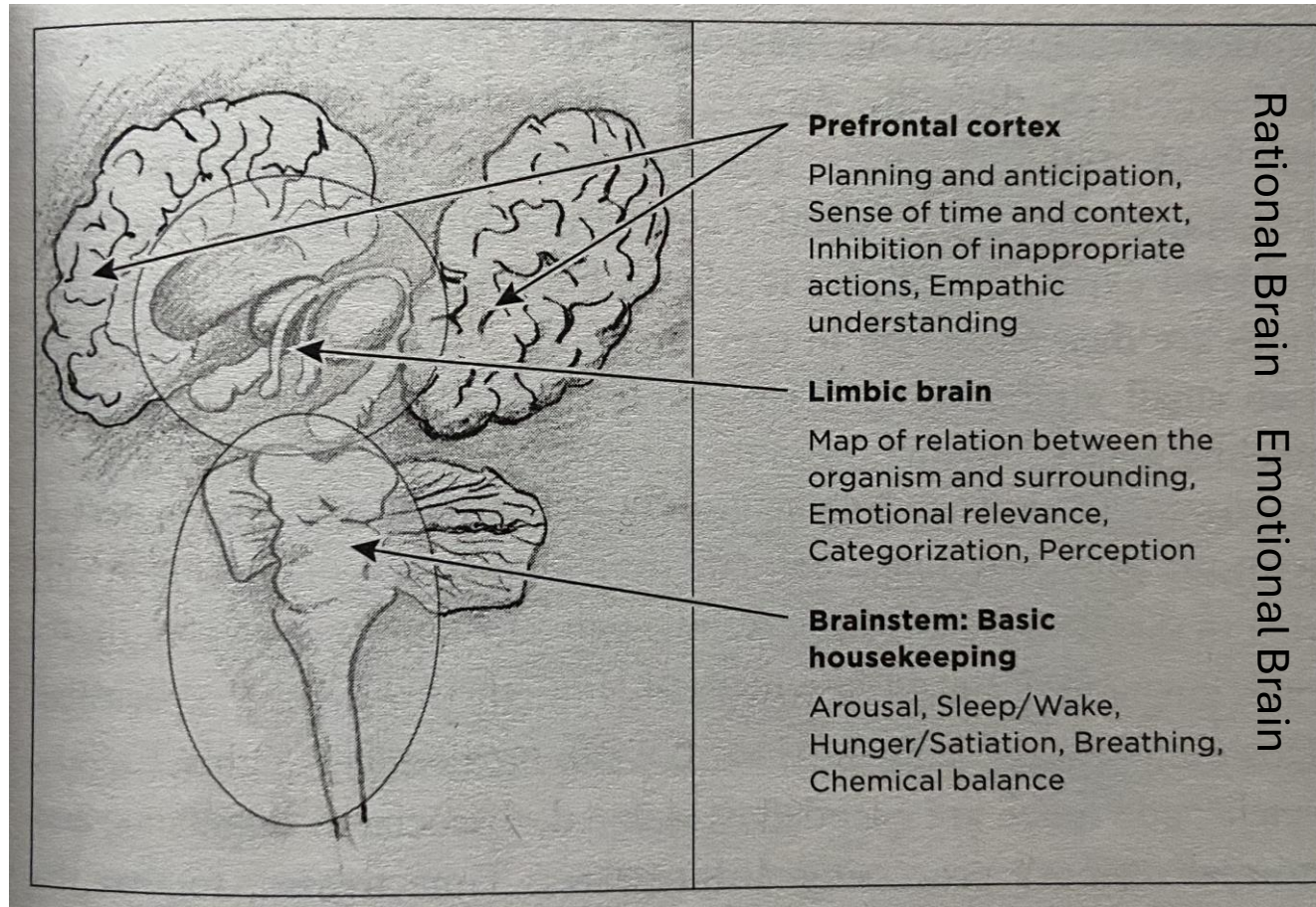


Can spirituality be reduced to neuroscience?

Rob Rabinowitz

The triune brain



Rational brain - higher-thinking, language, and emotion regulation

- spatial reasoning, metaphorical thinking, nonverbal communication and processing negative emotions
- analyzing logic, verbal communication, integrating positive emotions and organizing life experiences in a coherent narrative.
- working memory, decision making, planning, insight/awareness, and relationship to the external surroundings
- emotion regulation and impulse control, form explicit memories and house conclusions/decisions based on our past experiences.

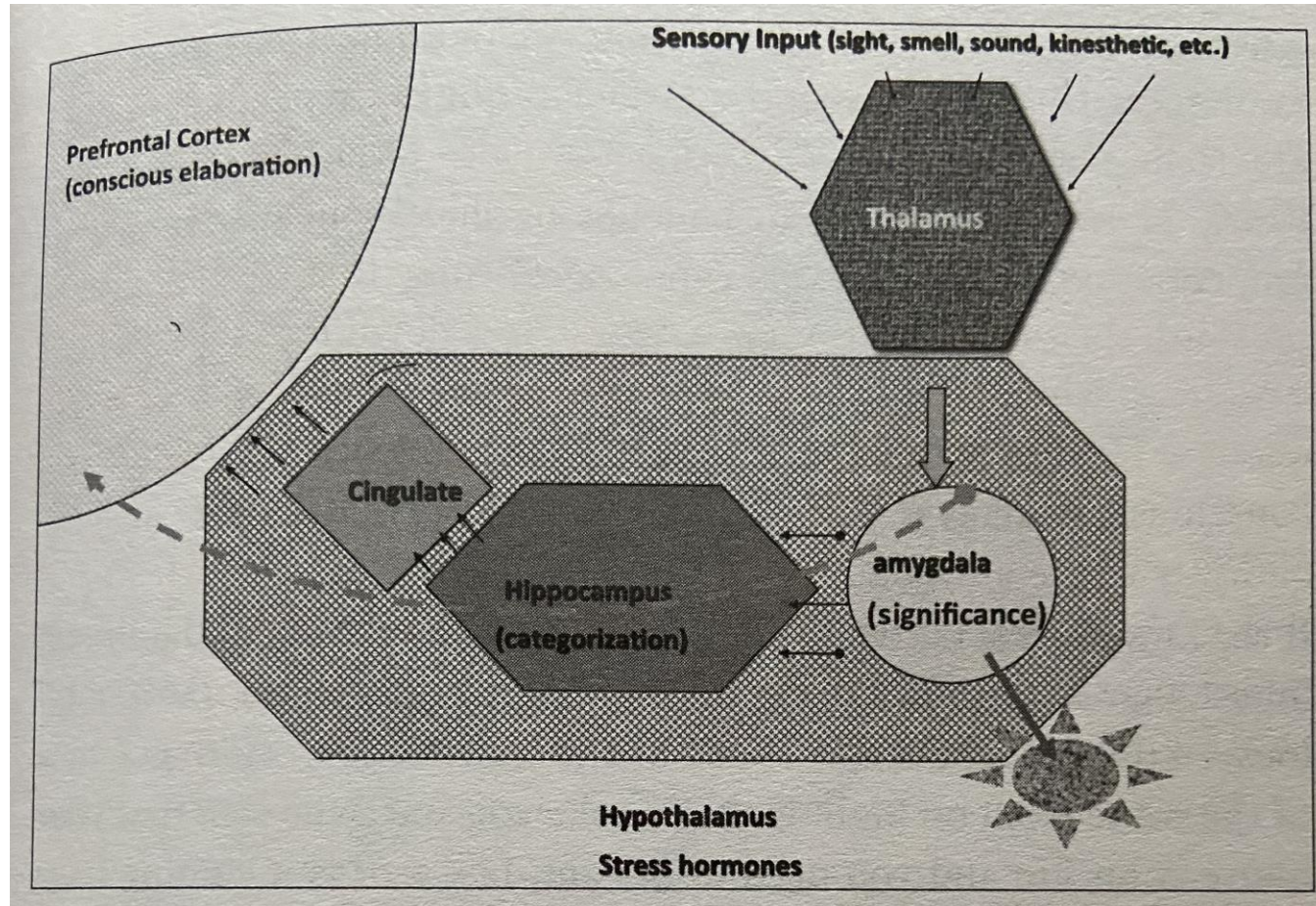
Mammalian brain - regulates emotional responses and attachment

- receives sensory input, coordinates brain responses
- autonomic nervous system responses, body temperature and food/drink intake
- “fear center” – determine if stimuli is safe or unsafe
- release hormones, e.g. pleasurable experience = dopamine, loving care giver = oxytocin, danger = cortisol or adrenaline
- organize emotional experiences into time and context

Reptilian brain - in charge of functions we do not have “conscious control over”

- breathing, digestion, reflex responses, blood pressure, bowel and bladder control
- balance, voluntary movements and posture
- procedural memory (routine behaviours, muscle memory), reward centre, learns from conditioning

Competing neural pathways



The low road

- Sensory Information about the environment and body state received by the eyes, ears, touch, kinesthetic sense, etc., converges on the thalamus, where it is processed, and then passed on to the amygdala to interpret its emotional significance.
- If a threat is detected the amygdala sends messages to the hypothalamus to secrete stress hormones to defend against that threat.

The high road

- Runs from the thalamus, via the hippocampus and anterior cingulate, to the prefrontal cortex, the rational brain, for a conscious and much more refined interpretation.

The high road takes several microseconds longer than the low road.

Thinking fast and slow

System 1 - Automatic activities

- Detect that one object is more distant than another.
- Orient to the source of a sudden sound.
- Complete the phrase "bread and . . ."
- Make a "disgust face" when shown a horrible picture.
- Detect hostility in a voice.
- Answer to $2 + 2 = ?$
- Read words on large billboards.
- Drive a car on an empty road.
- Find a strong move in chess (if you are a chess master).
- Understand simple sentences.
- Recognize that a "meek and tidy soul with a passion for detail" resembles an occupational stereotype.

System 2 – Activities that require attention

- Brace for the starter gun in a race.
- Focus attention on the clowns in the circus.
- Focus on the voice of a particular person in a crowded and noisy room.
- Look for a woman with white hair.
- Search memory to identify a surprising sound.
- Maintain a faster walking speed than is natural for you.
- Monitor the appropriateness of your behaviour in a social situation.
- Count the occurrences of the letter a in a page of text.
- Tell someone your phone number.
- Park in a narrow space (for most people except garage attendants).
- Compare two washing machines for overall value.
- Fill out a tax form.
- Check the validity of a complex logical argument.

Modular view of mind

7 modules:

- self-protection
- mate attraction
- mate retention
- affiliation
- kin care
- social status
- disease avoidance

Modules compete at an unconscious level for control of consciousness

The thoughts that are animated by the strongest feelings win control

There is no “internal CEO” or conscious mind to choose between modules

The conscious mind is the PR agent of the winning module

Robert Wright
Why Buddhism is True
pp. 270-275

Default mode network

- A large-scale brain network that is active
 - when a person is not focused on the outside world and the brain is at wakeful rest, such as during daydreaming and mind-wandering
 - during detailed thoughts related to external task performance
 - when the individual is thinking about others, thinking about themselves, remembering the past, and planning for the future
- Potentially the neurological basis for the self:
 - **Autobiographical information**: Memories of collection of events and facts about one's self
 - **Self-reference**: Referring to traits and descriptions of one's self
 - **Emotion of one's self**: Reflecting about one's own emotional state
- Thinking about others:
 - **Theory of mind**: Thinking about the thoughts of others and what they might or might not know
- **Emotions of others**: Understanding the emotions of other people and empathizing with their feelings
- **Moral reasoning**: Determining a just and an unjust result of an action
- **Social evaluations**: Good-bad attitude judgements about social concepts
- **Social categories**: Reflecting on important social characteristics and status of a group
- **Social isolation**: A perceived lack of social interaction
- Remembering the past and thinking about the future:
 - **Remembering the past**: Recalling events that happened in the past
 - **Imagining the future**: Envisioning events that might happen in the future
 - **Episodic memory**: Detailed memory related to specific events in time
 - **Story comprehension**: Understanding and remembering a narrative
 - **Replay**: Consolidating recently acquired memory traces

Summary from Wikipedia

Liberation from the Illusory Self

1. Human beings fail to see the world clearly which leads them to suffer and to make others suffer.

2. Humans anticipate more enduring satisfaction from attainment of goals than will transpire.

3 *Dukkha* (“unsatisfactoriness”/”suffering”) is a relentlessly recurring part of ordinary life.

4. The source of dukkha is *Tanha* as "thirst" or "craving" or "desire"- the desire for pleasant things and to escape from unpleasant things.

5. Mindfulness meditation can weaken tanha by making one less enslaved by craving and aversion.

6. Our intuitive conception of the "self" is misleading. Identification with thoughts and feelings is optional. Meditation reduces identification and hence suffering.

7. There is no interior self that is the decider, judge or

"thinker of thoughts." "Thoughts think themselves."

8. The bounds surrounding the self are illusory and can be dissolved.

9. Dissolving the bounds of self leads to less prioritization of "my" interests over the interests of others.

10. Emptiness = it is an illusion that objects and beings have independent "essences." This illusion leads us to suffer or to inflict suffering on others.

11. Not seeing the world clearly leads to our own suffering and to bad conduct that makes others suffer needlessly.

12. Mindfulness meditation increases attentiveness to how illusory perceptions and feelings influence our internal states and behaviours. Buddhist liberation is an escape from chains of influence that bind us and to which we were blind.

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TRUE SELF NESHAMA

Giving

What do others need?

How can I serve others?

Gratitude

Inner Focused

Presence

Now

EGO YETZER

Taking

What do I need?

How can others serve me?

Dissatisfaction

Status Focused

Absence

Grievance, regret, worry