

# Mindfulness Meditation: Use in TBI Rehabilitation



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# Overview & Learning Objectives

## Mindfulness Meditation

- What is it?
- How does it work?
- Exercise – Short breath focus
- Research: Use of mindfulness in TBI rehabilitation
- Exercise – Short body scan
- Incorporating mindfulness into your own life

# Mindfulness Meditation

What is it?



**The awareness that emerges from paying attention to something in a particular way -**  
on purpose,  
in the present moment,  
and nonjudgmentally.

Jon Kabat-Zinn, 1994, 2003



“Most people assume that meditation is all about stopping thoughts, getting rid of emotions, somehow controlling the mind.

But actually, it’s ... about stepping back, seeing the thought clearly, witnessing it coming and going.”

Andy Puddicombe



# If not Mindful...Mindless?

Can you relate?





# How often do our minds wander?

## Any guesses?



# A Wandering Mind Is an Unhappy Mind

Matthew A. Killingsworth\* and Daniel T. Gilbert



Unlike other animals, human beings spend a lot of time thinking about what is not going on around them, contemplating more of 22 activities adapted from the day reconstruction method (10, 11), and a mind-wandering question (“Are you thinking about something

- developed a web application for the iPhone [www.trackyourhappiness.org](http://www.trackyourhappiness.org)
- large database of “real-time” reports of thoughts, feelings, and actions of a broad range of people as they went about their day
- at the time of publication...
  - nearly a quarter of a million samples from about 5000 people from 83 different countries who range in age from 18 to 88 and who collectively represent every one of 86 major occupational categories.



# How often do our minds wander?

**46.9% of the time!**

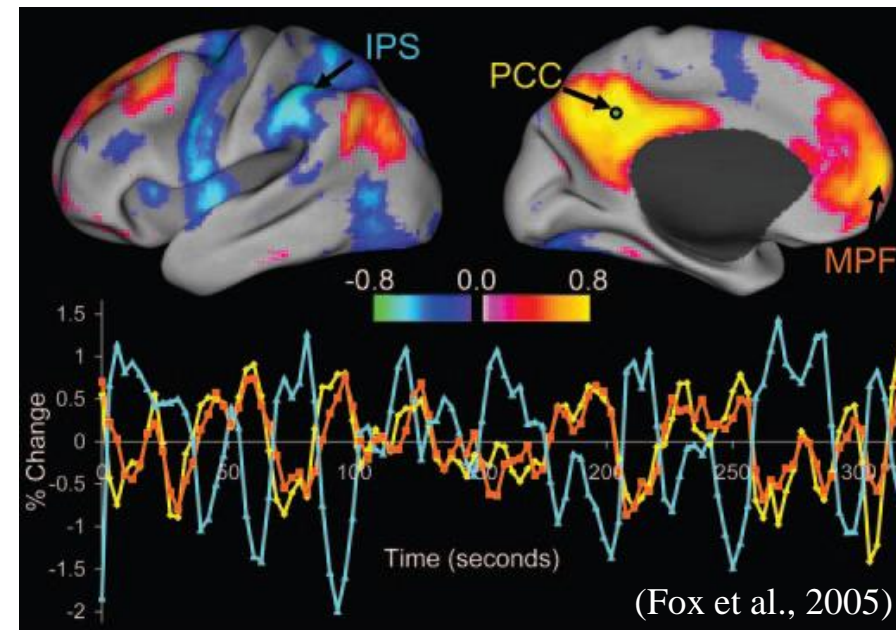
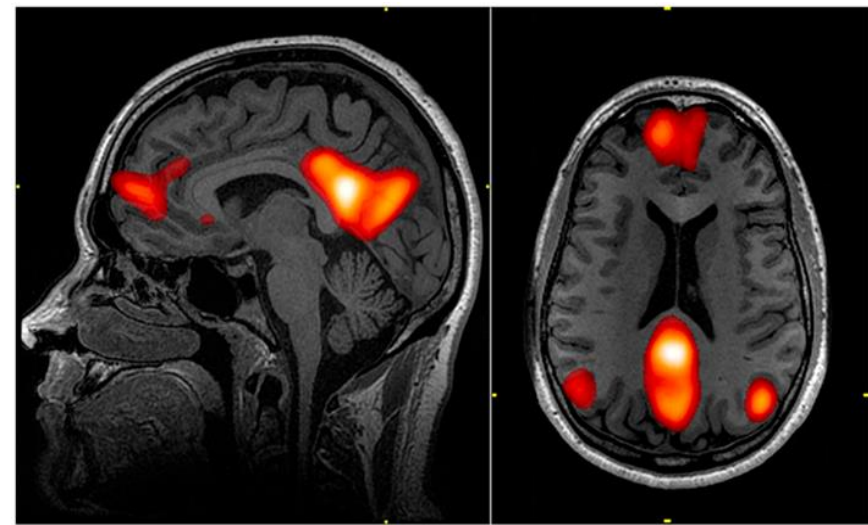


- people were less happy when their minds were wandering than when they were not
- mind wandering was generally the cause, and not merely the consequence, of unhappiness
- what people were thinking was a better predictor of happiness than what they were doing

**Conclusion: a human mind is a wandering mind, and a wandering mind is an unhappy mind**

# Default Mode Network

- a self-referential, introspective, “task-independent” network
- most active when we are not focused on a task (“wakeful rest”)
- reciprocal relationship with “task-positive” networks (blue), which are active during periods of focused concentration (e.g., reading, attentive listening, work tasks, etc.)



# Why be mindful?

*“My life has been filled with terrible misfortunes...most of which have never happened.”*

Michel de Montaigne



# 'Therapeutic' Mindfulness

## MBSR

- Jon Kabat-Zinn, 1979, U Mass
- Stress, pain, chronic health conditions

## MBCT

- Zindel Segal, Mark Williams & John Teasdale, Toronto/UK
- Depression, anxiety – relapse prevention

## MBRP

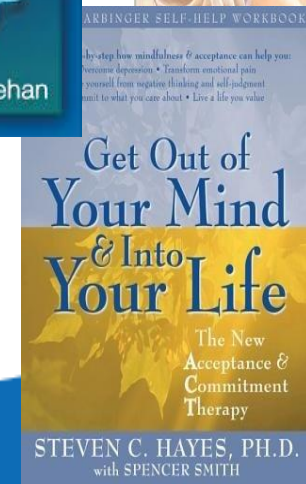
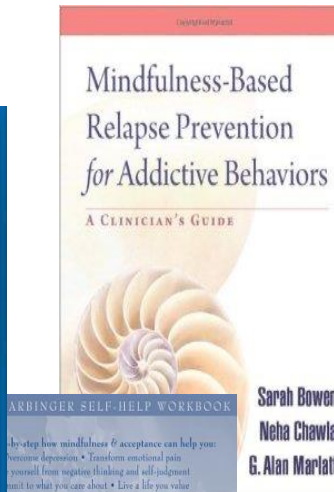
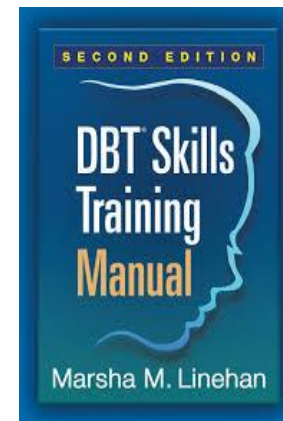
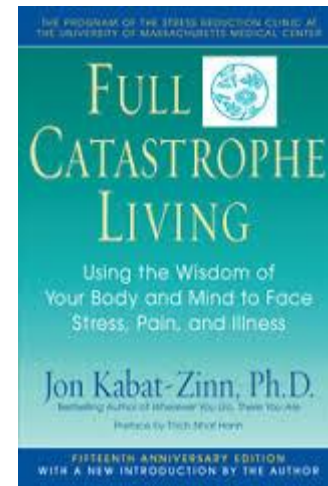
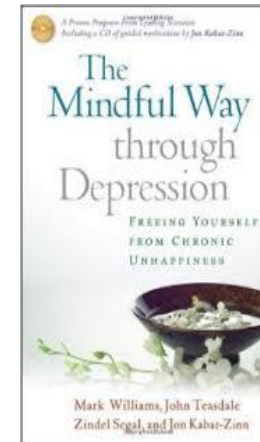
- Sarah Bowen, Alan Marlatt, UCSD
- Addictions – relapse prevention

## Mindfulness in Psychotherapy

- Mark Epstein, Stephen Hayes (ACT), Marsha Linehan (DBT), Ron Siegal, Tara Brach

## Newer – Mobile apps, Web-based

- Cavanaugh et al, 2013, Lim, Condon & DeSteno, 2015



# The Research

## MINDFULNESS BASED STRESS REDUCTION

Most research on the effects of mindfulness on stress, mood, well-being etc. have been conducted within the context of treatment interventions such as **Mindfulness Based Stress Reduction (MBSR)** and **Mindfulness Based Cognitive Therapy (MBCT)**.



# MBSR & MBCT

- group format
- weekly meetings for 8 weeks (1.5 - 2.5 hours) and a half- or full-day silent retreat
- practice in mindfulness meditation skills and psychoeducation
- daily homework (~45 min/day, 6 days/week)
- MBCT incorporates aspects of cognitive behavioural therapy (CBT)



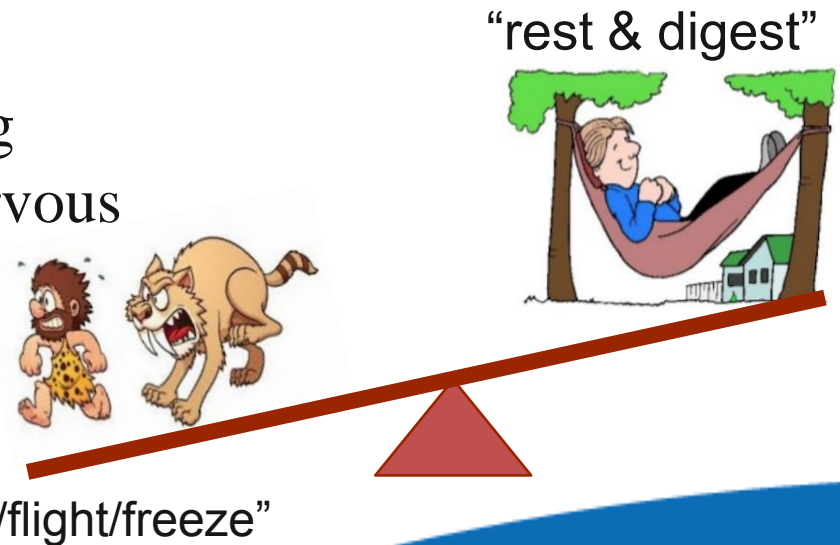


# How does it work?

- **MIND:** practicing mindfulness strengthens our attentional control “muscle”. This puts us more in control of our thinking and makes us less prone to mind wandering and autopilot.

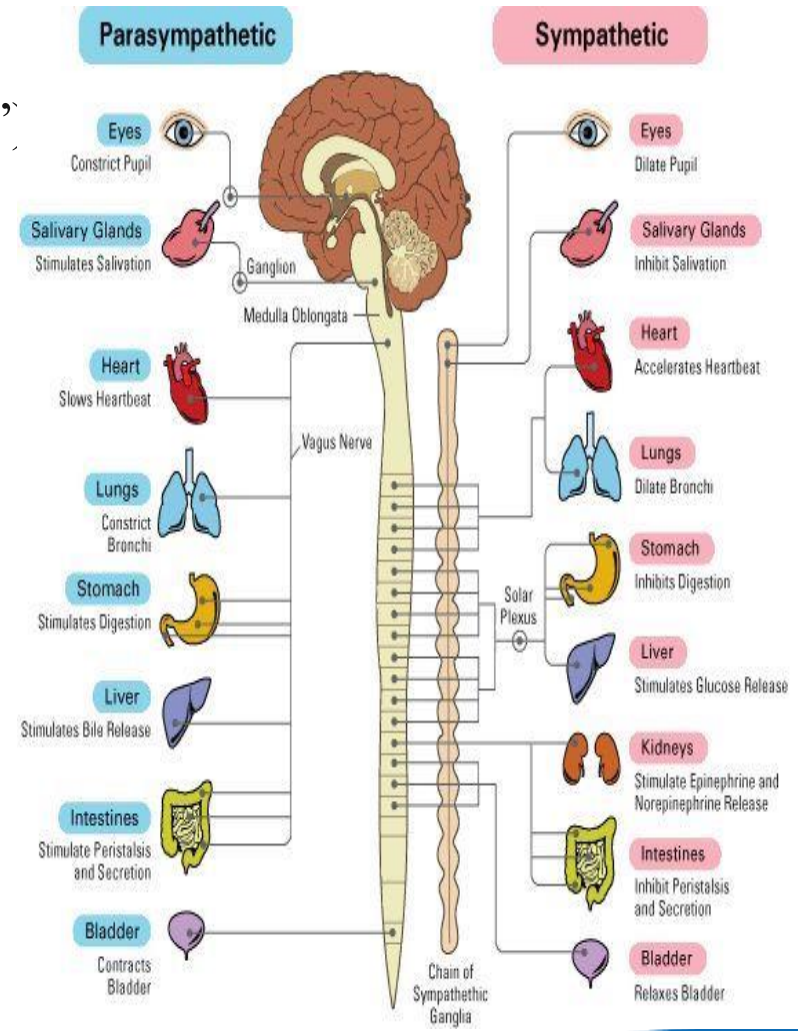


- **BODY:** slow controlled breathing activates the parasympathetic nervous system and reduces sympathetic nervous system dominance.



# Diaphragmatic Breathing and Vagal Stimulation

diaphragmatic breathing (or “belly breathing”) stimulates the vagus nerve to activate the relaxation response (PNS) and lower the stress response (SNS) (“*fight-or-flight*” system)



# Diaphragmatic Breathing



Chest breathing

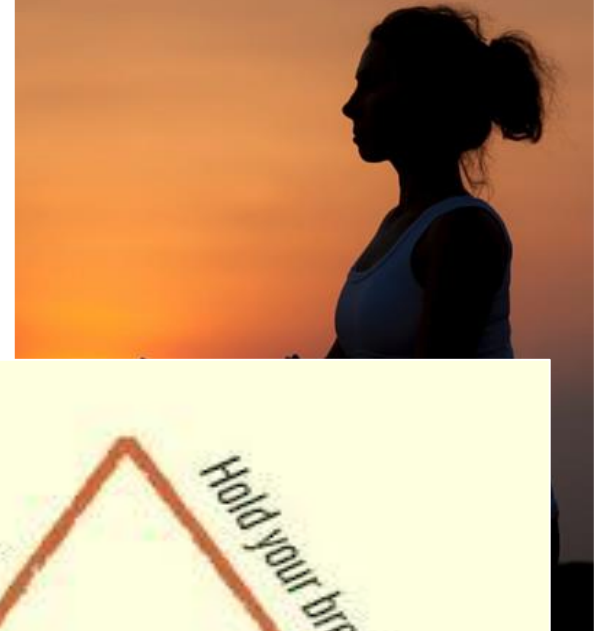
VS



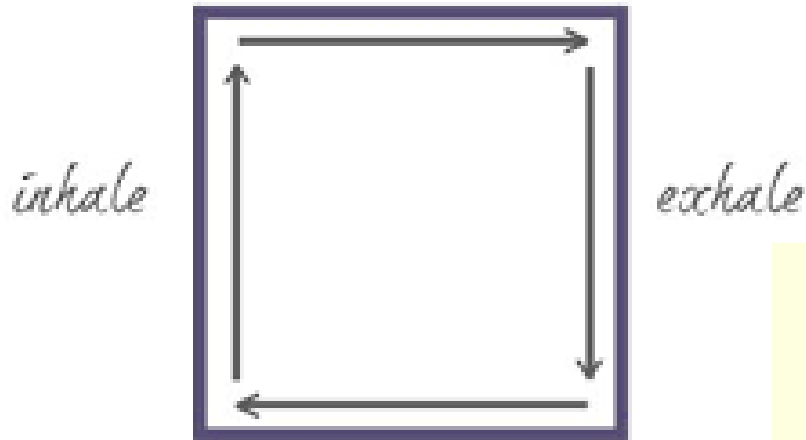
Diaphragmatic Breathing

# Basic Relaxation Breathing

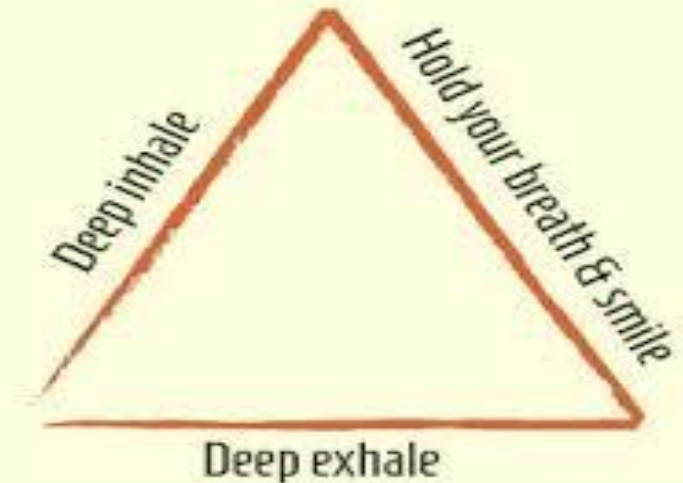
**4 second inhale**  
**7 second hold**  
**8 second exhale**



*hold breath in lungs*



*hold with breath out*



# Exercise – Short breath focus

<https://youtu.be/SEfs5TJZ6Nk>

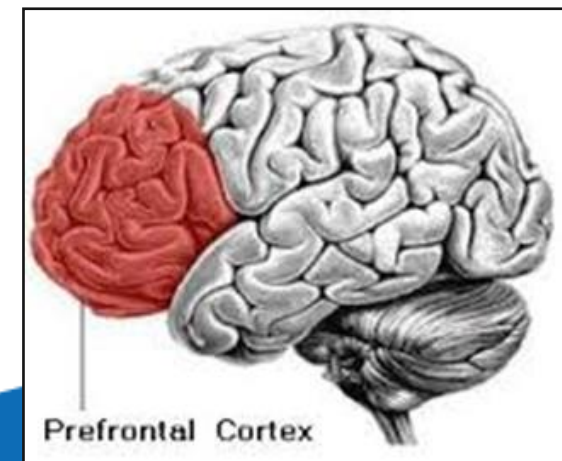


# What does the research show?



There is evidence to suggest mindfulness may:

- improve immune function
- improve mood, sleep, stress, attention...
- increase cortical thickness
- reduce gray matter atrophy with age
- increase activation in the prefrontal control (top-down attentional control)





# What does the research show?



There is also emerging evidence to suggest that mindfulness may confer benefits in those with TBI



# Bedard et al. (Lakehead University/Ottawa University)

**2003** - Pilot evaluation of a mindfulness-based intervention to improve quality of life among individuals who sustained traumatic brain injuries.

**2005** - A Mindfulness-Based Intervention to Improve Quality of Life Among Individuals Who Sustained Traumatic Brain Injuries: One-Year Follow-Up.

**2012** - Mindfulness-based cognitive therapy: benefits in reducing depression following a traumatic brain injury.

**2013** - Mindfulness-based cognitive therapy reduces symptoms of depression in people with a traumatic brain injury: results from a randomized controlled trial.

# Johansson et al. (Sweden)

**2012** - Mindfulness-based stress reduction (MBSR) improves long-term mental fatigue after stroke or traumatic brain injury

**2013** - Evaluation of an Advanced Mindfulness Program Following a Mindfulness-Based Stress Reduction Program for Participants Suffering from Mental Fatigue After Acquired Brain Injury

**2015** - Mindfulness-Based Stress Reduction (MBSR) Delivered Live on the Internet to Individuals Suffering from Mental Fatigue After an Acquired Brain Injury

# Brief mindfulness training for attentional problems after traumatic brain injury: A randomised control treatment trial

T. McMillan<sup>1</sup>, Ian H. Robertson<sup>2</sup>, D. Brock<sup>3</sup>, and L. Chorlton<sup>3</sup>

<sup>1</sup>*University of Glasgow, Glasgow, <sup>2</sup>Trinity College, Dublin, Ireland,*

<sup>3</sup>*Wolfson Neurorehabilitation Centre, St Georges Healthcare, London*

A mindfulness meditation technique has been shown to be effective in reducing self-reports of pain and mood disorder in chronic pain patients. Although a pilot study on traumatic brain injury patients showed improvement in self-report of cognitive impairment, a larger scale randomised control treatment trial found no differences on objective or self-report measures of cognitive function, mood or symptom reporting. *Brief* exposure to mindfulness meditation cannot be recommended as a treatment technique for traumatic brain injury cases.

# A Pilot Study Examining the Effect of Mindfulness-Based Stress Reduction on Symptoms of Chronic Mild Traumatic Brain Injury/Postconcussive Syndrome

*Joanne Azulay, PhD; Colette M. Smart, PhD; Tasha Mott, PhD; Keith D. Cicerone, PhD*

**Objective:** To evaluate the effectiveness of the mindfulness-based stress reduction (MBSR) program tailored to individuals with mild traumatic brain injury (mTBI). **Design:** A convenience sample recruited from clinical referrals over a 2-year period completed outcome measures pre- and posttreatment intervention. **Setting:** Post-acute brain injury rehabilitation center within a suburban medical facility. **Participants:** Twenty-two individuals with mTBI and a time postinjury more than 7 months. Eleven participants were men and 11 were women, ranging in age from 18 to 62 years. **Intervention:** A 10-week group (with weekly 2-hour sessions) modeled after the MBSR program of Kabat-Zinn, but with modifications designed to facilitate implementation in a population of individuals with brain injury. (The treatment involved enhancement of attentional skills, in addition to increased awareness of internal and external experiences associated with the perspective change of acceptance and nonjudgmental attitude regarding those experiences). **Main Outcome Measures:** Perceived Quality of Life Scale, Perceived Self-Efficacy Scale, and the Neurobehavioral Symptom Inventory. Secondary measures included neuropsychological tests, a self-report problem-solving inventory, and a self-report measure of mindfulness. **Results:** Clinically meaningful improvements were noted on measures of quality of life (Cohen  $d = 0.43$ ) and perceived self-efficacy (Cohen  $d = 0.50$ ) with smaller but still significant effects on measures of central executive aspects of working memory and regulation of attention. **Conclusion:** The MBSR program can be adapted for participants with mTBI. Improved performance on measures associated with improved quality of life and self-efficacy may be related to treatment directed at improving awareness and acceptance, thereby minimizing the catastrophic assessment of symptoms associated with mTBI and chronic disability. Additional research on the comparative effectiveness of the MBSR program for people with mTBI is warranted. **Key words:** *mild traumatic brain injury, mindfulness, quality of life, rehabilitation, self-efficacy*



# Simultaneous Treatment of Neurocognitive and Psychiatric Symptoms in Veterans with Post-Traumatic Stress Disorder and History of Mild Traumatic Brain Injury: A Pilot Study of Mindfulness-Based Stress Reduction.

[Cole MA](#)<sup>1</sup>, [Muir JJ](#)<sup>1</sup>, [Gans JJ](#)<sup>1</sup>, [Shin LM](#)<sup>2</sup>, [D'Esposito M](#)<sup>1</sup>, [Harel BT](#)<sup>3</sup>, [Schembri A](#)<sup>3</sup>.

## ⊕ Author information

### Abstract

Treating patient populations with significant psychiatric and neurocognitive symptomatology can present a unique clinical dilemma: progress in psychotherapy can be significantly fettered by cognitive deficits, whereas neurocognitive rehabilitation efforts can be ineffective because of psychiatric overlay. Application of mindfulness-based interventions to address either cognitive or psychiatric symptoms in isolation appears efficacious in many contexts; however, it remains unclear whether this type of intervention might help address simultaneous neurocognitive and psychiatric symptomatology. In a pre-post mixed methods design pilot study, nine Veterans with post-traumatic stress disorder (PTSD) and a history of mild traumatic brain injury with chronic cognitive complaints participated in Mindfulness-Based Stress Reduction (MBSR). Clinical interview, questionnaires, and attention and PTSD measures were administered immediately before, immediately after, and 3 months after MBSR completion. Qualitative and quantitative findings suggest high levels of safety, feasibility, and acceptability. Measurement of attention revealed significant improvement immediately following MBSR ( $p < 0.05$ ,  $d = 0.57$ ) and largely sustained improvement 3 months after completion of MBSR ( $p < 0.10$ ,  $d = 0.48$ ). Significant reduction in PTSD symptoms was found immediately after MBSR ( $p < 0.05$ ,  $d = -1.56$ ), and was sustained 3 months following MBSR completion ( $p < 0.05$ ,  $d = -0.93$ ). These results warrant a randomized controlled trial follow-up. Potential mechanisms for the broad effects observed will be explored.



# Mindfulness Meditation in TBI at TRI

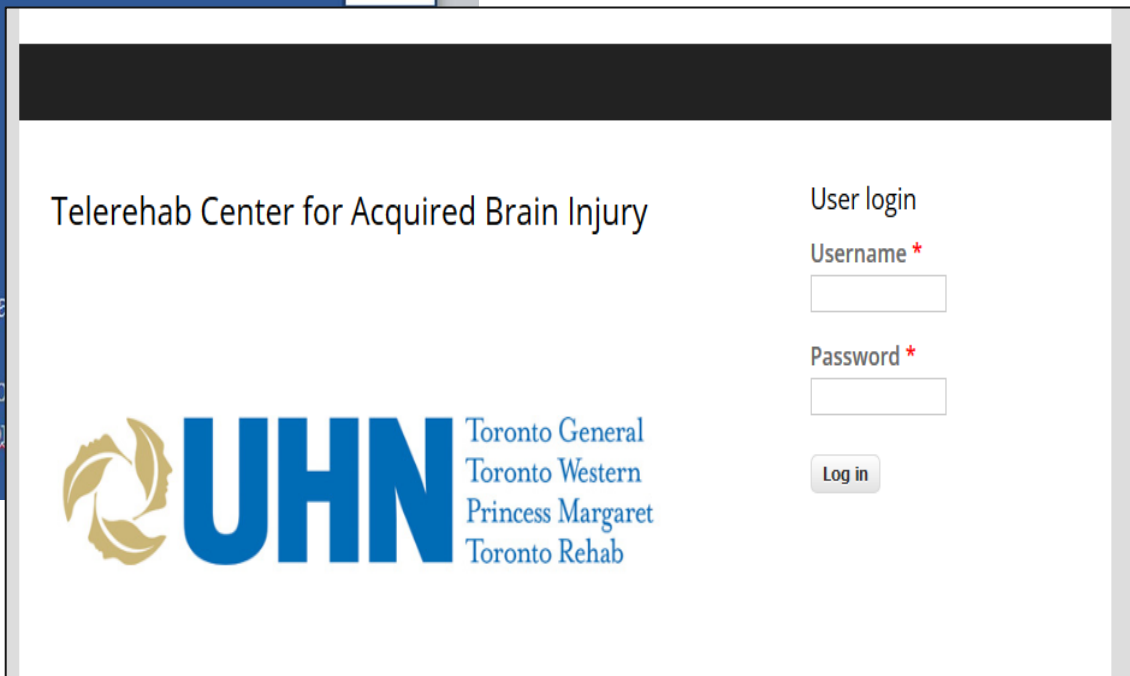


## Behavioural interventions for the Consequences of Multiple Concussions in Retired Professional Athletes

**Robin E.A. Green**

Senior Scientist, Toronto Rehab –UHN  
Canada Research Chair (II) Traumatic Brain Injury

Brenda Colella, Lesley Ruttan, Sabrina Lo Meusel, Lily Miguel-Jaimes, Charles Tator  
Sports Concussion Project members

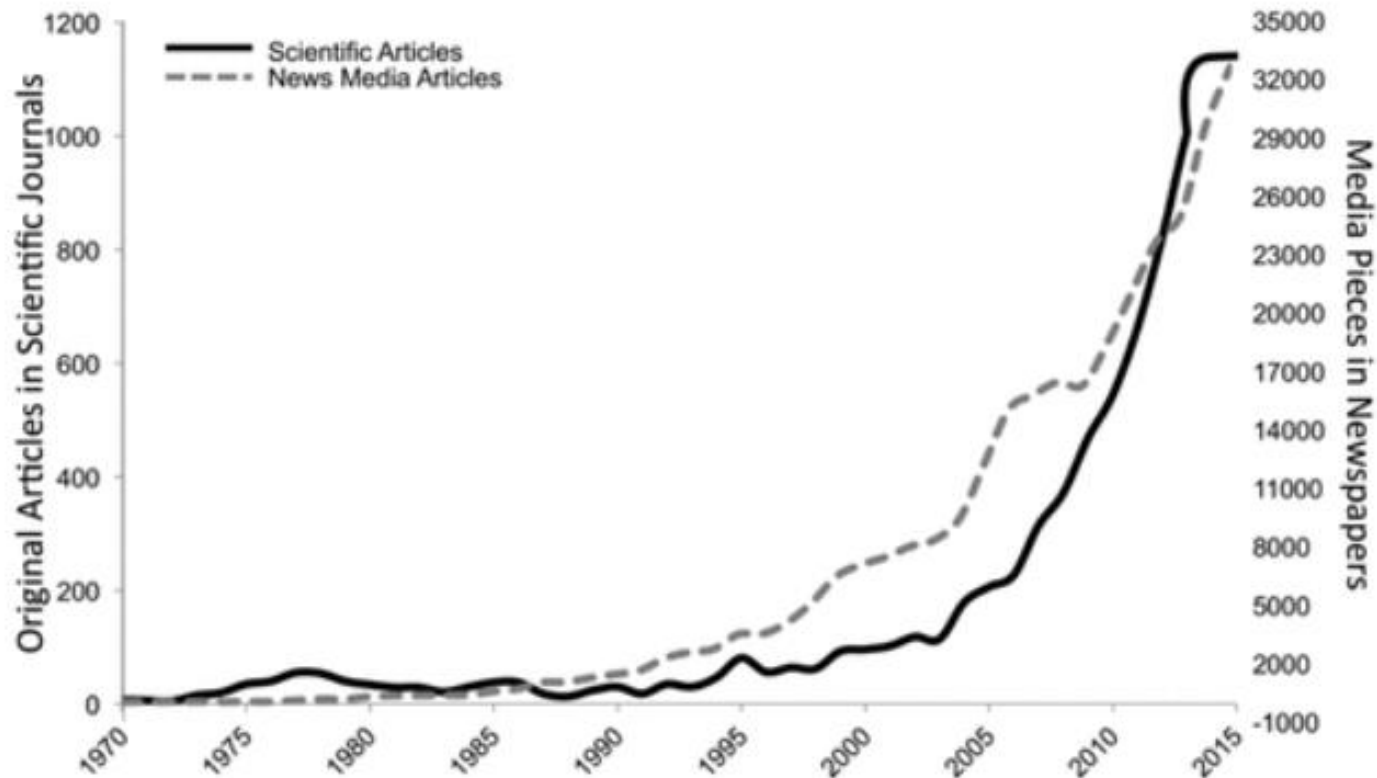


# Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation

Nicholas T. Van Dam, Marieke K. van Vugt†, David R. Vago†, Laura Schmalz†, Clifford D. Saron†, Andrew Olendzki†, Ted Meissner†, Sara W. Lazar†, Catherine E. Kerr†\*, Jolie Gorchovt, Kieran C. R. Fox†, Brent A. Field†, Willoughby B. Britton†, Julie A. Brefczynski-Lewis†, David E. Meyer

Show less ^

First Published October 10, 2017 | Research Article



# What does the research show?

## Always keep in mind...

- negative findings
- small sample sizes
- poorly designed studies - direct comparisons to empirically established treatments are limited
- media hype
- bias/financial/other interest



\* Exclusions for MBSR (suicidality, any psychiatric disorder)

# What does the research show?



Evidence for use in clinical contexts is preliminary

Meditation trials - not everyone benefits

Caution on making clinically-based decisions from neuroscience studies

Mindfulness not orders of magnitude better than other interventions

Must look at mindfulness in the context of a **range** of options

More rigorous research is required

So, what do you think – is mindfulness a **pathway to brain health and an option for neurorehabilitation?**



# Exercise – Short body scan

<https://soundcloud.com/mindfulmagazine/3-minute-body-scan-meditation>





# Mindfulness Technology

Neurofeedback (e.g., EEG)

- Muse 



Biofeedback (e.g., heart rate variability)

- Inner Balance
- wearable sensors



# Incorporating mindfulness into your own life

## Why?

Personal...

Professional

- high rate stress in healthcare field
- mindfulness can reduce risk of burnout
- MBSR and MBCT shown to be important tools for mitigating empathy fatigue



# Incorporating mindfulness into your own life

1. Connect with your breath and/or body
2. When your mind wanders, gently bring it back
3. **Repeat Step 2 several billion times**



# Other ways to get started...

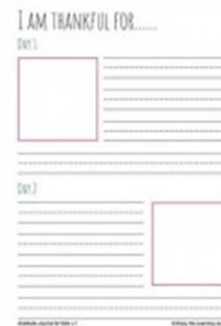
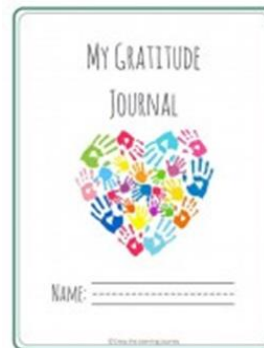
Informal: bring mindfulness to everyday activities

Formal: set aside time to practice

Join a meditation group

Sign up for a mindfulness course

Keep a gratitude journal



# Resources

**Mindfulness Toronto** <http://www.mindfulnessstoronto.net>

## Apps (Top Rated of 2017)

Headspace. iPhone rating: ★★★★★

Calm. iPhone rating: ★★★★★

Insight Timer. iPhone rating: ★★★★★

Smiling Mind. iPhone rating: ★★★★★ ☆

Stop, Breathe & Think. iPhone rating: ★★★★★



## Podcasts

10% Happier with Dan Harris

.Mindfulness Mode by Bruce Langford

On Being with Krista Tippett

Pathway to Happiness by Gary Van Warmerdam

Tara Brach

