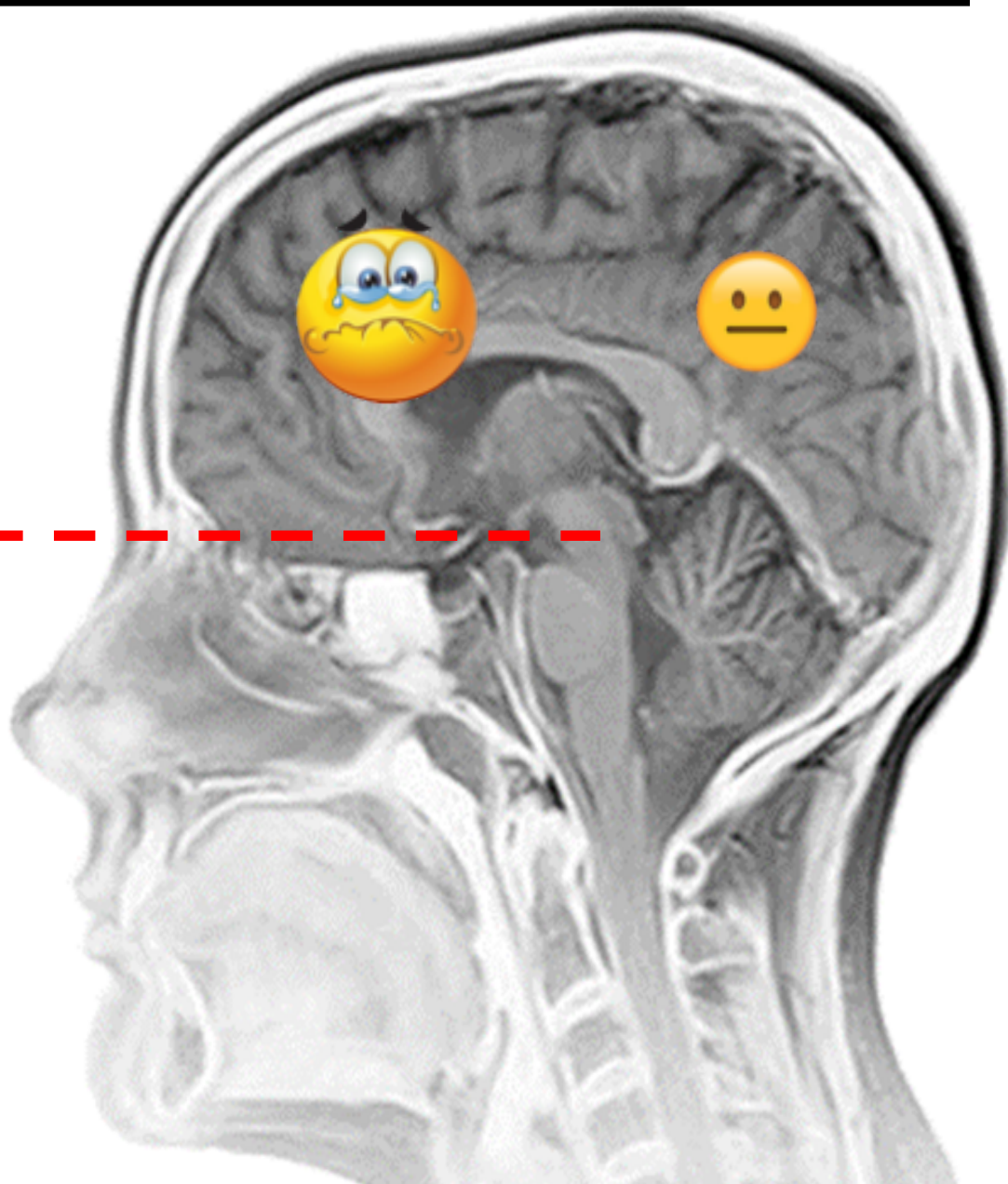
*Relief*

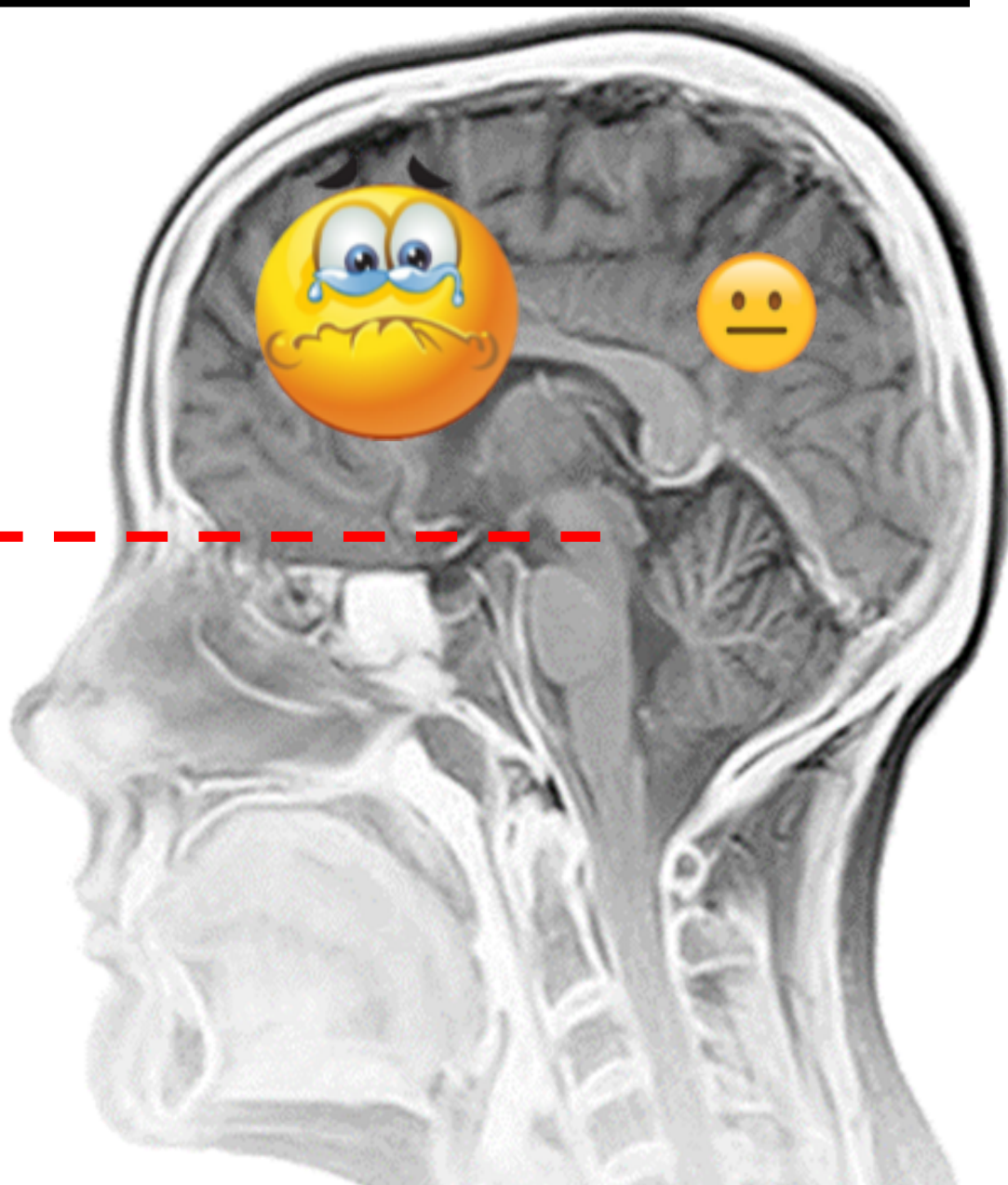
*Accomplishment*

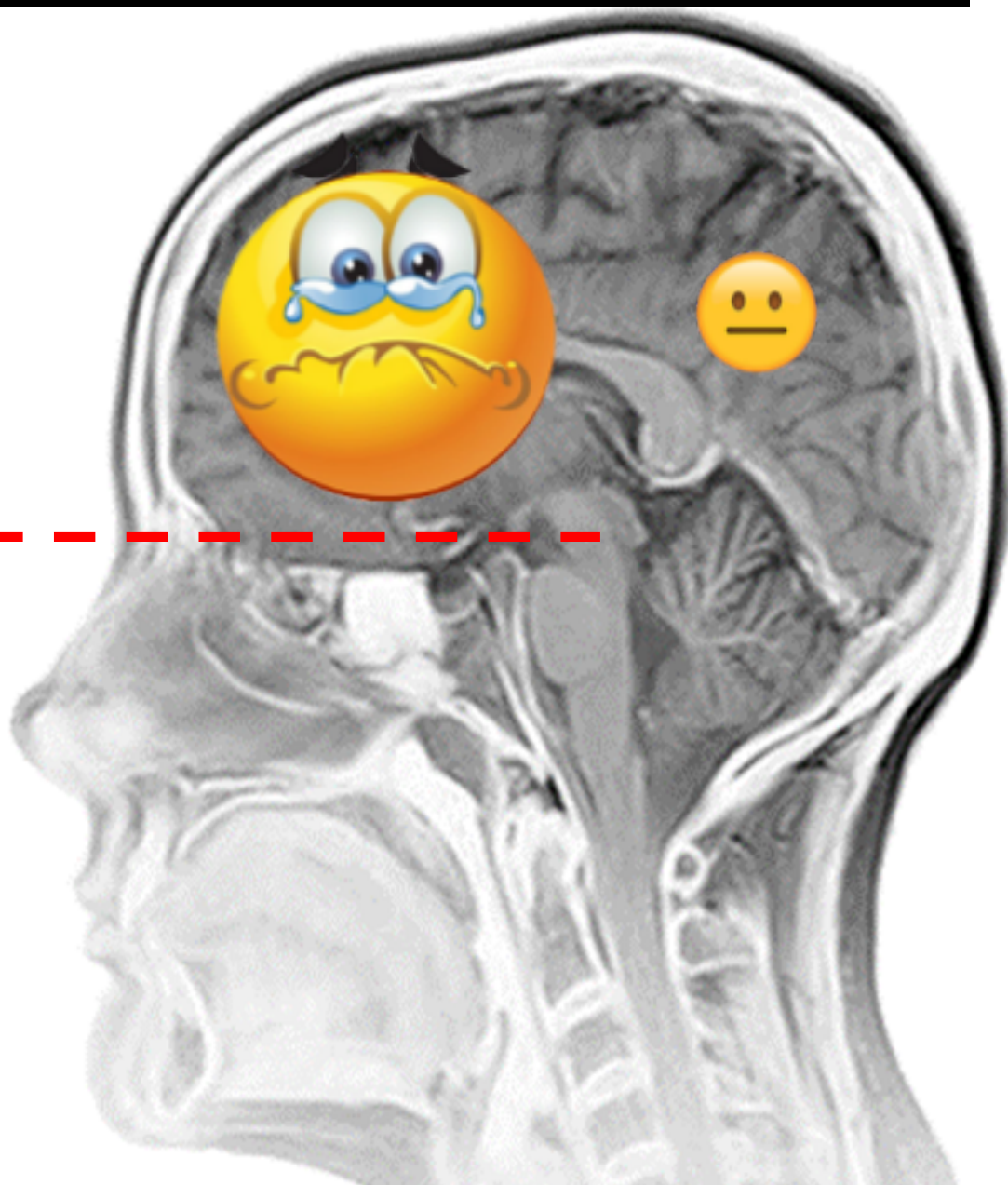
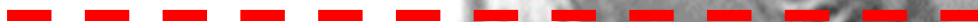














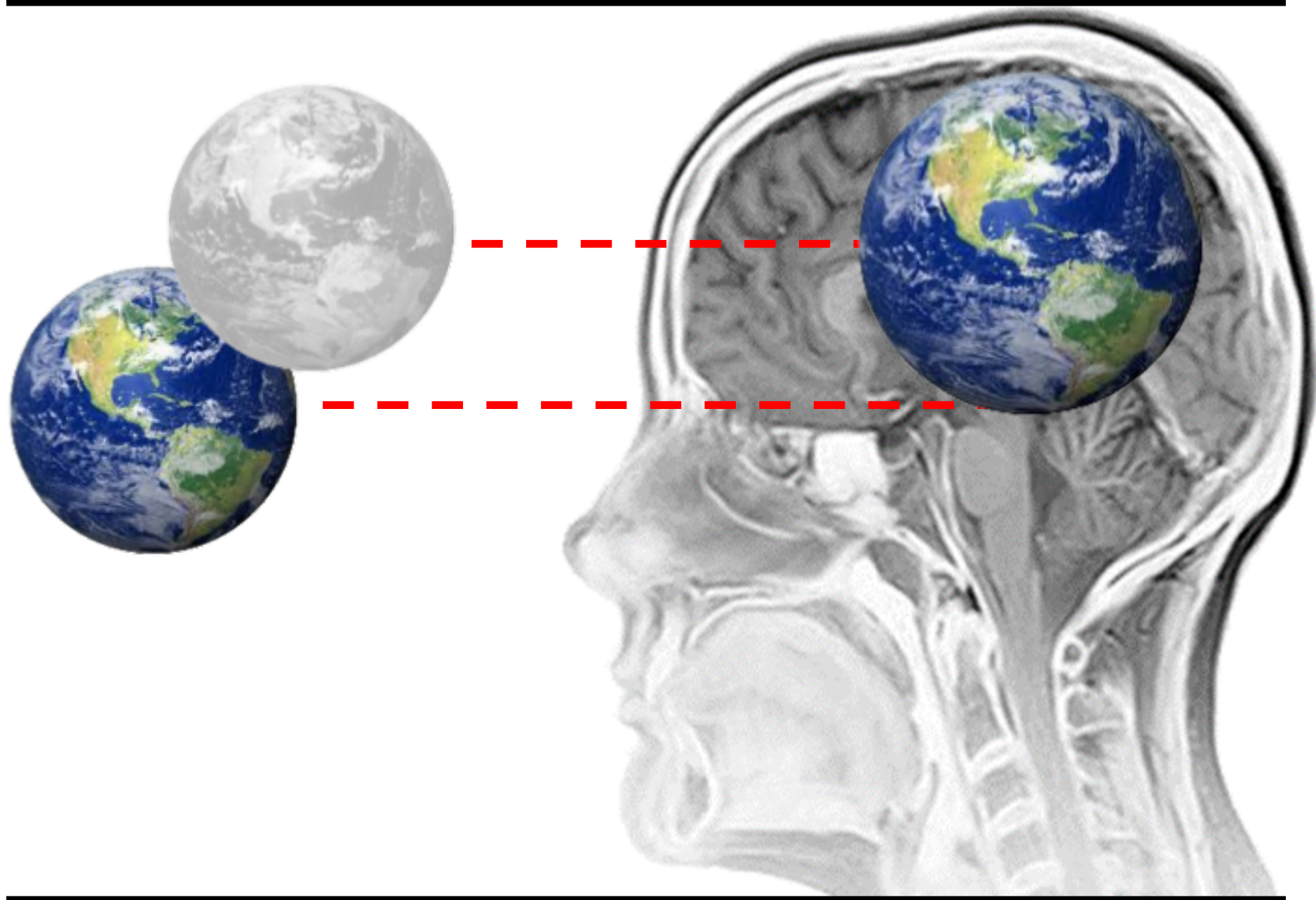




---

**Repetition...**





---

**Recall**



---

**Recognition**

*What's the capital of  
Germany?*

A) Berlin

B) Munich

C) Bern

---

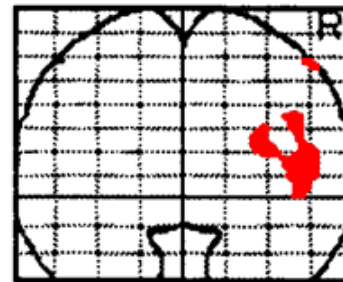
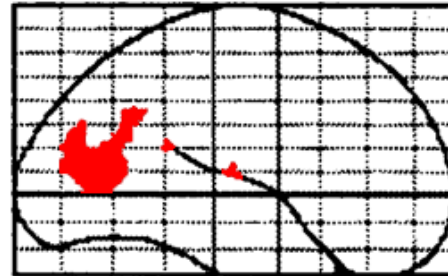
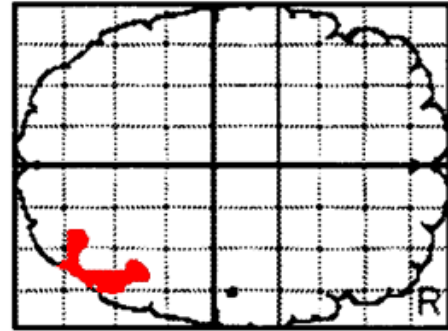
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**Recall**

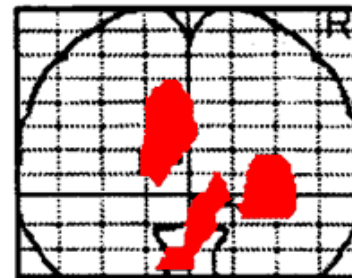
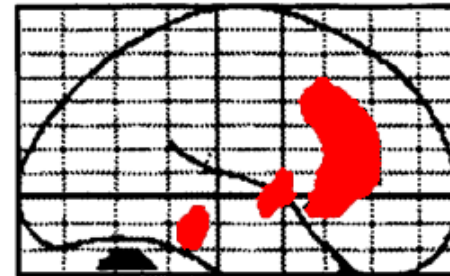
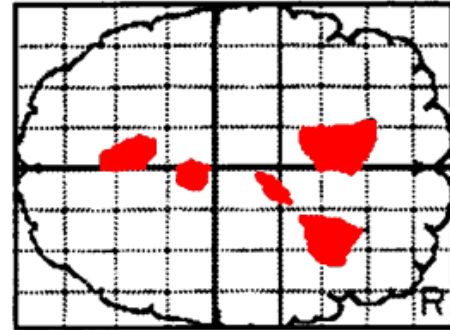
*What's the capital of  
Germany?*



# Recognition



Recall



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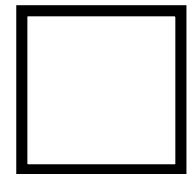
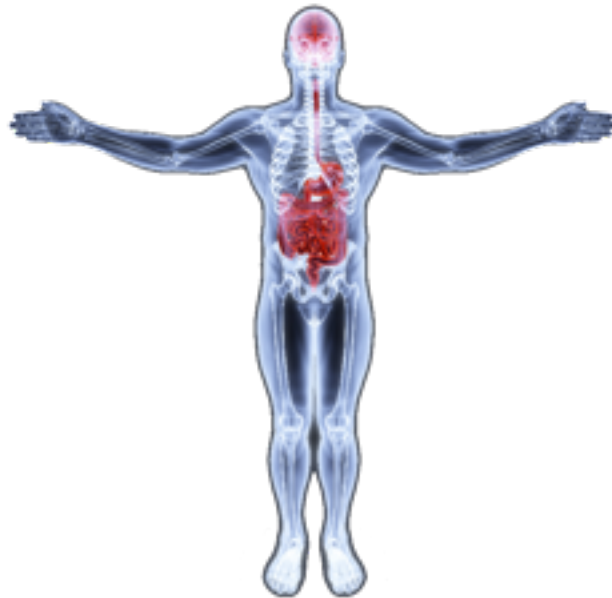
**Jingle**





# Studying





Over to You



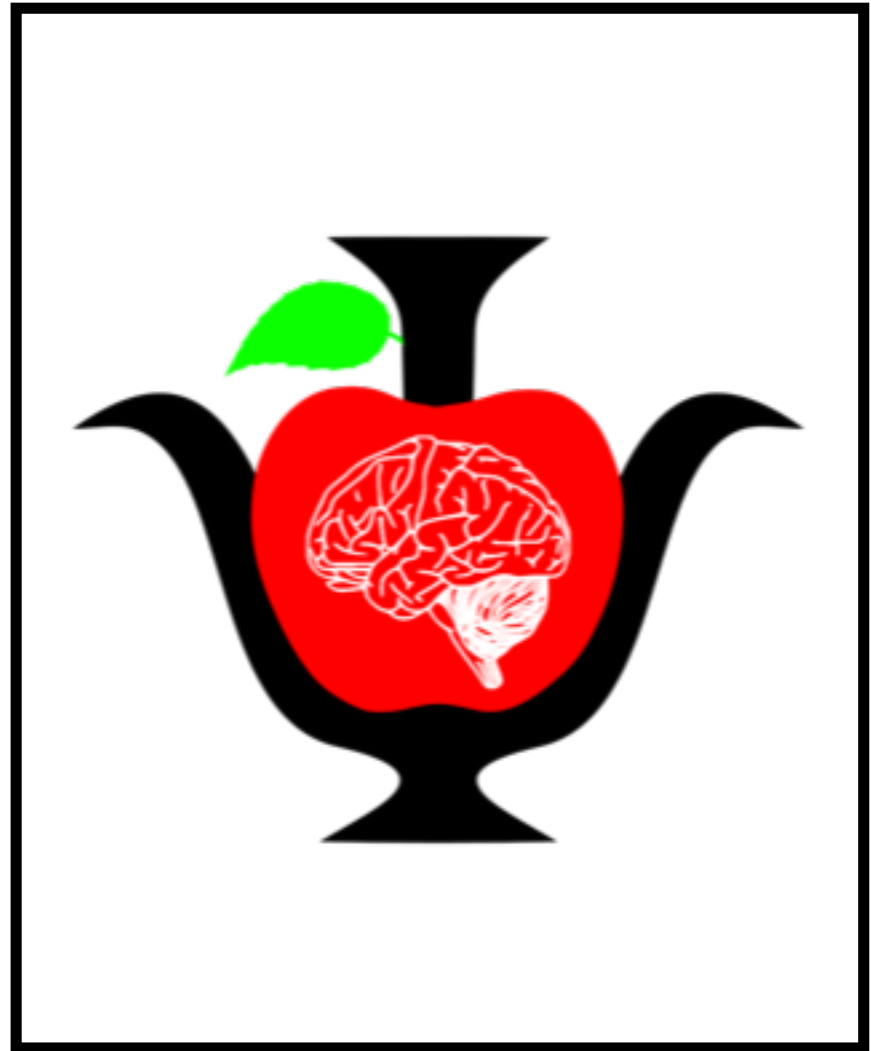
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Game



## PEN Principle #6

*Multitasking Impairs  
Memory & Learning*

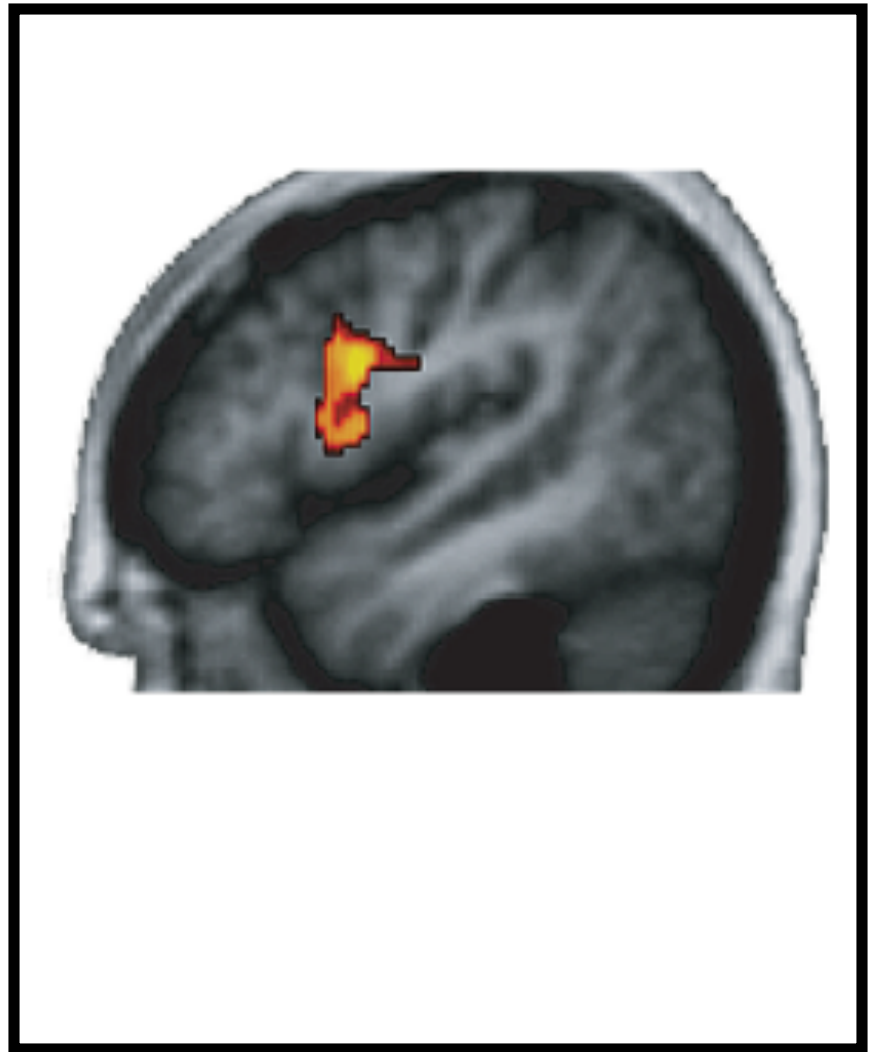


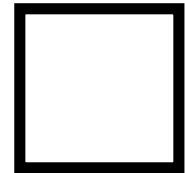
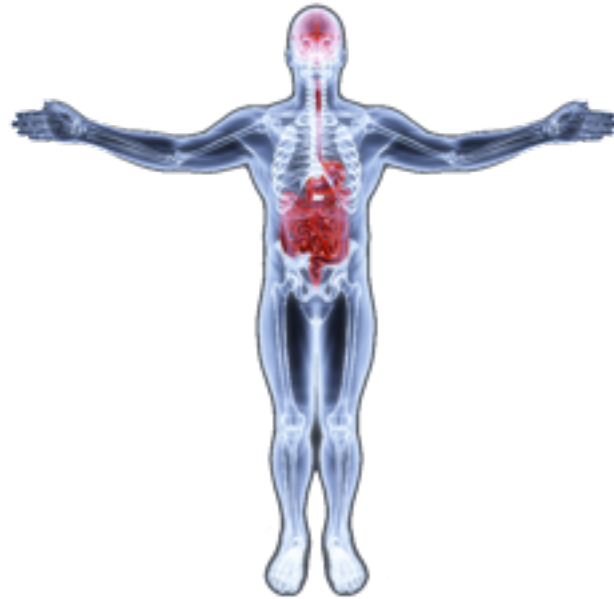
## Task Switching



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Task Switching





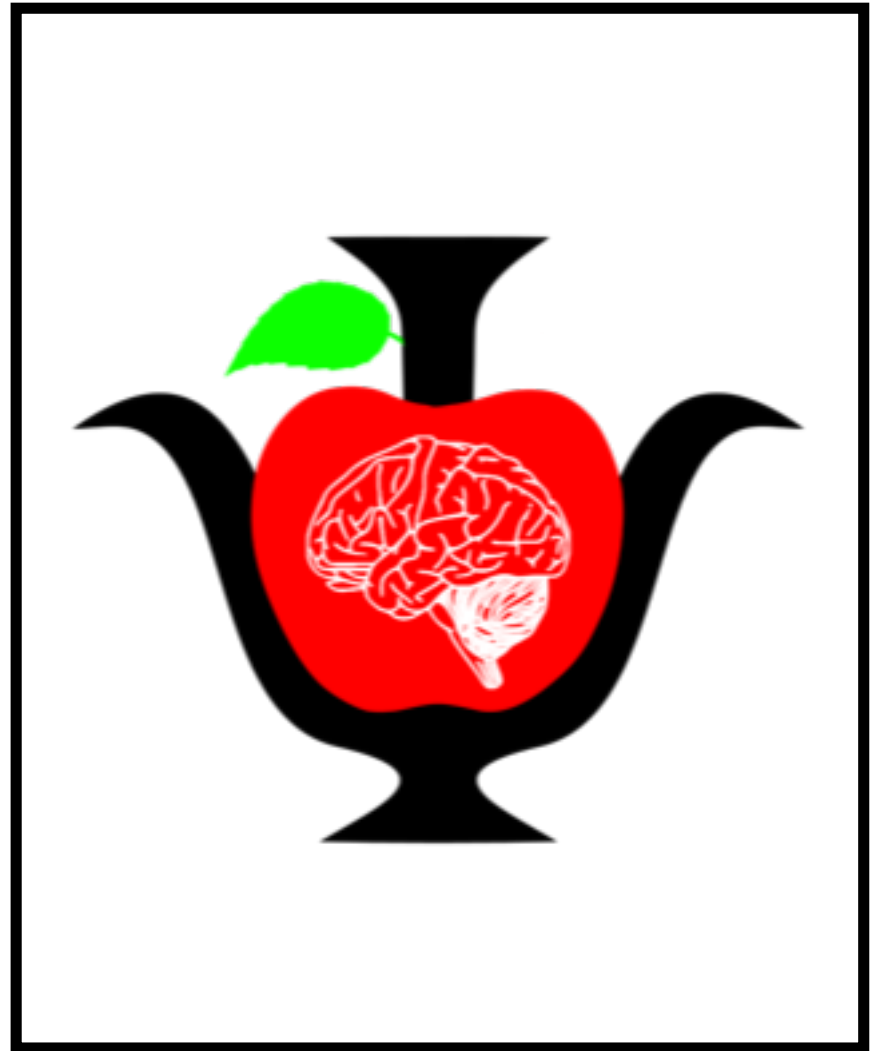


Over to You



## PEN Principle #5

*Leverage Context  
According to Outcome*

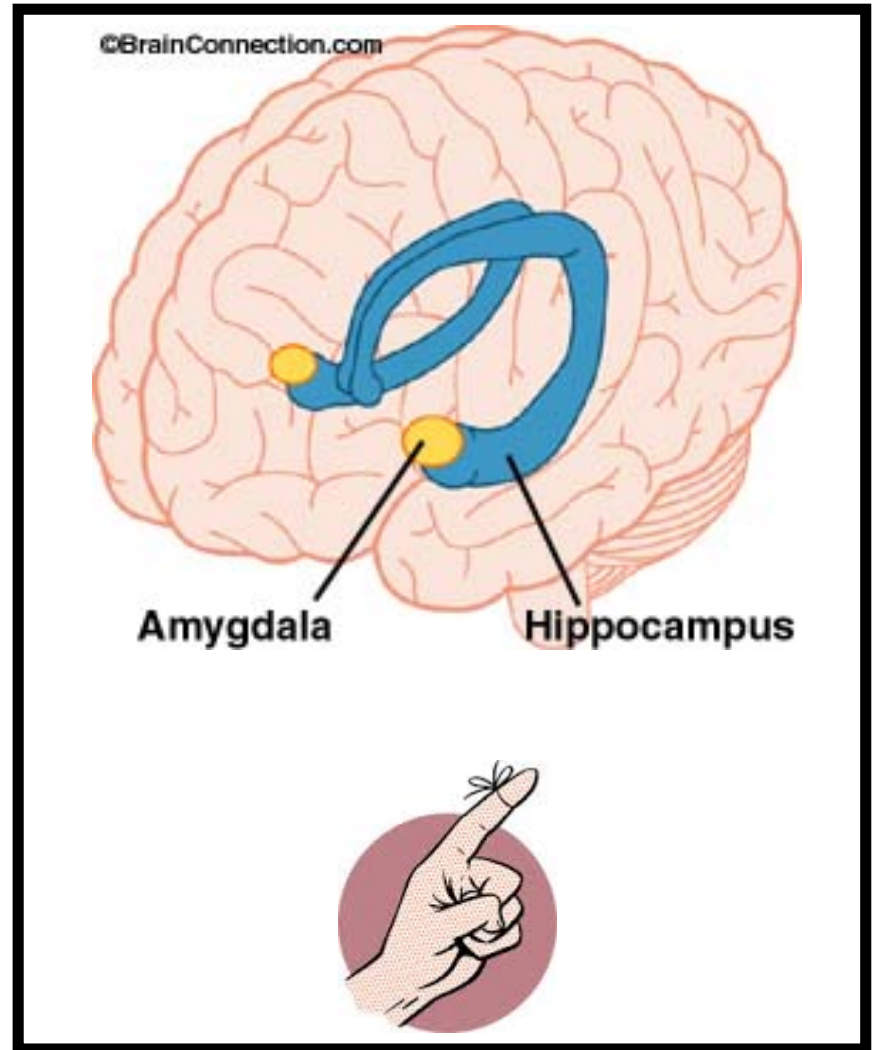


My Grandfather



# Hippocampus

## Memory



Environment



Same Environment



# Novel Environment

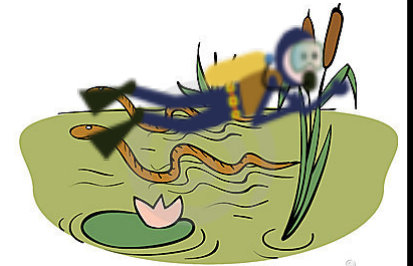


# Novel Environment





# Novel Environment



[dreamstime.com](http://dreamstime.com)



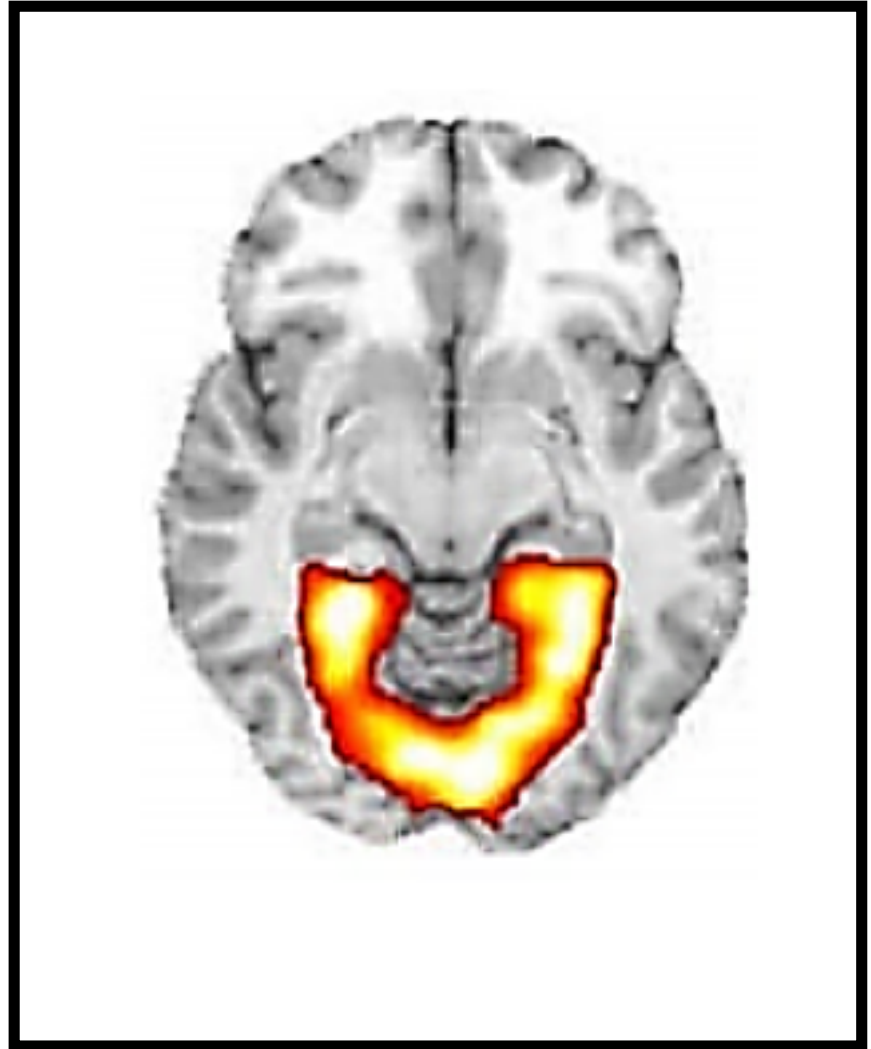
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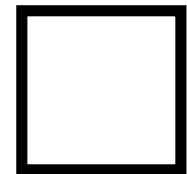
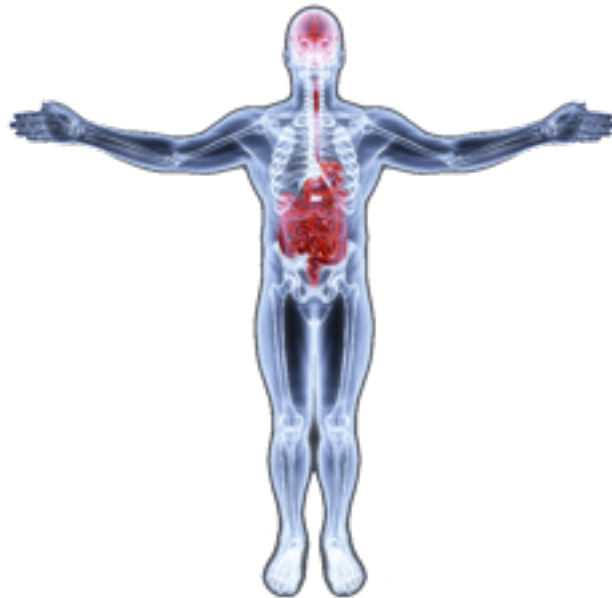
Drinking



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Feeling  
*State-Dependent  
Memory*





Over to You

