

Introduction to mindfulness & neuroscience

What is mindfulness

- ‘the clear and single minded awareness of what happens to us and in us at the successive moments of perception”
- “ is the awareness that emerges by paying attention, on purpose, in the present moment, non-judgementally

The feeling of what happens: The first noble truth

- Exercise 1 – focus on the image
- Exercise 2 - place the image in the background and observe the observer

"A hint half guessed, a gift
half understood

What is an emotion, what are feelings

- 1. Emotion (to emote) triggered and executed non consciously
- 2 A feeling which is non –conscious
- 3 A state of feeling made conscious – i.e. made aware

Exercise - threat response



Emotions The arising of suffering – the second noble truth

- 1 Complicated collections of chemical and neural patterns that sustain regulation and maintain life
- 2 Culture and learning alter the expression- but the are biological driven processes depend on an inbuilt set of brain devices developed over long evolutionary path
- 3 devices occupy a restricted ensemble of subcortical structure – regulate body state

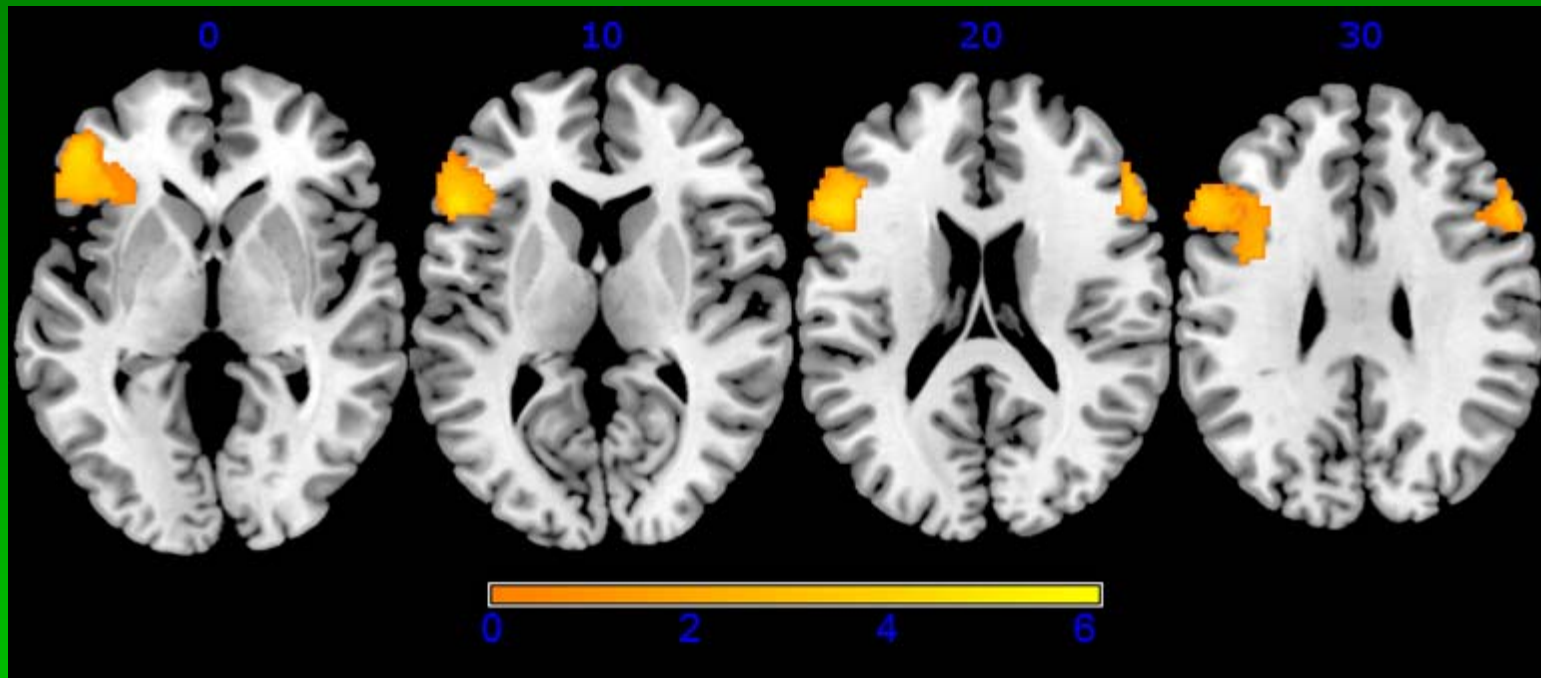
Emotions -cont

- 4. these devices are engaged automatically-shift in body state – i.e. flight/response
- 5 Emotions use the body as their theatre

Third noble truth What arises must fall

- brain seems to induce emotion from a remarkably small area: the brain stem, hypothalamus and periaqueductal gray (PAG).
- Functional imaging has shown that different emotions have different activation patterns.
- Sadness activates the ventromedial prefrontal cortex, hypothalamus and brain stem. Anger and fear activates the amygdala area.

Every picture tells a story



emotion

- In emotion, precise regions of the brain, in a system which is largely preset, are triggered and send commands throughout the body.
- achieved through two routes; one route via the blood stream in the form of neuropeptides such as endorphin which attach on receptor sites spread throughout the body but concentrated around the heart, chest and internal viscera.
- other route consists of neuron pathways in the form of electrochemical signals

result of this preset cascade of commands is to produce a global shift in the body sensation and cognition

The nature of self

- “ how does an emotion become known to us, how does these patterns of activation which are pre conscious – step into the light of awareness “

Deep mystery

- “The unvarnished sense of our individual in the act of knowing occurs”

Protoself

- “The question of what might give the brain a natural means to generate the single and stable reference we call self has remained unanswered “

Individual singularity

- the brain in order to create the self needs a single reference point, an anchor in space and time.
- anchor point needs to be relatively stable; it would be unsettling to wake up as a different self each day!
- The obvious place to look is to the body proper, that is stable over time and whose internal environment is minutely monitored by the brain stem, hypothalamus and subcortical structures.
- these very structures that modulate attention and are critical in the emergence of awareness.

protoself

- Several structures are thought to be key
- Brain stem nuclei – vagus – heart
- The hypothalamus – regulates internal state
- Insula cortex

protoself

- is a coherent collection of neural patterns which map, moment by moment, the state of the physical structure of the organism in its many dimensions.
- It is a first order collection of patterns that is ceaselessly maintained at a multiplicity of levels from the brain stem to the cerebral cortex. intimately connected to the regulation and homeostasis of the internal environment.
- We are not conscious of the Protoself.
- It has no language, holds no knowledge and no powers of perception. It is not the sense of knowing of each moment; instead it is the reference point, the anchor of the self in the body proper.

- The same structures that regulate body sensation, breathe, heart rate
- Are the foundation of the self
- Implications for mindfulness

- “awareness occurs when the brains representation devices generate an imagined nonverbal account of how the organism’s processing of an object and when this process enhances the object, thus placing it in a spatial and temporal context”

Awareness of self

- Awareness begins with the internal construction of an interaction between the organism and an object. (Object refers to a physical object like a landscape or to a sensation like pain)
- within the structures that regulate basic life functions, which signal continuously internal states. The object of our awareness also becomes mapped as a neural pattern; what is termed a first order map. This probably occurs in the sensory and motor structures.
- The first order sensorimotor maps about the object cause shifts
- This process generates second order maps pertaining to the relationship between the organism and the object.
- The neural patterns transiently formed in second order maps then become wordless mental images.
- Because of the body-related nature of both organism maps and second order maps, the mental images that describe the relationship are feelings.

- “The knowable entity of the catcher is created in the narrative of the catching process”.

- Mindfulness the moment of self reflective awareness is created moment by moment, the feeling of what happens creating core awareness, and the reference point always points back to the body proper.

Kinds of self

- **Autobiographical self**

- The autobiographical self is based on autobiographical memory which is constituted by implicit memories of multiple memories of individual experience of the past and of the anticipated future. It is primarily cortically based and sets of memories which describe identity can be reactivated as a neural pattern and made explicit. Each reactivated memory operates as “something to be known” and generates its own pulse of core awareness

- **Core Self**

- Occurs with the second order nonverbal account that occurs whenever an object modifies the proto-self. We are aware of the core self and it is strongly linked to body sensation. It is continuously generated and thus appears continuous in time. The mechanism of core-self requires the presence of Protoself. The biological essence of the core self is the representation in a second – order map of the Protoself being modified.

- **Awareness**

- **Proto-self**

- The Protoself is an interconnected coherent collection of neural patterns which represent the state of the body moment by moment, at multiple levels of the brain. We are **not** conscious of the Protoself.

mindfulness

- “You rise above the sea level of knowing, transiently but incessantly as a **felt core self**,

- Awareness springs to life in this story as a nonverbal account with the grammar syntax and vocabulary of body sensation.
- moment to moment our awareness brings us the images that dominate us, the subtle “feeling of you in the act of knowing” is a hint half guessed as a
- felt core self.

- “Sometimes all you notice is the whisper of a subsequent verbal translation”
- “Music heard so deeply that it is barely heard at all “
- TS Eliot

Fourth noble truth : a path through the heart



Lock & Key hypothesis

