

M U N I

M E D

17

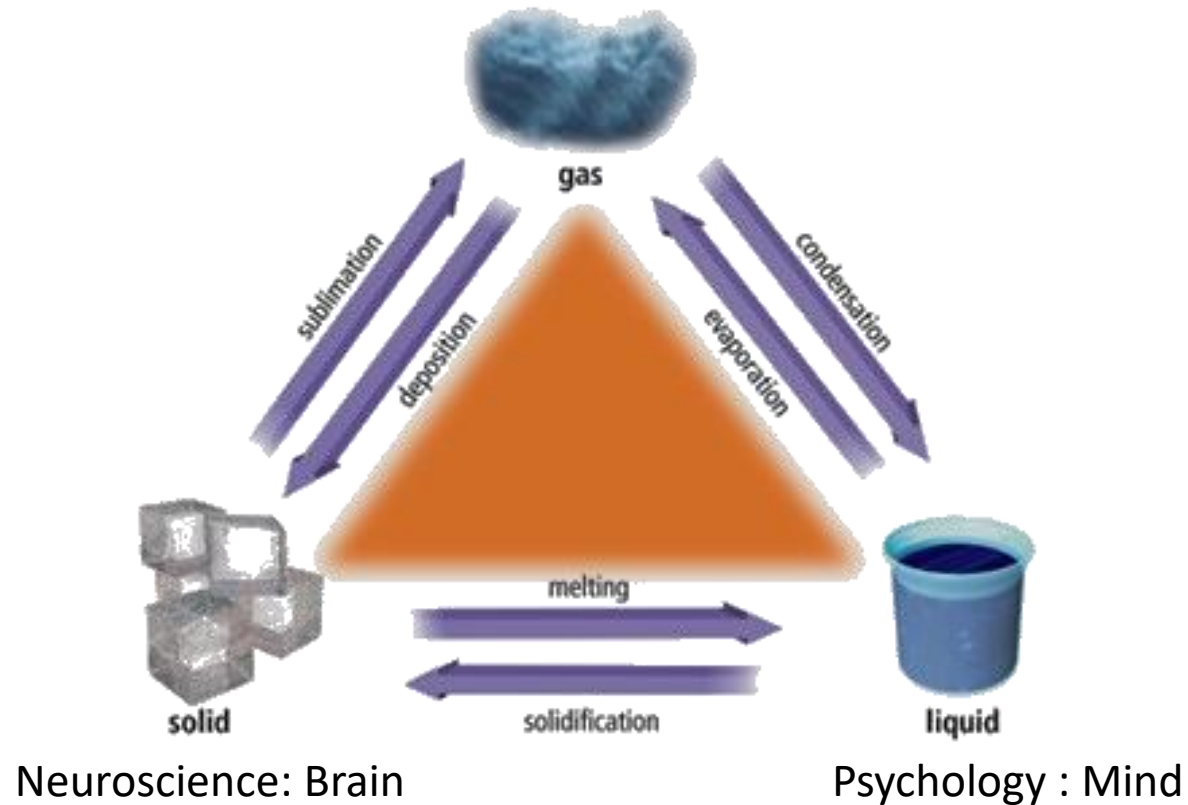
The Highest Functions of Nervous System - Psychological and Social Aspects of Brain Activity I

Three States of Cognition

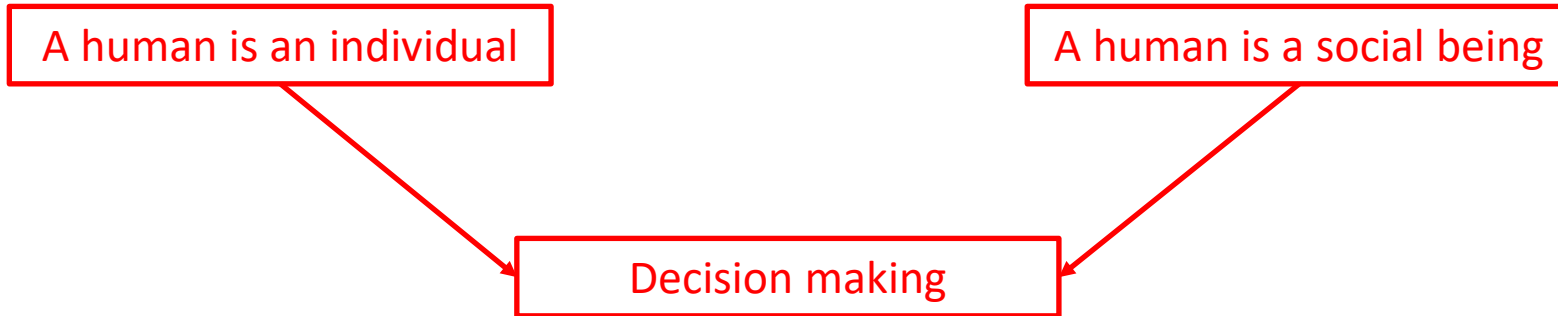
Philosophy : Mind behind Mind



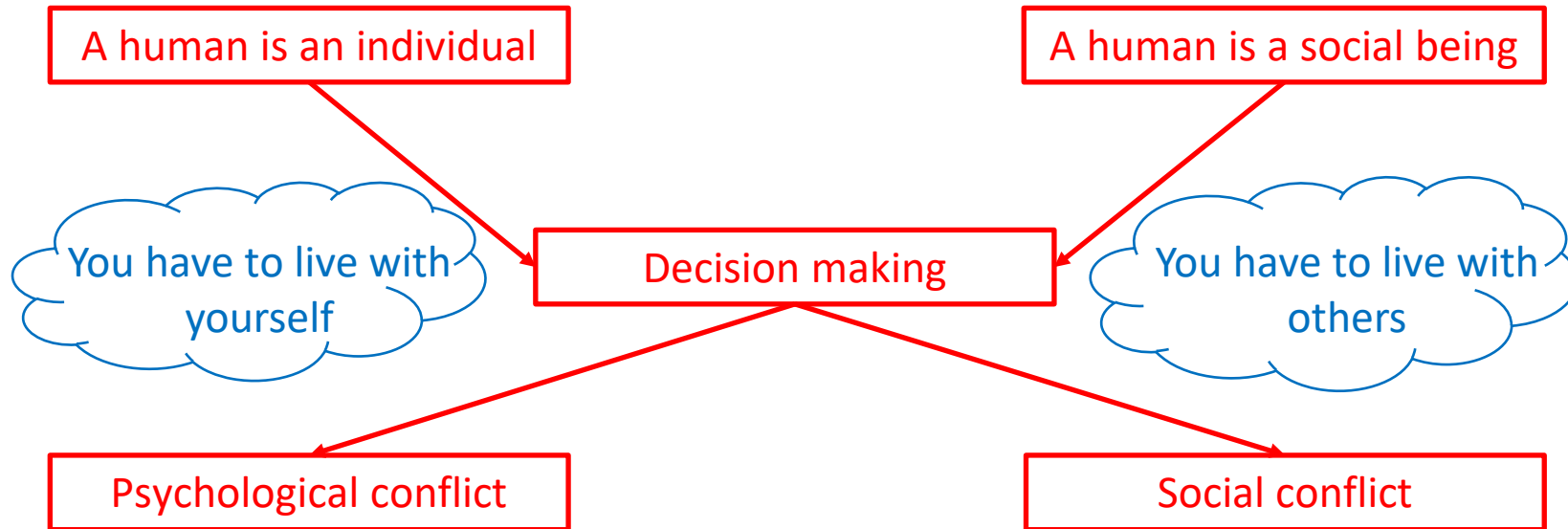
PS Deb



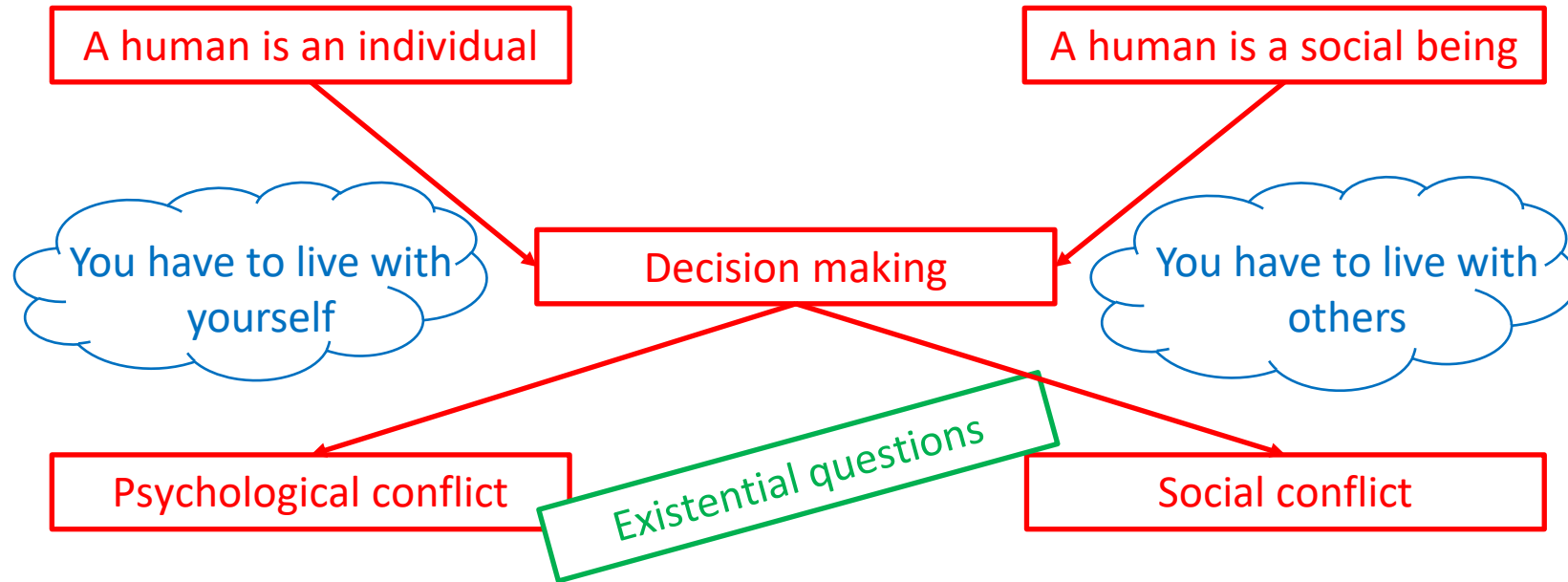
Why?



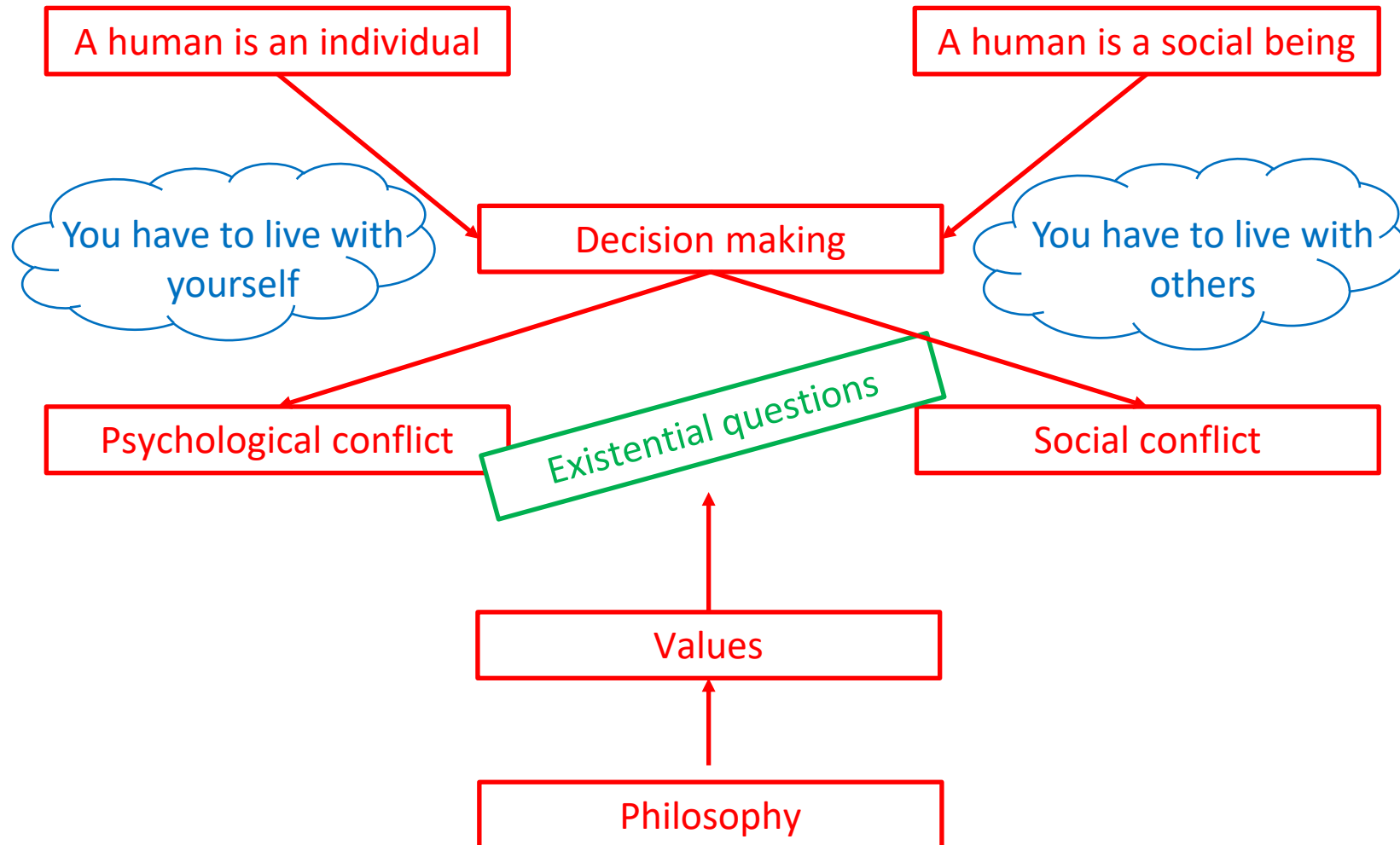
Why?



Why?



Why?

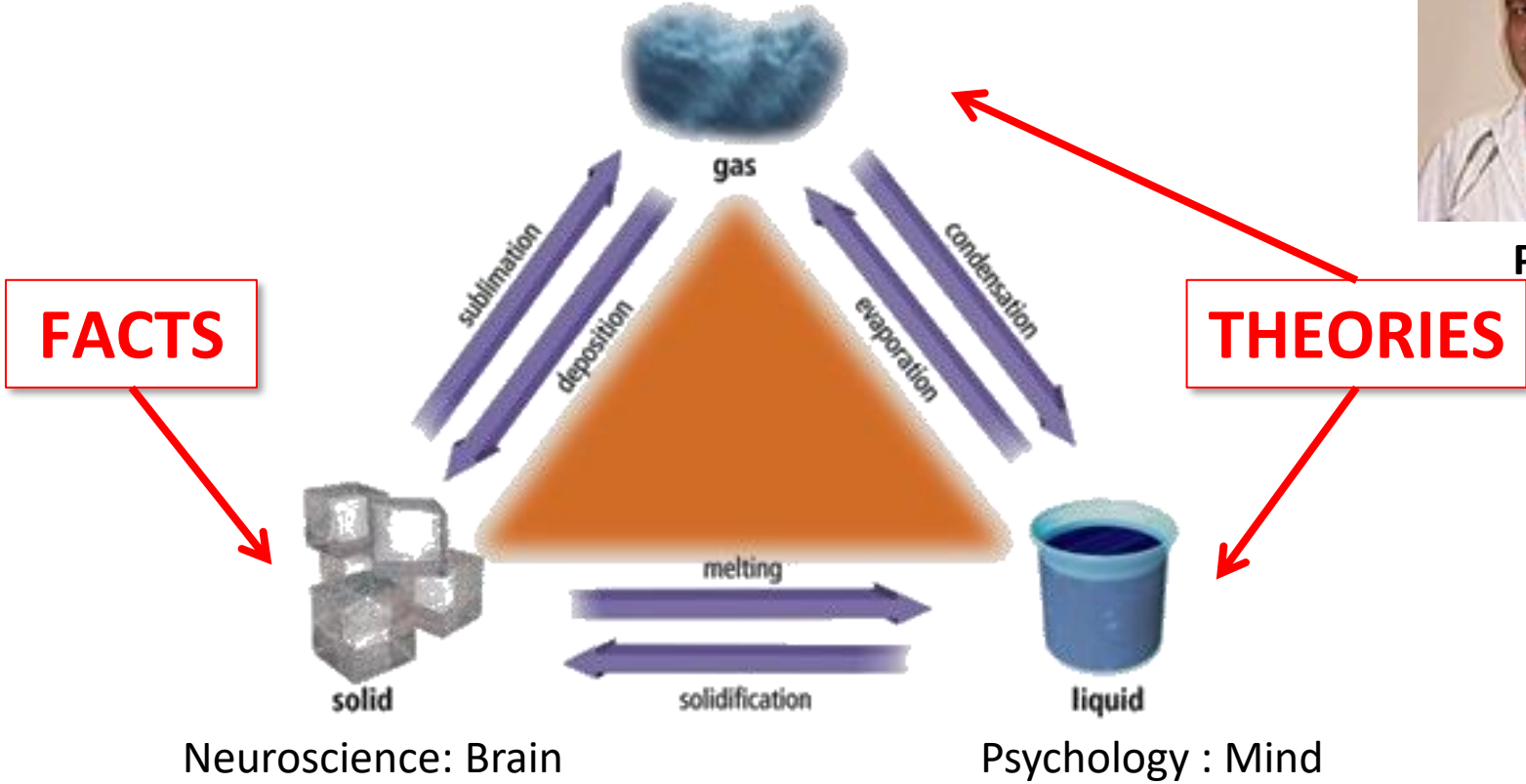


Three States of Cognition

Philosophy : Mind behind Mind

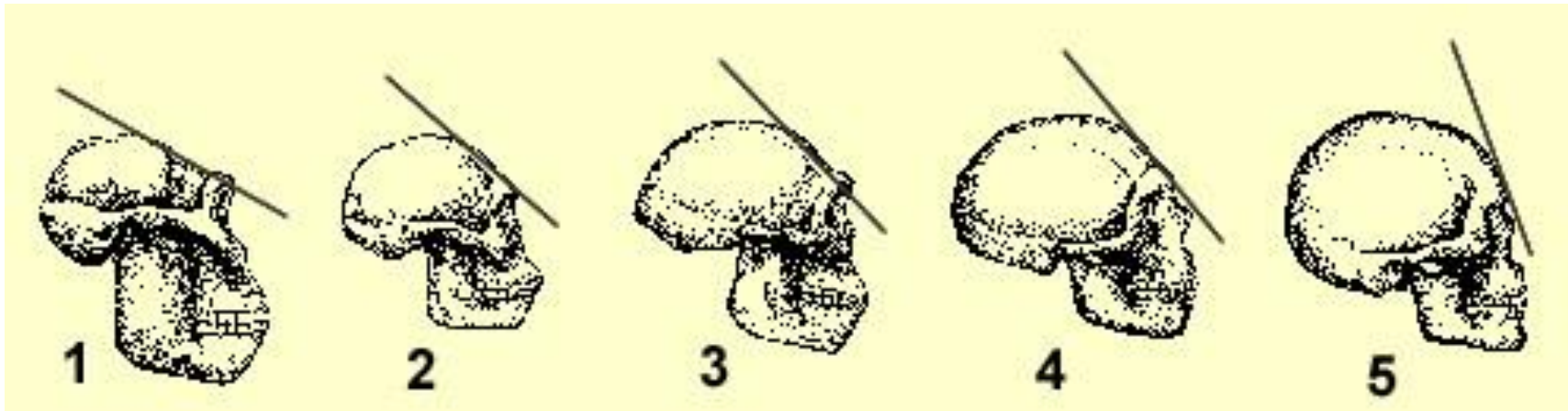
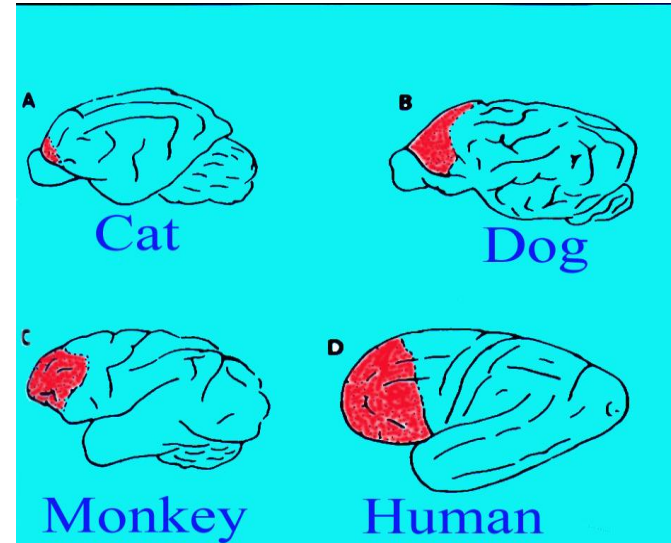


PS Deb



Frontal association area

- Executive function
 - Motor / behavioral
 - Cognitive
- Mostly developed in human



1. *Australopithecus robustus*
2. *Homo habilis*
3. *Homo erectus*
4. *Homo sapiens neanderthalensis*
5. *Homo sapiens sapiens*

Functions of frontal association area

- Motor/non-motor planning/organization - strategy - anticipation

- Thinking – mental models processing

- Attention – „information filtering“

- Behavioral control
 - Facilitation of „wanted“
 - Inhibition of „unwanted“

**Social brain may be considered as
an anticipation in social context**



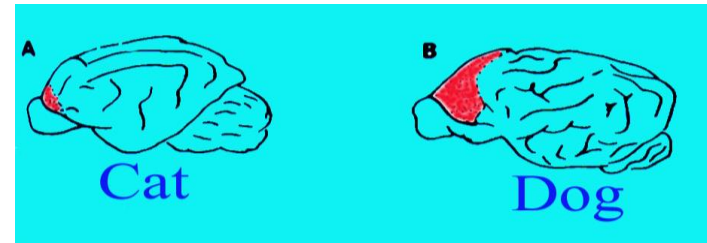
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<http://thenextweb.com/wp-content/blogs.dir/1/files/2015/03/jerry1.jpg>

Socialization

- ✓ Socialization is an evolutionary strategy of „weak/less skilfull“
- ✓ Socialization allows be specialized („weak/less sklifull“)
- ✓ The social group brings its members benefits which could not be achieved on an individual basis
- ✓ Society
 - Collaboration
 - Categorization of duties and responsibilities
 - Hierearchy



<http://www.slideshare.net/drpsdeb/presentation>

5

<https://wallhere.com/cs/wallpaper/1065382>

https://en.wikipedia.org/wiki/Society#/media/File:Canis_lupus_pack_surrounding_Bison.jpg

Society



Culture

– the sum of knowledge

- ✓ Material
- ✓ Spiritual



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



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<https://en.wikipedia.org/wiki/File:Mary16thC.jpg>



<https://www.wikiart.org/en/leonardo-da-vinci/the-madonna-of-the-carnation>



<https://pixels.com/featured/1-madonna-and-child-peter-paul-rubens.html>



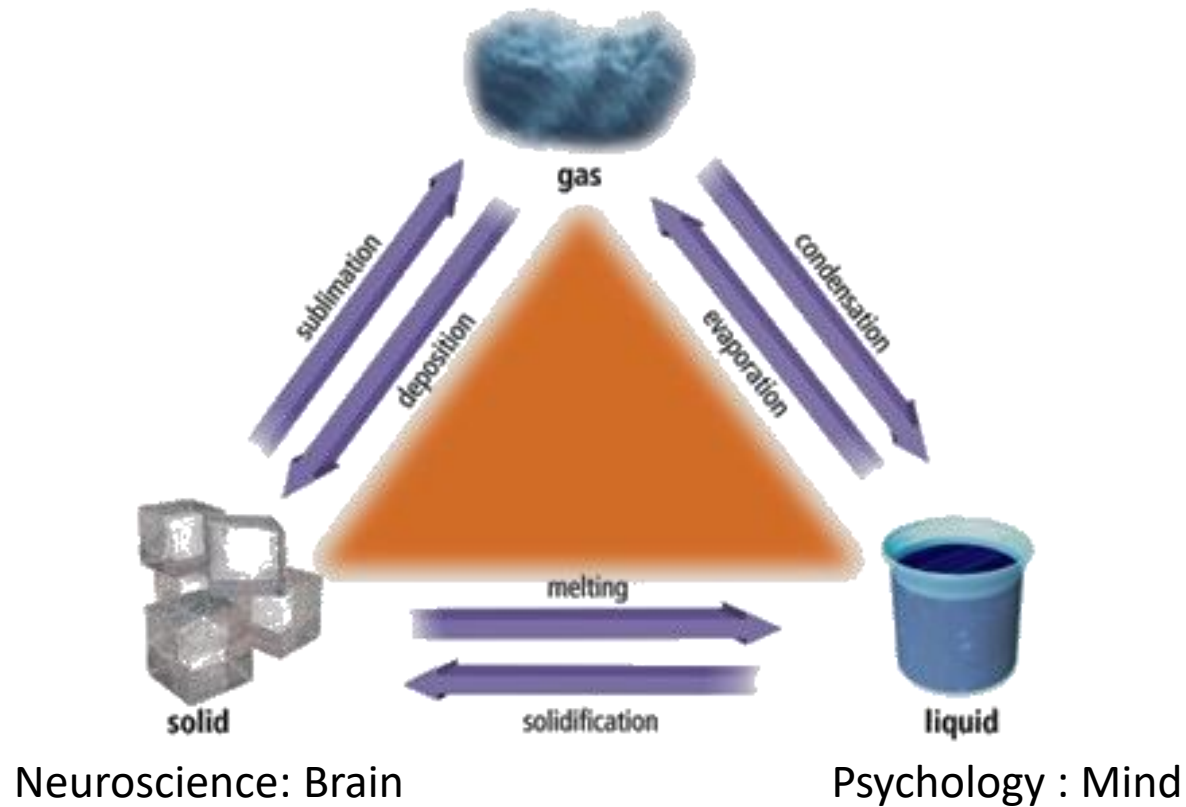
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Three States of Knowledge and Cognition

Philosophy : Mind behind Mind



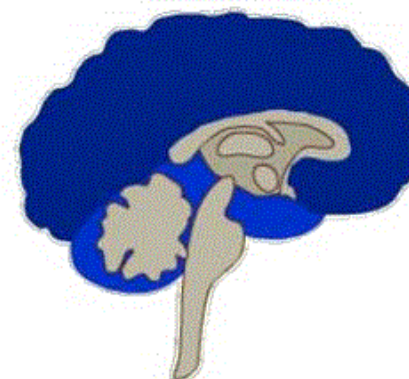
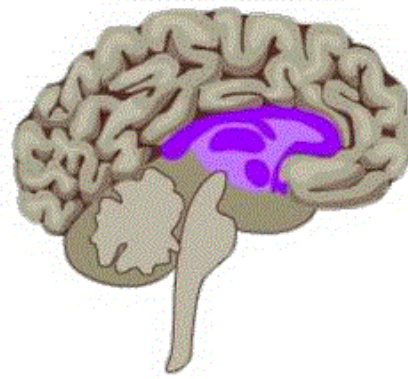
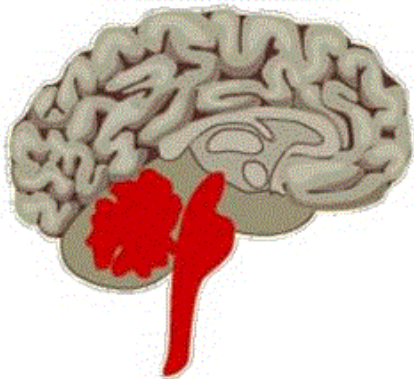
PS Deb



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

1960



The Triune Brain in Evolution, Paul MacLean, 1960

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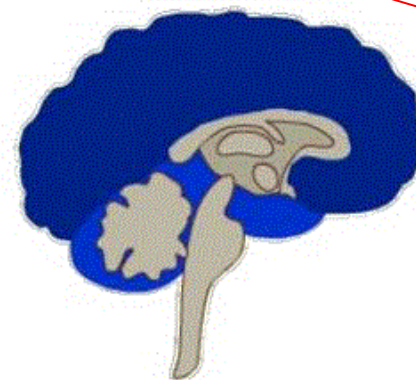
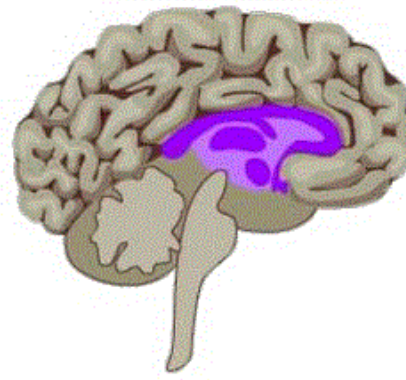
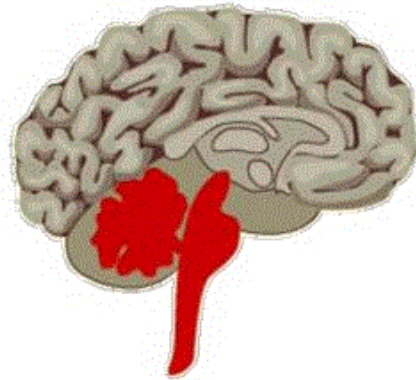
https://upload.wikimedia.org/wikipedia/commons/thumb/d/d4/Paul_D_MacLean.jpg/220px-Paul_D_MacLean.jpg

Triune Brain Theory

Lizard Brain	Mammal Brain	Human Brain
Brain stem & cerebellum	Limbic System	Neocortex
Fixed programs	Emotions, memories, habits	Learning, thinking, planning
Uniform ACTION	Decisions	Performance
Economy		

Fixed programs
Uniform **ACTION**
Economy

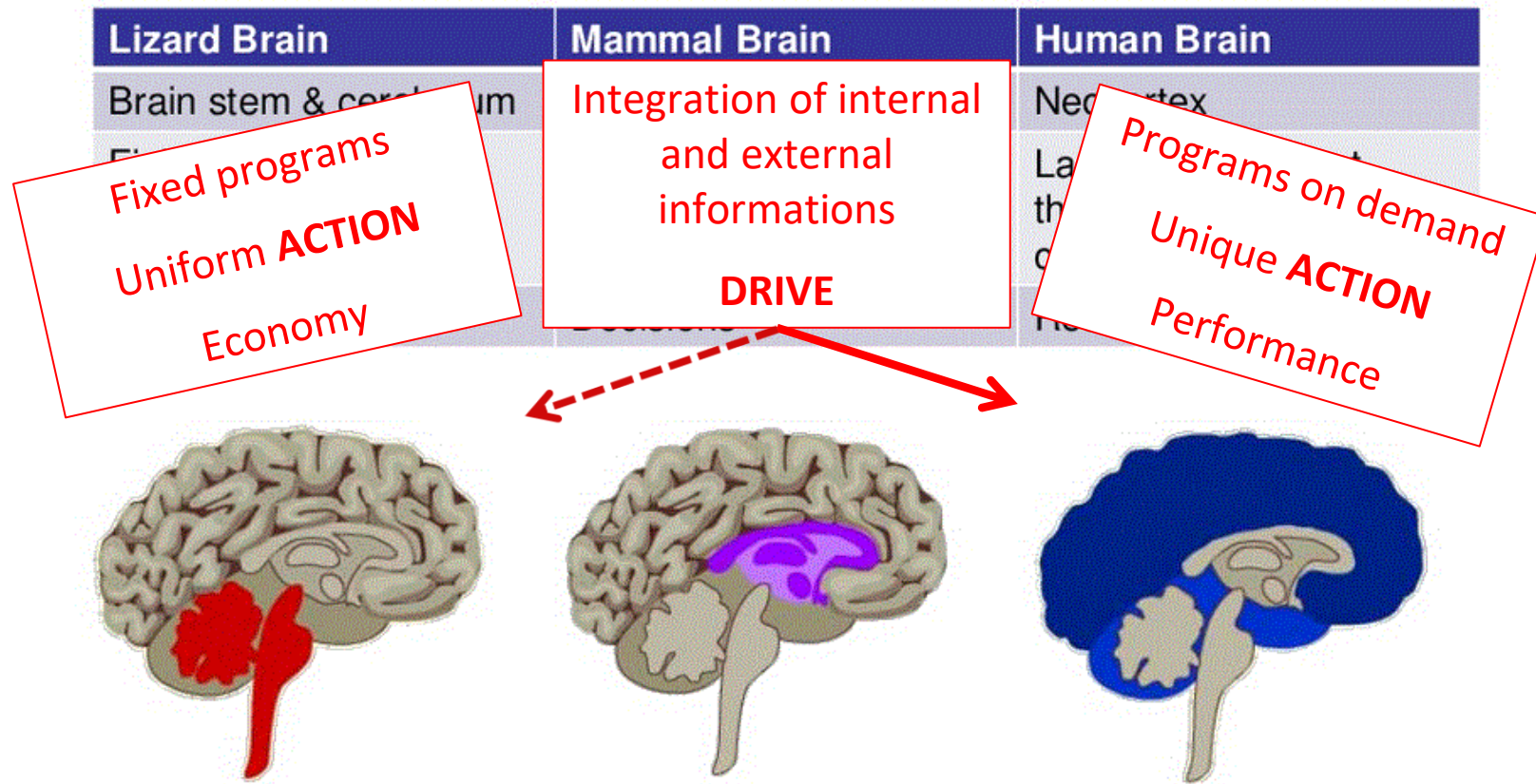
Programs on demand
Unique **ACTION**
Performance



The Triune Brain in Evolution, Paul MacLean, 1960

<https://s-media-cache-ak0.pinimg.com/originals/2f/60/99/2f609962e23fdce7a008fb224d316256.gif>

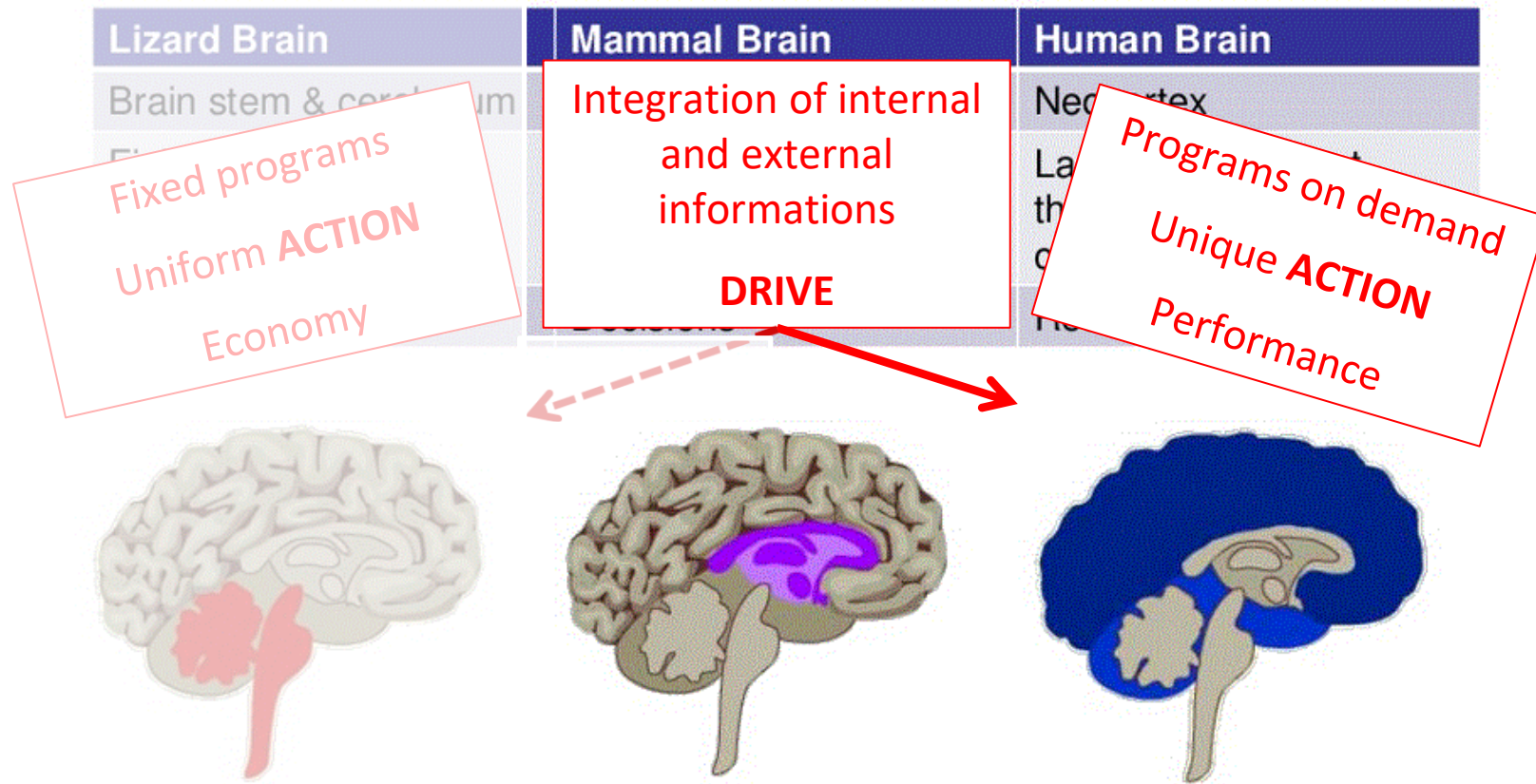
Triune Brain Theory



The Triune Brain in Evolution, Paul MacLean, 1960

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Triune Brain Theory

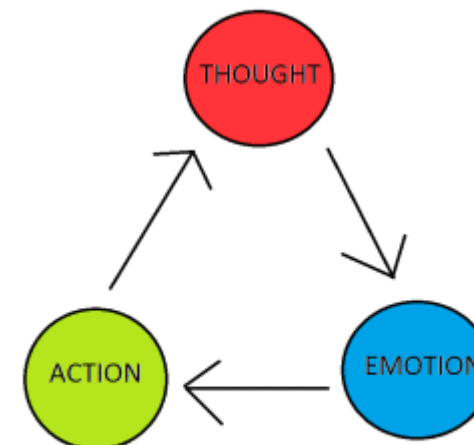
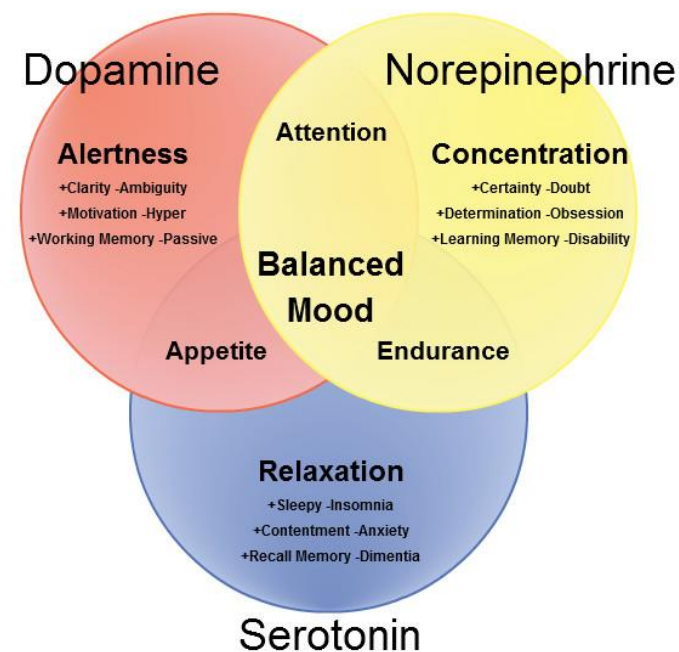


The Triune Brain in Evolution, Paul MacLean, 1960

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Influence of hypothalamus on neocortex

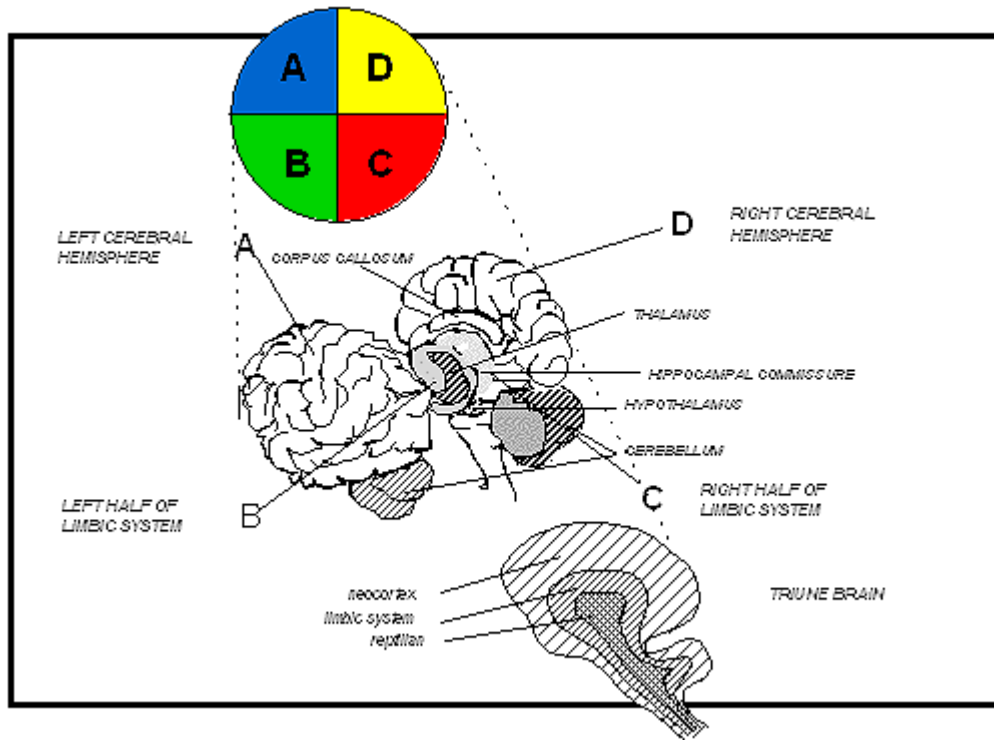
- Papez circuit
- Via neuromodulating systems
 - Consciousness
 - Mood
- Via thalamus
 - Via nucleus mediodorsalis to orbitofrontal cortex (influence on decision making)
 - Influence gating function of other thalamic nuclei



http://ausm.org.uk/wp-content/uploads/2015/02/Dopamine_Norepinephrine_Serotonin.jpg

<https://decodingfilm.files.wordpress.com/2014/09/tea.png?w=272&h=300>

Whole brain model

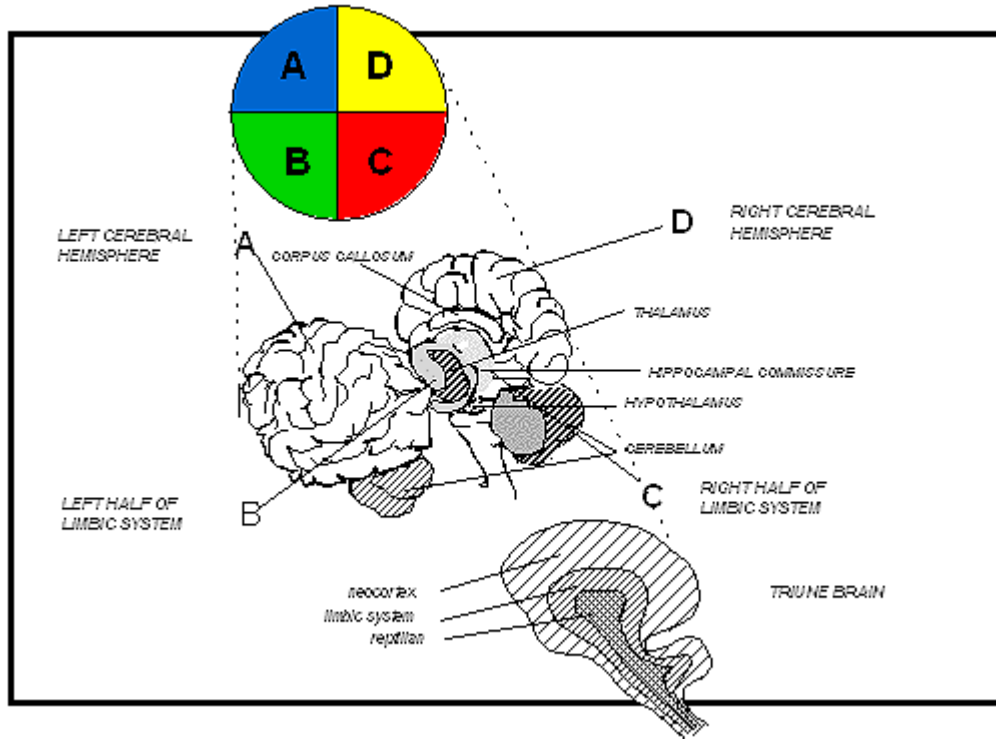


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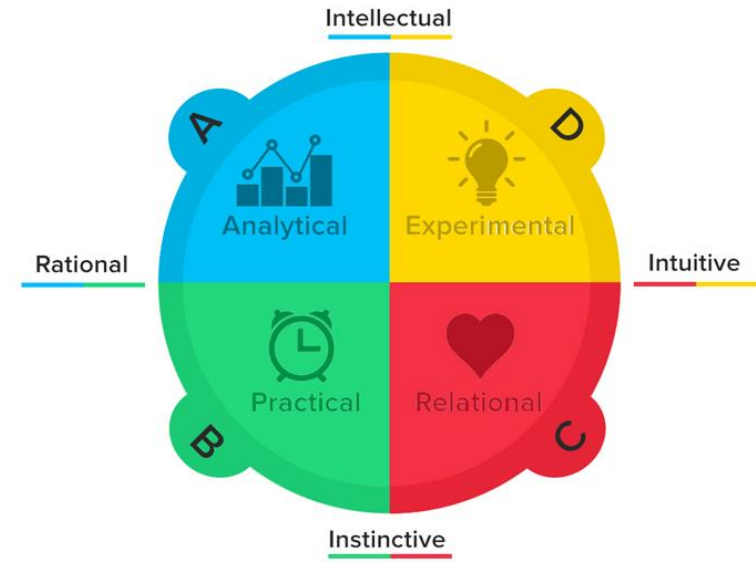
1978



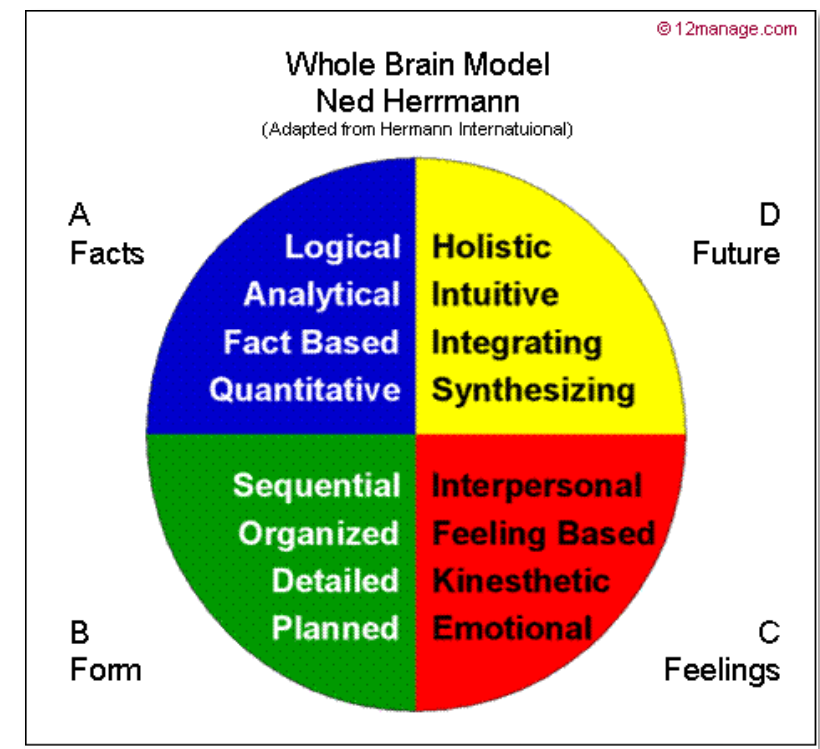
Whole brain model



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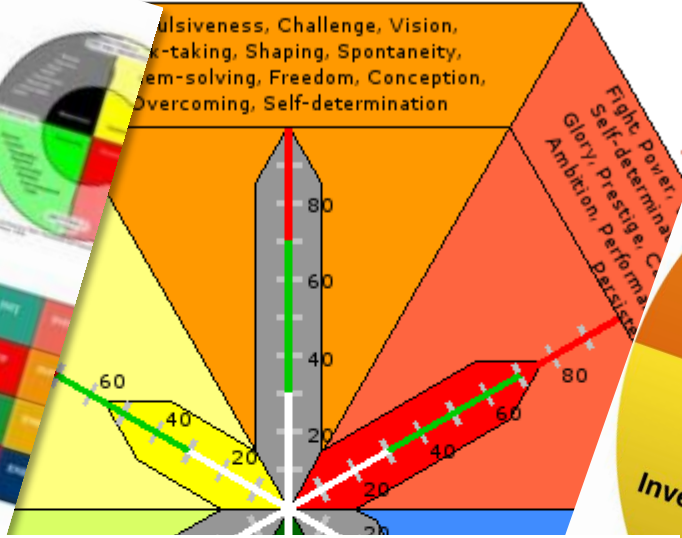


1978



Innovation "Pioneer"

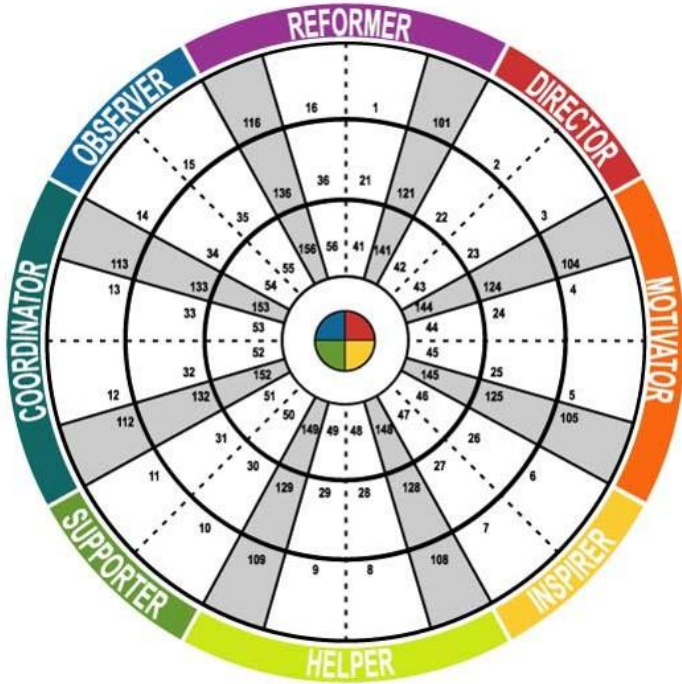
Impulsiveness, Challenge, Vision, Risk-taking, Shaping, Spontaneity, Problem-solving, Freedom, Conception, Overcoming, Self-determination



The Four Quadrants of Technology Service & Support



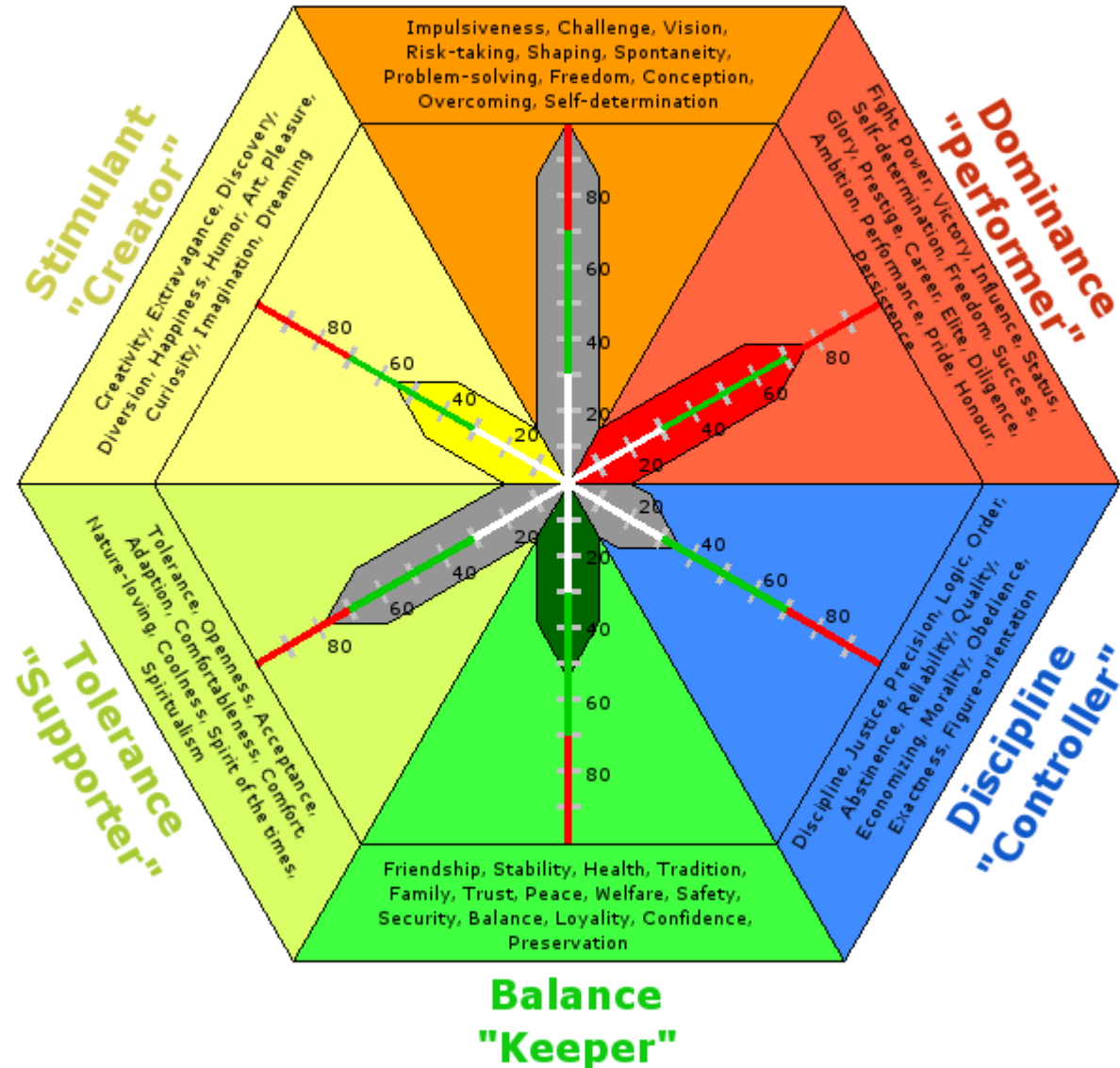
<http://teamchange.nl/wp-content/uploads/2014/05/Kleurenmodellen2-380x250.jpg>



Disciplin "Control"

<http://scottschwefel.com/wp-content/uploads/2016/01/smart-skills.jpg>

Innovation "Pioneer"



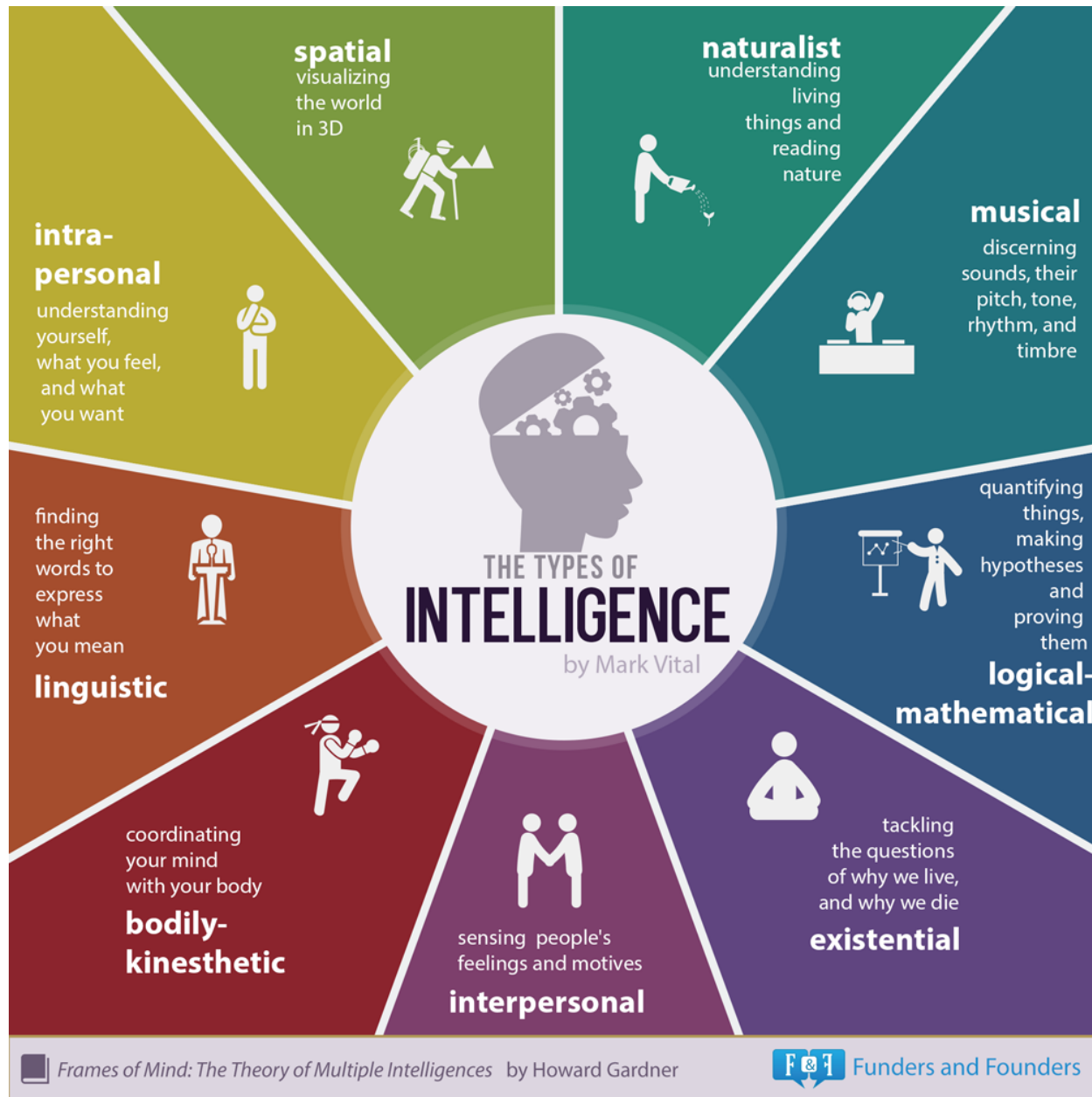
<https://web.limbic-personality.com/files/CjvXQ2.bmp>

Every brain is unique

- Emotionally
 - Limbic system
- Rationally
 - Neocortex

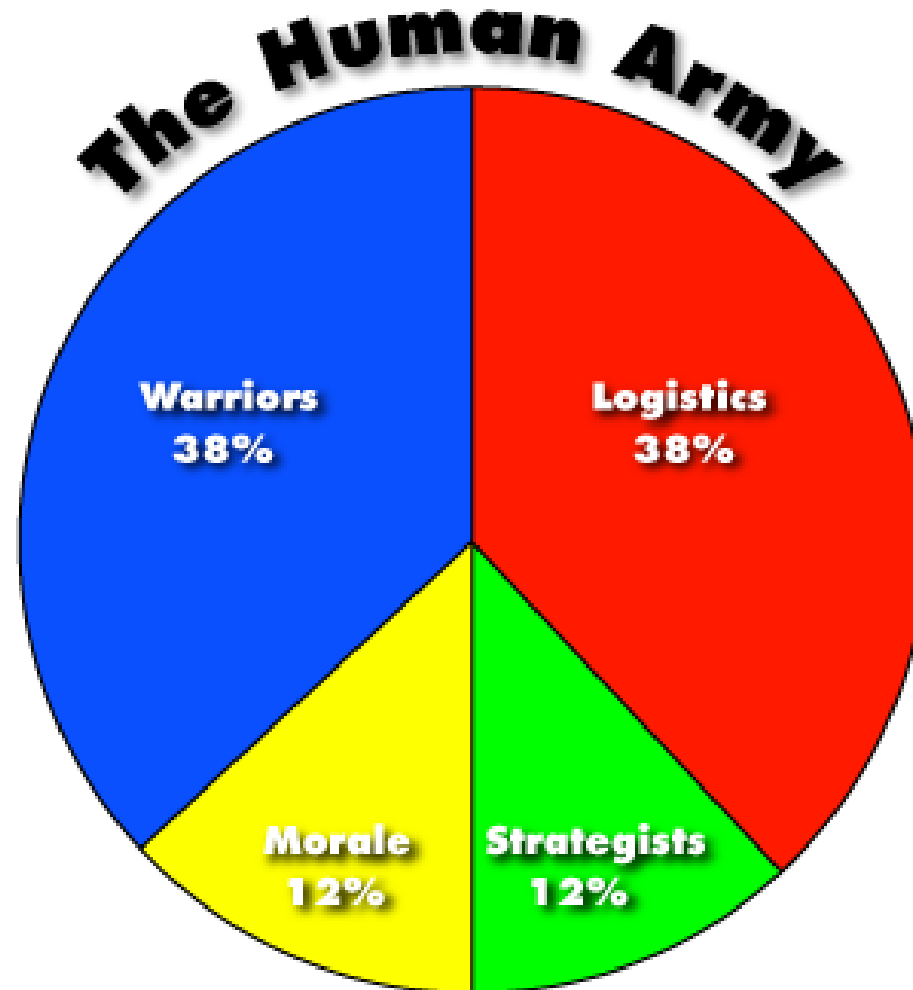
✓ Genetics
✓ Environment





Society

- ✓ Collaboration
- ✓ Categorization of duties and responsibilities
- ✓ Hierarchy



The 4 Personality Types In The Human Race

©2011 Personality Marketing LLC

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

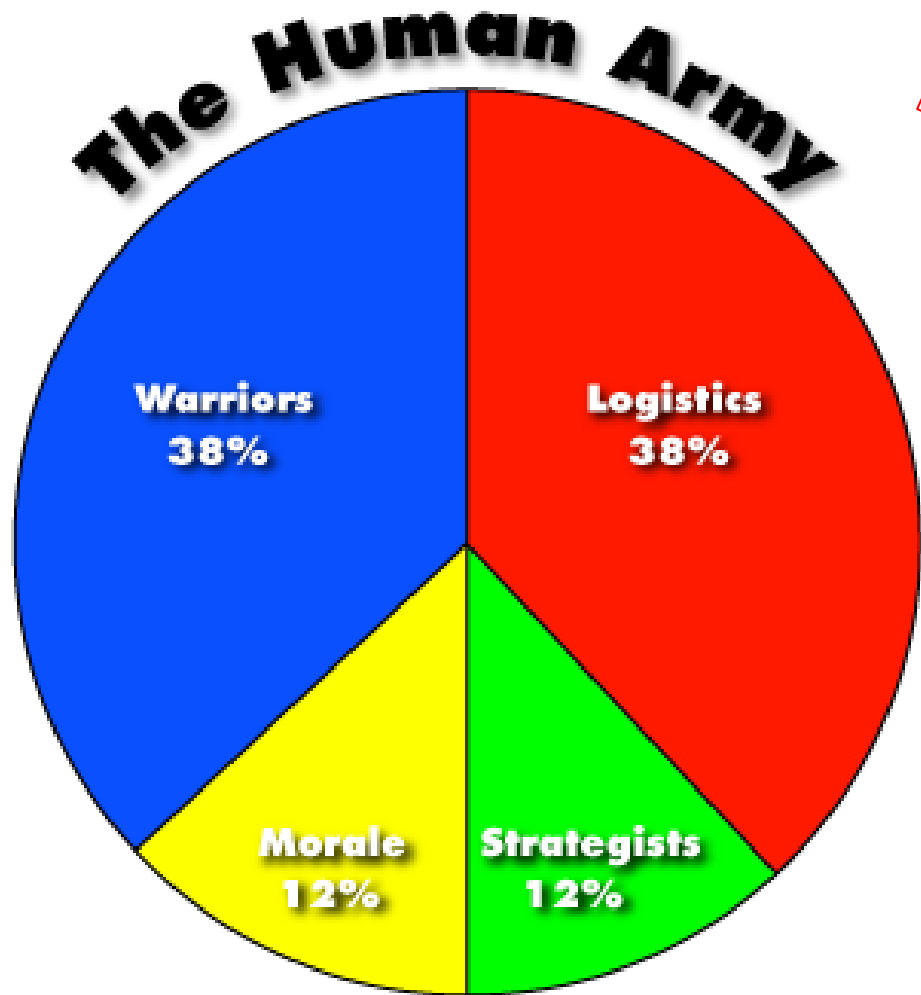
Society

- ✓ Collaboration
- ✓ Categorization of duties and responsibilities
- ✓ Hierarchical

Potential conflict

- I do not respect the status quo
- We do not respect the status quo

- Me versus society
- We versus other society (societies)



The 4 Personality Types In The Human Race

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

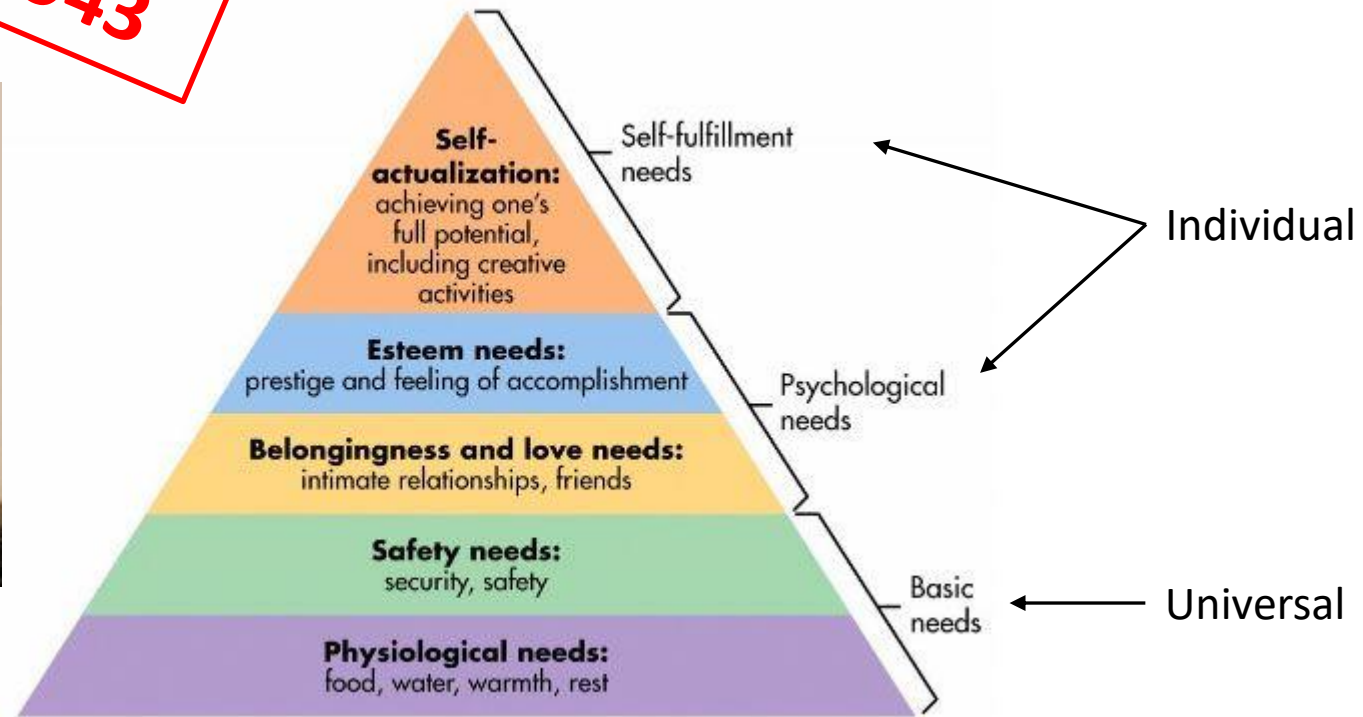


Hierarchy of Needs by Abraham Maslow

1943



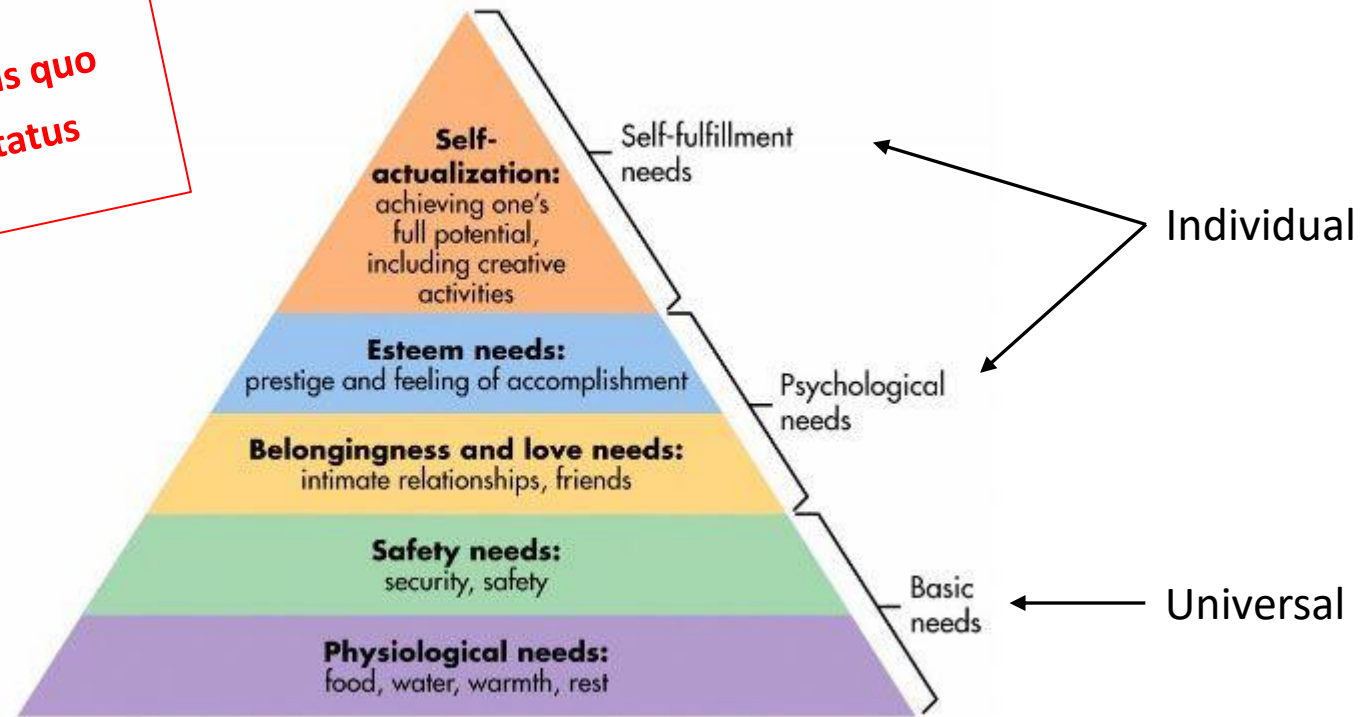
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<http://www.simplypsychology.org/maslow-pyramid.jpg>

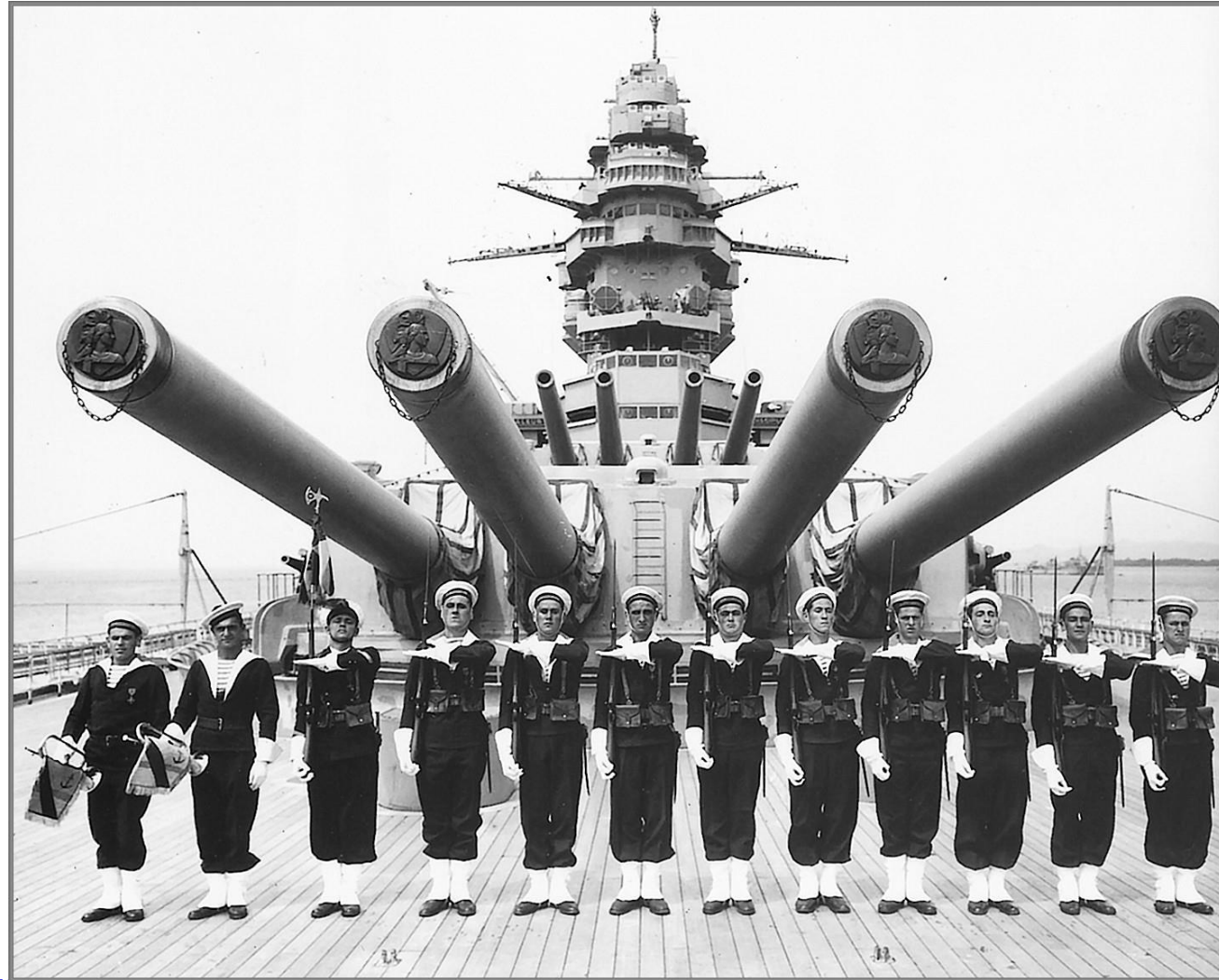
Hierarchy of Needs by Abraham Maslow

- Potential conflict**
 - I do not respect the status quo
 - We do not respect the status quo
- The hunter brain Versus The Social brain**
- EGOISM Versus ALTRUISM**



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

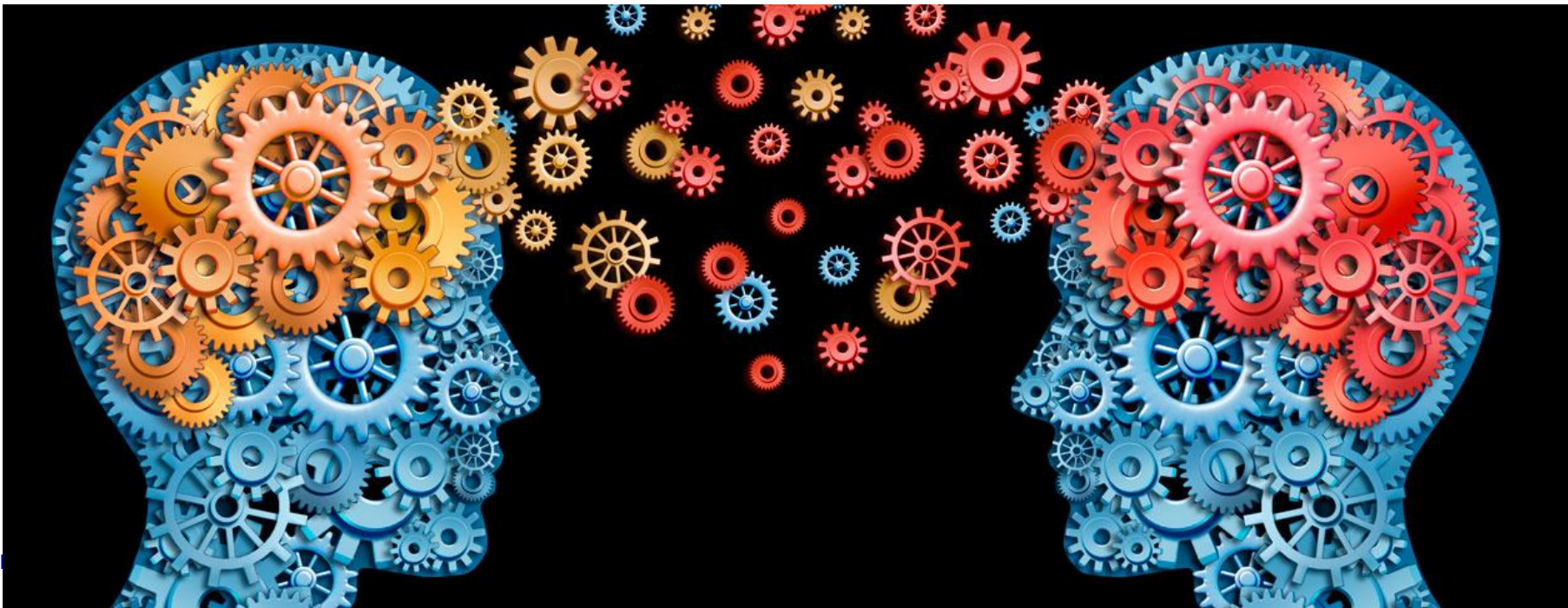
„The first sign of civilization was a femur that had been broken and then healed... Helping someone else through difficulty is where civilization starts“

Margaret Mead



Mentalization

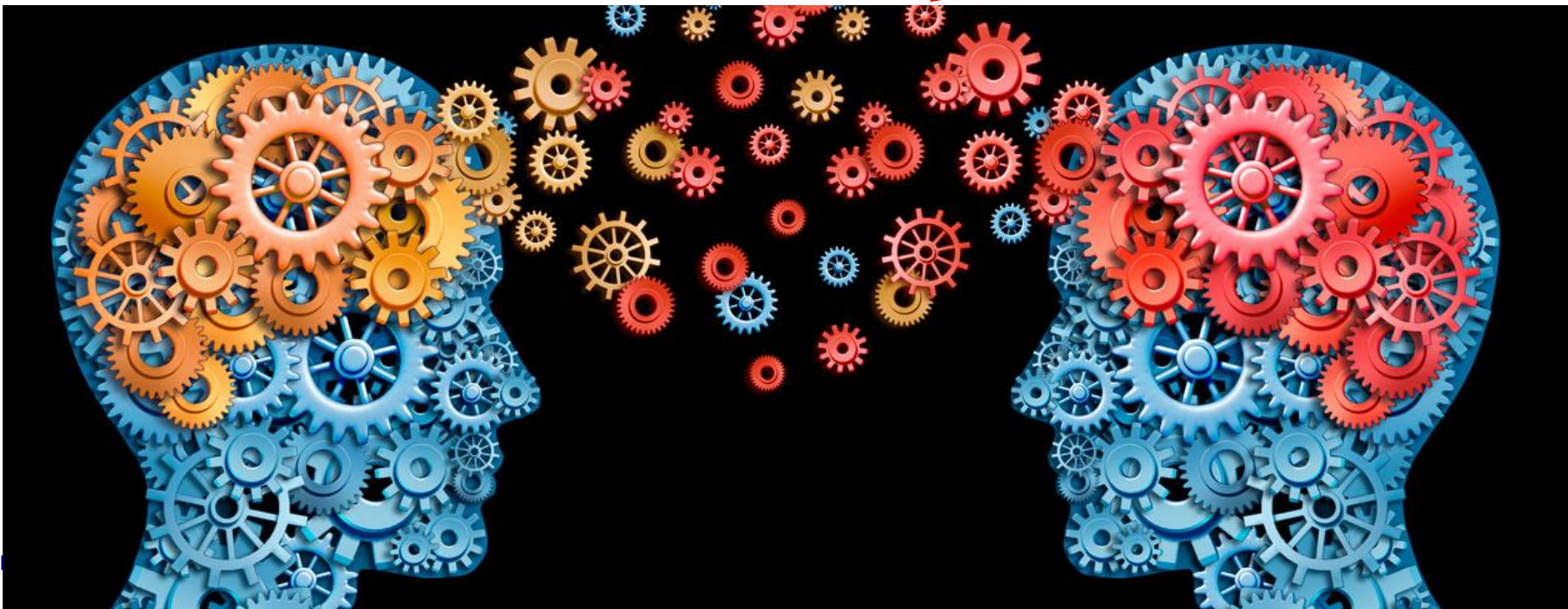
- the ability to understand the mental state, of oneself or others, that underlies the behavior
 - Rationally
 - Emotionally



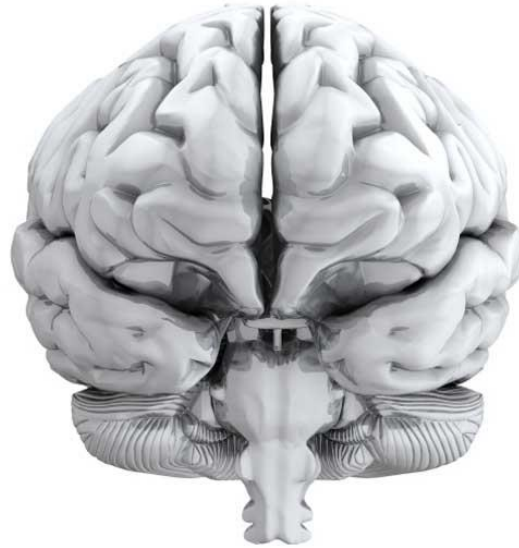
Mentalization

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

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



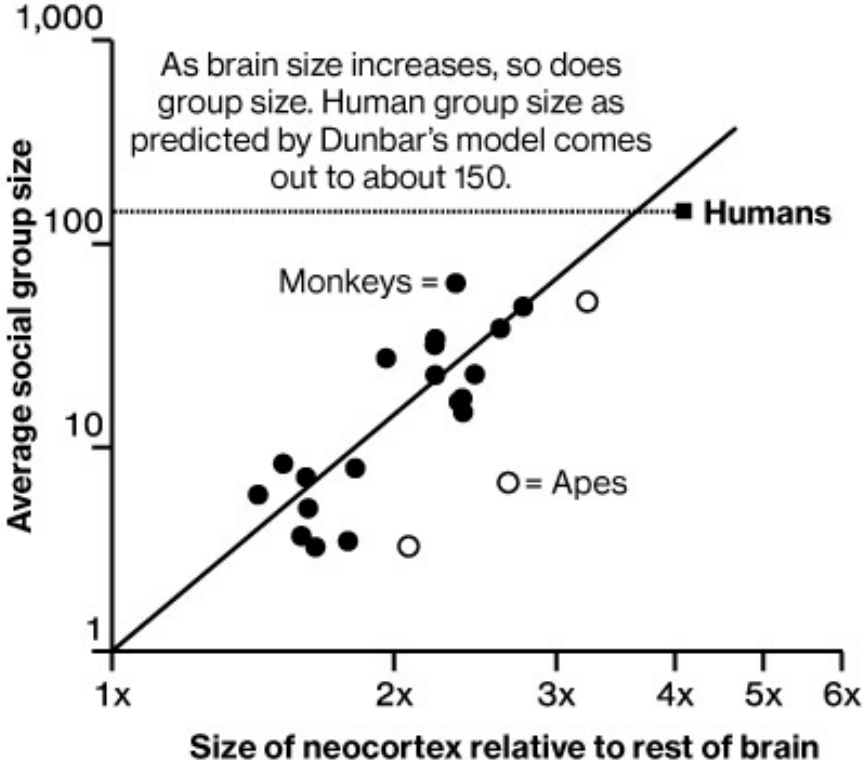
Social brain



Social brain

1998

The Social Cortex



DATA: THE SOCIAL BRAIN HYPOTHESIS, DUNBAR 1998

<http://assets.bwbx.io/images/users/iqjWHBFdfxIU/ibn8LbKHvbxI/v1/-1x-1.jpg>

Robin Dunbar



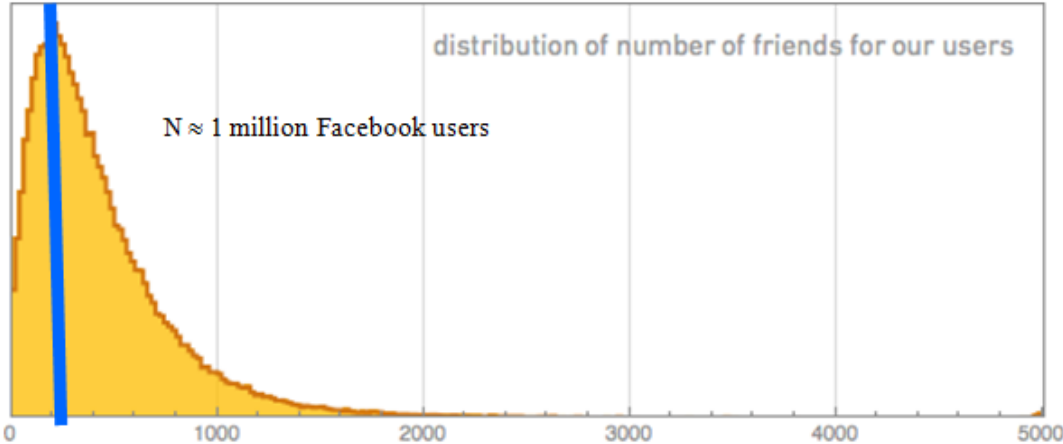
https://en.wikipedia.org/wiki/Robin_Dunbar

2014

Social brain

Has Facebook Really Widened Your Social World?

- It seems not....
- Modal number of 'friends' on Facebook = 150-250
- You may list 100s of friends, but you only talk to a handful



Robin Dunbar

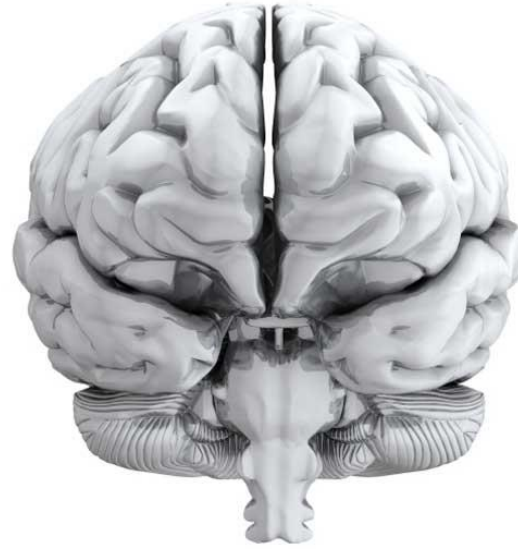


https://en.wikipedia.org/wiki/Robin_Dunbar

http://www.slideshare.net/EXCCLEssex/robin-dunbar-has-the-internet-changed-our-social-world?qid=8bec5233-8b90-40fa-9c8c-a7033224c639&v=&b=&from_search=1

Every brain is a powerful instrument...

... which is hard to control



✓ The conflict between the limbic system and the neocortex

✓ The problem with effective control of the neocortex



The conflict between the limbic system and the neocortex



The conflict between the limbic system and the neocortex

- Power
 - Hera
- Love
 - Aphrodite
- Wisdom
 - Athena

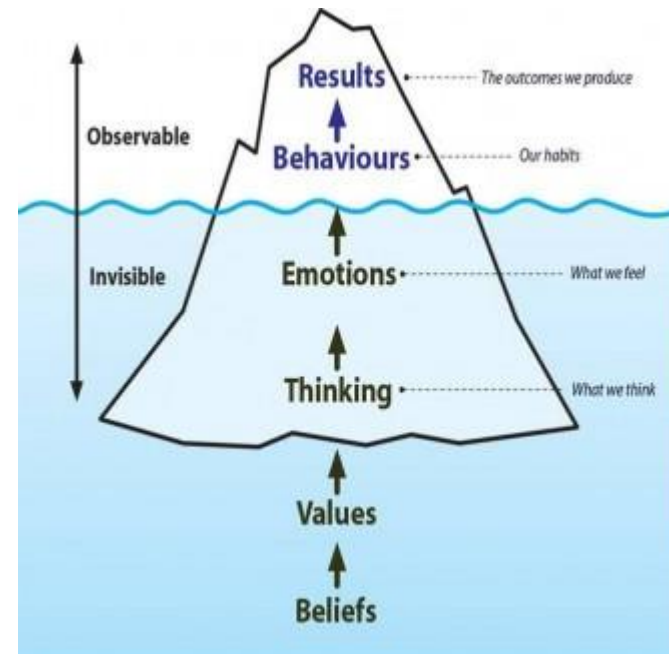


<https://www.museodelprado.es/en/the-collection/art-work/the-judgement-of-paris/f8b061e1-8248-42ae-81f8-6acb5b1d5a0a>

Limbic system and neocortex

Instinctive behavior

- Limbic system
- ✓ I see a nice thing, so why not to steel it?



<http://www.coaching.net.nz/wp-content/uploads/2013/06/iceberg-for-blog-from-j-e1371521135440.jpg>

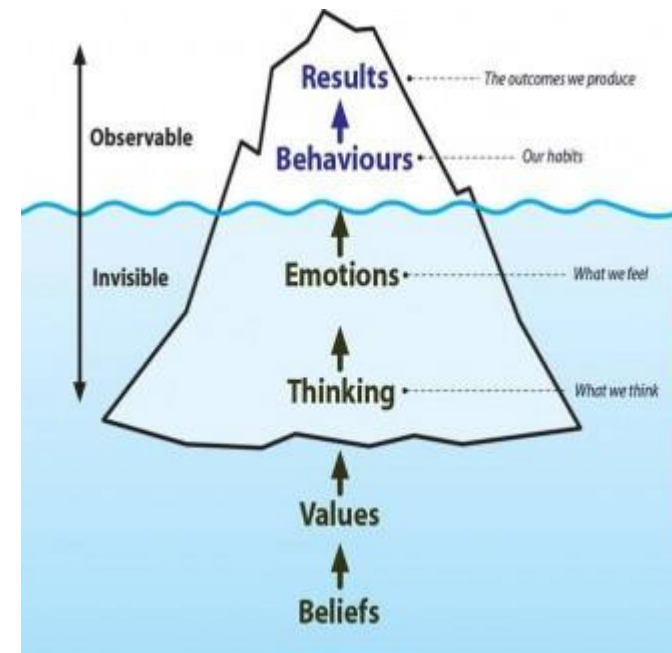
Limbic system and neocortex

Instinctive behavior

- Limbic system
- ✓ I see a nice thing, so why not to steal it?

Socially enforced behavior

- Legal behavior
- Neocortex – limbic system
- ✓ Theft is a crime, and punishment may come



<http://www.coaching.net.nz/wp-content/uploads/2013/06/iceberg-for-blog-from-j-e1371521135440.jpg>

Limbic system and neocortex

Instinctive behavior

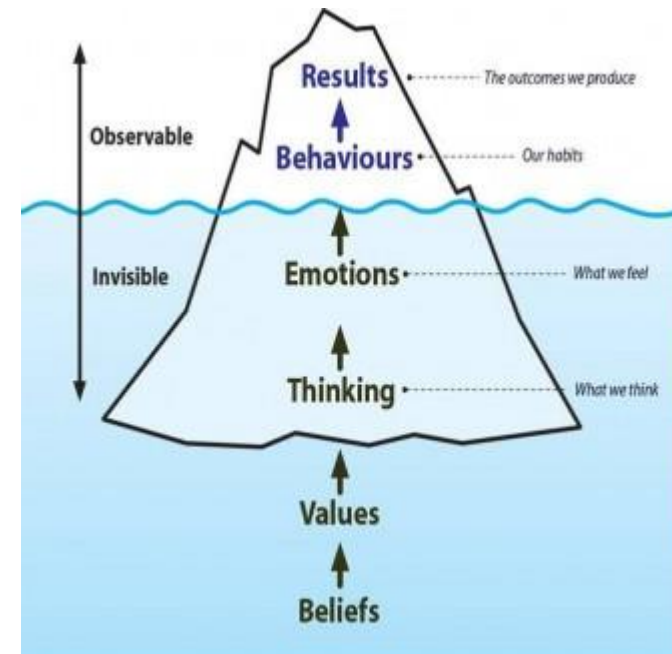
- Limbic system
- ✓ I see a nice thing, so why not to steal it?

Socially enforced behavior

- Legal behavior
- Neocortex – limbic system
- ✓ Theft is a crime, and punishment may come

Moral behavior

- Legitimate behavior
- Limbic system
- ✓ Stealing is a bad thing



<http://www.coaching.net.nz/wp-content/uploads/2013/06/iceberg-for-blog-from-j-e1371521135440.jpg>

Limbic system and neocortex

Instinctive behavior

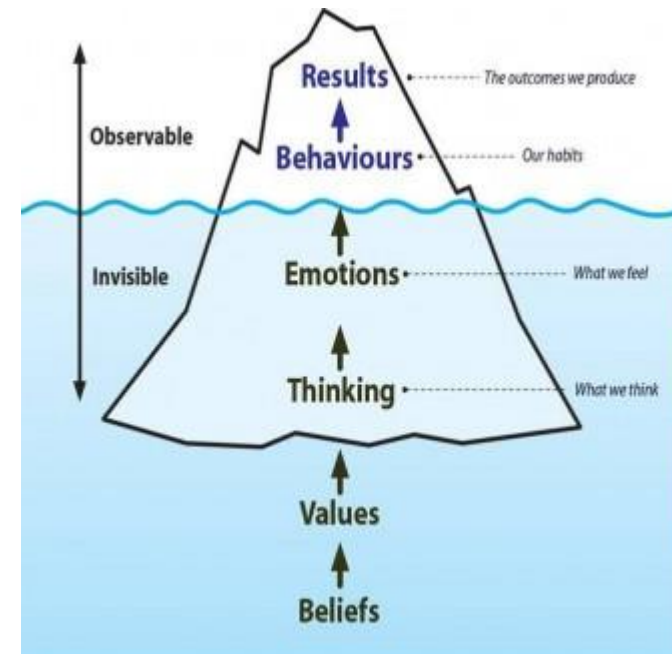
- Limbic system
- ✓ I see a nice thing, so why not to steal it?

Socially enforced behavior

- Legal behavior
- **Fear of punishment** (Limbic system)
- ✓ Stealing is a crime, and punishment may come

Moral behavior

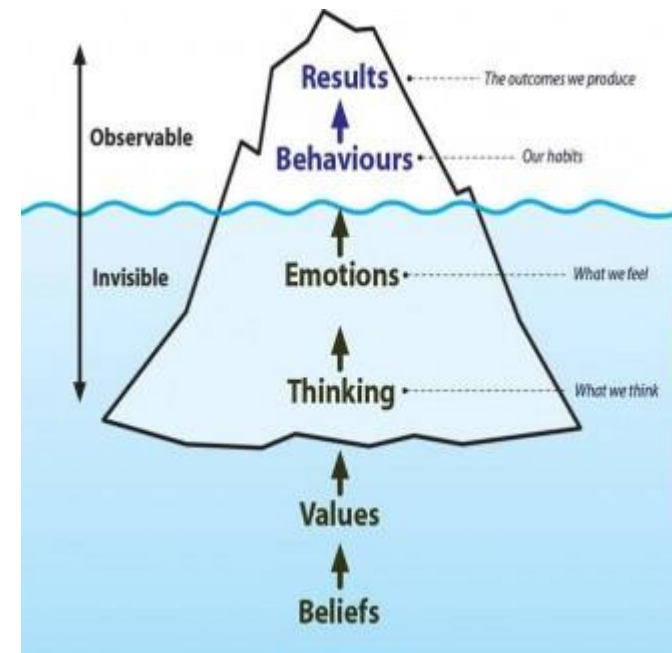
- Legal behavior
- **Moral stance** (Neocortex)
- ✓ Stealing is a bad thing



<http://www.coaching.net.nz/wp-content/uploads/2013/06/iceberg-for-blog-from-j-e1371521135440.jpg>

Limbic system and neocortex

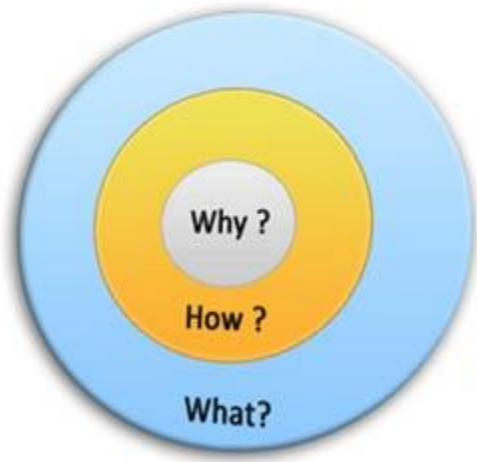
Information
NEOCORTEX
VS
Complex information
NEOCORTEX/limbic system
VS
Values/Philosophy/Faith
Neocortex/LIMBIC SYSTEM



<http://www.coaching.net.nz/wp-content/uploads/2013/06/iceberg-for-blog-from-j-e1371521135440.jpg>

Limbic system and neocortex

<https://s-media-cache-ak0.pinimg.com/originals/84/34/b1/8434b124c9fc92003051c56b088906a5.jpg>



Why = The Purpose

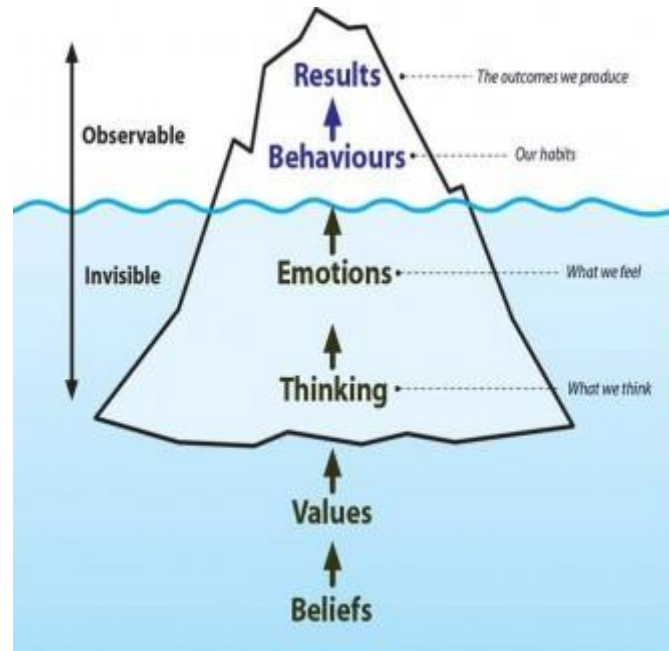
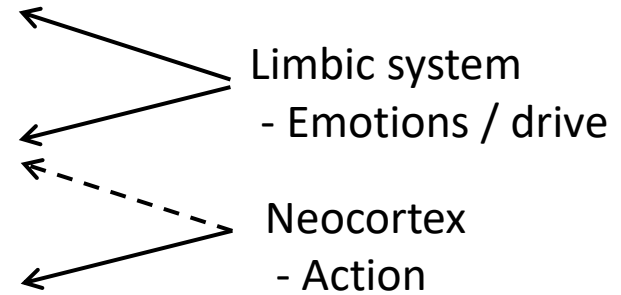
What is your cause? What do you believe?

How = The Process

Specific actions taken to realize the Why.

What = The Result

What do you do? The result of Why. Proof.



<http://www.coaching.net.nz/wp-content/uploads/2013/06/iceberg-for-blog-from-J-e1371521135440.jpg>

Limbic system and neocortex

„ The whole is greater than the sum of its parts“

Aristoteles

Information

NEOCORTEX

VS

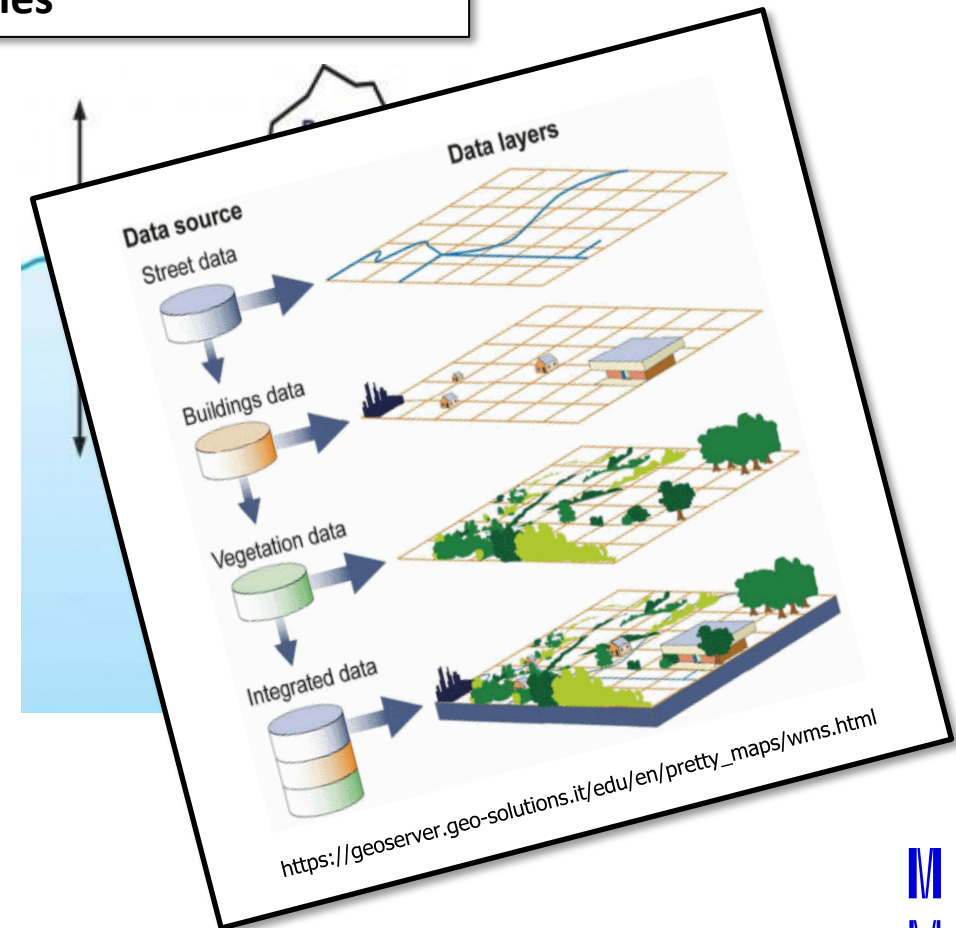
Complex information

NEOCORTEX/limbic system

VS

Values/Philosophy/Faith

Neocortex/LIMBIC SYSTEM

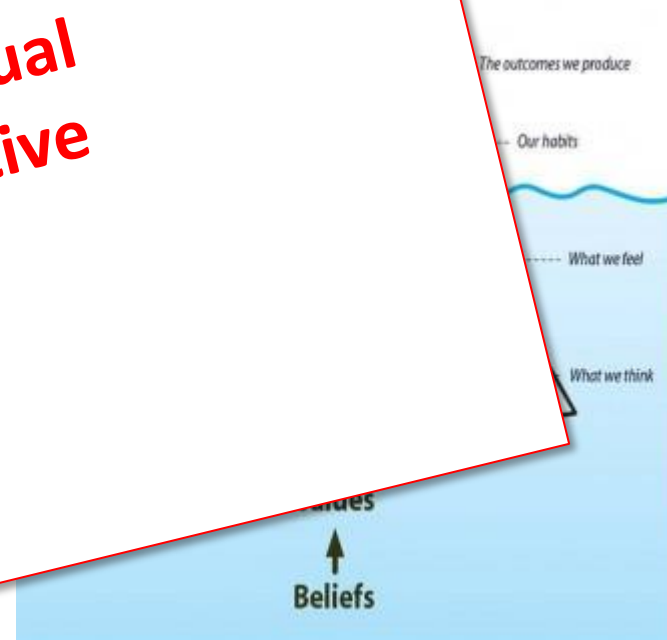


Limbic system and neocortex

„ The whole is greater than the sum of parts

Brain activity
✓ Highly individual
✓ Very subjective

Value
N



<http://www.coaching.net.nz/wp-content/uploads/2013/06/iceberg-for-blog-from-j-e1371521135440.jpg>

Limbic system and neocortex

„ The whole is greater than the sum of parts

Brain activity

- ✓ Highly individual
- ✓ Very subjective
- ✓ Values/philosophy/faith enable coexistence within the larger group/society

Value
N



<http://www.coaching.net.nz/wp-content/uploads/2013/06/Iceberg-for-blog-from-J-e1371521135440.jpg>

Limbic system and neocortex

„ The whole is greater than the sum of parts

- ✓ **Brain activity**
- ✓ Highly individual
- ✓ Very subjective
- ✓ Values/philosophy/faith enable coexistence within the larger group/society
- ✓ These systems represent **RULES**



<http://www.coaching.net.nz/wp-content/uploads/2013/06/iceberg-for-blog-from-j-e1371521135440.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

Individual / subjective character in 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.fearfor.net/>

https://images.sciencedaily.com/2008/03/080320132646_1_900x600.jpg

Individual / subjective character of brain activity

NEOCORTEX – RATIONAL

- (Pseudo)rational preferences
- Imagination



<http://www.hospitality-school.com/wp-content/uploads/2011/06/guest-preference-2.jpg>

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_5PSAhVDbBoKHe53B98QsAQIGA#tbn=isch&q=red+car+white+background

Individual / subjective character of brain activity

NEOCORTEX – RATIONAL

- Imagine red Ferrari...



https://www.google.cz/search?q=red+car&biw=1150&bih=492&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwjBupCC_5PSAhVDbBoKHe53B98QsAQIGA#tbm=isch&q=red+ferrari+white+background

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_5PSAhVDBoKHe53B98QsAQIGA#tbn=isch&q=red+ferrari+458+from+side+white+background

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

- 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?)

Every brain is unique

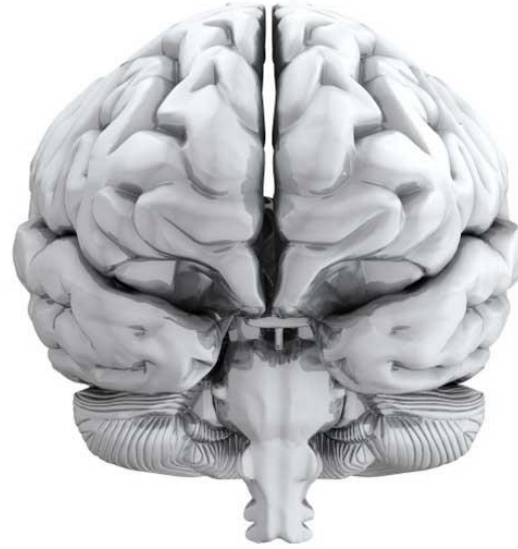
- Emotionally
 - Limbic system
- Rationally
 - Neocortex

✓ Genetics
✓ Environment



Every brain is a powerful instrument...

... which is hard to control



✓ The conflict between the limbic system and the neocortex

✓ The problem with effective control of the neocortex



86. The basic characterization of neocortical functions – language and social brain, basic overview of functional diagnostic methods used in neurology

- Communication and language
 - Language areas – localization and function including lobulus parietalis inferior, aphasia...
 - Lateralization of language functions, gender differences
- Social brain
 - Human is a social being, so the brain has to be designed accordingly
 - Frontal lobe and limbic system in behavioral control
 - Triune brain theory, whole brain model, mentalization, dehumanization
- Functional diagnostic methods (EEG, SPECT, PET , fMRI)

M U N I

M E D