

# **The Highest Functions of Nervous System**

## **Psychological and Social Aspects of Brain Activity**

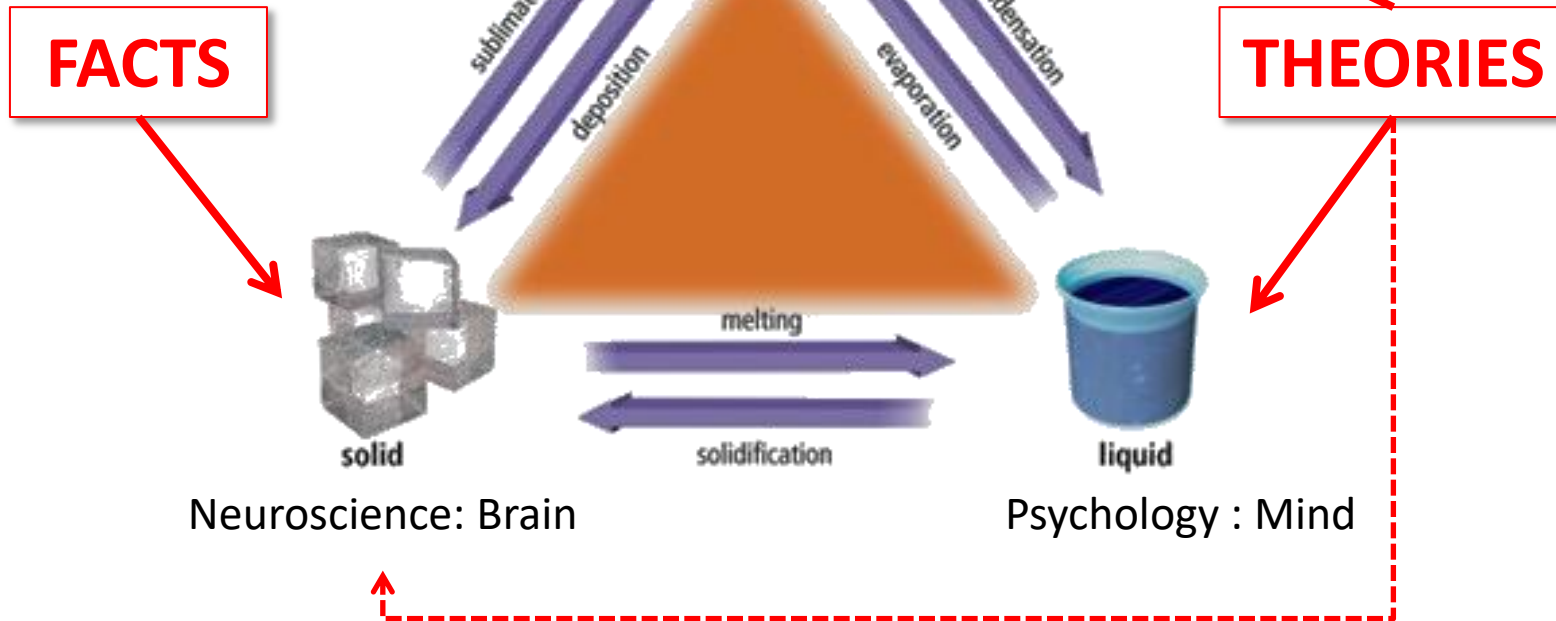
**I**

# Three States of Knowledge and Cognition

Philosophy : Mind behind Mind

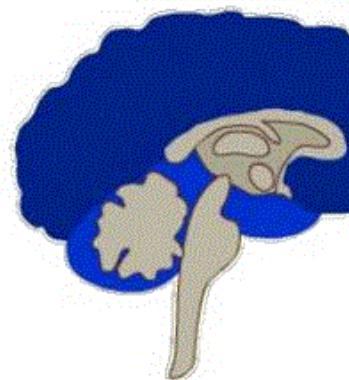
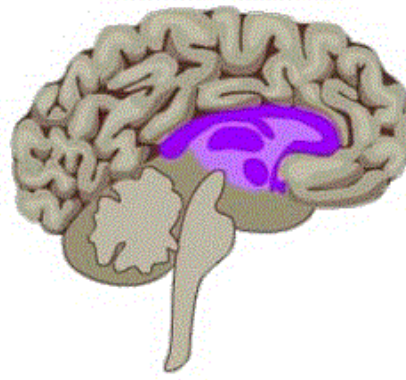
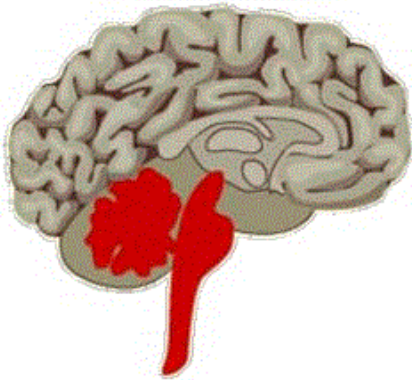


PS Deb



# Triune Brain Theory

Lizard Brain	Mammal Brain	Human Brain
Brain stem & cerebellum	Limbic System	Neocortex
Fight or flight	Emotions, memories, habits	Language, abstract thought, imagination, consciousness
Autopilot	Decisions	Reasons, rationalizes



The Triune Brain in Evolution, Paul MacLean, 1960

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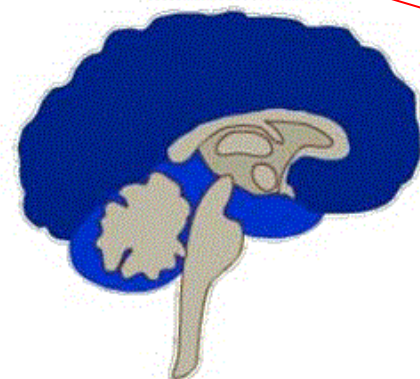
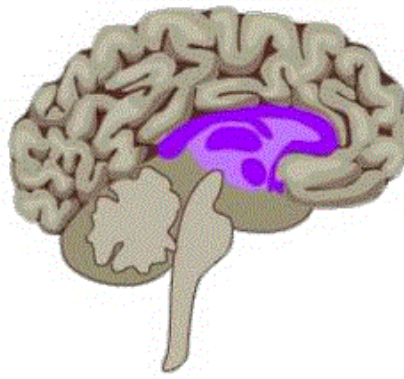
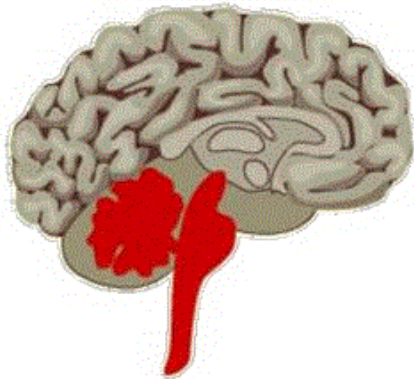
[https://upload.wikimedia.org/wikipedia/commons/thumb/d/d4/Paul\\_D\\_MacLean.jpg/220px-Paul\\_D\\_MacLean.jpg](https://upload.wikimedia.org/wikipedia/commons/thumb/d/d4/Paul_D_MacLean.jpg/220px-Paul_D_MacLean.jpg)

# Triune Brain Theory

Lizard Brain	Mammal Brain	Human Brain
Brain stem & cerebellum	Limbic System	Neocortex
Fixed programs	Emotions, memories, habits	Learning, adaptation
Uniform <b>ACTION</b>	Decisions	Performance
Economy		

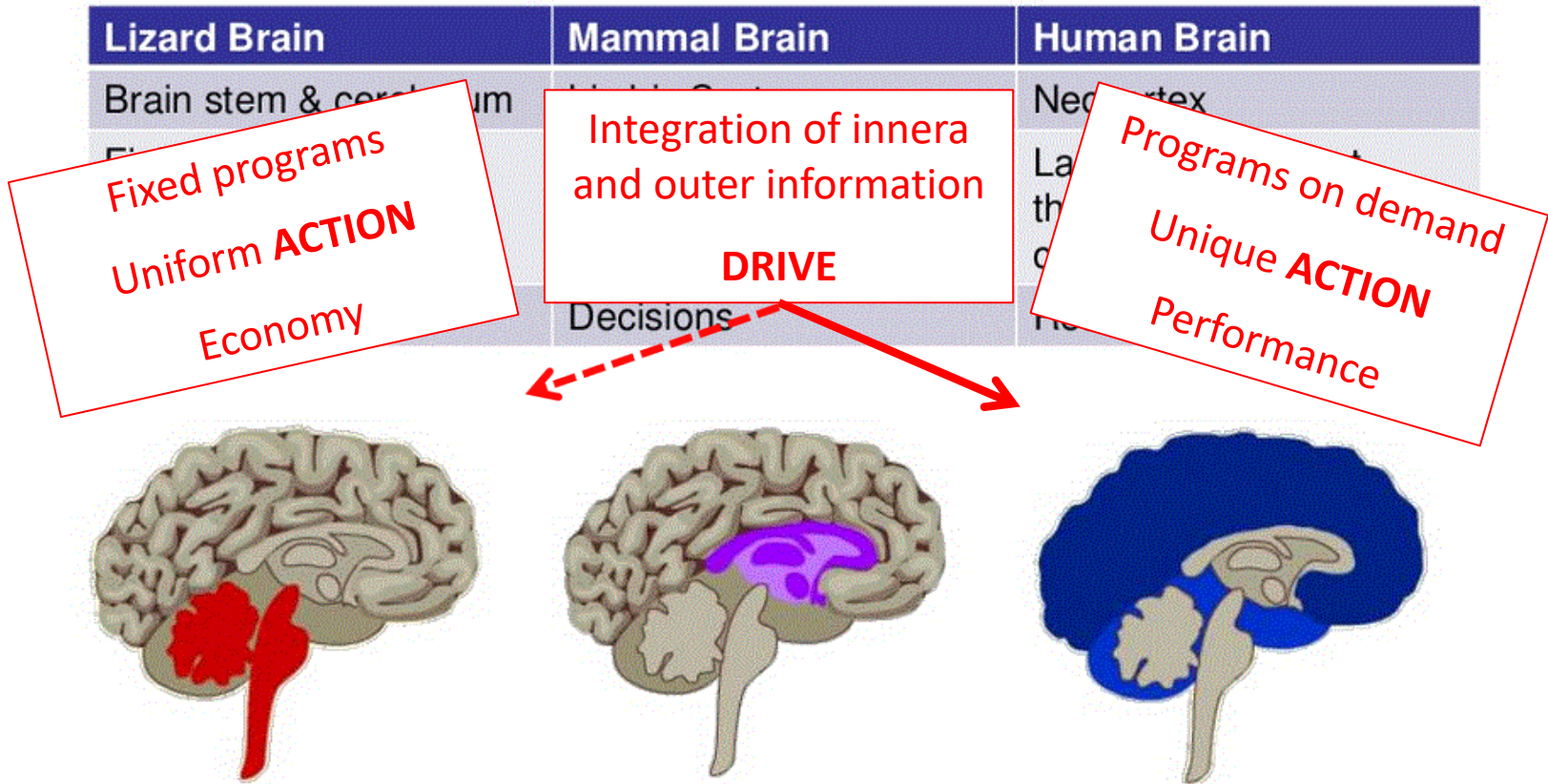
Fixed programs  
Uniform **ACTION**  
Economy

Programs on demand  
Unique **ACTION**  
Performance



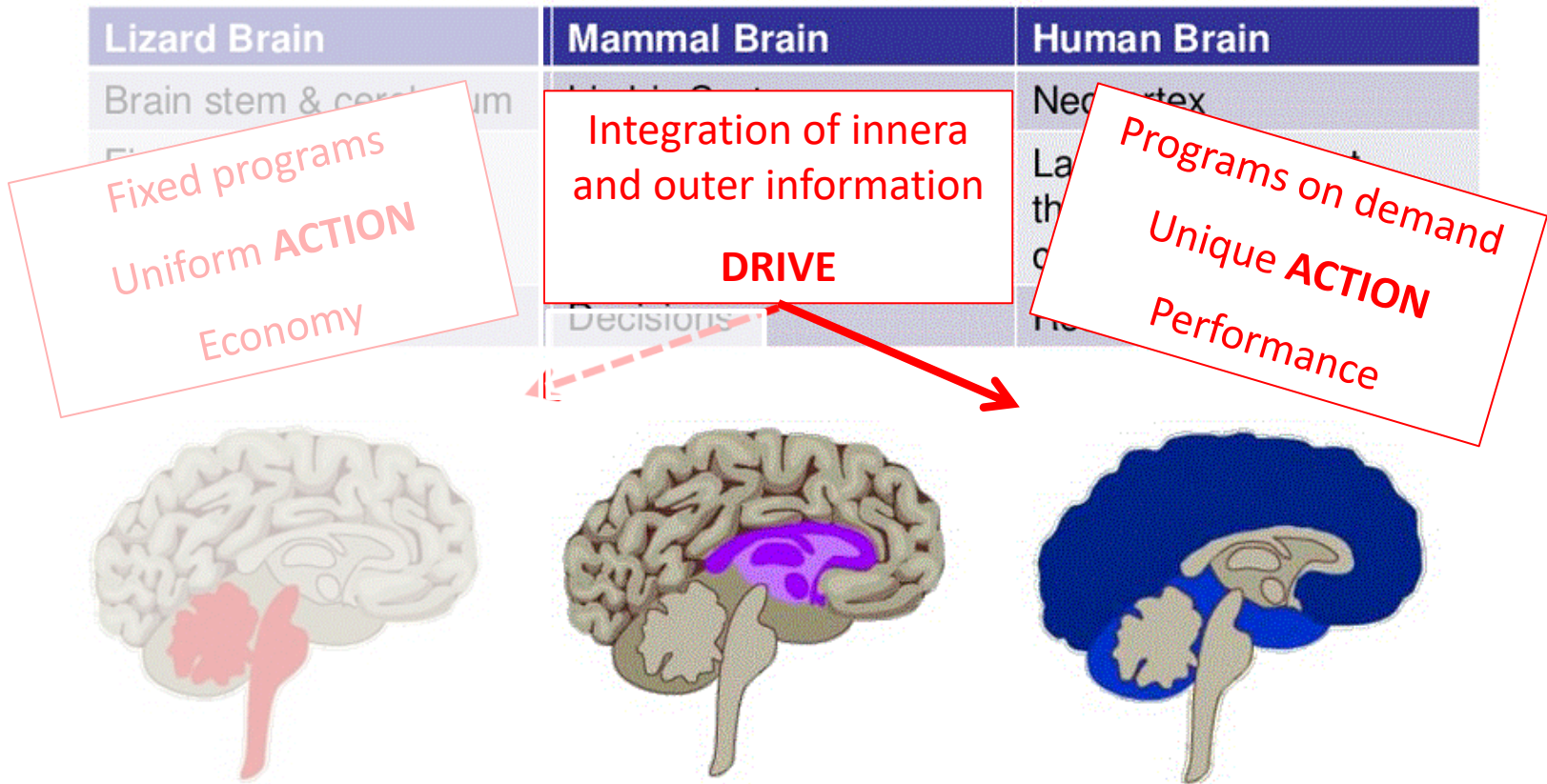
The Triune Brain in Evolution, Paul MacLean, 1960

# Triune Brain Theory



The Triune Brain in Evolution, Paul MacLean, 1960

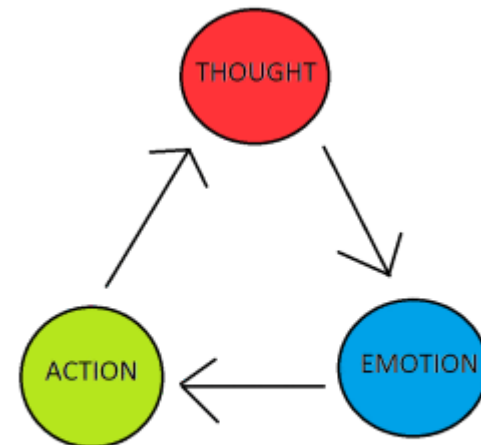
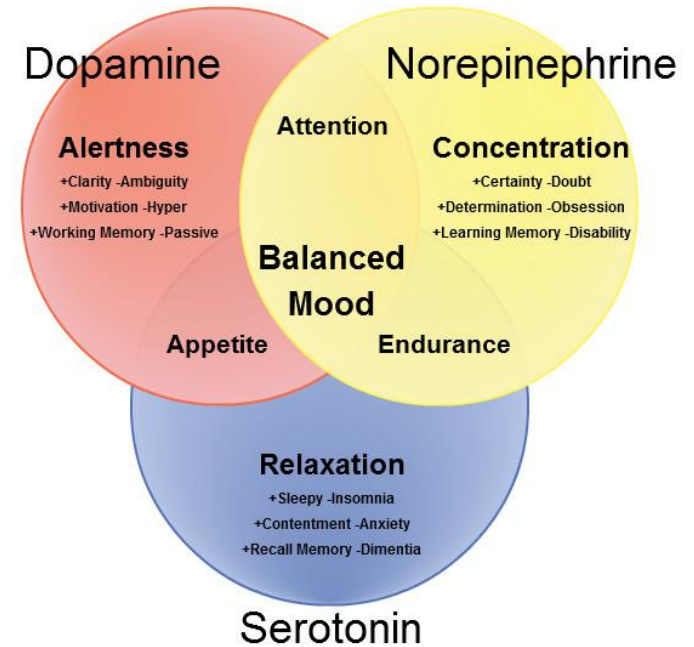
# Triune Brain Theory



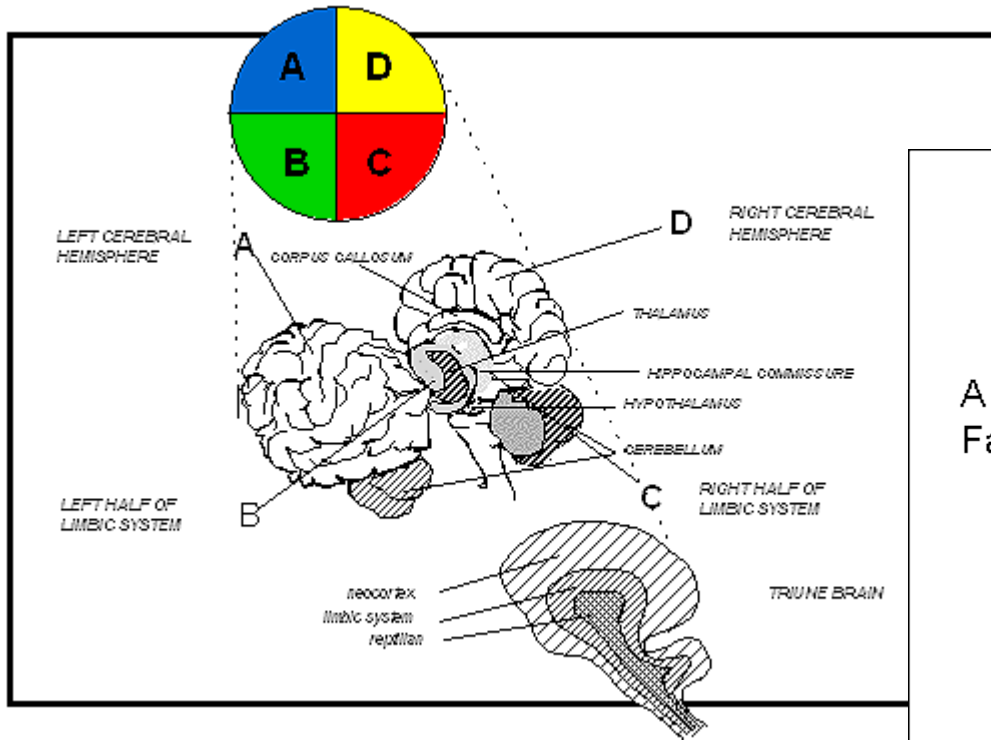
The Triune Brain in Evolution, Paul MacLean, 1960

# Influence of hypothalamus on neocortex

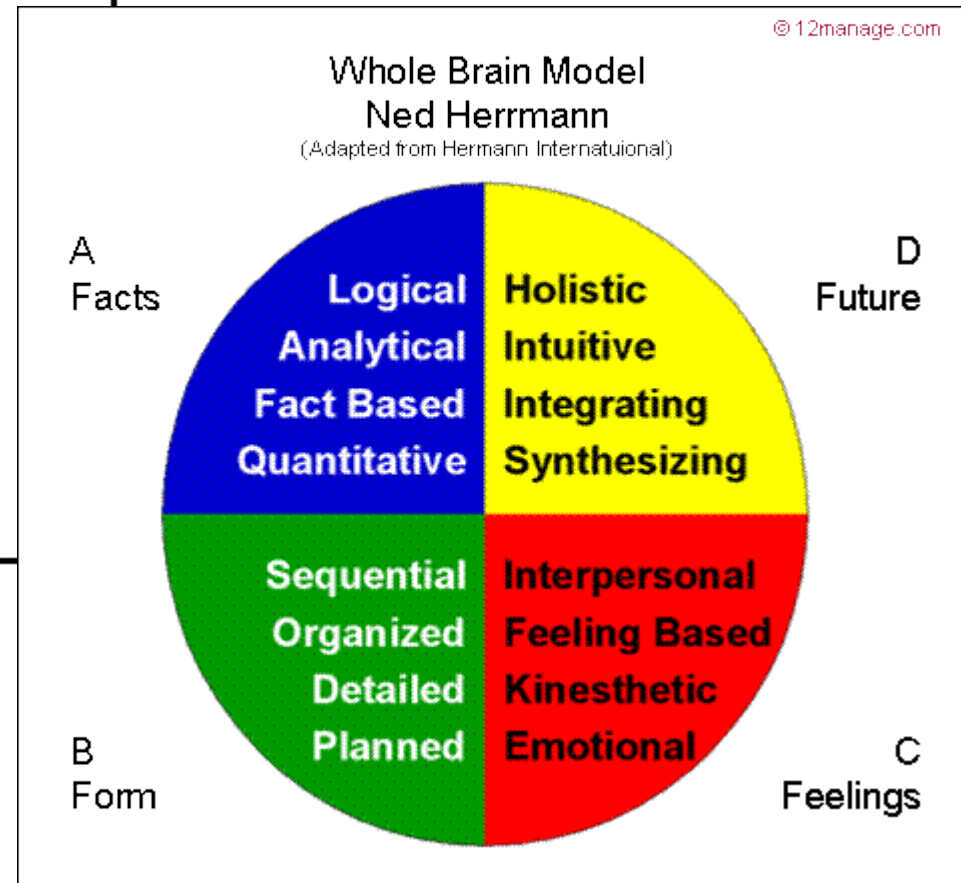
- (Papez circuit)
- Via neuromodulating systems
  - Consciousness
  - Mood
- Via thalamus
  - Via nucleus mediodorsalis to orbitofrontal cortex (influence on decision making)
  - Influence gating function of other thalamic nuclei



# Whole brain model



<http://www.sacsa.sa.edu.au/ATT/%7BBA2B8C52-92B6-4C17-AEEB-3A9D4F9AE8DE%7D/images/BackgroundInfo/images/image8.gif>



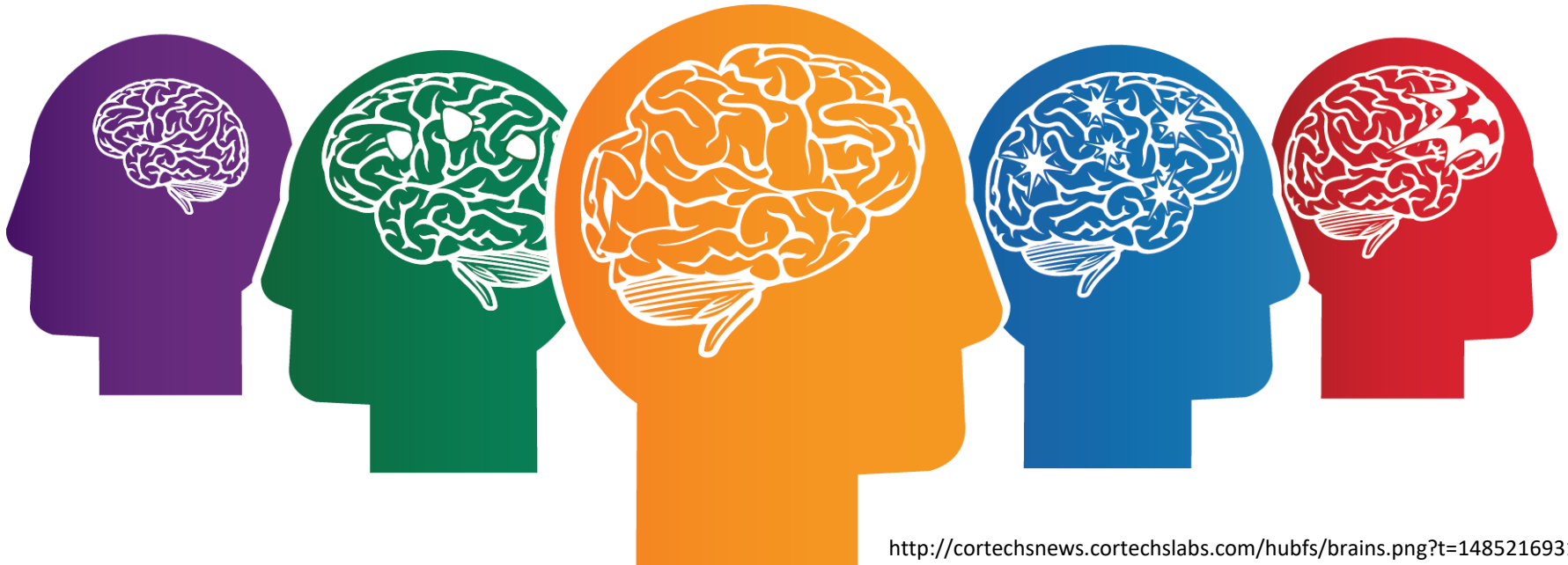
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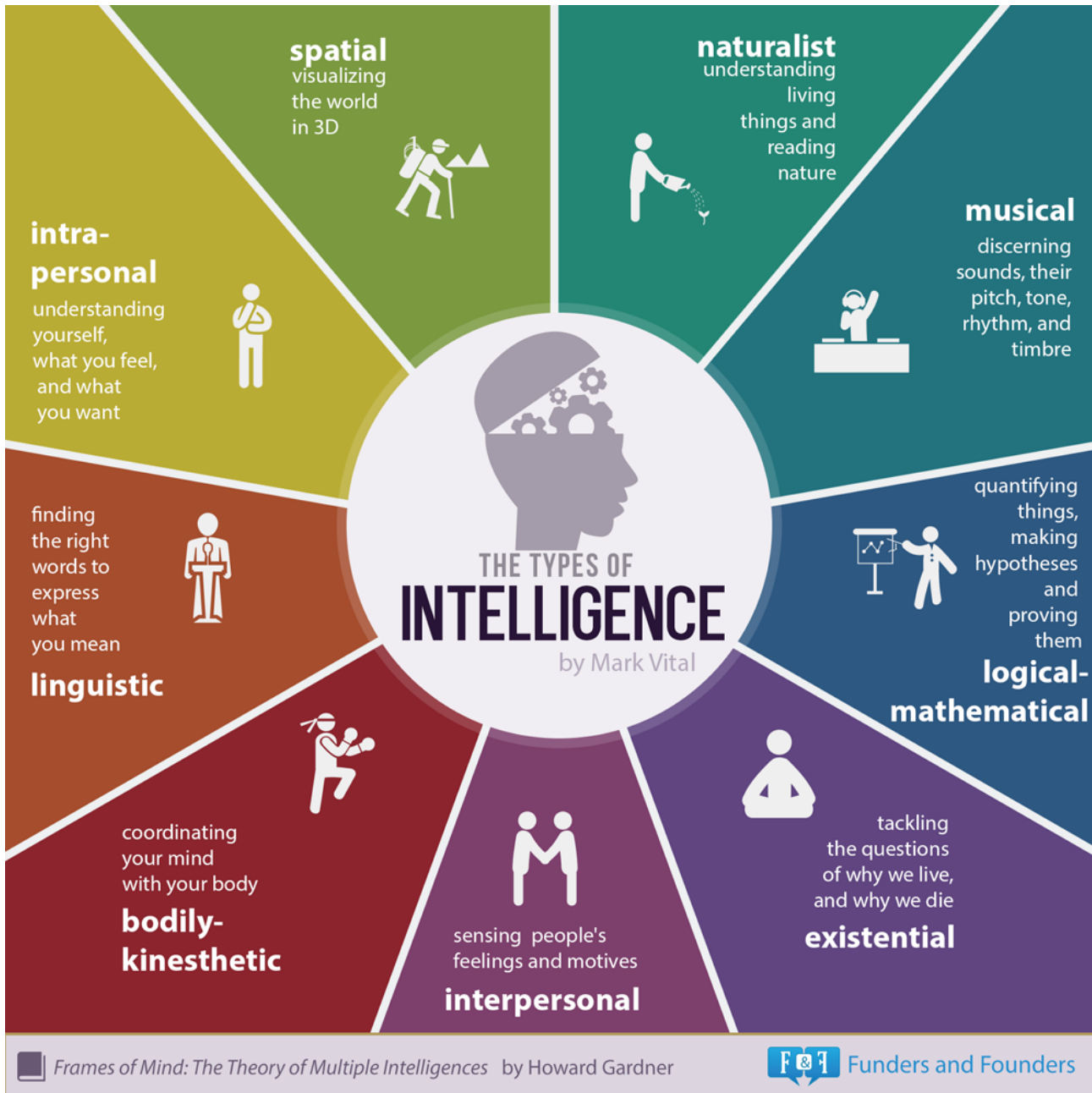


# Every brain is unique

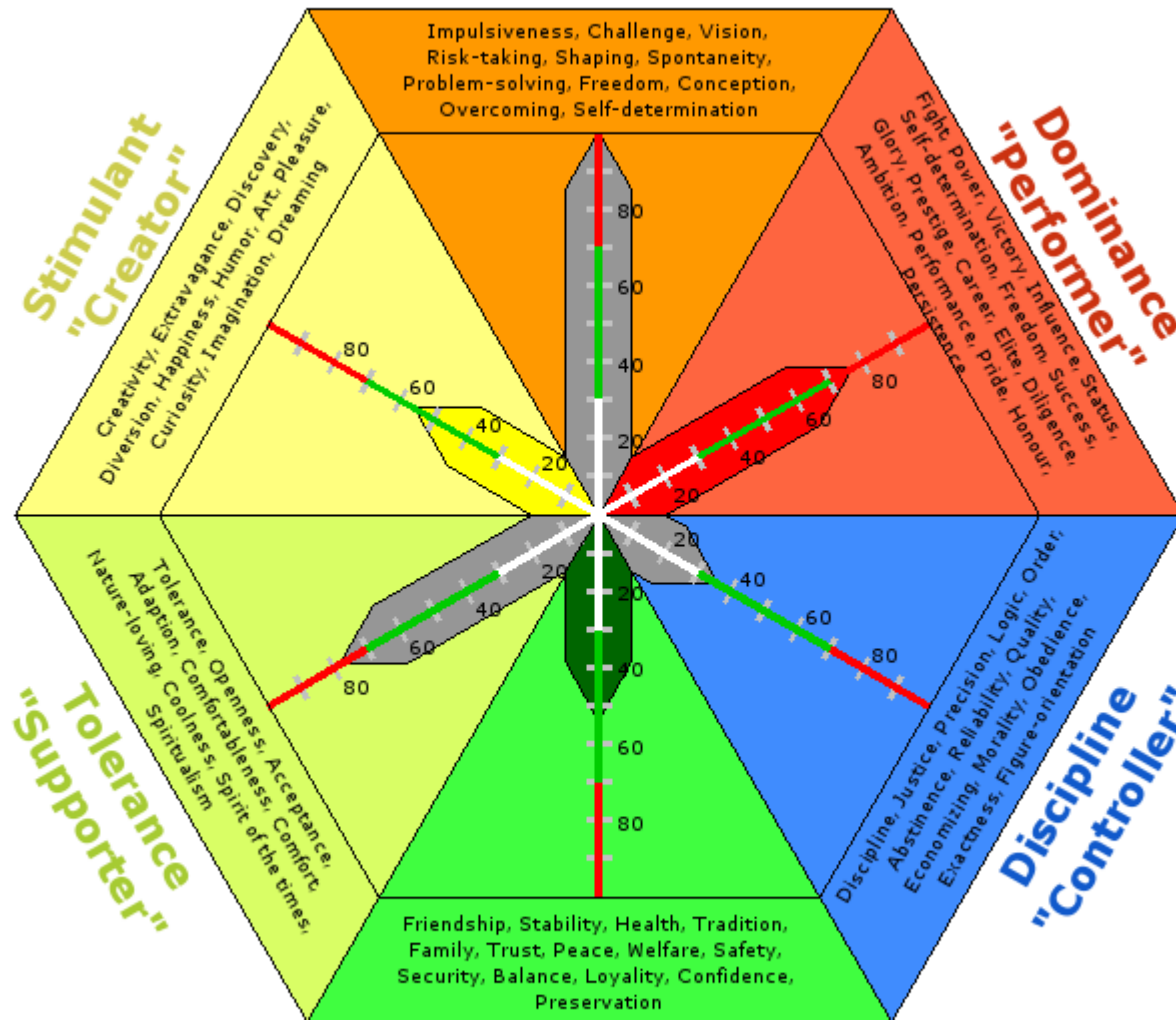
- Emotionally
  - Limbic system
- Rationally
  - Neocortex

✓ Genetics  
✓ Environment





# Innovation "Pioneer"



# Balance "Keeper"

<https://web.limbic-personality.com/files/CjvXQ2.bmp>

[https://web.limbic-personality.com/ /](https://web.limbic-personality.com/)

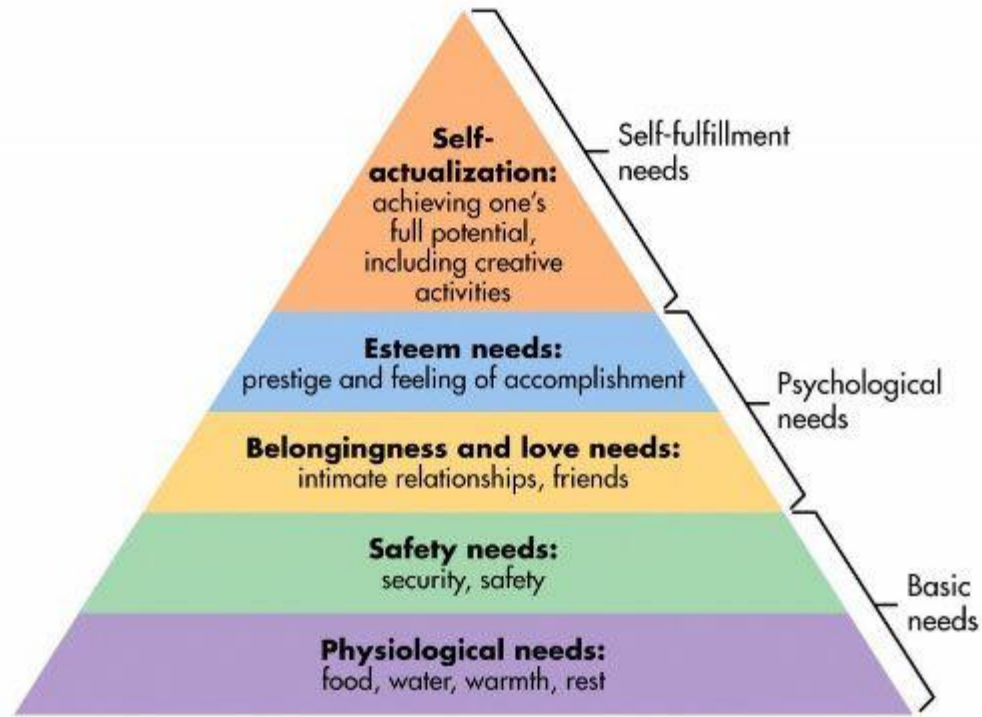


## The 4 Personality Types In The Human Race

©2011 Personality Marketing LLC

<http://customersecrets.com/wp-content/uploads/2011/09/Army-Personality-Types.png>

# Maslow's Hierarchy of Needs



<http://www.simplypsychology.org/maslow-pyramid.jpg>

# Society



<https://cdn.nexternal.com/tjb/images/FC-11.jpg>

<https://s-media-cache-ak0.pinimg.com/564x/9a/86/da/9a86da32052973bb085dc1511d4b7102.jpg>  
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# Society



**Culture**  
– the sum of knowledge  
✓ Material  
✓ Spiritual

<https://cdn.nexternal.com/tjb/images/FC-11.jpg>

<https://s-media-cache-ak0.pinimg.com/564x/9a/86/da/9a86da32052973bb085dc1511d4b7102.jpg>  
<http://previews.123rf.com/images/dja65/dja651107/dja65110700341/10025966-Stone-age-axe-Stock-Photo-tools-ancient-stone.jpg>

[http://www.thebushcraftstore.co.uk/ekmps/shops/bduimportsltd/images/condor-greenland-pattern-axe-\[2\]-12105-p.jpg](http://www.thebushcraftstore.co.uk/ekmps/shops/bduimportsltd/images/condor-greenland-pattern-axe-[2]-12105-p.jpg)

# Social brain or asocial brain?





# Social brain or asocial brain?



FORMER FRENCH BATTLESHIP STRASBOURG AND CRUISER.

US AAF PHOTO 225-8

# Social brain or asocial brain?

Nick Ut, Trang Bang 1972



# Social brain

„The first sign of civilization was a femur that had been broken and then healed... Helping someone else through difficulty is where civilization starts“

Margaret Mead

[http://anthropology.si.edu/writteninbone/images/G0500\\_large.jpg](http://anthropology.si.edu/writteninbone/images/G0500_large.jpg)



<http://www.ancient.eu/uploads/images/display-1166.jpg>

# Mentalization

- the ability to understand the mental state, of oneself or others, that underlies over behavior
- Rationally
- Emotionally



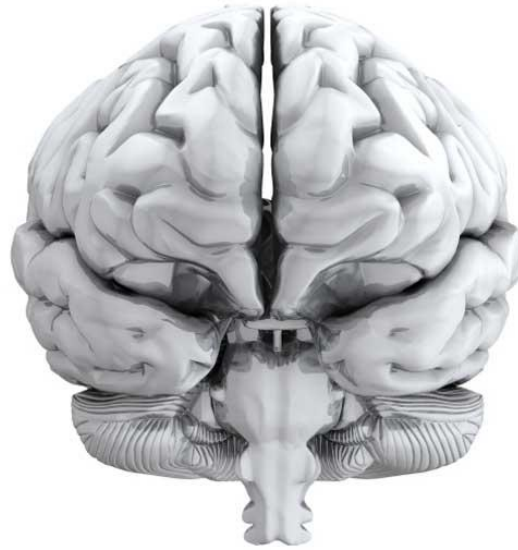
# Mentalization

- the ability to understand the mental state, of oneself or others, that underlies over behavior
- Rationally
- Emotionally

**Empathy – „mentalization in a positive sense“**

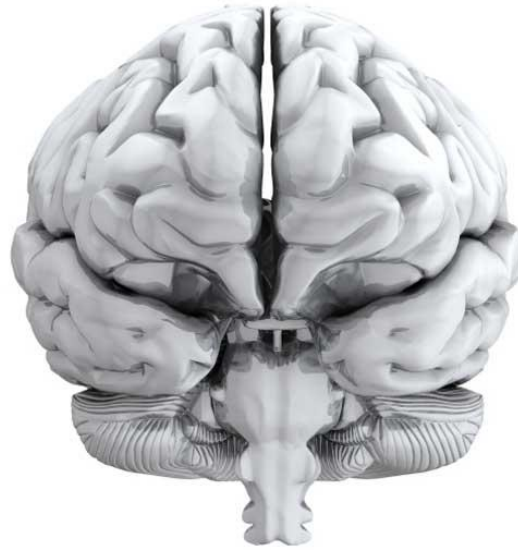


# Social brain



# Every brain is a powerful machine...

... which is hard to control



- ✓ The conflict between the limbic system and the neocortex
- ✓ The problem with effective control of the neocortex



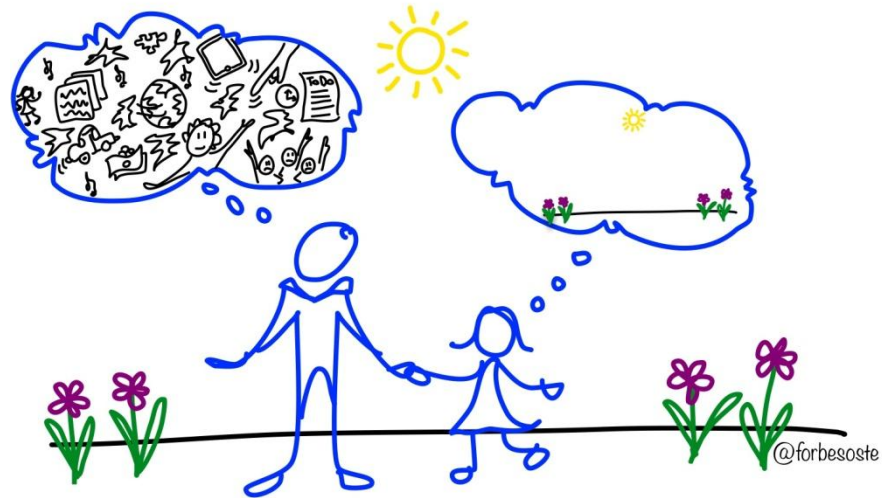
# Awareness / Mindfulness

✓The problem with effective control of the neocortex

<http://cognitivetherapyonline.com/cbt4panic/wp-content/uploads/2011/03/past-future.gif>



## Mind Full, or Mindful?



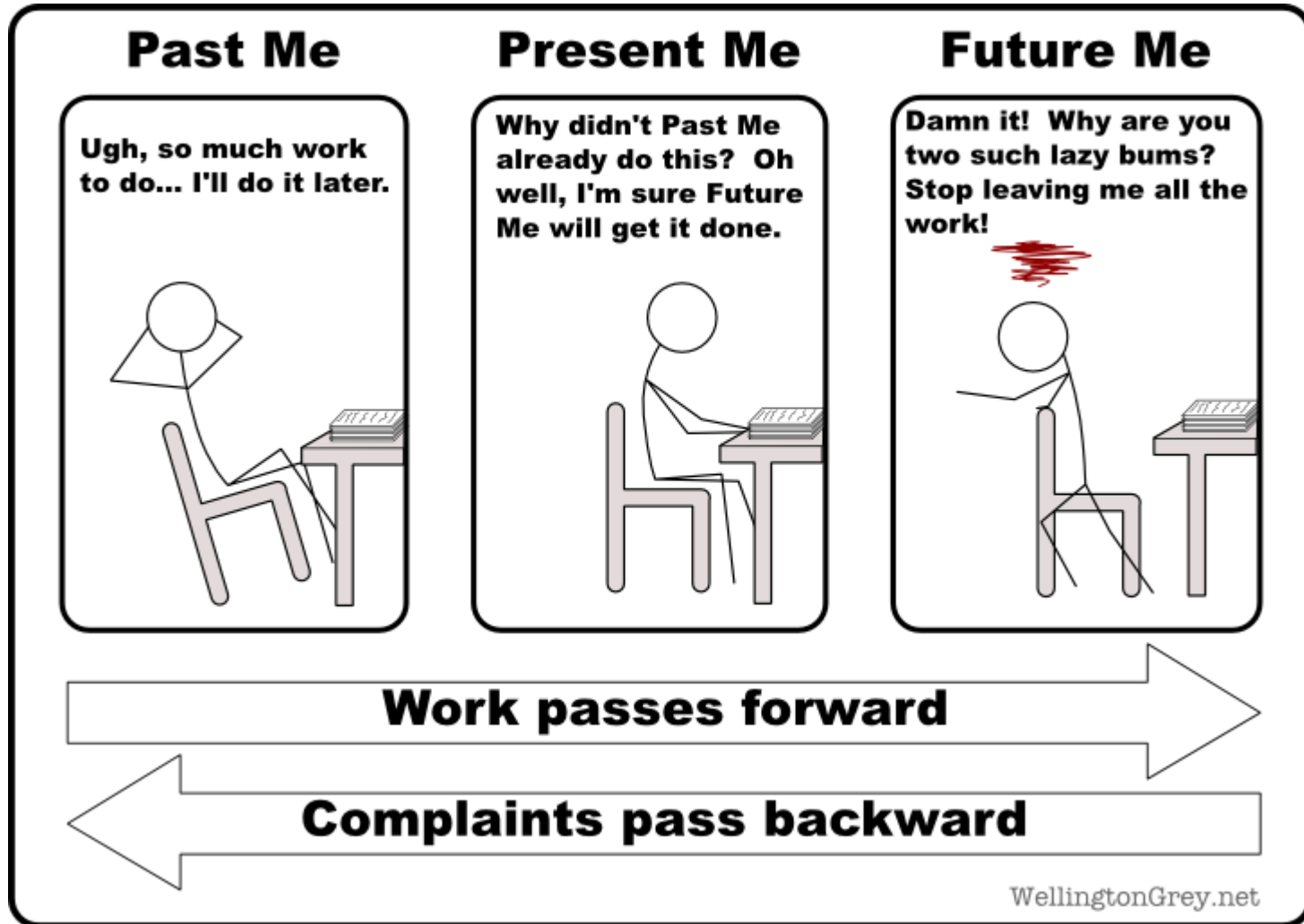
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„When you are hungry, eat; when you are tired, sleep“

Zen Buddhist quote



# Awareness / Mindfulness ✓ The problem with effective control of the neocortex



# The conflict between the limbic system and the neocortex





[http://at-hk.s3.amazonaws.com/i/20120526051907-best\\_bungee\\_jumping.jpg](http://at-hk.s3.amazonaws.com/i/20120526051907-best_bungee_jumping.jpg)

# Individual / subjective character of brain activity

## LIMBIC SYSTEM – IRRATIONAL

- Irrational preferences
- Irrational fear
- Phobia
  - Panic (extreme) irrational fear
    - Specific
    - Social
- <http://www.fearof.net/>



[https://images.sciencedaily.com/2008/03/080320132646\\_1\\_900x600.jpg](https://images.sciencedaily.com/2008/03/080320132646_1_900x600.jpg)

# Individual / subjective character of brain activity

## LIMBIC SYSTEM

### Top 100 Phobia List

These are the top 100 phobias in the world, with the most common ones listed from the top. You can click on each phobia to learn about causes, symptoms and treatments.

1. Arachnophobia – The fear of spiders affects women four times more (48% women and 12% men).
2. Ophidiophobia – The fear of snakes. Phobics avoid certain cities because they have more snakes.
3. Acrophobia – The fear of heights. Five percent of the general population suffer from this phobia.
4. Agoraphobia – The fear of open or crowded spaces. People with this fear often won't leave home.
5. Cynophobia – The fear of dogs. This includes everything from small Poodles to large Great Danes.
6. Astraphobia – The fear of thunder/lightning AKA Brontophobia, Tonitrophobia, Ceraunophobia.
7. Claustrophobia – The fear of small spaces like elevators, small rooms and other enclosed spaces.
8. Mysophobia – The fear of germs. It is also rightly termed as Germophobia or Bacteriophobia.
9. Aerophobia – The fear of flying. 25 million Americans share a fear of flying.
10. Trypophobia – The fear of holes is an unusual but pretty common phobia.

<http://www.fearof.net/>

# Individual / subjective character of brain activity

## NEOCORTEX – RATIONAL

- (Pseudo)rational preferences
- Imagination



# Individual / subjective character of brain activity

## **NEOCORTEX – RATIONAL**

- Imagine red car...

# Individual / subjective character of brain activity

## NEOCORTEX – RATIONAL

- Imagine red car...



[https://www.google.cz/search?q=red+car&biw=1150&bih=492&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKewjBupCC\\_5PSAhVDbBoKHe53B98QsAQIG A#tbn=isch&q=red+car+white+background](https://www.google.cz/search?q=red+car&biw=1150&bih=492&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKewjBupCC_5PSAhVDbBoKHe53B98QsAQIG A#tbn=isch&q=red+car+white+background)



# Individual / subjective character of brain activity

## NEOCORTEX – RATIONAL

- Imagine red Ferrari...



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# Individual / subjective character of brain activity

## NEOCORTEX – RATIONAL

- Imagine red Ferrari 458 from the side...



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# Individual / subjective character of brain activity

## NEOCORTEX – RATIONAL

- Imagine red Ferrari 458 from the side...



[https://www.google.cz/search?q=red+car&biw=1150&bih=492&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwjBupCC\\_5PSAhVDbBoKHe53B98QsAQIGA#tbn=isch&q=red+ferrari+458+from+side+white+background](https://www.google.cz/search?q=red+car&biw=1150&bih=492&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwjBupCC_5PSAhVDbBoKHe53B98QsAQIGA#tbn=isch&q=red+ferrari+458+from+side+white+background)

- Closer specification (more conditions) leads us to a more consistent output, but increases the likelihood of errors
  - ✓ Random – some specifications are randomly overlooked
  - ✓ System – some specification is unknown (How does Ferrari 458 look like?)