Mindfulness and wellbeing for children and young people

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“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.”

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

Three regions of the brain

- **Frontal lobes (prefrontal cortex) centre for executive functioning**
  - Attention regulation
  - Working memory
  - Reasoning and decision making
  - Emotional regulation
  - Appetite regulation
  - Impulse control
  - Directs immune system

- **Limbic system – emotion centre**

- **Mesolimbic reward system – appetites**
Child abuse and brain development

- The brains of adolescents brought up in hostile and unsupportive environments were predisposed to reproduce anti-social behaviours in later life because of overstimulation of the brain regions such as the amygdala and underdevelopment of the prefrontal cortex

- Adolescents who have issues with aggression, particularly young males, have significantly larger and more reactive amygdalas along with less developed regions to regulate emotions (e.g. the prefrontal cortex) than those who do not have issues with aggression
Child abuse and brain development

- Changes found in adolescents with significant depression such as smaller hippocampi indicating a reduction the brain's production of hormones like brain-derived neurotrophic factor
- BDNF is important for stimulating and maintaining brain cells
- Implications not just for poor performance at school but also for future neurodegenerative conditions such as Alzheimer's Disease
- These brain changes are largely due to the epigenetic effects of behaviour, environment and experience affecting the genetic levers and switches within the brain's cells
Stress and telomere shortening

- Study on healthy premenopausal women showed that psychological stress associated with:
  - higher oxidative stress
  - lower telomerase activity (telomerase repairs DNA telomeres) leading to shorter telomere length

- These are known determinants of cell death/longevity

- Women with highest levels of perceived stress c/w low stress women have shorter telomeres
  - Average equivalent at least 9-17 years of additional ageing

- Implications for how, at the cellular level, stress may promote earlier onset of age-related diseases
Stress and ageing in children

- Study on associations b/w autonomic nervous system and adrenocorticoid (cortisol) reactivity to lab stressors and telomere length (TL) in 5-6y/o children
- Heart rate and cortisol reactivity inversely related to TL
- Children with high sympathetic activation and parasympathetic withdrawal and high cortisol reactivity had significantly shorter TL – a marker of early biologic aging
Hostility and telomere length

- High-hostile men had significantly shorter leukocyte TL than their low-hostile counterparts
- The relationship between hostility and disease is stronger in men than in women, and men generally have a shorter life expectancy than women

Mind wandering and ageing

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

Higher TV watching at 3 y/o associated with higher ADHD at age 7

- Friedland RP et al. Proc Nat Acad Sci USA, 10.1073/pnas.061002998
TV, children & executive functioning

- 4-year-olds randomly assigned to watch a fast-paced TV cartoon (Spongebob Squarepants), educational cartoon or draw for 9 minutes
- 4 tasks on executive function
- Children who watched the fast-paced TV cartoon performed significantly worse on executive function tasks
- “Just 9 minutes of viewing a fast-paced television cartoon had immediate negative effects on 4-year-olds' executive function. Parents should be aware that fast-paced television shows could at least temporarily impair young children's executive function.”

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
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)
On the performance of extreme multi-taskers

“These are kids who are doing 5, 6, or more things at once all the time. ... It turns out multi-taskers are terrible at every aspect of multitasking! They get distracted constantly. Their memory is very disorganized. Recent work we’ve done suggests that they’re worse at analytic reasoning. We worry that it may be we’re creating people who may not be able to think well, and clearly.”

Multitasking or task-switching?

- Multitasking is an illusion (misnomer)
- Switching happens so fast that it appears we are performing multiple tasks simultaneously like the concurrent performance of several jobs by a computer
- Reality is that we are switching back and forth between tasks
This time I won't screw up! I won't, I won't, I won't, I won't...

Roger screws up.
The Default Brain

- **Active tasks**
  - Tasks associated with paying attention
  - Brain efficient and quiet

- **Default state (mode)**
  - Mind is inattentive, distracted, idle, recalling past, daydreaming
  - Areas active in default mode similar to areas affected by Alzheimer’s Disease
“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
Attention regulation

- 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
Applications of mindfulness

- Mental health E.g. depression relapse prevention, anxiety, panic disorder, stress, emotional regulation, addiction, sleep, eating disorders, psychosis

- Neuroscience E.g. structural and functional changes in the brain, neurogenesis, (dementia prevention) amygdala, executive function, working memory

- Social E.g. communication, empathy, relationships

- Clinical E.g. pain management, symptom control, cancer, metabolic, hormonal, weight management, genetic function and repair

- Performance E.g. sport, academic, leadership

- Spiritual E.g. transcendence, oneness,

Results suggest that MBSR may help a broad range of individuals to cope with their clinical and non-clinical problems. Grossman P. J Psychosomatic Research. 2004;57(1):35-43.
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
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
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.”
Default mode network

- Default mental activity flourishes in various forms of psychopathology including depression, anxiety, schizophrenia and autism
- Default activity decreased or deactivated when paying attention (e.g. experienced meditators)
- In experienced meditators but not novices, even when the default mode network is active, brain regions associated with self-monitoring and cognitive control are co-activated
  - Reduces vulnerability to default thinking

Positive and supportive parenting style associated with healthy changes in the brain particularly in the amygdala and prefrontal cortex.

Mindfulness-based practices shown to produce positive changes on the brain including:

- quietening the amygdala
- enhancing the function of the attention regulation, prefrontal and emotion regulation regions
- stimulating BDNF
- thickening the grey matter in the memory and learning regions


Mindfulness, adolescents and mental health

“Mindfulness-based stress reduction (MBSR) program for adolescents age 14 to 18 years with heterogeneous diagnoses in an outpatient psychiatric facility.

Relative to treatment-as-usual control participants, those receiving MBSR self-reported reduced symptoms of anxiety, depression, and somatic distress, and increased self-esteem and sleep quality.”

http://dx.doi.org/10.1037/a0016241
Mindfulness in schools

- 522 young people aged 12–16 in 12 secondary schools either participated in Mindfulness in Schools Programme (intervention) or usual school curriculum (control)

- Rates of acceptability were high

- Relative to the controls, children who participated in the intervention reported fewer depressive symptoms post-treatment and at 3 month follow-up and lower stress and greater well-being at follow-up

- The degree to which students practised the mindfulness skills was associated with better well-being and less stress at follow-up

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.”

Depersonalisation and mindfulness

- Depersonalization (DP) – feelings of being detached from one's own mental processes or body – a form of mental escape from the full experience of reality
- Linked with maltreatment during childhood
- Study found a strong inverse correlation between DP severity and mindfulness
- Significant correlations between emotional maltreatment on the one hand and DP severity (positive) and mindfulness (negative) on the other
- Results suggest an antithetical relationship between DP and certain aspects of mindfulness
Mindfulness and child abuse

- 27 adult survivors of childhood sexual abuse participated in an 8-week mindfulness meditation-based stress reduction (MBSR) plus 3 refresher classes at final follow-up at 24 weeks

- At 8 weeks, depressive symptoms reduced by 65%

- Statistically significant improvements observed in all outcomes (mood, anxiety, PTSD) post-MBSR (large effect sizes above 1.0)

- Improvements were largely sustained until 24 weeks

- Of three PTSD symptom criteria, symptoms of avoidance / numbing most greatly reduced

- Compliance, attendance, home practice and acceptability high

## Emotional Intelligence & mindfulness

- Mindfulness related to aspects of personality and mental health
  - Lower neuroticism, psychological symptoms, experiential avoidance, dissociation
  - Higher emotional intelligence and absorption

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

- Qualitative study on mindfulness and adolescents’ emotional control
- Participants described daily lives as beset by frequent experiences of distress worsened by their unhelpful or destructive reactions
- Mindfulness practice led to greater calm, balance, and control
- Developed a clearer understanding of themselves and others
- Mindfulness described as a "mindset" associated with greater confidence and competence and a lessened risk of future distress
  - “Participants demonstrated a sophisticated understanding of and engagement with mindfulness principles and practice. … An encouraging finding was that, with ongoing mindfulness practice and within a relatively short time, participants were able to move beyond improved emotion regulation and gain greater confidence in their ability to manage life challenges.”

Mindfulness and doctor 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
Mindfulness and healthcare quality

- Observational study of clinicians caring for patients
- Measured patient-clinician communication quality and patient ratings
- Comparing clinicians with highest and lowest mindfulness scores: high-mindfulness clinician consultations:
  - Patient-centered pattern of communication (OR 4.14)
  - Engaged in more rapport building and discussion of psychosocial issues
  - Displayed more positive emotional tone with patients
  - Patients more likely to give high ratings on clinician communication and to report high overall satisfaction

Mindfulness for teachers

- RCT of pilot program of Mindfulness-Based Stress Reduction adapted for teachers
- Mindfulness group showed significant reductions in:
  - psychological symptoms
  - burnout

- Improvements in:
  - observer-rated classroom organization
  - performance on a computer task of affective attentional bias
  - increases in self-compassion

- Control group showed worse cortisol levels and increased burnout

- Changes in mindfulness correlated with improved outcomes (e.g. psychological symptoms, burnout, and sustained attention)
Meditation and compassion

- Limbic brain regions implicated in empathic response to another's pain
- Meditators have more active empathic response
  - Activation in insula greater in expert than novices
- Empathy w/o stress reduces carer fatigue
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 training in mindfulness meditation,
  - 8-week training in moderate-intensity sustained exercise
  - control (no intervention)

- 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
  - 67 missed in the control group
  - 32 in the exercise group
  - 16 in the meditation group
Self-compassion and performance

- Can treating oneself with compassion after making a mistake increase self-improvement motivation?
- Self-compassion intervention compared to a self-esteem control group, no intervention or a positive distraction control group
- Self-compassion associated with:
  - Greater belief that a personal weakness can be changed for the better
  - Greater motivation to make amends and avoid repeating a moral transgression
  - More time studying for a difficult test following an initial failure
  - A preference for upward social comparison after reflecting on a personal weakness
  - Greater motivation to change the weakness

Mindfulness and cognition

- Study on brief meditation training effects on cognition and mood
- Four sessions of either meditation training
- Participants were assessed with measures of mood, verbal fluency, visual coding, and working memory
- Mindfulness training improved mindfulness, mood, and reduced fatigue, anxiety, and increased visuo-spatial processing, working memory, and executive functioning
Mindfulness and student performance

- Three studies examined the effects of mindfulness meditation on the knowledge retention of tertiary students.
- Participants from three introductory psychology courses randomly received either brief meditation training or rest.
- Then listened to a class lecture and took a post-lecture quiz that assessed students’ knowledge of lecture material.
- Results indicated that meditation improved students’ retention of the information conveyed during the lecture in each of the three experiments.
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.”
mindful learning
Reduce stress and improve brain performance for effective learning

mindfulness FOR LIFE
Foreword by Ian Gawler OAM