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# Mindfulness for pregnancy and childbirth

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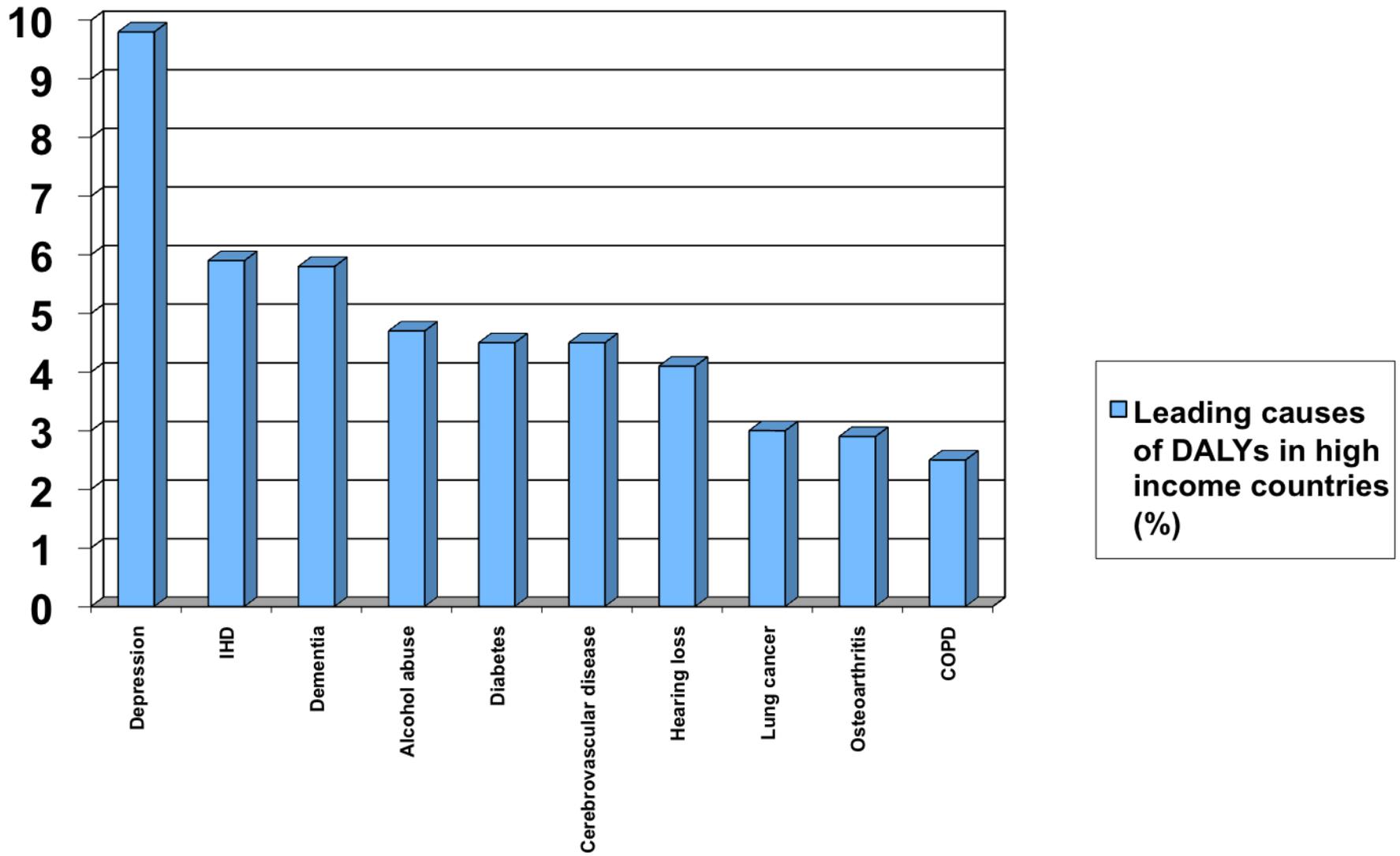
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# Mind wandering and happiness

- “In conclusion, a human mind is a wandering mind, and a wandering mind is an unhappy mind. The ability to think about what is not happening is a cognitive achievement that comes at an emotional cost.”
  - Killingsworth MA, Gilbert DT. A Wandering Mind Is an Unhappy Mind. *Science* 12 November 2010: Vol. 330. no. 6006, p. 932 DOI: 10.1126/science.1192439





Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. PLoS Med. 2006 Nov;3(11):e442.

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# Allostatic load

- Prolonged stress leads to wear-and-tear on the body (allostatic load)
    - Mediated through the Sympathetic Nervous System
  - Allostatic load leads to:
    - Impaired immunity, atherosclerosis, metabolic syndrome, bone demineralization
    - Atrophy of nerve cells in the brain
      - **Hippocampal formation:** learning and memory
      - **Prefrontal cortex:** working memory, executive function
    - Growth of **Amygdala** mediates fear response
  - Many of these processes are seen in chronic depression and anxiety
    - McEwen BS. Ann N Y Acad Sci. 2004;1032:1-7.
-

# Distress during pregnancy

- In utero environment plays an essential role in shaping future foetal growth and development
- Psychological distress during pregnancy associated with negative repercussions in the offspring, adverse birth outcomes, long-term defects in cognitive development, behavioral problems during childhood and high levels of stress-related hormones
- Due to foetal epigenetic programming
- Recent studies have examined the usefulness of mindfulness to reduce prenatal psychological stress and improve maternal psychological health
- Findings are promising but more research is needed
  - Isgut M, Smith AK, Reimann ES, Kucuk O, Ryan J. The impact of psychological distress during pregnancy on the developing fetus: biological mechanisms and the potential benefits of mindfulness interventions. *J Perinat Med*. 2017 Jan 31. pii: /j/jpme.ahead-of-print/jpm-2016-0189/jpm-2016-0189.xml. doi: 10.1515/jpm-2016-0189.

# TELOMERES

Embryonic Stem Cell

Adult Stem Cell

Telomere Long

Telomere Short

Telomerase Active

Telomerase Inactive or Absent

A A T  
A A T  
C C T  
C C T  
G G G  
G G G

Telomere is a Repeating DNA Sequence



# Work stress and aging

- Study on whether work-related exhaustion (prolonged work stress – Maslach’s Burnout Inventory) associated with accelerated biological aging (telomere length)
- Data from sample of 2911 of the Finnish working-age population aged 30-64
- Individuals with severe exhaustion had leukocyte telomeres on average 0.043 relative units shorter than those with no exhaustion ( $p=0.009$ )
  - Association remained significant after adjustment for other factors
- “These data suggest that work-related exhaustion is related to the acceleration of the rate of biological aging.”
  - Ahola K, Sirén I, Kivimäki M, et al. Work-related exhaustion and telomere length: a population-based study. PLoS One. 2012;7(7):e40186. Epub 2012 Jul 11.

# Maternal mental health and offspring TL

- Mental health of a woman during pregnancy affects the telomeres of her offspring
- Study of maternal stress during pregnancy measured in 94 healthy young adults
- Of these 45 were offspring of mothers who had experienced a severe stress during pregnancy and 49 were offspring of mothers who had a healthy, uneventful, relatively stress-free pregnancy
- Prenatal stress was a significant predictor of subsequent short adult telomere length in the offspring independent of other factors
  - Entringer S, Epel ES, Kumsta R, et al. Stress exposure in intrauterine life is associated with shorter telomere length in young adulthood. Proc Natl Acad Sci U S A. 2011;108(33):E513-8.

# Mind wandering and ageing

- The greater the level of mind wandering, the greater the level of telomere shortening (a marker of biological age)

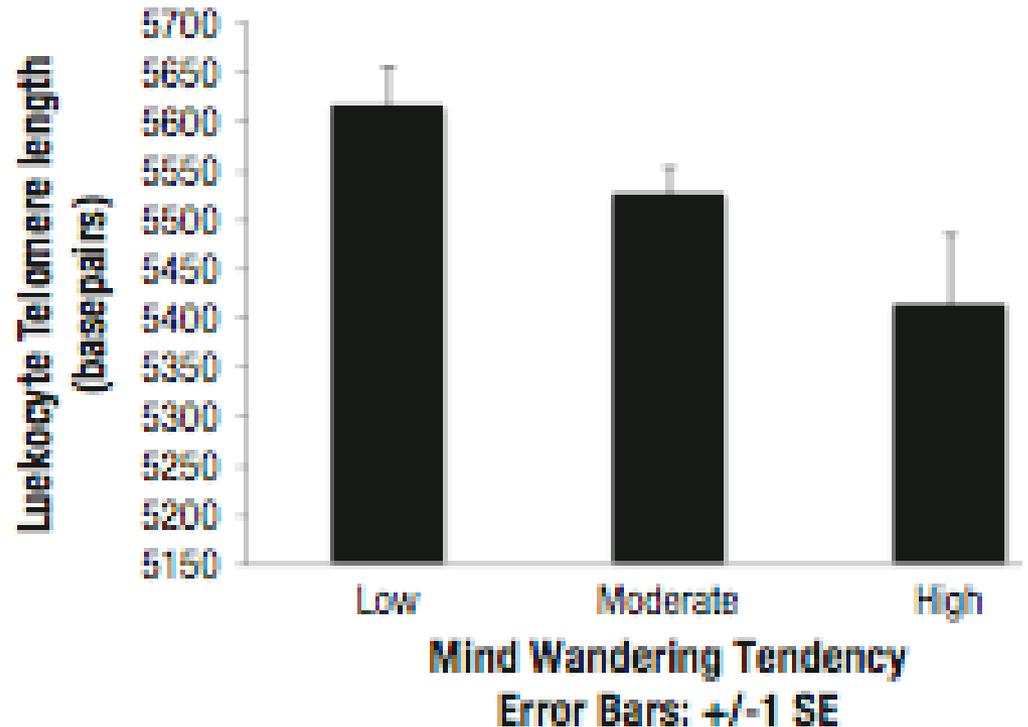
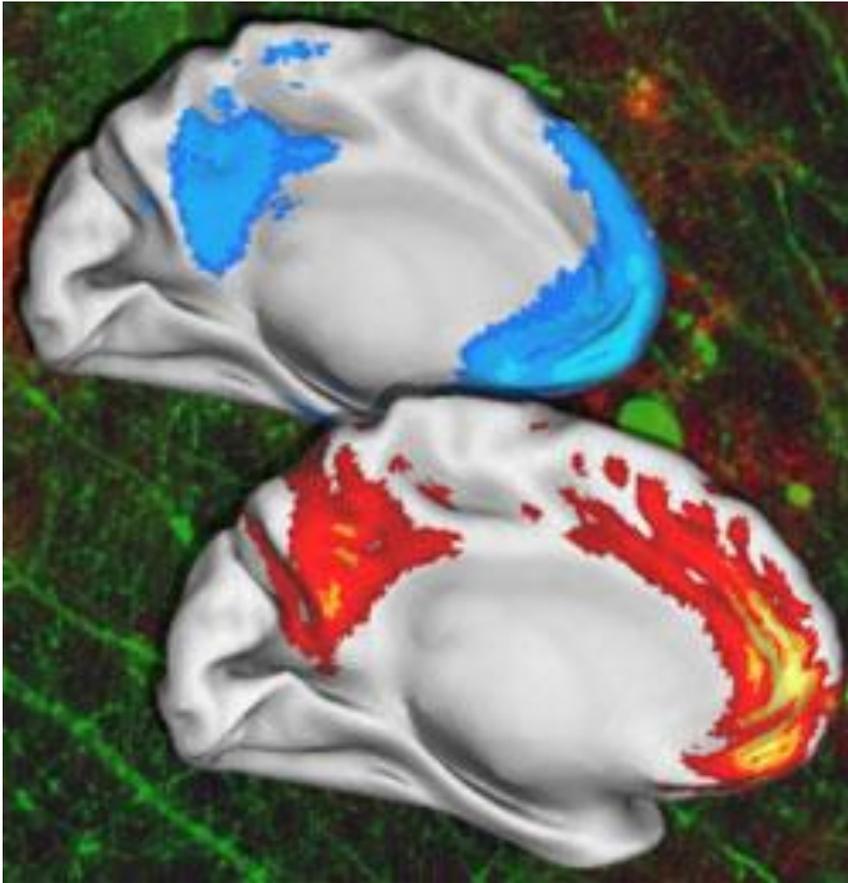


Fig. 1. Leukocyte telomere length by greater mind-wandering group.

Epel ES, Puterman E, Lin J, Blackburn E, et al. Wandering Minds and Aging Cells. *Clinical Psychological Science* 2012, in press.

# The Default Brain



- Focused / attentive
  - Tasks associated with paying attention
  - Brain efficient and quiet
- Default state (mode)
  - The default-mode network (DMN) is a major resting-state network that supports most of the baseline brain activity
  - Mind is inattentive, distracted, idle, recalling past, daydreaming

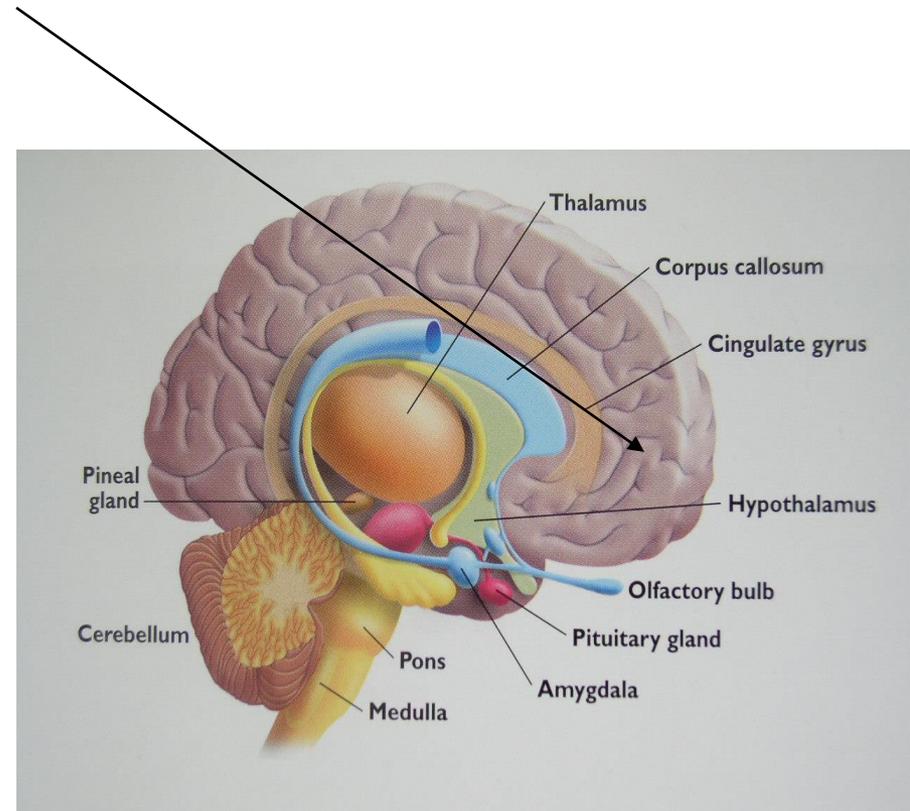
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# The Default Brain associated with:

- **Stress** (Brewer et al., 2011)
  - **Anxiety** (Zhao et al., 2007)
  - **Depression** (Greicius et al., 2007)
  - **ADHD** (Uddin et al., 2008a)
  - **Schizophrenia** (Pomarol-Clotet et al., 2008)
  - **Autism** (Kennedy & Courchesne, 2008)
  - **Alzheimer's disease** (Firbank et al., 2007)
  - **Criminal recidivism** (Aharoni et al., 2013)
  - **Reduced performance** (Brewer et al., 2011)
-

# Executive functions

- Frontal lobes (prefrontal cortex) centre for executive functioning
  - Attention regulation
  - Working memory
  - Self-awareness
  - Reasoning and decision making
  - Emotional regulation
  - Appetite regulation
  - Impulse control
  - Directs immune system
- Limbic system – emotion centre
- Mesolimbic reward system – appetites



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# Falling attention spans

- According to a Microsoft Canada report, the average human's attention span is below that of a goldfish (8 sec vs. 9 sec)
  - “We are moving from a world where computing power was scarce to a place where it now is almost limitless, and where the true scarce commodity is increasingly human attention”
    - Satya Nadella
      - <file:///microsoft-attention-spans-research-report.pdf>
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# Overloaded circuits

- “Bain and Company, the consultancy, has estimated that executives in the 1970s had to deal with fewer than 1,000 phone calls, telexes and telegraphs a year from people outside their company. These days, 30,000 external communications clog managers’ inboxes annually. As Henry Mintzberg asks in his 2009 book, *Managing*: “Might the internet, by giving the illusion of control, in fact be robbing managers of control? In other words, are the ostensible conductors becoming more like puppets?”
    - Financial Times, UK March 5, 2016.
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# Attention Deficit Trait

- Newly recognized neurological phenomenon: attention deficit trait (ADT)
    - Response to hyperkinetic environment
  - Trying to deal with too much input, results in:
    - Black-and-white thinking; perspective and shades of grey disappear
    - Difficulty staying organized, setting priorities, and managing time
    - Feel a constant low level of panic and guilt
      - Hallowell EM. Overloaded circuits: why smart people underperform. Harv Bus Rev. 2005 Jan;83(1):54-62, 116.
-

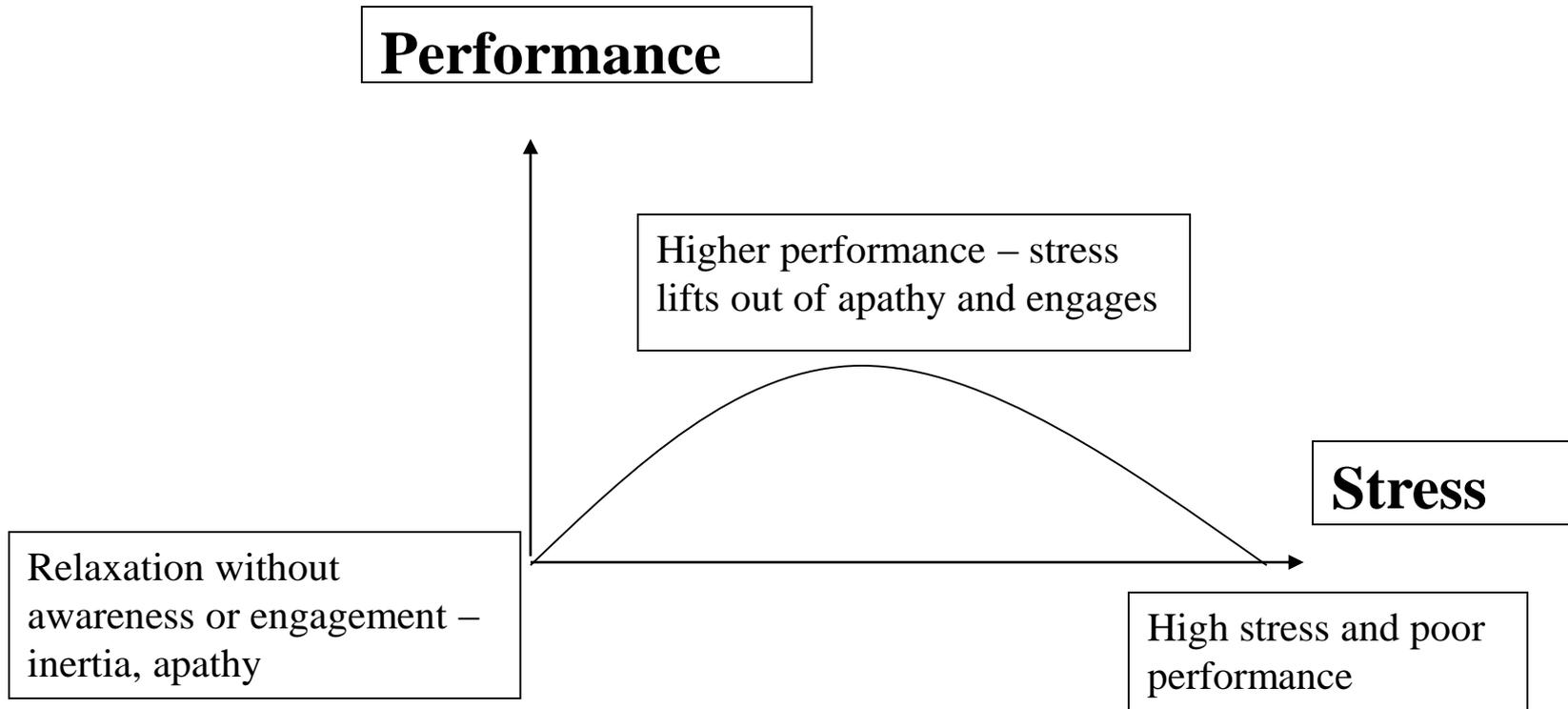
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# Mobile phone use and motor vehicle accidents

- Driver's use of a mobile phone within 5 min before a crash associated with fourfold increased likelihood of crashing (OR 4.1)
  - McEvoy SP, Stevenson MR, Woodward M. The contribution of passengers versus mobile phone use to motor vehicle crashes resulting in hospital attendance by the driver. *Accid Anal Prev.* 2007 Nov;39(6):1170-6. Epub 2007 Apr 9.



# Yerkes-Dodson Stress-performance curve

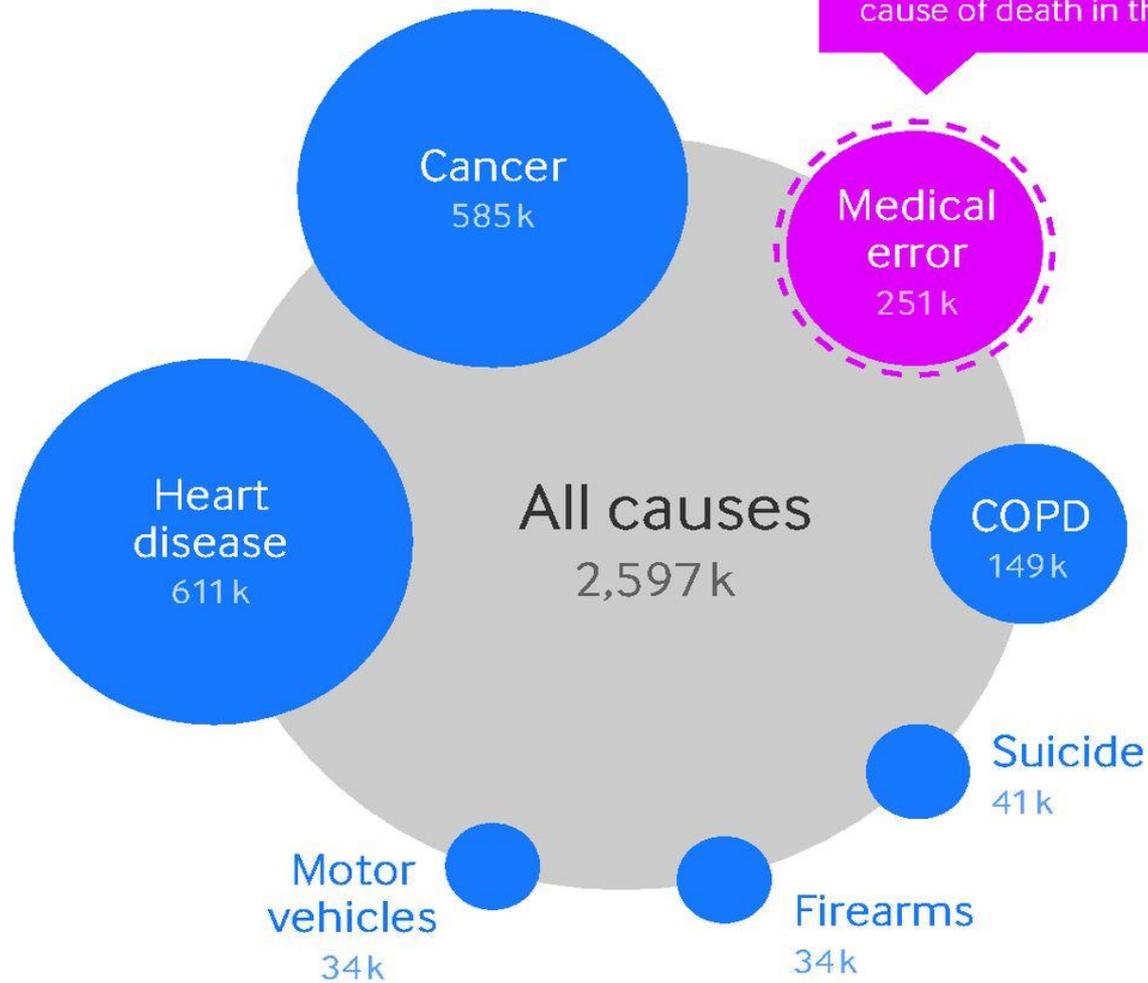


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# Nurses, burnout and quality of care

- “Organizational factors play a crucial role in the development of health professionals' job burnout, which in turn impacts the patient experience and quality of care.”
  - Significant patterns with regard to quality of care and job strain
  - Higher levels of depersonalisation, withdrawal, poor judgment and errors
    - Montgomery A, Todorova I, Baban A, Panagopoulou E. Improving quality and safety in the hospital: The link between organizational culture, burnout, and quality of care. *Br J Health Psychol.* 2013 Apr 23. doi: 10.1111/bjhp.12045.
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# Causes of death, US, 2013



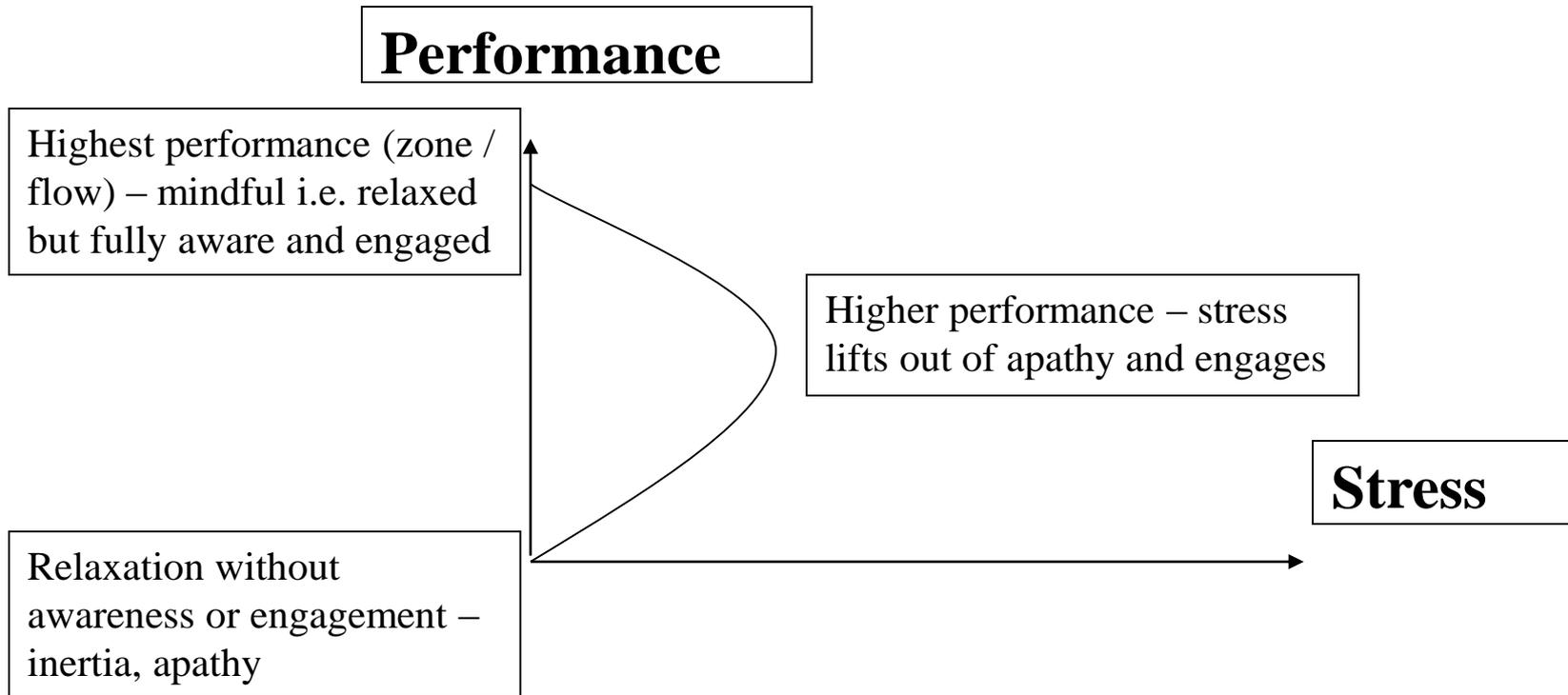
However, we're not even counting this - medical error is not recorded on US death certificates

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**Data source:**

[http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64\\_02.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf)

# Hassed / mindfulness stress-performance curve



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- “The faculty of voluntarily bringing back a wandering attention over and over again, is the very root of judgment, character, and will. No one is compos sui if he have it not. An education which should improve this faculty would be the education par excellence.”
    - William James,  
Principles of Psychology,  
1890
-

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# Mindfulness and attention regulation

- Mindfulness involves **attention** and **attitude**
  - Attention regulation has three aspects
    1. To know where our attention is
    2. To prioritise where the attention needs to be
    3. For the attention to go there and stay there
  - Mindful attitude
    1. Openness
    2. Curiosity
    3. Acceptance
    4. Self-compassion
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# Practicing mindfulness

- Formal practice
    - Mindfulness meditation
  - Informal practice
    - Mindful while engaged in daily activities and work
  - Cognitive practices
    - Perception
    - Letting go (non-attachment)
    - Acceptance
    - Presence of mind
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# Applications of mindfulness

- **Mental health:** E.g. therapeutic application for depression, anxiety, panic disorder, stress, emotional regulation, addiction, sleep problems, eating disorders, psychosis, ADHD, autism, reduced burnout, greater resilience
  - **Neuroscience:** E.g. structural and functional changes in the brain, stimulation of neurogenesis, possible prevention of dementia and cognitive decline, down-regulating the amygdala, improved executive functioning and working memory, reduced default mental activity, improved self-monitoring and cognitive control, improved perception of sensory input
  - **Clinical:** E.g. therapeutic applications for pain management, symptom control, coping with chronic illness (e.g. cancer and MS), metabolic and hormonal benefits (e.g. reduced allostatic load, cortisol), facilitating lifestyle change (e.g. weight management, smoking cessation), improved immunity (e.g. improved resistance, reduced inflammation), improved genetic function and repair, slower ageing as measured by telomeres
  - **Performance:** E.g. sport, academic, leadership qualities, mental flexibility and problem solving, decision-making, sunk-cost bias
  - **Education:** E.g. improved problem-solving, executive functioning and working memory, better focus, less behavioural problems, fostering growth mindsets
  - **Relationships:** E.g. greater emotional intelligence and empathy, improved communication, reduced vicarious stress and carer burnout
  - **Spiritual**
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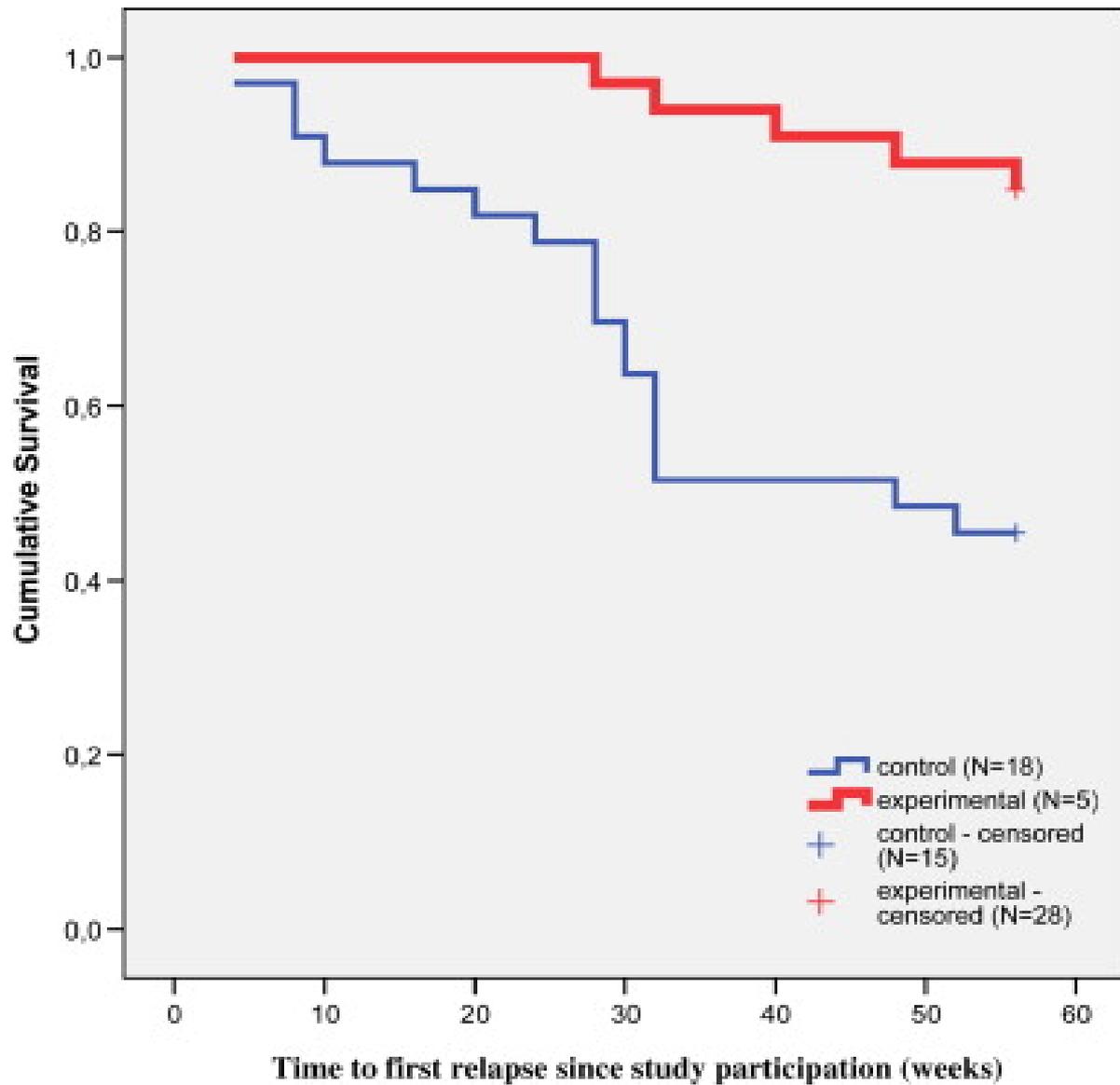
# Symptoms of depression

- Depression can be understood as a disorder of attention
  - Depressive rumination – default mode
  - Not present – foreboding about future and reliving past
  - Poor functioning – distracted
  - Anhedonia – lack of pleasure / enjoyment
  - Reactivity – non-acceptance of state of thoughts and emotions
  - High allostatic load – poor health
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# MBCT and depression

- RCT investigated the effects of Mindfulness-based cognitive therapy (MBCT) on the relapse in depression, time to first relapse and the quality of life
    - 106 recovered depressed patients with a history of at least 3 depressive episodes
    - Treatment as usual (TAU) vs MBCT plus TAU 1 year f/up
  - Relapse/recurrence significantly reduced and the time until first relapse increased in the MBCT plus TAU c/w TAU
  - MBCT plus TAU group also showed a significant reduction in both short and longer-term depressive mood, better mood states and quality of the life
    - Godfrin KA, van Heeringen C. The effects of mindfulness-based cognitive therapy on recurrence of depressive episodes, mental health and quality of life: A randomized controlled study. *Behav Res Ther.* 2010 Aug;48(8):738-46.
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# Mindfulness in mundane activities

- Study investigated whether washing dishes could be used as an informal contemplative practice, promoting the state of mindfulness, emotional wellbeing
  - 51 college students engaged in either a mindful or control dishwashing practice
  - Mindful dishwashers had greater state mindfulness, more enjoyment, increase in positive affect (i.e., inspiration), decrease in negative affect (i.e., nervousness), and overestimations of dishwashing time
    - Hanley AW, Warner AR, Dehili VM, Canto AI, Garland EL. Washing Dishes to Wash the Dishes: Brief Instruction in an Informal Mindfulness Practice. *Mindfulness* (2015) 6:1095–1103. DOI 10.1007/s12671-014-0360-9
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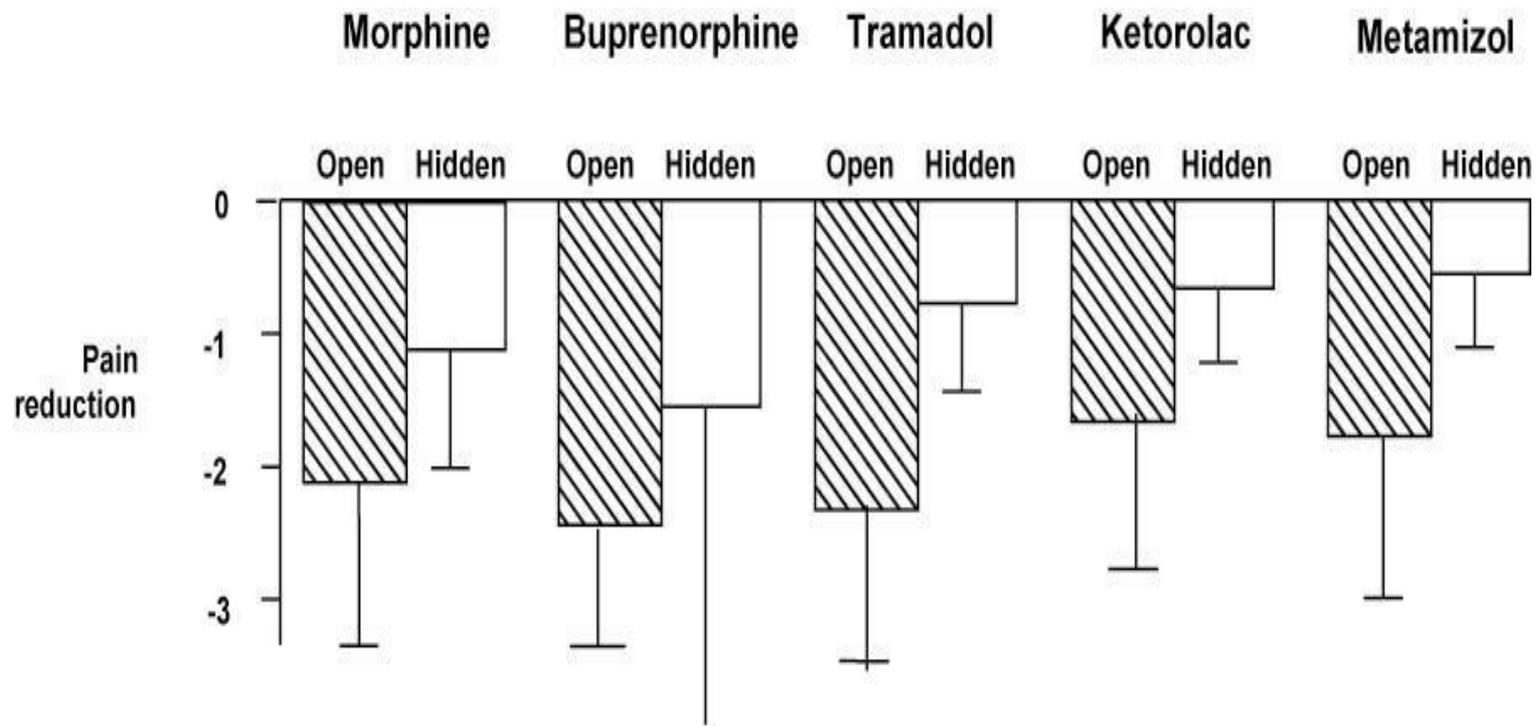
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# Emotions and pain

- Attention to pain is linked to activation of the fight or flight response (amygdala) and the consequent need to take action, such as escaping or avoiding it
  - Hyper-vigilance is an abnormal focus on or preoccupation about possible signals of pain or injury
  - Hyper-vigilance explains why a relatively small injury can result in the perception of intense pain and the suffering associated with it (e.g. the dentist chair)
  - Exemplifies close link between emotional and thought processes, attention and the perception of pain
    - Linton SJ. Understanding Pain for Better Clinical Practice. Edinburgh, Scotland: Elsevier; 2005.
    - Leeuw M, Goossens ME, Linton SJ, et al. The fear-avoidance model of musculoskeletal pain: current state of scientific evidence. *J Behav Med.* 2007;30:77–94.
    - Villemure C, Bushnell M. Cognitive modulation of pain: how do attention and emotion influence pain processing. *Pain.* 2002;95:195–199.
-

# Mindfulness and pain

- Improvements were found in depressive symptoms, pain burden, and physical health
  - Veehof MM, Oskam MJ, Schreurs KMG, Bohlmeijer ET (2011) Acceptance-based interventions for the treatment of chronic pain: A systematic review and meta-analysis. *Pain* 152: 533–542. doi: 10.1016/j.pain.2010.11.002
- Pain intensity and pain disability decreased significantly and pain acceptance increased: self-efficacy no significant improvement
- Quality of life favoured MBSR
  - Cramer H, Haller H, Lauche R, Dobos G (2012) Mindfulness-based stress reduction for low back pain. A systematic review. 162. *BMC Complement Altern Med*. 2012 Sep 25;12:162. doi: 10.1186/1472-6882-12-162.
- “MBCT showed a statistically significant, robust, and durable effect on pain intensity, indicating that MBCT may be an efficacious pain rehabilitation strategy for women treated for breast cancer.”
  - Johannsen M, O'Connor M, O'Toole MS, Jensen AB, Højris I, Zachariae R. Efficacy of Mindfulness-Based Cognitive Therapy on Late Post-Treatment Pain in Women Treated for Primary Breast Cancer: A Randomized Controlled Trial. *J Clin Oncol*. 2016 Jun 20. pii: JCO650770
- MBSR improved quality of life and depressive symptoms significantly in fibromyalgia patients
  - Kozasa EH, Tanaka LH, Monson C, Little S, Leao FC, et al. (2012) The effects of meditation-based interventions on the treatment of fibromyalgia. *Curr Pain Headache Rep* 16: 383–387. doi: 10.1007/s11916-012-0285-8



AR Price DD, et al. 2008  
 Annu. Rev. Psychol. 59:565–90

- **Figure 1** Comparison of analgesic effects of opioid (morphine, tramadol, buprenorphine) and nonopioid (ketorolac, metamizol) medications across hidden versus open intravenous injections in patients with postoperative pain. (Data are from Amanzio et al. 2001.)

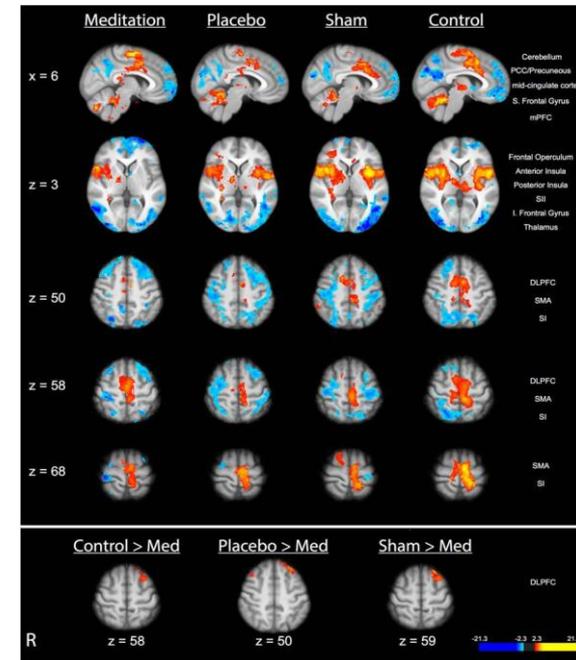
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# Mindfulness and pain

- With mindfulness meditation group reported pain intensity reduced by 27% and by 44% for the emotional aspect of pain
- Placebo cream reduced the sensation of pain by 11% and emotional aspect of pain by 13%
  - Zeidan F, Emerson NM, Farris SR, et al. Mindfulness Meditation-Based Pain Relief Employs Different Neural Mechanisms Than Placebo and Sham Mindfulness Meditation-Induced Analgesia. *J Neurosci*. 2015 Nov 18;35(46):15307-25. doi: 10.1523/JNEUROSCI.2542-15.2015.

# Mindfulness and pain

- Mindfulness practice produced patterns of brain activity different to placebo
- Mindfulness reduced pain by activating brain regions associated with the self-control of pain
- Placebo lowered pain by reducing brain activity in pain-processing areas
  - Thalamus deactivated during mindfulness meditation but activated by placebo
  - Thalamus: gateway determining if sensory information allowed to reach higher centers
  - Mindfulness may have caused signals about pain to simply fade away
    - Zeidan F, Emerson NM, Farris SR, et al. Mindfulness Meditation-Based Pain Relief Employs Different Neural Mechanisms Than Placebo and Sham Mindfulness Meditation-Induced Analgesia. *J Neurosci*. 2015 Nov 18;35(46):15307-25. doi: 10.1523/JNEUROSCI.2542-15.2015.



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# Acceptance and pain

- Emotional reactivity to pain is greatly accentuated by the resistance to it and the cognitive elaboration on it
  - Cultivating acceptance is aimed at reducing unsuccessful attempts to avoid or control pain where that is not possible
  - Makes it easier for a person to then to focus instead on other experiences or aspects of the environment and participate in valued activities and pursue personally relevant goals
  - “Pain-related acceptance leads to enhanced emotional and physical functioning in chronic pain patients above and beyond the influence of depression, pain intensity, and coping.”
    - [McCracken LM](#), [Vowles KE](#), [Eccleston C](#). Acceptance of chronic pain: component analysis and a revised assessment method. [Pain](#). 2004 Jan;107(1-2):159-66.
    - McCracken LM, Eccleston C. Coping or acceptance: what to do about chronic pain? [Pain](#). 2003;105:197–204.
    - <http://www.psychologytools.org/pain.html>
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# Calm pregnancy

- Many women experience anxiety during pregnancy with potential negative effects on maternal, birth, and child outcomes
  - Coping with Anxiety through Living Mindfully (CALM) Pregnancy is an adaptation of MBCT designed to address anxiety in pregnant women
  - Pilot study examined feasibility, acceptability, and clinical outcomes of the CALM Pregnancy intervention in pregnant women anxiety
  - 24 pregnant women with generalized anxiety disorder (GAD) participated in an open treatment trial of the CALM Pregnancy group intervention
  - Participants completed intervention with high attendance and good compliance with home practice
  - CALM showed statistically and clinically significant improvements in anxiety, worry, and depression, and significant increases in self-compassion and mindfulness
  - Of the 17 who met GAD criteria at baseline, only one continued to meet criteria post-intervention
    - Goodman JH, Guarino A, Chenausky K, et al. CALM Pregnancy: results of a pilot study of mindfulness-based cognitive therapy for perinatal anxiety. *Arch Womens Ment Health*. 2014 Oct;17(5):373-87. doi: 10.1007/s00737-013-0402-7.
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# Mindfulness for childbirth

- Australian pilot study tested feasibility and effectiveness of Mindfulness-Based Childbirth Education (MBCE) for mental health promotion with pregnant women
  - A single-arm pilot study of the MBCE intervention
  - Data before and after the MBCE intervention determine changes in mindfulness; depression, anxiety, and stress; childbirth self-efficacy; fear of childbirth
  - Pregnant women (18-28 weeks' gestation) and their support companions attended weekly MBCE group sessions over 8 weeks
  - Statistically significant improvements and large effect sizes observed for childbirth self-efficacy and fear of childbirth
  - Improvements in depression, mindfulness, and birth outcome expectations were underpowered
  - At postnatal follow-up significant improvements were found in anxiety as well as improvements in mindfulness, stress, and fear of birth
  - Also felt more empowered and a part of a community
    - Byrne J, Hauck Y, Fisher C, Bayes S, Schutze R. Effectiveness of a Mindfulness-Based Childbirth Education pilot study on maternal self-efficacy and fear of childbirth. *J Midwifery Womens Health*. 2014 Mar-Apr;59(2):192-7. doi: 10.1111/jmwh.12075.
    - Fisher C, Hauck Y, Bayes S, Byrne J. Participant experiences of mindfulness-based childbirth education: a qualitative study. *BMC Pregnancy Childbirth*. 2012 Nov 13;12:126. doi: 10.1186/1471-2393-12-126.
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# Mindfulness-based childbirth

- Mindfulness-Based Childbirth and Parenting (MBCP – an adaptation of MBSR) program as a pilot study of 27 pregnant women during third trimester of pregnancy
  - Quantitative results include statistically significant increases in mindfulness and positive affect, and decreases in pregnancy anxiety, depression, and negative affect
  - Effect sizes were large ( $d > .70$ ) suggesting that MBCP is achieving its intended effects on maternal well-being during pregnancy
  - Qualitative reports: majority of participants reported variety of benefits
    - Duncan LG, Bardacke N. Mindfulness-Based Childbirth and Parenting Education: Promoting Family Mindfulness During the Perinatal Period. *J Child Fam Stud.* 2010 Apr;19(2):190-202.
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# Mindfulness and practitioner wellbeing

- An 8-week mindfulness program: improvements on all measures of wellbeing including:
    - Mindfulness
    - Burnout (emotional exhaustion; depersonalization; personal accomplishment)
    - Empathy and responsiveness to psychosocial aspects
    - Total mood disturbance
    - Personality (conscientiousness; emotional stability)
  - Improvements in mindfulness correlated with improvements on other scales
    - Krasner MS, Epstein RM, Beckman H, et al. JAMA. 2009;302(12):1338-40.
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# Mindfulness and the workplace

- 8 week mindfulness program for ANU staff
  - Key findings include:
    - Increased self-rated performance (ECDP)
    - Improved wellbeing (PANAS)
    - Improved eudaimonic wellbeing (meaningfulness) (PWB)
    - Increase in work engagement (vigour and dedication) (UWES)
    - Increased authenticity (self-awareness, authentic behaviour, open relationships) (AI3)
    - Increased satisfaction with life (SWLS)
  - Improvements sustained at 6 month f/up
    - Atkins PWB, Hassed C, Fogliati VJ. (2015) Mindfulness Improves Work Engagement, Wellbeing and Performance in a University Setting. In Burke, RJ, Cooper, CL & Page, KM. Flourishing in Life, Work, and Careers, pp 193-209. Elgar, Cheltenham.
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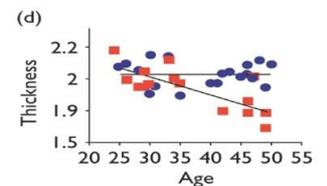
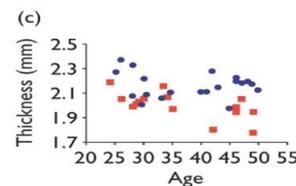
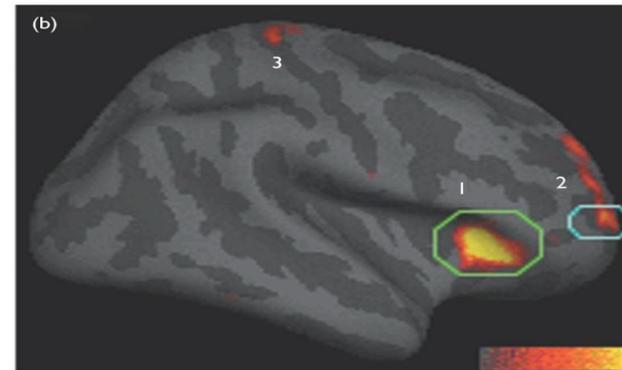
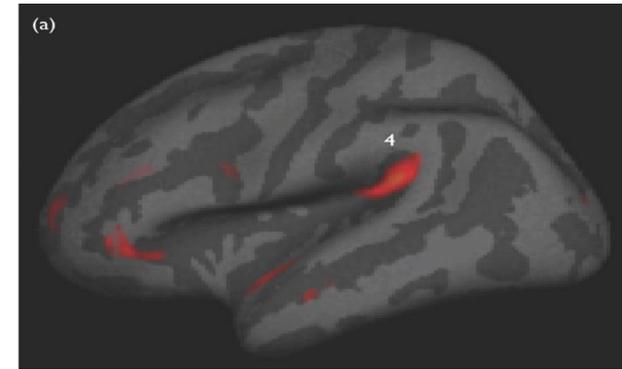
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# Mindfulness and job stress

- RCT evaluated the effectiveness of 8-week mindfulness-based intervention (MBI) on mental illness risks (including psychological distress, prolonged fatigue, and perceived stress) and job strain (job control and job demands) for 144 employees with poor mental health
  - MBI group significantly lower on psychological distress, prolonged fatigue, and perceived stress
    - Job strain: job demands showed a significant decline but the significance disappeared when the demographic variables were controlled for
      - Huang SL, Li RH, Huang FY, Tang FC. The Potential for Mindfulness-Based Intervention in Workplace Mental Health Promotion: Results of a Randomized Controlled Trial. PLoS One. 2015 Sep 14;10(9):e0138089. doi: 10.1371/journal.pone.0138089. eCollection 2015.
  - Interventions for enhancing workplace resilience for individuals should not be divorced from the need to create work environments and systems sympathetic to wellbeing and being mindful
-

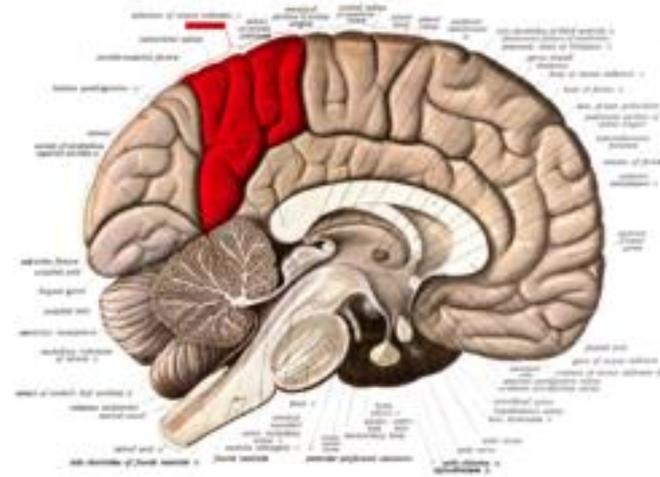
# Mindfulness and the brain

- Mindfulness training improves functioning in areas related to executive functioning, attentional control, self-regulation, sensory processing, memory and regulation of the stress response
  - Thickening of cortex in regions associated with attention, self-awareness and sensory processing thicker in meditators
  - “The regular practice of meditation may have neuroprotective effects and reduce the cognitive decline associated with normal aging.”
    - Hölzel BK, Carmody J, Evans KC, et al. Stress reduction correlates with structural changes in the amygdala. *Soc Cogn Affect Neurosci*. 2010 Mar;5(1):11-7.
    - Hölzel BK, Carmody J, Vangel M, et al. Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Res*. 2011 Jan 30;191(1):36-43.
    - Kilpatrick LA, Suyenobu BY, Smith SR, et al. Impact of Mindfulness-Based Stress Reduction training on intrinsic brain connectivity. *Neuroimage*. 2011 May 1;56(1):290-8.
    - Lazar SW, Kerr CE, Wasserman RH, et al. *Neuroreport*. 2005;16(17):1893-1897.
    - Pagnoni G, Cekic M. *Neurobiology of Aging*. 2007;28(10):1623-7.



# Precuneus

- A brain region that becomes active when experiencing:
  - consciousness, wakefulness, self-awareness
  - attention, episodic memory retrieval, working memory and conscious perception
  - visuospatial processing
- Impaired by default mental activity
- Larger in happy people
  - Sato W, Kochiyama T, Uono S, et al. The structural neural substrate of subjective happiness. *Scientific Reports*, 2015; 5: 16891 DOI: 10.1038/srep16891
- 6-week mindfulness program on the grey matter: a significant grey matter increase identified within the precuneus
  - Kurth F, Luders E, Wu B, Black DS. Brain Gray Matter Changes Associated with Mindfulness Meditation in Older Adults: An Exploratory Pilot Study using Voxel-based Morphometry. *Neuro*. 2014; 1(1): 23–26. Published online 2014 Nov 12. doi: 10.17140/NOJ-1-106



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# Mindful practice

- In the context of medical practice, ‘mindful practice’ was a term coined by Prof. Ron Epstein in 1999
  - Refers to a clinician’s ability to be mindful while actively engaged in their work
  - “Mindful practice is conscious and intentional attentiveness to the present situation – the raw sensations, thoughts, and emotions as well as the interpretations, judgments and heuristics that one applies to a particular situation.”
  - Mindfulness is essential underpinning for self-monitoring
  - Avoids automatic pilot
    - Epstein RM. Mindful practice. JAMA. 1999 Sep 1;282(9):833-9.
    - Epstein R, Siegel D, Silberman J. Self-monitoring in clinical practice: a challenge for medical educators. J Cont Educ Health Prof 2008;28(1):5-13.
    - Epstein RM. Mindful practice in action (II): Cultivating habits of mind. Fam Syst Health . 2003;21: 11-17.
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# Bias: the root of diagnostic errors

- Confirmation bias: the pursuit of data that support a diagnosis over data that refute it
  - Anchoring bias: a resistance to adapting appropriately to subsequent data that suggest alternative diagnoses
    - Sibinga EM, Wu AW. Clinician Mindfulness and Patient Safety. JAMA 2010;304(22):2532-3.
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# Mindfulness and mental flexibility

- Mindfulness leads to:
    - reduced cognitive rigidity via the tendency to be "blinded" by experience
    - “a reduced tendency to overlook novel and adaptive ways of responding due to past experience, both in and out of the clinical setting.”
      - Greenberg J, Reiner K, Meiran N. "Mind the trap": mindfulness practice reduces cognitive rigidity. PLoS One. 2012;7(5):e36206. Epub 2012 May 15.
-

# Emotional Intelligence & mindfulness

- Mindfulness related to aspects of personality and mental health
  - Lower neuroticism, psychological symptoms, experiential avoidance, dissociation
  - Higher emotional intelligence and absorption
    - Baer RA, et al. Assessment. 2004;11(3):191-206.

EI	Definition
<b>Self-awareness</b>	Ability to recognise and understand emotions, drives and effects
<b>Self-regulation</b>	Can control or redirect disruptive impulses, can think before acting
<b>Motivation</b>	Passion for work that goes beyond money or status, energy and persistence
<b>Empathy</b>	Ability to understand emotions of others, skill in interacting with others
<b>Social skill</b>	Can manage relationships and build networks, can find common ground, rapport

# GPs, mindfulness and burnout

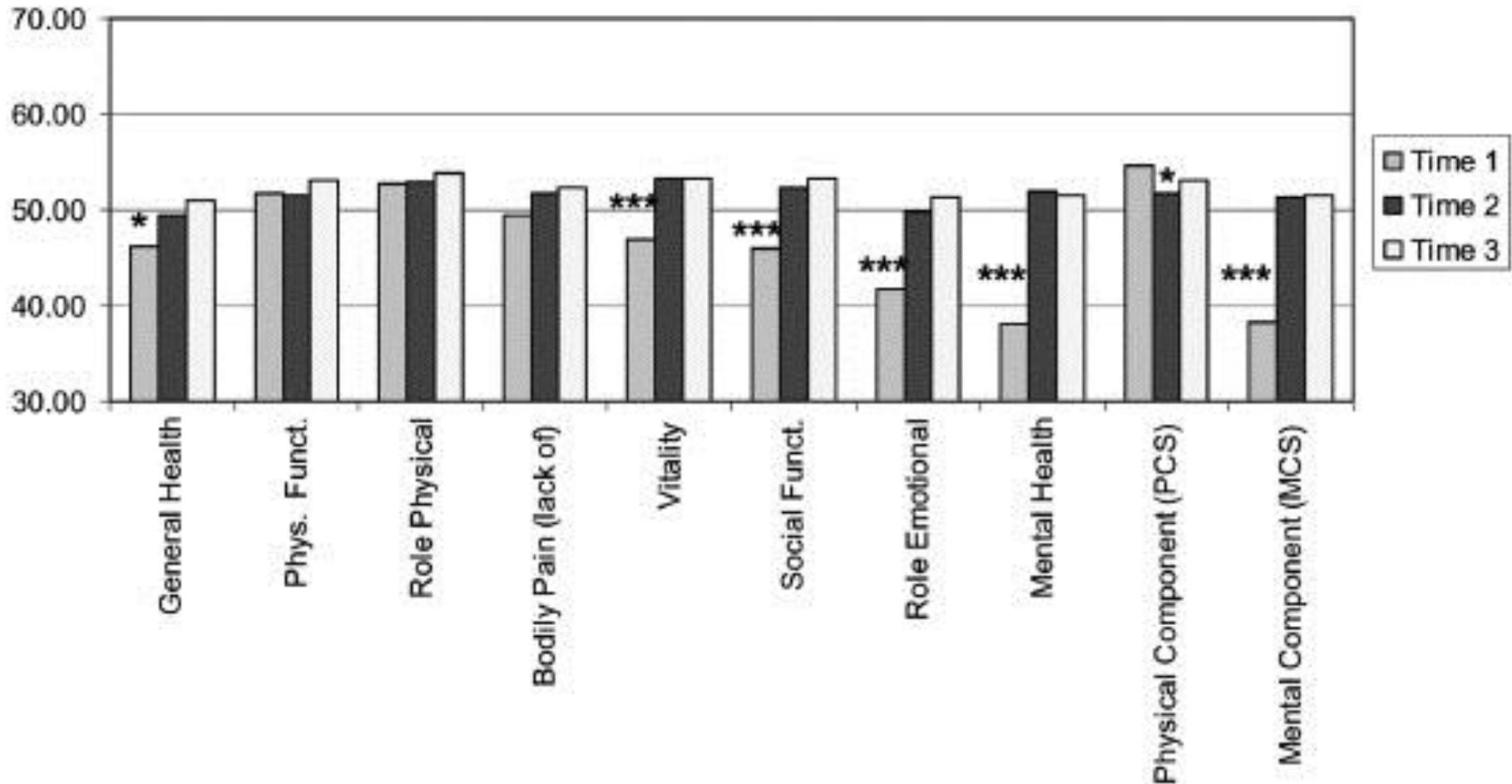
- Mixed methods study: waiting list-controlled pre-/post-study and a qualitative study of the experiences of Dutch GPs participating in an MBSR course
- Participants sent questionnaires assessing burnout, work engagement, empathy, and mindfulness skills, before and at the end of the MBSR training/waiting period
- Compared with the control group, MBSR group reported
  - Decrease in depersonalisation
  - Increase in dedication
  - Mindfulness skills increased
  - Work engagement increased (Vigour and Dedication but not Absorption)
- Qualitative data: MBSR course increased GP wellbeing and compassion towards themselves and others, including their patients
  - Verweij H, Waumans RC, Smeijers D et al. Mindfulness-based stress reduction for GPs: results of a controlled mixed methods pilot study in Dutch primary care. *Br J Gen Pract.* 2016 Feb;66(643):e99-e105. doi: 10.3399/bjgp16X683497.

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# Mindfulness for nurses

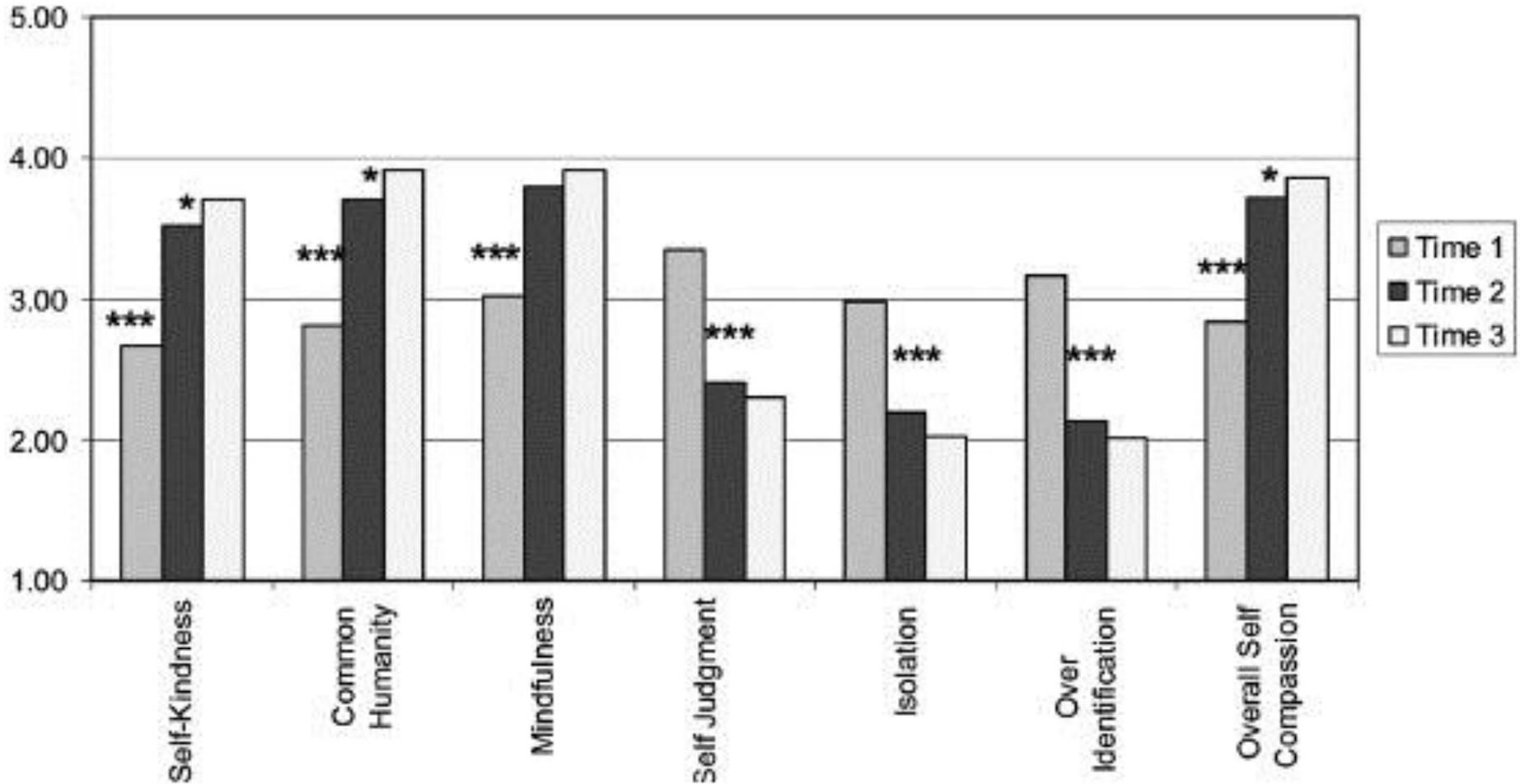
- Study implemented an innovative new model of delivering Mindfulness-Based Stress Reduction (MBSR)
    - Replaced six of the eight traditional in-person sessions with group telephonic sessions (tMBSR)
  - Between baseline (Time 1) and the end of the 8-week tMBSR intervention (Time 2) participants showed improv't in general health, decreased stress, decreased work burnout, and improvement in several other areas
  - Improvements sustained 4 months later (Time 3)
  - Individuals who continued MBSR practice after program demonstrated better outcomes than those that did not
    - Bazarko D, Cate RA, Azocar F, Kreitzer MJ. The Impact of an Innovative Mindfulness-Based Stress Reduction Program on the Health and Well-Being of Nurses Employed in a Corporate Setting. J Workplace Behav Health. 2013 Apr;28(2):107-133.
-

# Mindfulness for nurses



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# Mindfulness for nurses



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# Mindfulness for nurses

Figure 8A. Perceived Stress

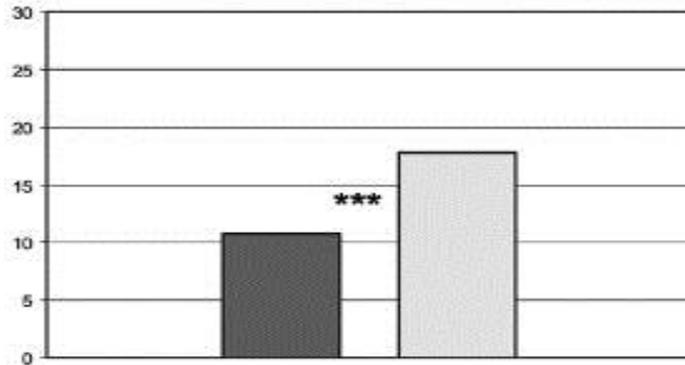


Figure 8B. Burnout

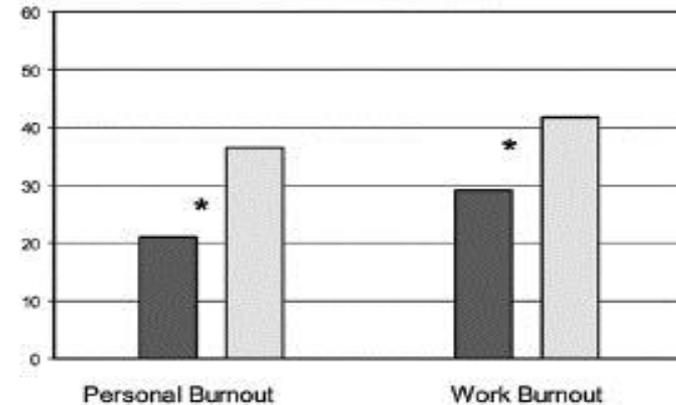


Figure 8C. Overall Self-Compassion

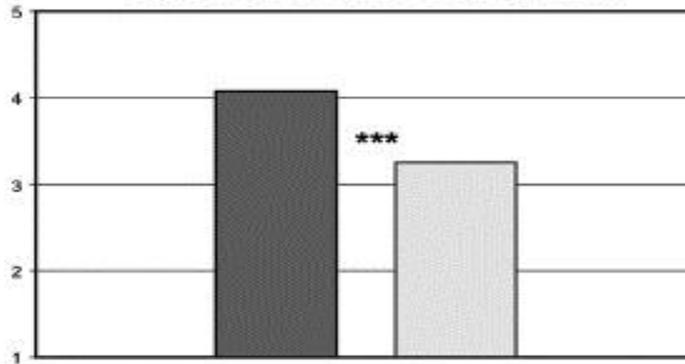
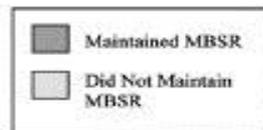
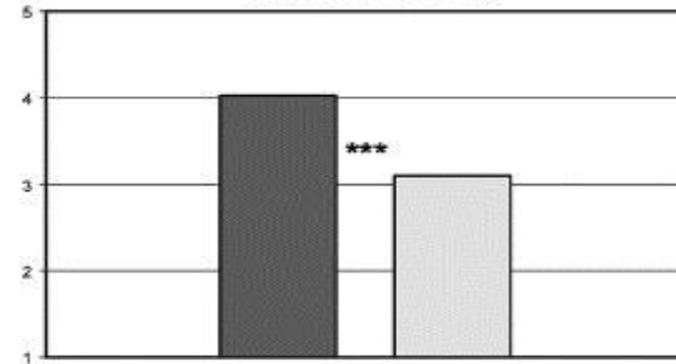


Figure 8D. Serenity



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# Mindfulness and healthcare quality

- Observational study of clinicians (physicians, nurse practitioners, and physician assistants)
  - Comparing clinicians with highest and lowest mindfulness scores: high-mindfulness clinician consultations:
    - Patient-centered pattern of communication (OR 4.14)
    - More rapport building and discussion of psychosocial issues
    - More positive emotional tone with patients
    - Patients more likely to give high ratings on clinician communication and to report high overall satisfaction
      - Beach MC, Roter D, Korthuis PT, Epstein RM, et al. A Multicenter Study of Physician Mindfulness and Health Care Quality doi: 10.1370/afm.1507 Ann Fam Med 2013;11(5):421-428.
-

# Mindfulness, exercise & the cold

- RCT evaluating effects of meditation or exercise on incidence, duration, and severity of acute respiratory infection (ARI)
- Adults >50 years randomized to 1 of 3 study groups:
  - 8-week mindfulness training
  - 8-week moderate exercise training
  - control (no intervention)
    - Barrett B, Hayney MS, Muller D, et al. Meditation or Exercise for Preventing Acute Respiratory Infection: A Randomized Controlled Trial. *Ann Fam Med* 2012 10:298-299.
- ARIs and days of illness:
  - Control group: 40 ARIs and 453 illness days
  - Exercise group: 26 ARIs and 241 illness days
  - Meditation group: 27 ARIs and 257 days of ARI illness
- ARI symptom severity
  - 358 for control
  - 248 for exercise
  - 144 for meditation
- Days off work with illness
  - 67 missed in the control group
  - 32 in the exercise group
  - 16 in the meditation group

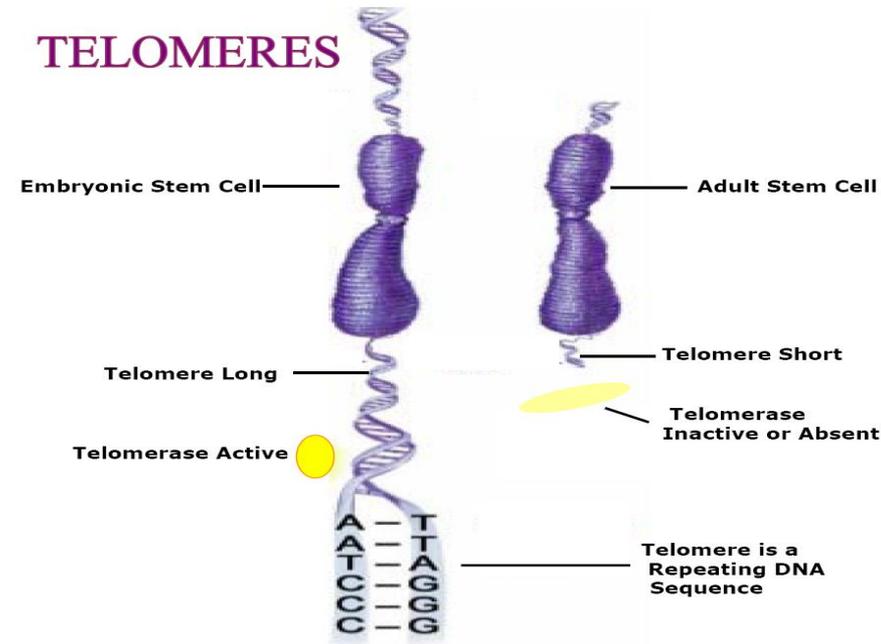
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# Meditation, genes and immunity

- Study on effect of meditation on genetic expression
  - 68 genes found to be differentially expressed (19 up-regulated, 49 down-regulated)
  - Up-regulated genes included immunoglobulin-related genes – better resistance
  - Down-regulated genes included pro-inflammatory cytokines – less inflammation
    - Black DS, Cole SW, Irwin MR, et al. Yogic meditation reverses NF- $\kappa$ B and IRF-related transcriptome dynamics in leukocytes of family dementia caregivers in a randomized controlled trial. *Psychoneuroendocrinology*. 2013 Mar;38(3):348-55. doi: 10.1016/j.psyneuen.2012.06.011.
-

# Mindfulness and cellular ageing

- Meditation may slow genetic ageing and enhance genetic repair
  - “...we propose that some forms of meditation may have salutary effects on telomere length by reducing cognitive stress and stress arousal and increasing positive states of mind and hormonal factors that may promote telomere maintenance.”
    - Epel E, Daubenmier J, Moskowitz JT, Folkman S, Blackburn E. Can meditation slow rate of cellular aging? Cognitive stress, mindfulness, and telomeres. *Ann N Y Acad Sci.* 2009 Aug;1172:34-53.



co-author of the bestselling *Mindfulness for Life*

DR CRAIG HASSED  
& DR RICHARD CHAMBERS

# mindful learning

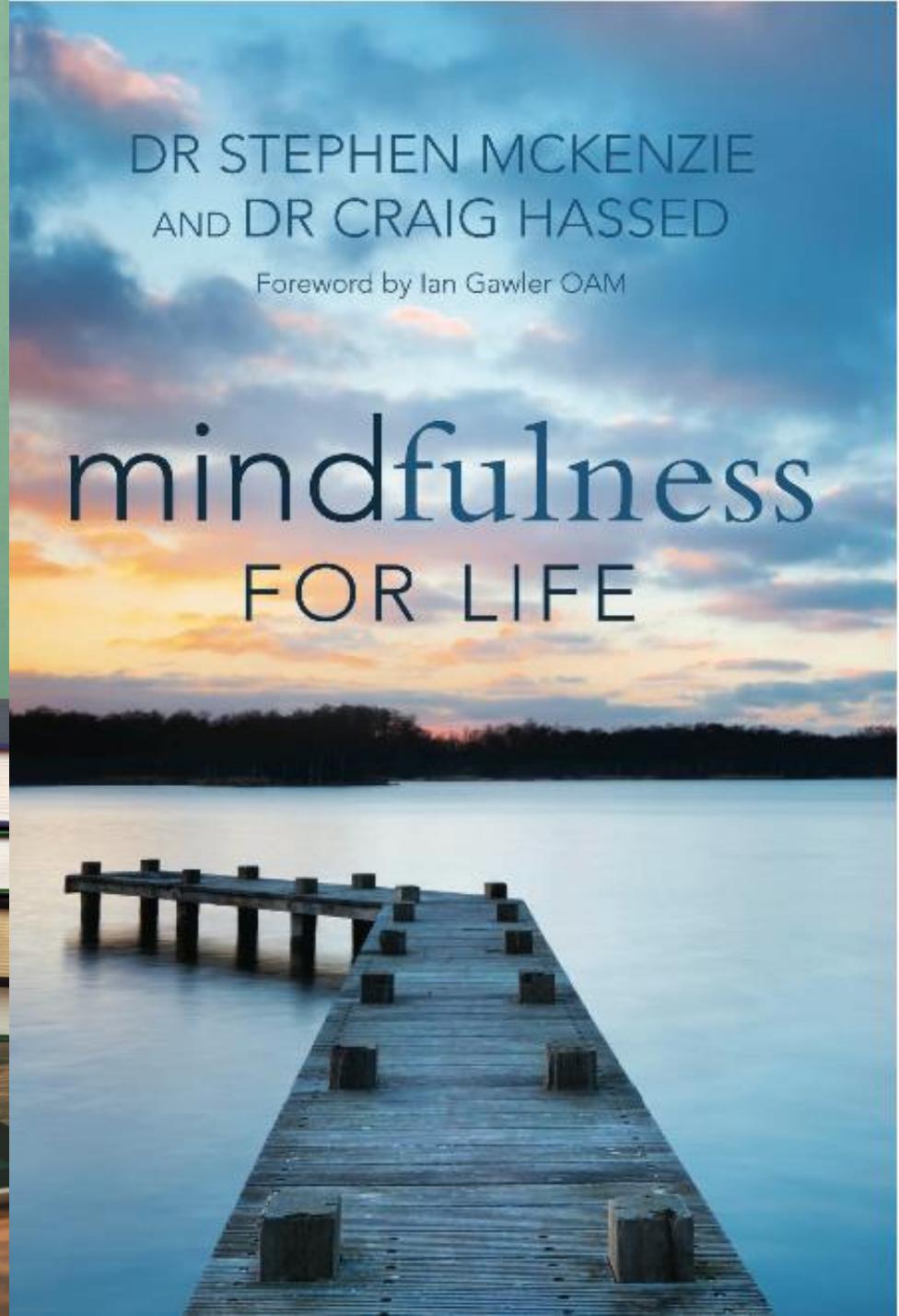
Reduce stress and improve brain  
performance for effective learning



DR STEPHEN MCKENZIE  
AND DR CRAIG HASSED

Foreword by Ian Gawler OAM

# mindfulness FOR LIFE



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# Free 4-week online mindfulness course

- <https://www.futurelearn.com/courses/mindfulness-wellbeing-performance>
  - Collaboration between Monash University and FutureLearn (UK)
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