

# The Neuroscience of Mindfulness

## The Mindful Brain



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# Definition of Mindfulness

Mindfulness is the **awareness** that emerges from **paying attention** in a particular way:

*on purpose,  
in the present moment and  
non-judgmentally*

(Kabat-Zinn, 2003)

# Mindfulness Techniques

- Pay close **attention to your breathing**, especially when feeling intense emotions.
- Notice—really notice—what you're **sensing** in a given moment
- Recognize that your thoughts and emotions are **fleeting and do not define you**
- Tune into your **body's physical sensations**

# Main Mindfulness Practices

- body scan
- mindfulness of breath (sitting)
- open awareness
- walking & movement practices
- compassion/kindness training

# ABCs of Mindfulness Meditation

## Develop **Awareness**

- (discernment of present moment experience)

## Learn to **Be with** experience

- (do not avoid/push away/distract)

## Make skilful **Choices**

- (non-reactivity, actions not mood-dependent)

# Non-Evaluative Attention

Re-training Attention Towards:

- Curiosity
- Nonjudgmental Thinking
- Equanimity
- Non-Anticipation
- Non-Reactivity
- Non-Rumination

*(FFMQ: Baer et al., 2006, 2008)*

# Awareness of Internal & External Stimuli

**Notice** and **discern** moment-by-moment:

- thoughts
- feelings
- bodily sensations
- urges/actions

**Dis-identify** with:

- thoughts
- feelings
- bodily sensations

(simply mental events that come and go)

# Mindfulness Benefits

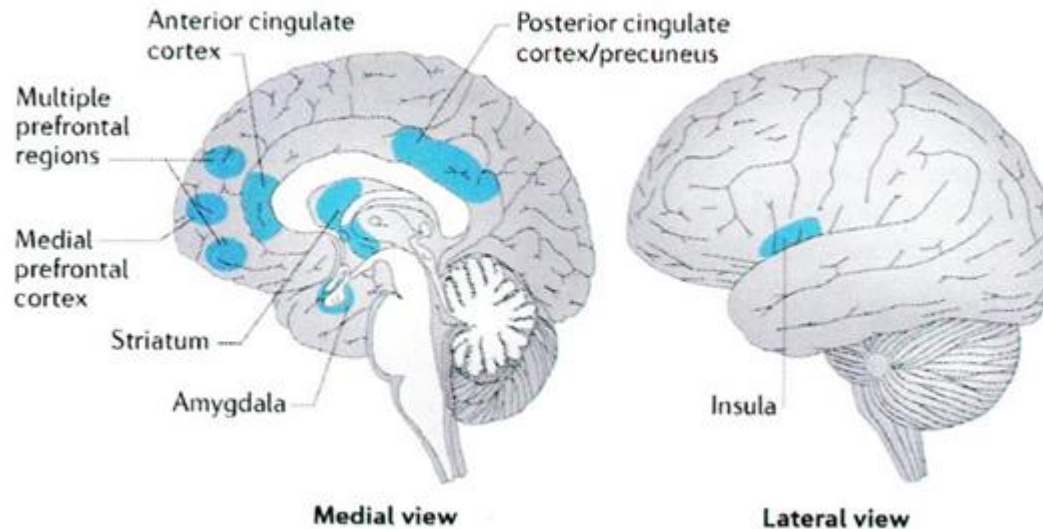
- Overactive/unproductive ruminative, predictive and worry networks can be disengaged (*Berkovich-Ohana et al., 2000*)
- Alters habitual responses in favour of intentional, skillful decision-making (*Chiesa et al., 2011*)
- Greater awareness of automatic pilot/inattentive mode
- Facilitates noticing thoughts come and go and letting them go (decentering) (*Hargus et al., 2010; Teasdale, 1999*)
- Alleviates anxiety, stress, insomnia, chronic pain (*Winbush et al., 2007; Jain et al., 2007; Hoffman et al., 2010*)
- Improves quality of life and creativity (*Manocha et al., 2012*)



# Mindfulness Research Findings

- Trains mind in attention: sustaining, selecting and shifting between modes (*Malinowski, 2013*)
- May initially activate attention to body (*Kerr et al., 2013*)
- Lowers stress reaction to negative thoughts and reduces self-referential bias – seen in fMRI (*Lazar et al., 2011; Taylor et al., 2013*)
- Reduces cortisol levels and boosts immune system (*Tang et al., 2009*)
- Self report studies show decrease in anxiety, stress, negative rumination, judgmental thinking (*Hoffman et al., 2010; Roemer et al., 2006*)
- Increases cortical thickness and changes brain structure (*Lazar et al., 2005; Fox et al., 2014*)
- Disengages Default Mode – background neuronal activity responsible for rumination and mind wandering (*Guo et al., 2014*)

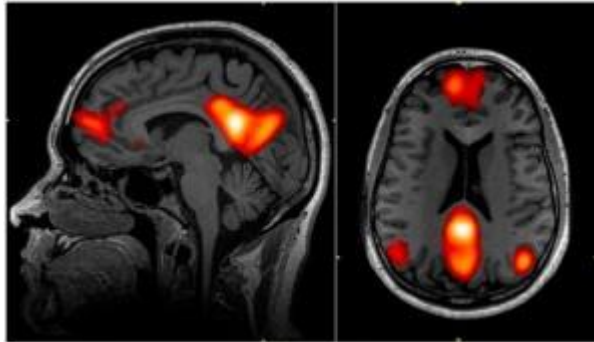
# Mindfulness and the Brain



## Brain areas involved and their function (Tang et al., 2015):

- **Attentional Control:** Anterior Cingulate Cortex and Striatum
- **Emotion Regulation:** Multiple Prefrontal Regions, Limbic Regions, Striatum
- **Body/Self-Awareness:** Insula, Medial Prefrontal Cortex, Posterior Cingulate Cortex & Precuneus

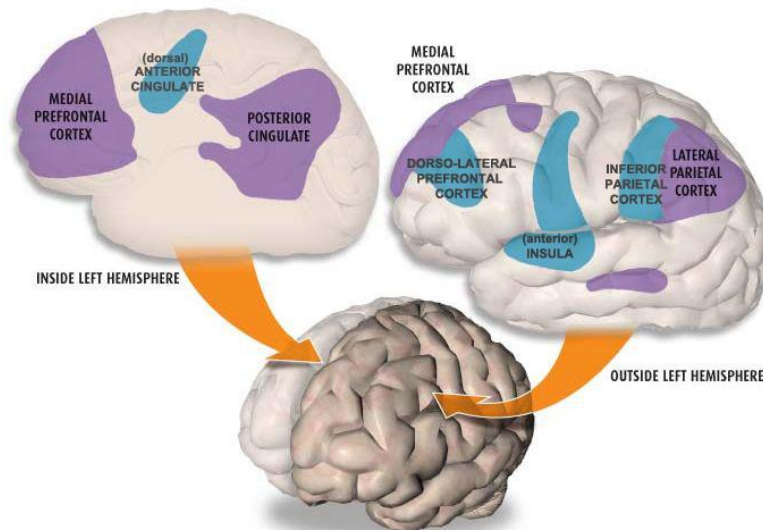
# Mindfulness and the Brain



## THE BRAIN IN NEUTRAL

When you switch off, a distinctive network of brain areas not involved in focused attention bursts into action

● Default network ● Areas involved in focused visual attention



Brian networks  
(connecting different  
brain structures)

▫ Task Positive Network

▫ Vs

▫ Task Negative  
Network/default Mode  
Network

<http://www.iqmindware.com/task-positive-default-mode-networks-focus-mindwandering/>