

# Western Science and Society's construction of mindfulness

## A little background for new MBSR teachers

Paul Grossman  
Department of Psychosomatic Medicine  
University Hospital  
Basel, Switzerland

European Center for Mindfulness  
Freiburg, Germany



the guardian

News | Sport | Comment | Culture | Business | Money | Life & style | Travel | Environment | T

Comment is free

### Why we will come to see mindfulness as mandatory

This increasingly popular tool for calming the mind, once seen as a New Age fad, could play a role in hospitals and schools

**Share** 5475  
**Tweet** 912  
**g+** 95  
**Pin it** 38  
**in Share** 486  
Email

**Madeleine Bunting**  
The Guardian, Tuesday 6 May 2014  
Jump to comments (464)



Mindfulness: 'our minds spin with thought, and we are absent to much of our physical experience'. Photograph: Victor de Schwanberg/Alamy

**Life and style**  
Health & wellbeing  
Meditation

**World news**  
Buddhism

**Science**  
Psychology

**More from Comment is free on**

**Life and style**  
Health & wellbeing  
Meditation

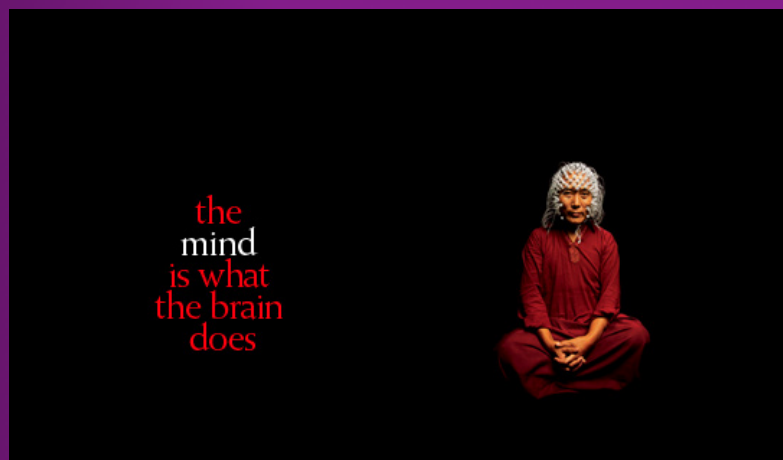
**World news**  
Buddhism

**Science**

## Some Questions

1. What are the salient influences in this process of getting to “scientifically” know and instrumentalize mindfulness (*vs.* the experience of practicing and living mindfulness?)
2. What are some of the problems along the way?
3. In terms of clinical trials, how effective are mindfulness-based programs and do they live up to the broad enthusiasm?

“Mindfulness” as example of tension between lived experience and scientific/psychological/commercial ‘object’ification/‘instrument’alization



## “Mindfulness” as example of tension between lived experience and scientific/psychological/commercial ‘object’ification/‘instrument’alization

- On one hand, mindfulness is a stance or gesture of inner, unquantifiable lived experience

In Buddhist psychology, antidote to 3 qualities underlying unwholesome attitudes & behavior: Greed, delusion & aversion

Oriented to benevolent stance to others & the world: cultivation of ethical

Not primarily directed to self: self optimization, “mental health,” positive psych.

## “Mindfulness” as example of tension between lived experience and scientific/psychological/commercial ‘object’ification/‘instrument’alization

- On one hand, mindfulness is a stance or gesture of inner, unquantifiable lived experience

In Buddhist psychology, antidote to 3 qualities underlying unwholesome attitudes & behavior: Greed, delusion & aversion

Oriented to benevolent stance to others & the world: cultivation of ethical

Not primarily directed to self: self optimization, “mental health”

- On other hand, M now characterized as technique or program to achieve specific goals (e.g. alleviate depression, improve test scores, make better combat soldiers)—measurable, documentable, manualizable

## “Mindfulness” as example of tension between lived experience and scientific/psychological/commercial ‘object’ification/‘instrument’alization

- On one hand, mindfulness is a stance or gesture of inner, unquantifiable lived experience

In Buddhist psychology, antidote to 3 qualities underlying unwholesome attitudes & behavior: Greed, delusion & aversion

Oriented to benevolent stance to others & the world: cultivation of ethical

Not primarily directed to self: self optimization, “mental health”

- On other hand, M now characterized as technique or program to achieve specific goals (e.g. alleviate depression, improve test scores, make better combat soldiers)—measurable, documentable, manualizable
- Razor’s edge between “subject(ive)” and “object(ive)” (1st vs 3rd person) perspectives

## Two mindfulness neuroscientists discussing life



“Mein Problem war schon immer ein Mangel an rechter anterioren Insula Funktion”

How to meaningfully coalesce these perspectives?

**Bruno Latour:  
Circulatory System of Knowing Phenomena**

e.g. (1999), *Pandora's Hope. Essays on the Reality of Science Studies*

**Articulation and Knowing of “Scientific Facts”:  
Confluence of circulating human and nonhuman factors**

B. Latour, e.g. (1999), *Pandora's Hope. Essays on the Reality of Science Studies*

- Rejection of traditional phenomenological distinction between “subjective” and “objective” (1st vs 3rd person) perspectives

## Articulation of “Scientific Facts”:

### Confluence of circulating human and nonhuman factors

B. Latour, e.g. (1999), *Pandora's Hope. Essays on the Reality of Science Studies*

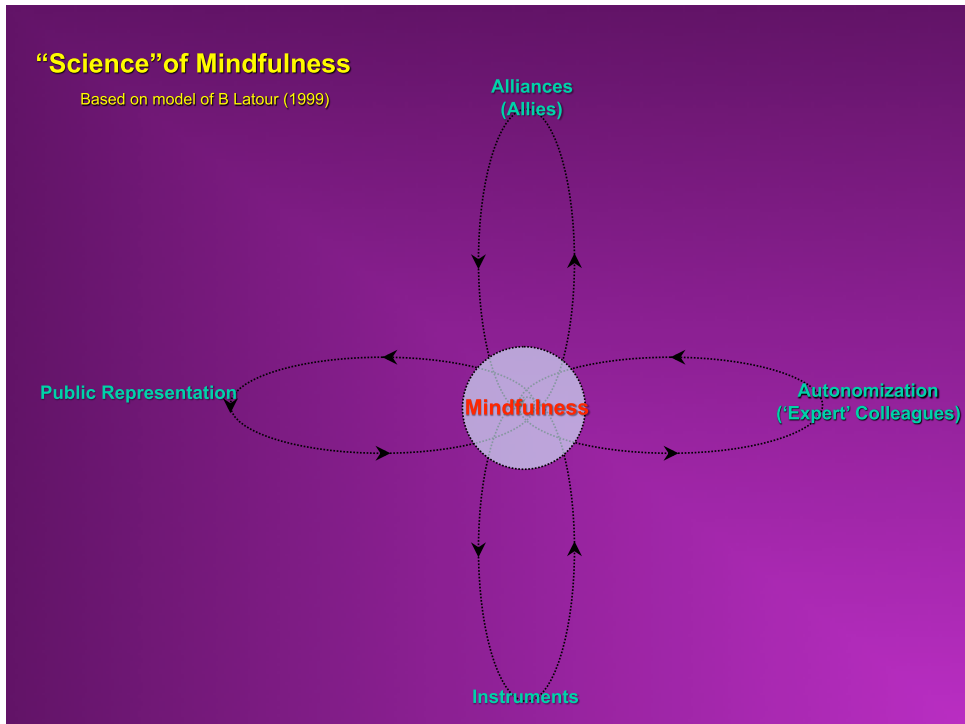
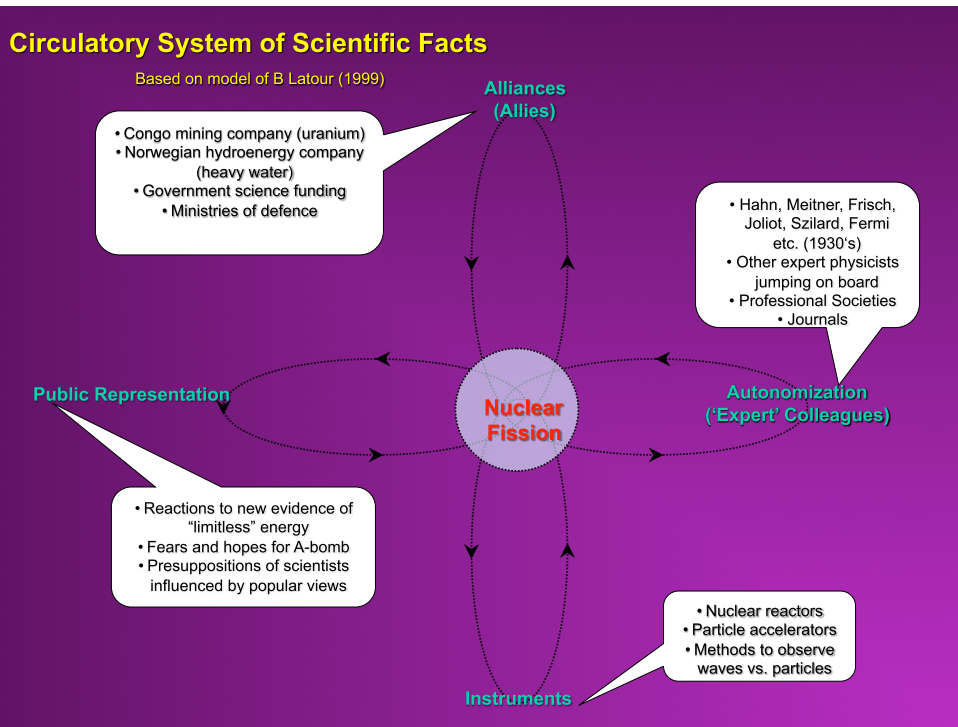
- Rejection of traditional phenomenological distinction between “subjective” and “objective” (1st vs 3rd person) perspectives
- Attempts to analyze and span the divide between subjects (humanity) and objects (inanimate and nonhuman animate world)

## Articulation of “Scientific Facts”:

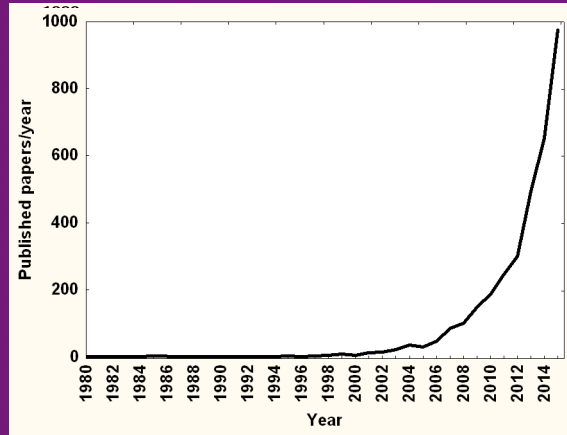
### Confluence of circulating human and nonhuman factors

B. Latour, e.g. (1999), *Pandora's Hope. Essays on the Reality of Science Studies*

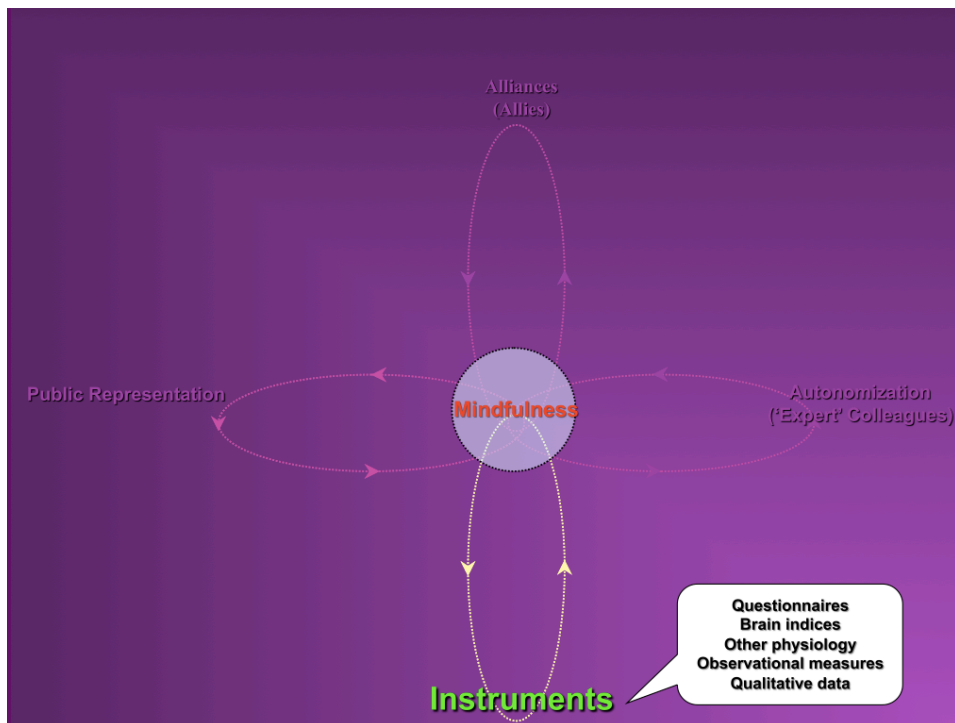
- Rejection of traditional phenomenological distinction between “subjective” and “objective” (1st vs 3rd person) perspectives
- Attempts to bridge divide between subjects (humanity) and objects (inanimate and nonhuman animate world)
- Fluid circulation between human experience, action and the animate and inanimate world.



## Mindfulness literally flew into Western Science & Society from very foreign shores



No. of "mindfulness" papers per year published in research journals (MEDLINE & Web of Science)





## Some *measurement* consequences of making 'mindfulness' into "scientific facts"

- The need for measurement (and instruments)  
For allies (e.g. sponsors), for autonomization (scientific mindfulness experts)
- Alters the very definition of 'mindfulness'?  
Has 'mindfulness' already become reified and restrictively redefined in the psychological literature?

## Some essential qualities of mindfulness in Theravada Buddhism (from which MBSR/CT predominantly derive)

(e.g. Bodhi, 2010; Feldman, 2015; Gunaratana, 2001; Olendzki, 2011)

- a) Deliberate intention to pay attention to experience
- b) Clear focus on aspects of active, unprejudiced investigation of moment-to-moment experience
- c) Continuity of precise moment-to-moment awareness of experience
- d) Assumptions of importance of training cultivation of mindfulness and its gradual acquisition
- e) A marked distinction from typical, everyday modes of consciousness
- f) Inherent interdependency, or melding, of mindfulness with attitudes of openness, acceptance, kindness, curiosity, and patience (underpinnings of "nonjudgmentalness")

## Most popular measure of 'mindfulness':

Mindfulness Attention Awareness Scale [MAAS], Brown & Ryan, 2003)

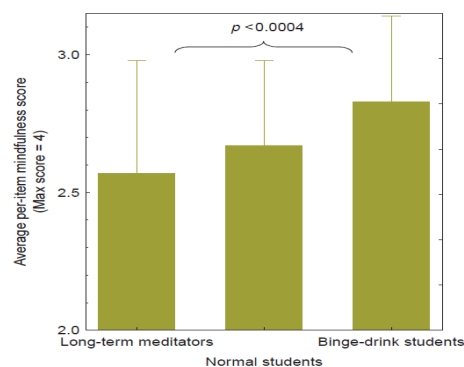
Almost never 1 2 3 4 5 Almost always 6

- I drive places on “automatic pilot” and then wonder why I went there.
- I snack without being aware that I’m eating.
- I forget a person’s name almost as soon as I’ve been told it for the first time.
- I break or spill things because of carelessness, not paying attention, or thinking of something else.
- I do jobs or tasks automatically, without being aware of what I’m doing.
- I rush through activities without being really attentive to them. . . . .

Is the **ABSENCE** of perceived (or reported) lapses of attention equivalent to mindfulness?

## Binge drinking improves “Mindfulness”??

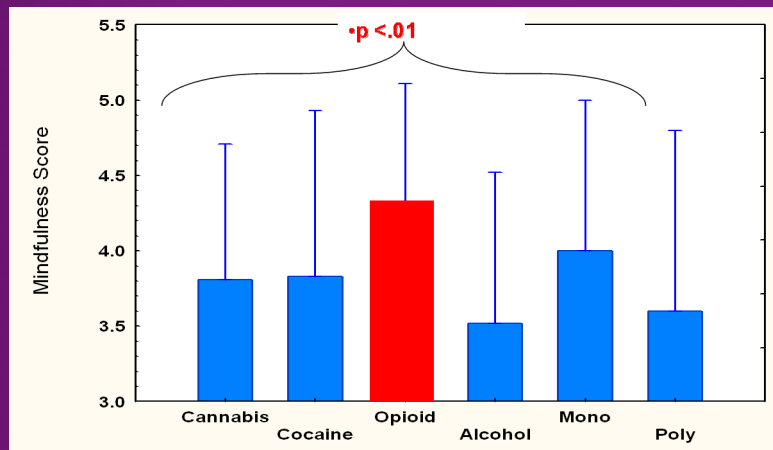
(Freiburg Mindfulness Inventory: Buchheld, Grossman et al., 2002)



**FIGURE 2**  
Mindfulness scores (Freiburg Mindfulness Inventory [FMI]); means (whiskers, standard deviations) of long-term experienced insight meditators, healthy non-meditating students, and binge-drinking, non-meditating students. Difference between meditators and binger drinkers ( $p < 0.0004$ ); differences between meditators and normal students approached significance ( $p < 0.06$ )

(Grossman & Van Dam, 2011)

**OTHER MINDFULNESS SCALES:**  
**Opioid Addicts are more mindful than other types of addicts**  
Mindfulness Attention and Awareness Scale (MAAS)



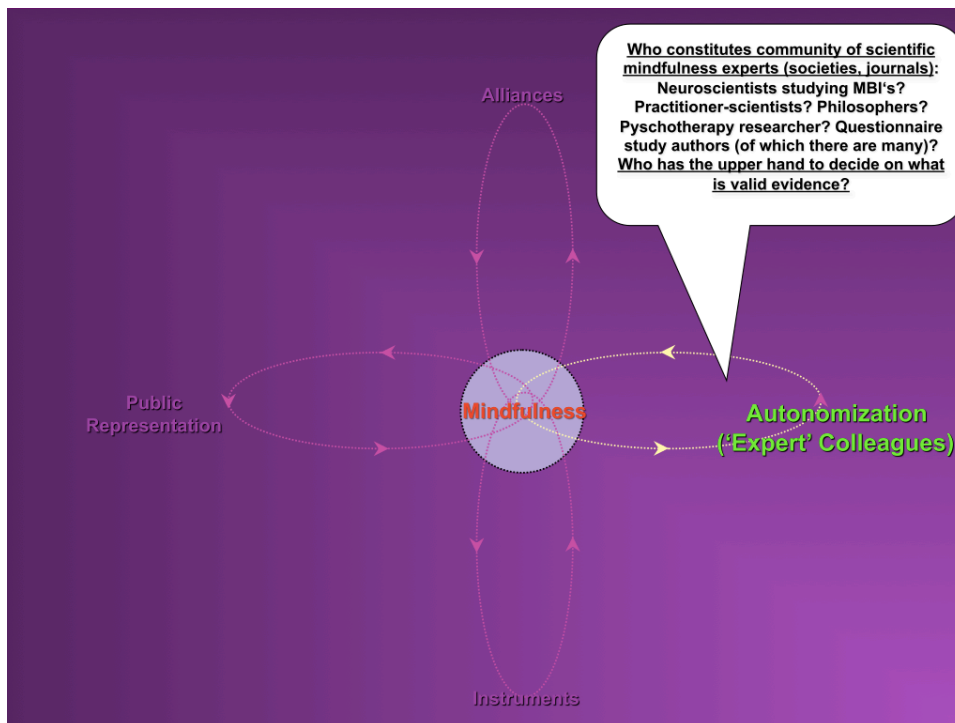
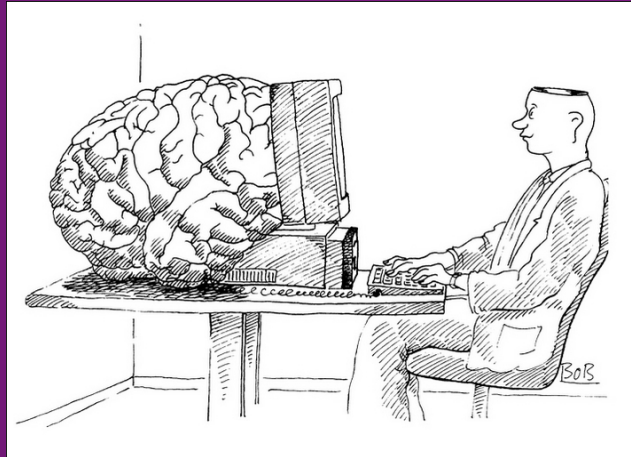
(Dakwar et al., 2011, *Amer J Drug & Alcohol Abuse*, 37:165-169)

So operationalization and measurement can pose serious issues for mindfulness

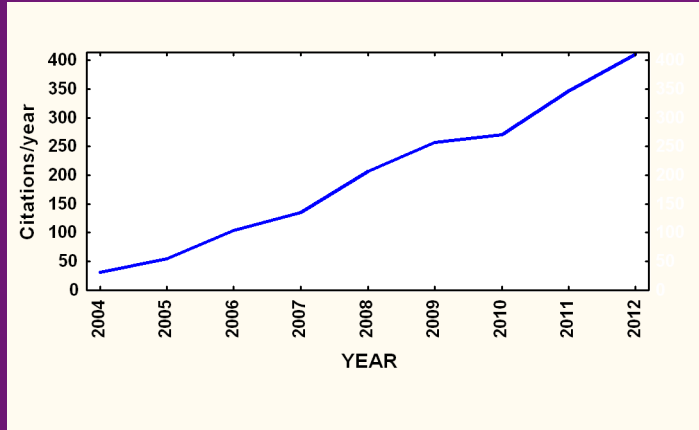
- Transforming
- Deforming
- Adulterating
- Denaturing

Similar issues for brain and cognitive measures?

## A neuroscientist's introspective search for mindfulness

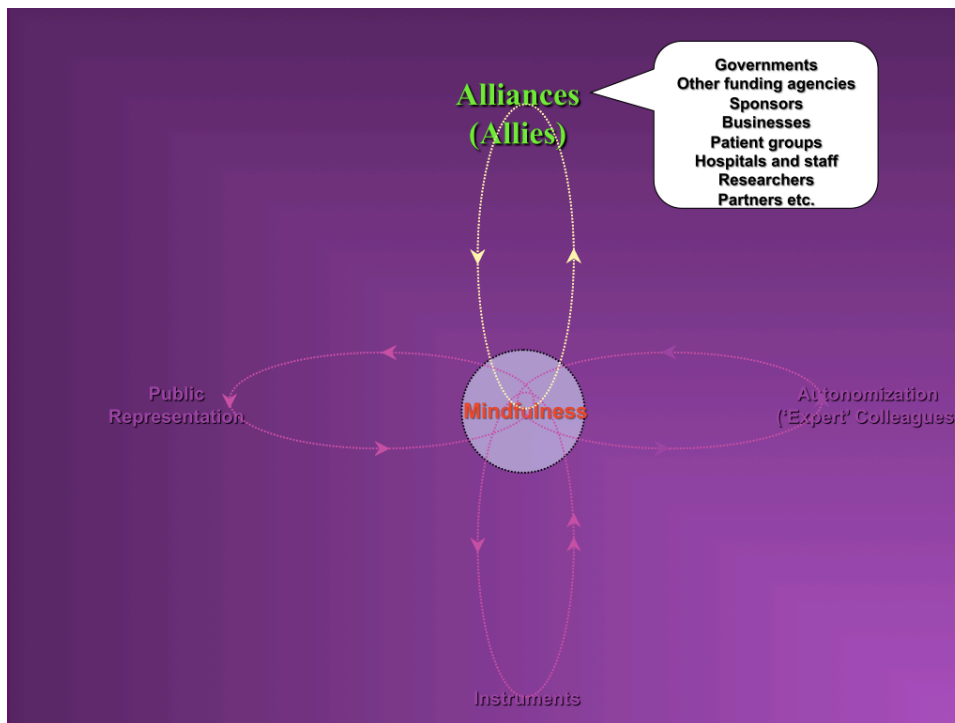


Number of publications citing validation studies of the MAAS, purporting to measure 'mindfulness' (Brown & Ryan, 2003)



Google Scholar (2013)


*N= 1997 citations*



## MINDFULNESS TRAINING TO MODIFY RESILIENCE IN MARINES

Johnson et al. (2014). *Am J Psychiatry* 171: 844–853.

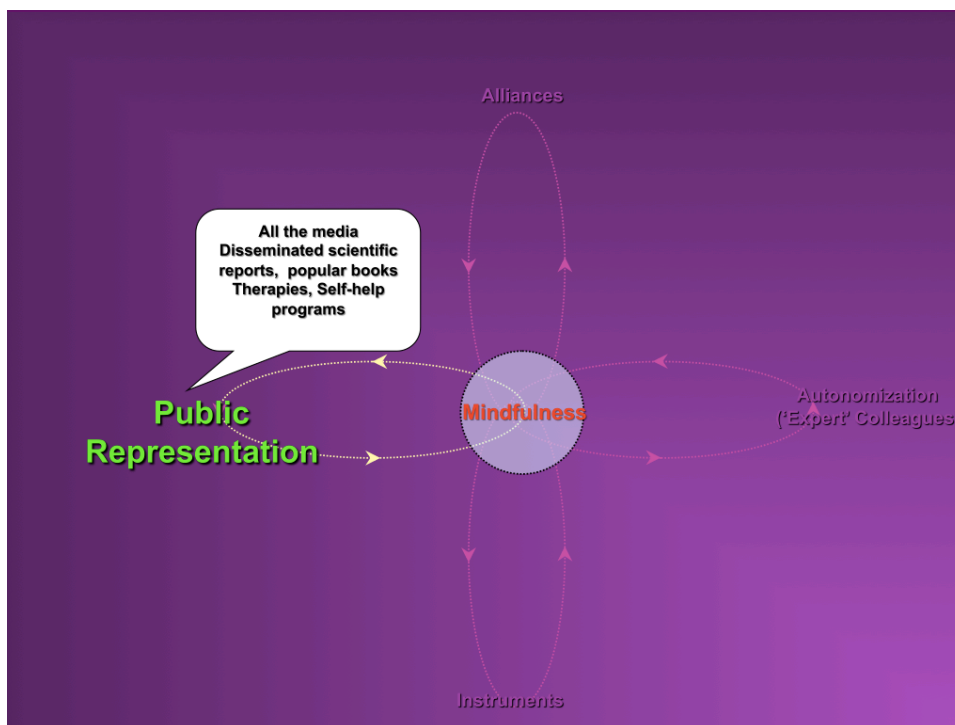
Sponsored by Expeditionary Maneuver Warfare and Combating  
Terrorism Department, US Office of Naval Research

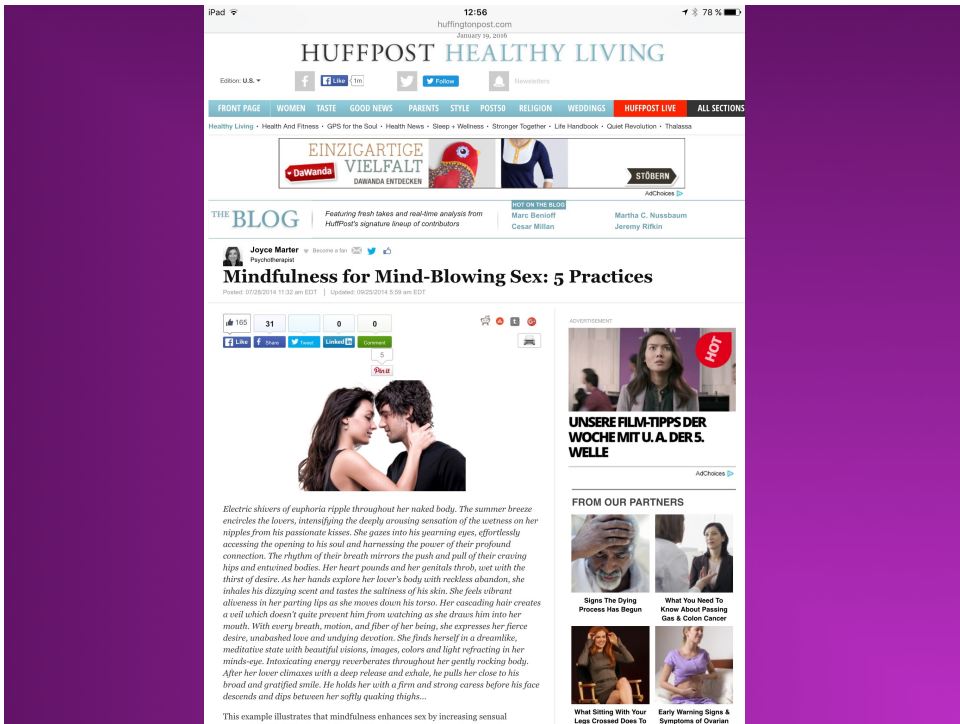


**Code 30**  
Expeditionary Maneuver Warfare and Combating Terrorism Department

Expeditionary Forces in Training

This department develops and transitions technologies to enable the Navy-Marine Corps team to win and survive on the battlefield, today and tomorrow.






12:58 huffingtonpost.com

165 31 0 0

Like Share Tweet LinkedIn Comment

5 Pin It



*Electric shivers of euphoria ripple throughout her naked body. The summer breeze encircles the lovers, intensifying the deeply arousing sensation of the wetness on her nipples from his passionate kisses. She gazes into his yearning eyes, effortlessly accessing the opening to his soul and harnessing the power of their profound connection. The rhythm of their breath mirrors the push and pull of their craving hips and entwined bodies. Her heart pounds and her genitals throb, wet with the thirst of desire. As her hands explore her lover's body with reckless abandon, she inhales his dizzying scent and tastes the saltiness of his skin. She feels vibrant aliveness in her parting lips as she moves down his torso. Her cascading hair creates a veil which doesn't quite prevent him from watching as she draws him into her mouth. With every breath, motion, and fiber of her being, she expresses her fierce desire, unabashed love and undying devotion. She finds herself in a dreamlike, meditative state with beautiful visions, images, colors and light refracting in her minds-eye. Intoxicating energy reverberates throughout her gently rocking body. After her lover climaxes with a deep release and exhale, he pulls her close to his broad and gratified smile. He holds her with a firm and strong caress before his face descends and dips between her softly quaking thighs...*

This example illustrates that mindfulness enhances sex by increasing sensual connection. The following are five practices for you and your partner to embrace together:

**1) Breathe consciously & deeply.**

12:57 huffingtonpost.com

**1) Breathe consciously & deeply.**

- \*Breathe down to the abdomen, giving life force, power, and energy to the sexual regions of the body.
- \*Breathe in what you desire and want to receive (i.e. love, connection, passion, etc.). Exhale. Relieve the tension. Surrender to the explosive release of the orgasm and the natural flow of the sexual fluids.
- \*Sync the rhythm of your breath with your partner's and deepen it together. Tantric sex is a way to prolong and transcend your sexual experience.

**2) Be present & aware.**

- \*Instead of obsessing about the past or worrying about the future, bring your complete and full attention to the present moment.
- \*Minimize distractions. Turn off the television. Silence your phone. Put Fido or Fluffy in the other room.
- \*Silence intrusive thoughts (no grocery lists allowed during mind-blowing sex!)
- \*Focus your attention on your sensual awareness (the curvature of the body, the softness, the slipperiness...)
- \*Consider kegel exercises for bodily awareness and control of the intricate internal muscles related to sex.
- \*Practice yoga for breath work, increased mind/body awareness, and improved flexibility. Yoga can also enhance sex and provide ideas for new positions.
- \*Avoid internal mind-chatter about worries about your body or your performance. Sex gurus, Masters and Johnson, refer to this phenomenon as, "spectatoring" because it prevents you from being present in the experience by putting you in the role of the observer.

**3) Practice acceptance & non-judgement.**

- \*Let go of expectations. There is no pressure to be perfect, to perform, or to orgasm. You and your lover, your bodies, and your time together are to be enjoyed. Period.
- \*Separate from ego – the false construct you identify as yourself. Connect with your essence – the deeper, authentic entity that resides within.
- \*Unplug from shame. Your body and your life are gifts to express your divine union with your lover.
- \*Detach from mind/thought/criticism. Connect with your body. Immerse yourself in the sensations.
- \*Let go of the need to control. Trust in yourself, your lover and the process. Enjoy the thrill of the unanticipated and unexpected ride.

**4) Meditate.**

- \*Clear out the cobwebs. Open your mind, heart and spirit to love through mindfulness meditation practices.
- \*Tap into your sexual energy with a Kundalini meditation.

**5) Invite new possibilities.**


- \*Detach from fear. Understand that vulnerability is sexy.
- \*Be welcoming. Be receptive. Be open to new experiences.
- \*Through conscious union of mind/body/spirit, your love will intensify. Invite and experience transcendental sex that is "out of this world." Together with your partner, explore each other and connect at a different, deeper dimension.

**Want to be a more mindful lover? Want a more conscious connection? Like this article and share with with the object of your affection. Please leave a comment.**


*\*Orgasm is the involvement of the total body: mind, body, soul, all together. You vibrate, your whole being vibrates, from the toes to the head. You are no longer in control; existence has taken possession of you and you don't know who you are. It is*

**SUGGESTED FOR YOU**


**Ted Cruz Does Not Understand What 'Carpet Bombing' Means**




**Doctor Accused Of Ejaculating In Patient's Face**




**Models Get Bodypainted Like Animals For Chinese Zoo Opening**




**NBC Exec Defends Jimmy Fallon Over Alleged Drinking Problem**



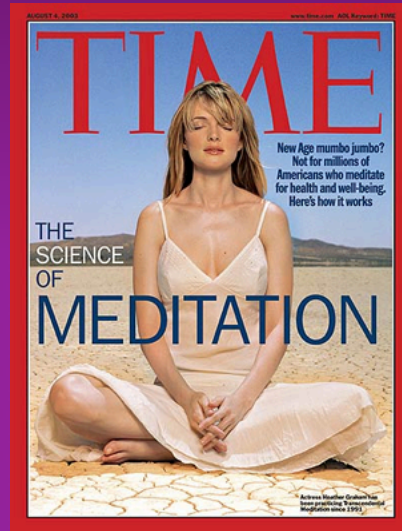
**Amy Schumer On Why It Isn't 'Brave' To Have A Little Belly Fat**



**UFC Fighter's Golf Ball-Sized Eye Is The Stuff Of Nightmares**







## Mindfulness as a therapeutic agent

### Spiritual Prosac??





JAMA Intern Med. 2014;174(3):357-368  
Published online January 6, 2014.

Original Investigation

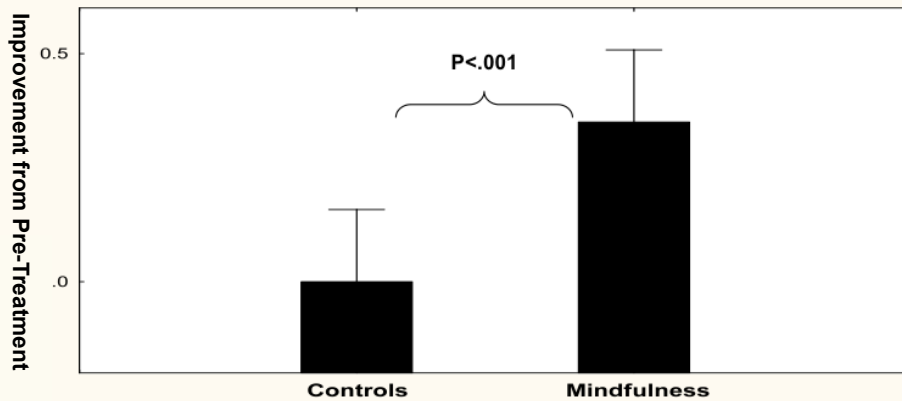
## Meditation Programs for Psychological Stress and Well-being A Systematic Review and Meta-analysis

Madhav Goyal, MD, MPH; Sonal Singh, MD, MPH; Erica M. S. Sibinga, MD, MHS; Neda F. Gould, PhD; Anastasia Rowland-Seymour, MD; Ritu Sharma, BSc; Zackary Berger, MD, PhD; Dana Sleicher, MS, MPH; David D. Maron, MHS; Hasan M. Shihab, MBChB, MPH; Padmini D. Ranasinghe, MD, MPH; Shauna Linn, BA; Shonali Saha, MD; Eric B. Bass, MD, MPH; Jennifer A. Haythornthwaite, PhD

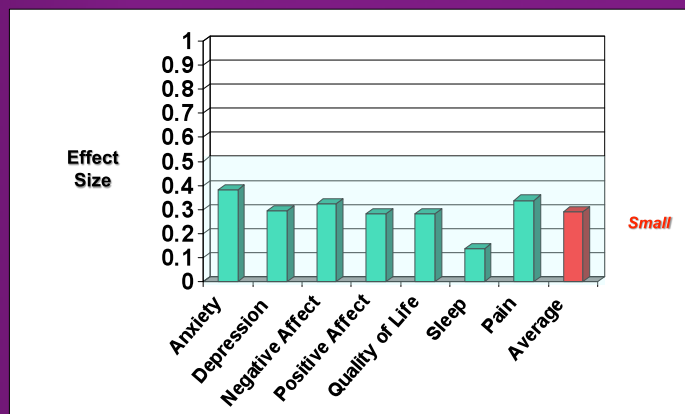
47 trials with 3515 participants.

## Usual way of representing data

Improvement in anxiety/depression:  
Change before to after Intervention

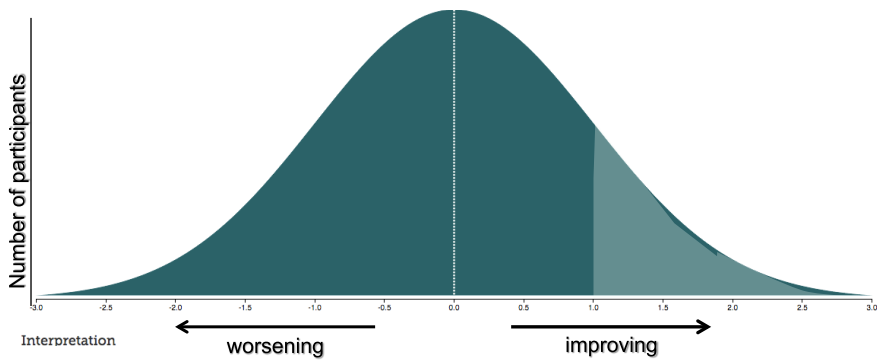


## Comparisons of Mindfulness Programs With Nonspecific Active Controls (Efficacy)



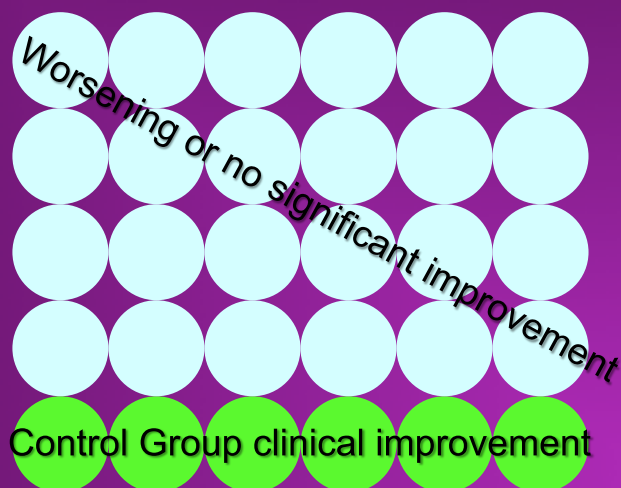
*JAMA Intern Med.* 2014;174(3):357-368  
Published online January 6, 2014.

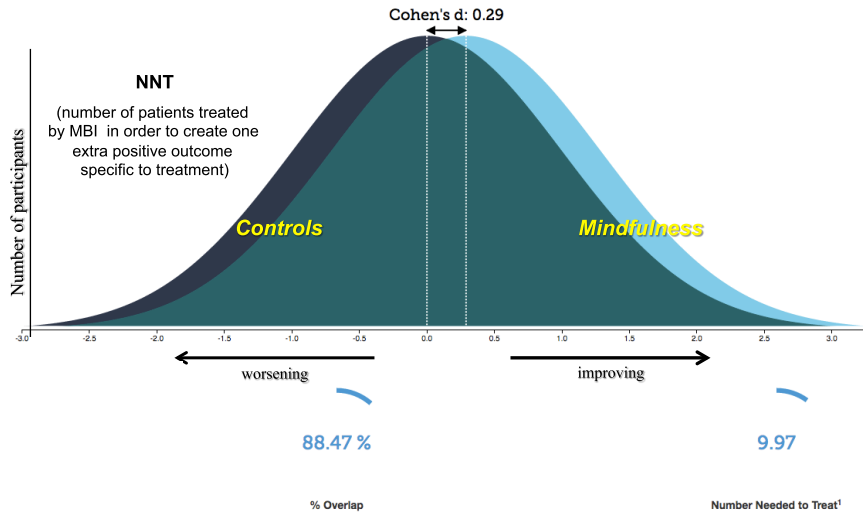
## When the Control Group (average) doesn't change



### Most recent meta-analysis study:

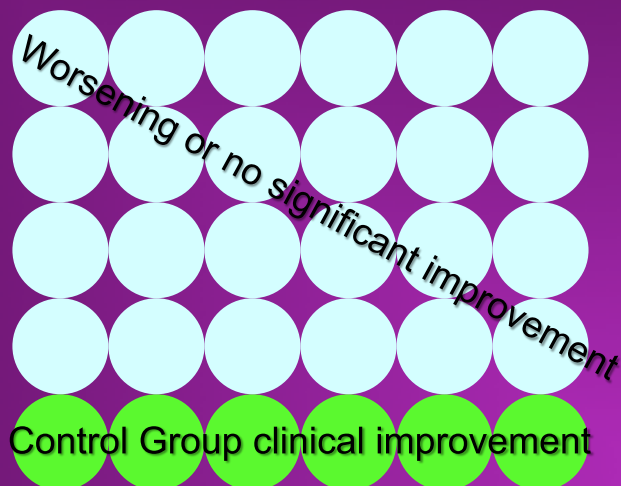
Effect size= 0.3 (Goyal et al, 2014)



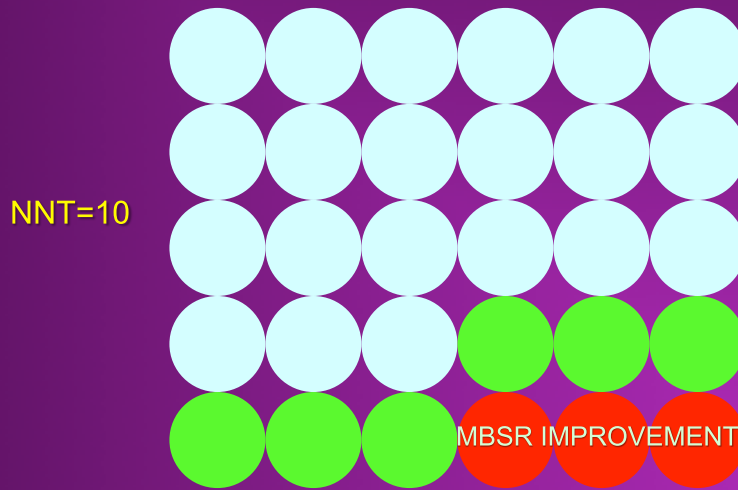


### Most recent meta-analysis study:

Effect size= 0.3 (Goyal et al, 2014)

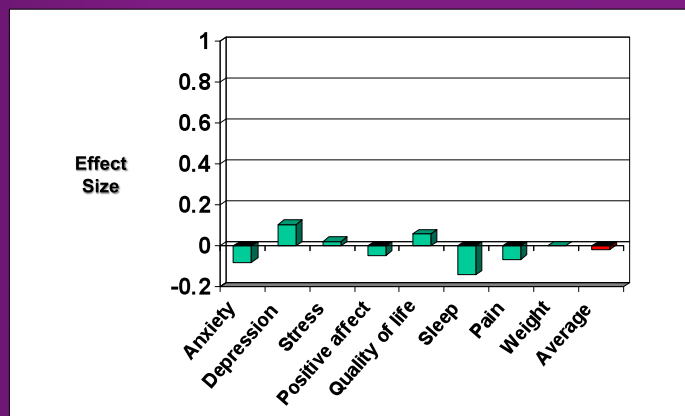


Meta-analysis of all studies only including active placebo control interventions

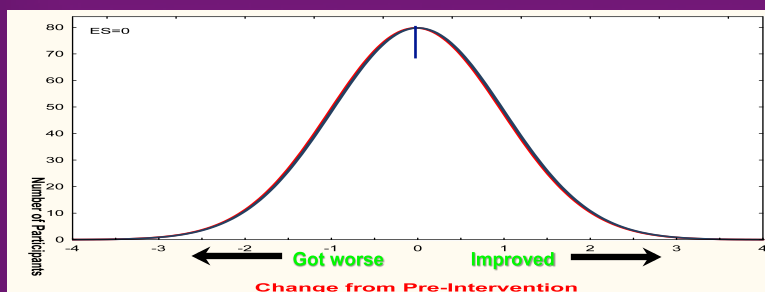


(Goyal et al. 2014)

Comparisons of Meditation Programs With Specific Active Controls (Comparative Efficacy)



HUFFINGTON POST: Some 30 minutes of meditation daily may improve symptoms of anxiety and depression, a new analysis of previously published research suggests.



RESEARCH ARTICLE

Standardised Mindfulness-Based Interventions in Healthcare: An Overview of Systematic Reviews and Meta-Analyses of RCTs

Renske A. Gotink<sup>1,2,3</sup>, Paula Chu<sup>4</sup>, Jan J. V. Busschbach<sup>2</sup>, Herbert Benson<sup>5,7</sup>, Gregory L. Fricchione<sup>6,7</sup>, M. G. Myriam Hunink<sup>1,3,8\*</sup>

- 115 unique RCTs of MBSR/MBCT to improve wellbeing
  - 8,683 unique individuals with various conditions
    - Average effect size = 0.44 (e.g. depression=.37; anxiety=0.49; quality of life=0.39)



Most recent meta-analysis study:

Effect size= 0.44 (Gotink et al, 2015 PLOS1)

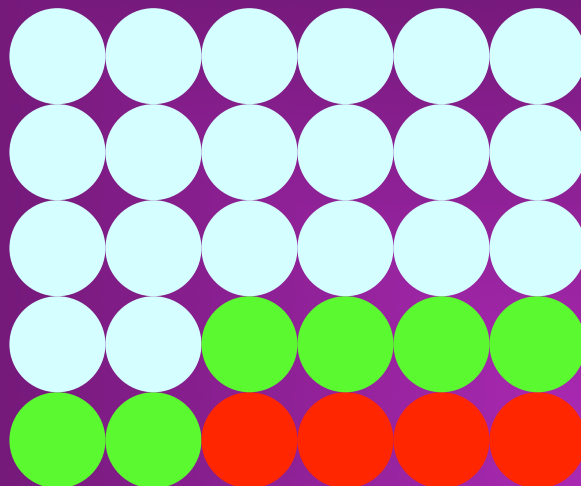


(Gotink et al, 2015 PLOS1)

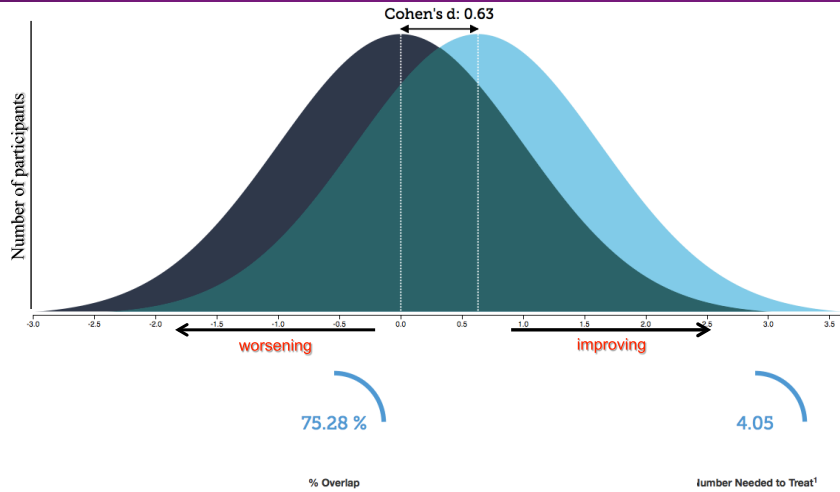
Most recent meta-analysis study:

Effect size= 0.44 (Gotink et al, 2015 PLOS1)

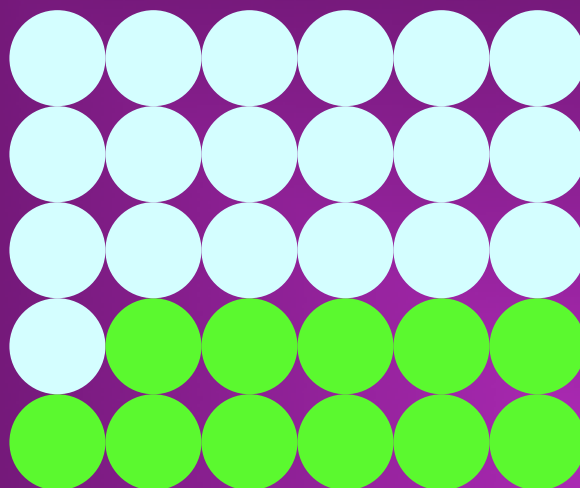
NNT=7



NONRECURRAL OF DEPRESSION OVER 1 YR: MBCT  
VS TAU (across studies: Piet et al, 2011)

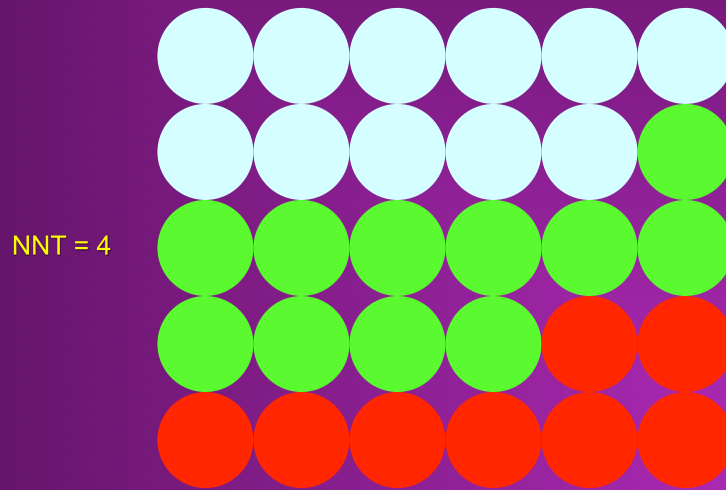


Effects upon nonrecurrence of depression among major depressives with  $\geq 3$  previous episodes



( meta-analysis across studies: Piet et al, 2011)

Effects upon nonrecurrence of depression among major depressives with  $\geq 3$  previous episodes



( meta-analysis across studies: Piet et al, 2011)

**What you can honestly tell the doctors, your skeptical colleagues or participants about benefits of mindfulness-based interventions?**

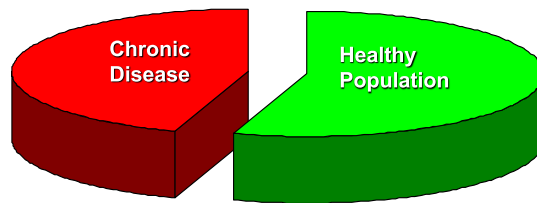
## **Chronische Erkrankungen als existenzielle Herausforderung: Achtsamkeit (MBSR) kann helfen**

- Eine chronische Krankheit ist entweder „das Ergebnis eines länger andauernden Prozesses degenerativer Veränderung somatischer oder psychischer Zustände“ oder eine Störung, die „dauernde somatische oder psychische Schäden oder Behinderung zur Folge“ hat.

(Waltz, 1989)

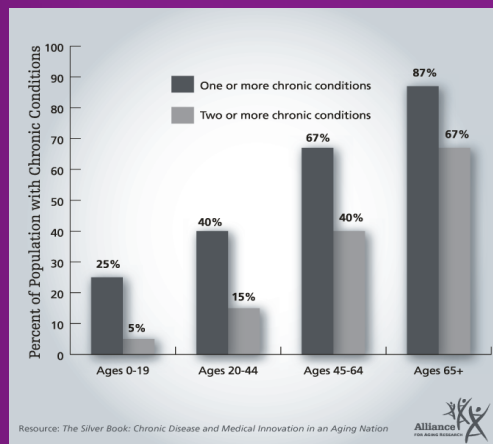
Arthritis	Asthma
Bluthochdruck	chronischen Atemwegserkrankungen
chronische Magen-Darmerkrankungen	Colitis
Depression	Diabetes
Demenz	Epilepsy
Herz-Kreislauf-Erkrankungen	Krebs
Multiple Sklerose	Niereninsuffizienz
Parkinson	Schizophrenie
Schmerzsyndromen	medikamentöse Nebenwirkungen

## 45% der Bevölkerung *leidet* unter einer oder mehreren chronischen Krankheiten



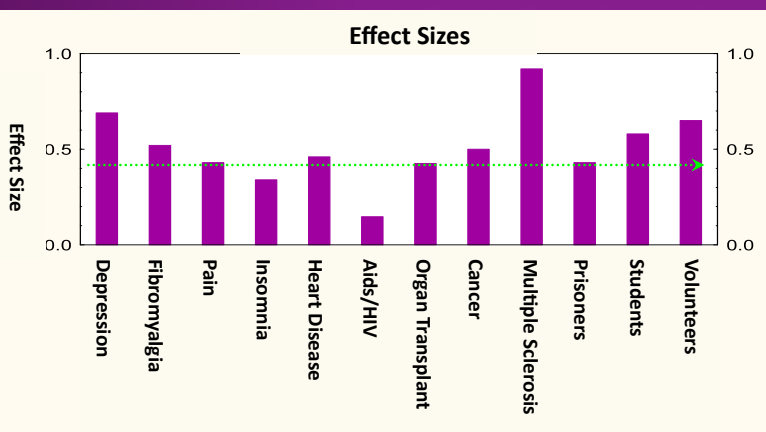
Anderson et al. (2004) "Chronic Conditions," Robert Wood Johnson Foundation and Johns Hopkins University

## Mit dem Alter wird's nicht besser!

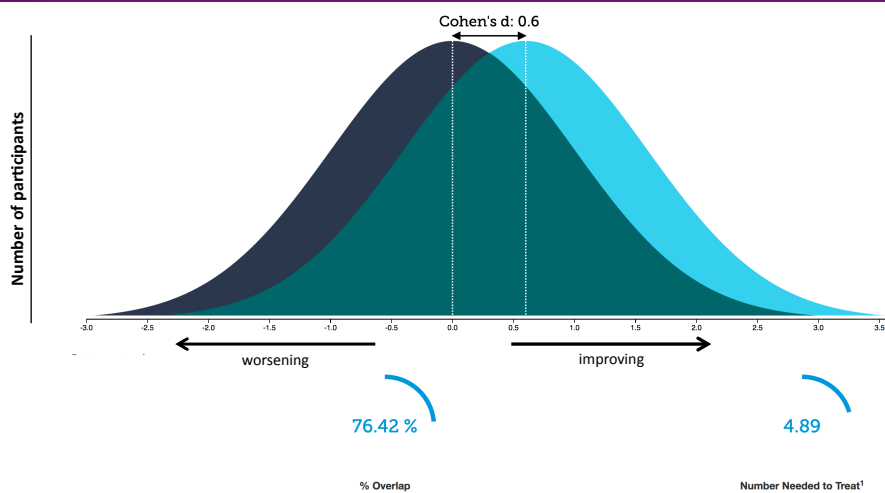


## MBI's help people with chronic conditions of many kinds better to cope with their illness

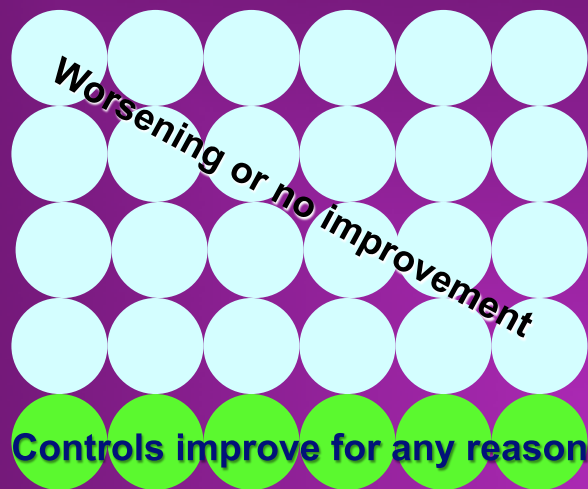
Short-term clinical benefits upon quality of life (QoL)  
(e.g. depression, anxiety, fatigue, health-related QoL)



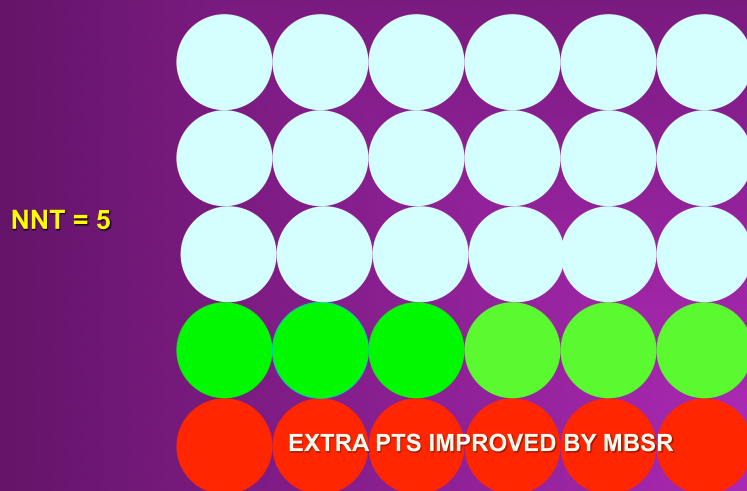
At least moderate to strong clinical improvements



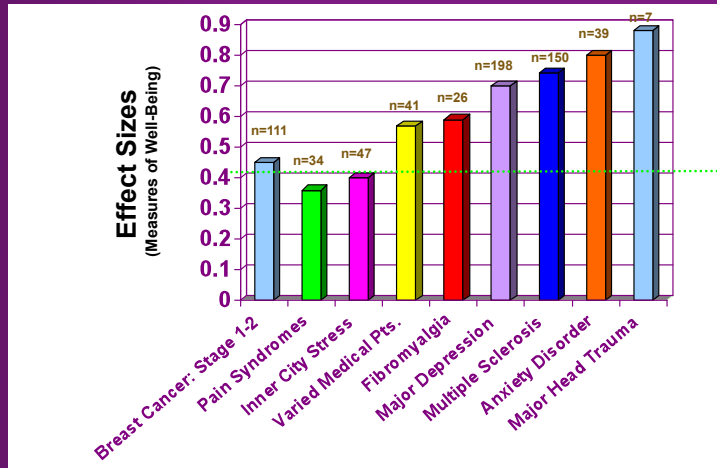
## MBSR/MBCT for Wellbeing



## MBSR/MBCT for Wellbeing

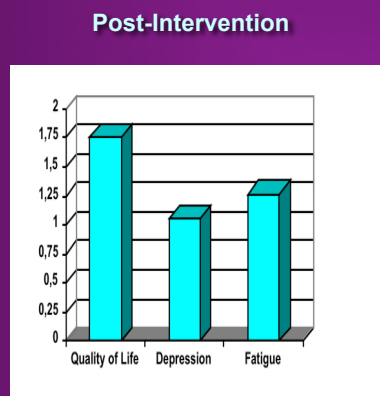


## Effects also seem to last\_ (0.5-3 year follow-ups)



At least moderate to strong clinical improvements

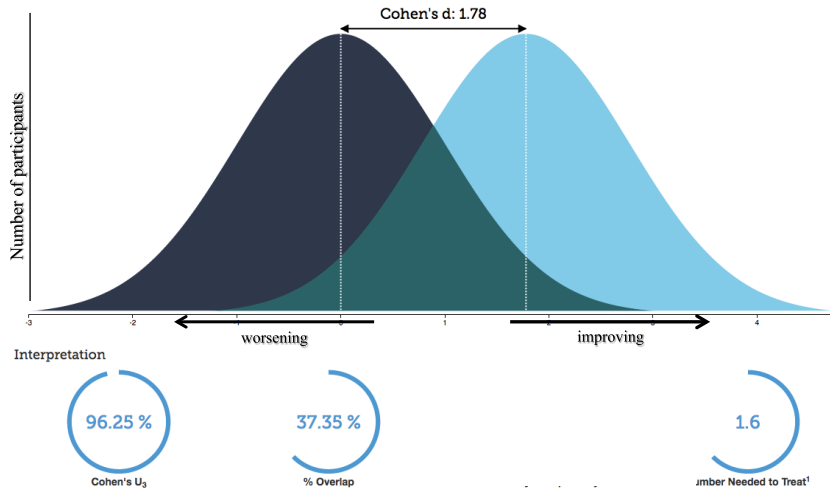
## MS patients who experienced low quality of life, depression, or chronic fatigue



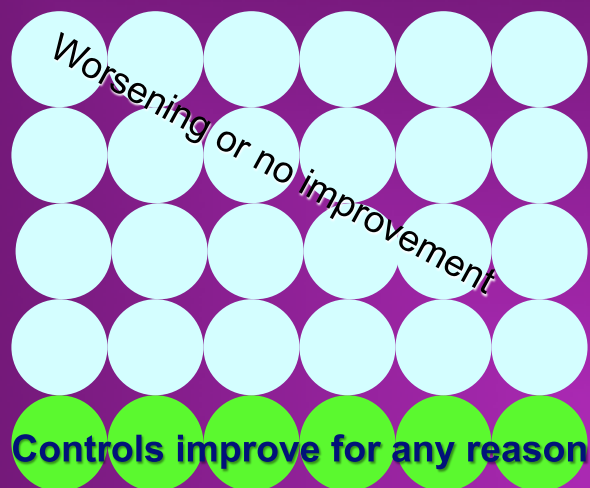
(All  $p$ 's < .0005)

(Grossman et al, 2010, Neurology)

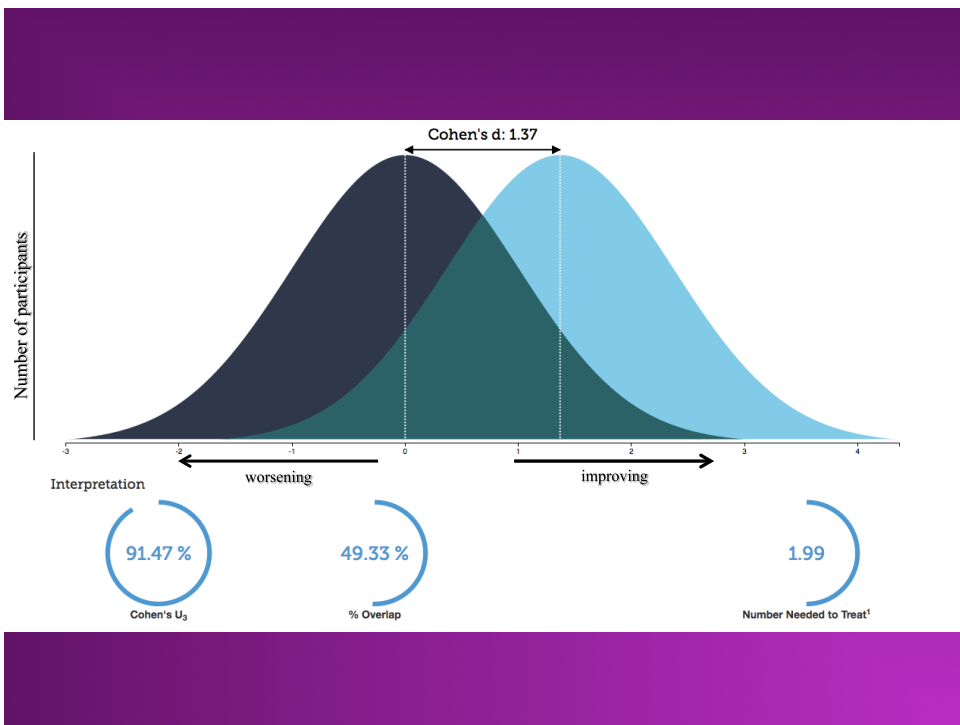
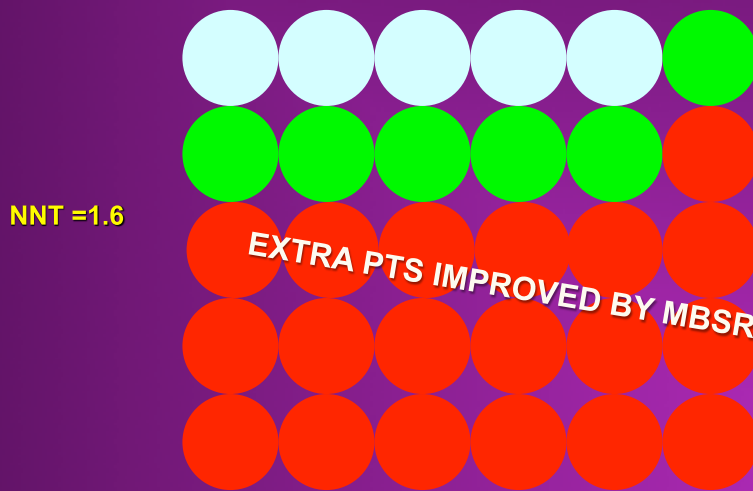




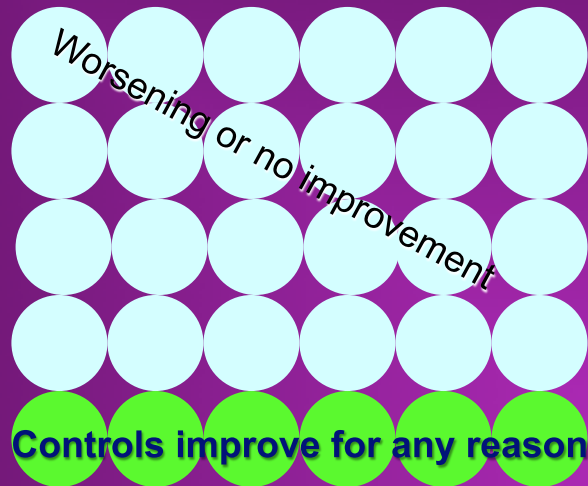
## MBSR for MS Quality of Life



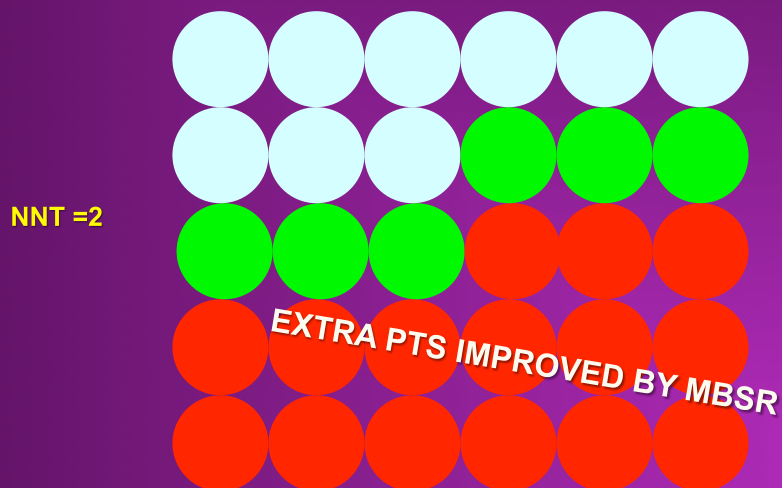
# MBSR for MS Quality of Life



## MBSR for MS Wellbeing (average)

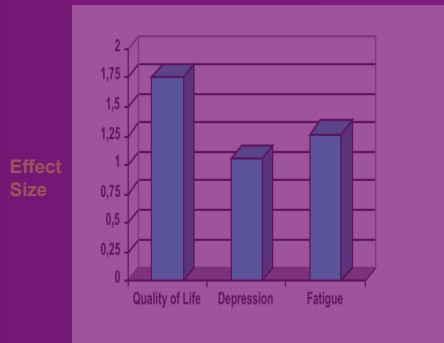


## MBSR for MS Wellbeing



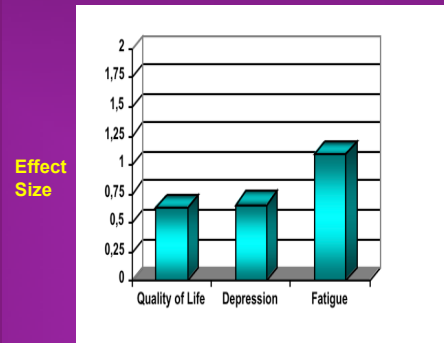
## MS patients who experienced low quality of life, depression, or chronic fatigue

Post-Intervention



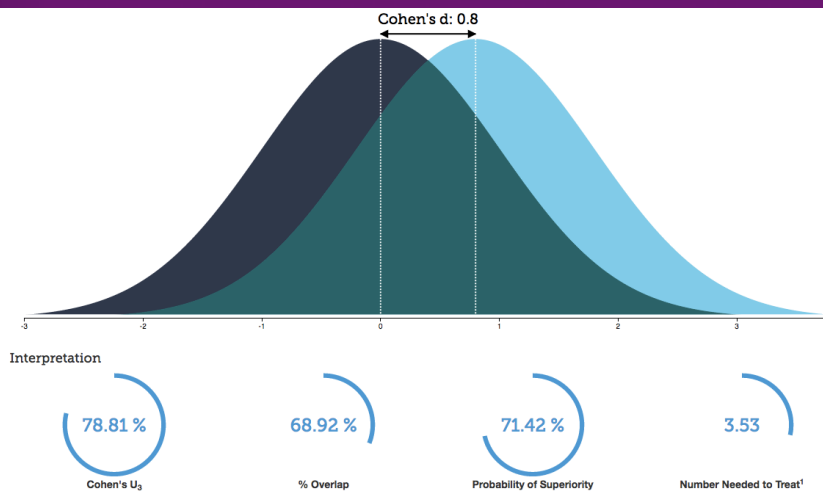
(All  $p$ 's < .0005)

6-month Follow-up

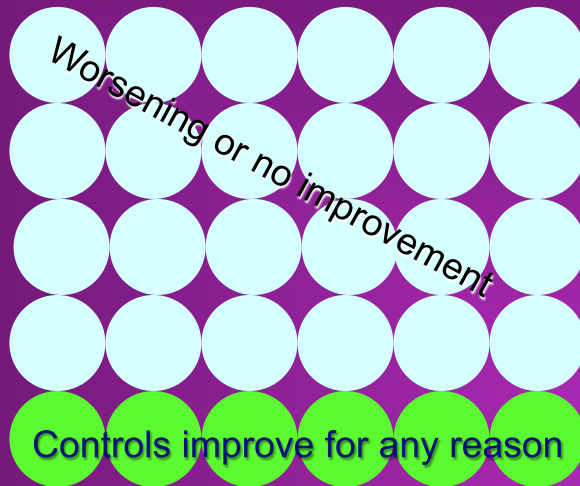


(All  $p$ 's < .03)

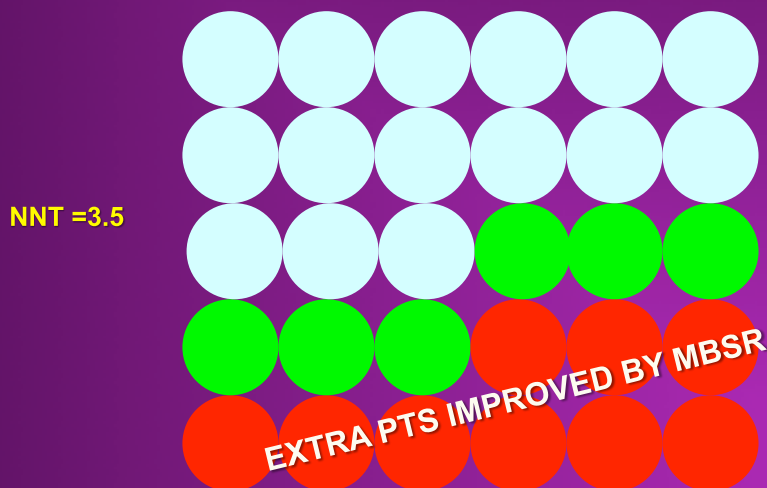
(Grossman et al, 2010, Neurology)



## MBSR for MS Wellbeing 6 MONTHS LATER

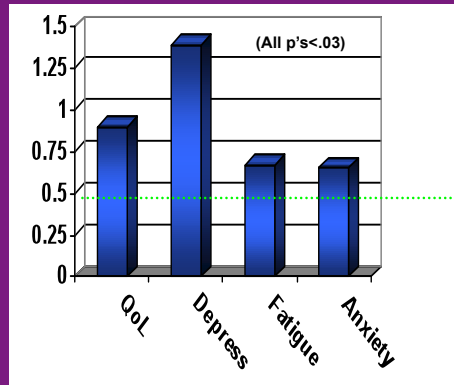


## MBSR for MS Wellbeing 6 MONTHS LATER



## MS patients 2.5 years later

Effect Size



At least moderate to strong clinical improvements

**80% reported still regularly practicing mindfulness exercises 2.5 years later**

Journal of Psychosomatic Research 77 (2014) 81–84

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

ELSEVIER

Short communication

Mindfulness-based cognitive therapy for people with diabetes and emotional problems: Long-term follow-up findings from the DiaMind randomized controlled trial

Jenny van Son <sup>a</sup>, Ivan Nyklíček <sup>a,\*</sup>, Victor J. Pop <sup>a</sup>, Marion C. Blonk <sup>b</sup>, Ronald J. Erdtsieck <sup>c</sup>, François Pouwer <sup>a</sup>

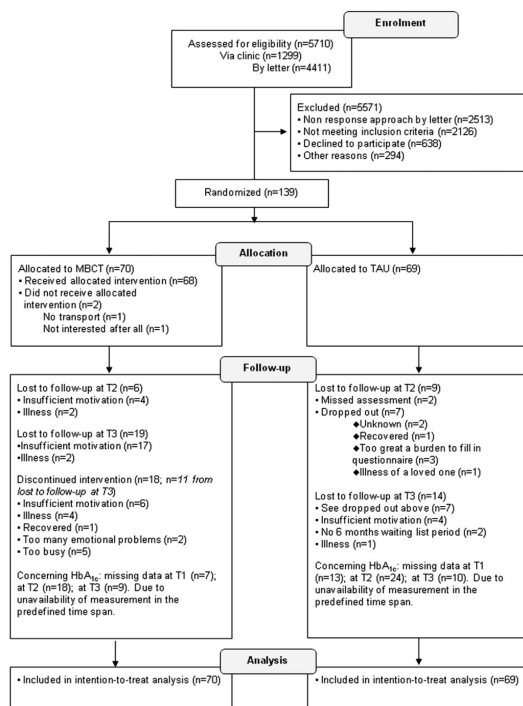
<sup>a</sup> Center of Research on Psychology in Somatic diseases (CoRPS), Department of Medical and Clinical Psychology, Tilburg University, Tilburg, The Netherlands

<sup>b</sup> Department of Internal Medicine, Catharina Hospital, Eindhoven, The Netherlands

<sup>c</sup> Department of Internal Medicine, Midsma Medical Center, Eindhoven, The Netherlands

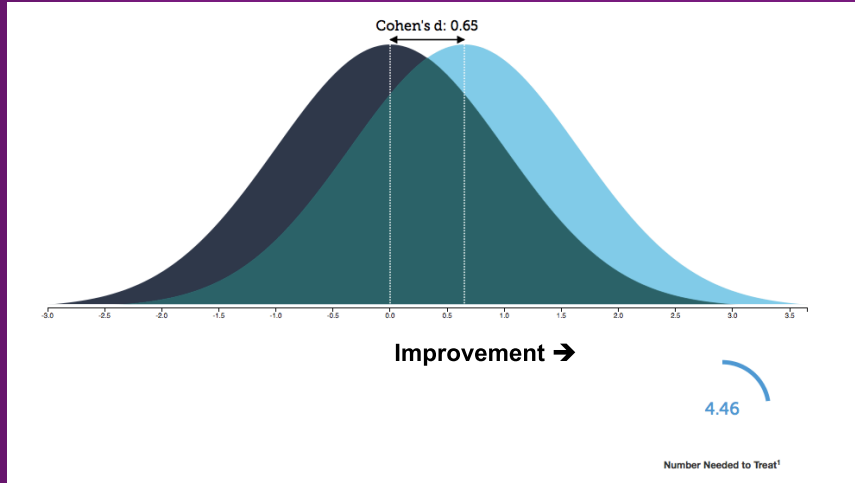
CrossMark

- 139 adults with diabetes (type 1 or type 2) with low levels of emotional well-being
- 6-month RCT follow-up data

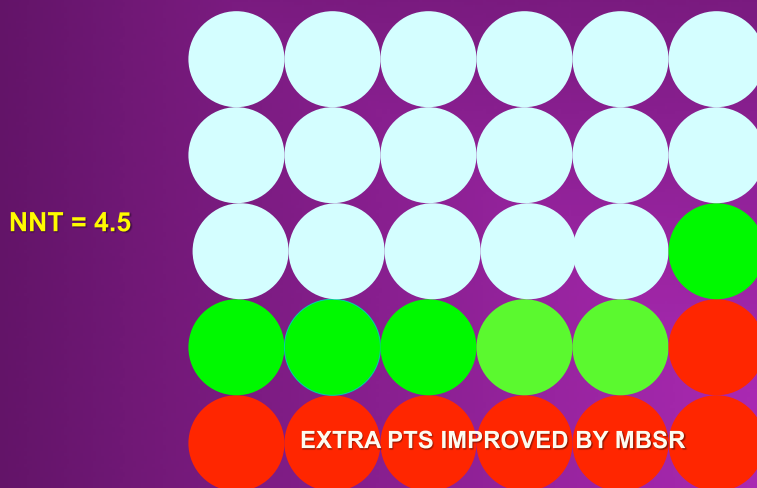


Measure		Pre M (SD)	Post M (SD)	6-m FU M (SD)	Effect Group on Pre-to-6-m FU change		
					t	p	d <sup>a</sup>
<i>Primary outcomes</i>							
Perceived stress	MBCT	19.5 (6.0)	14.4 (7.1)	13.4 (6.7)	- 3.93	< .001	0.76
	TAU	20.4 (5.9)	19.0 (6.7)	18.9 (7.0)			
HADS-anxiety	MBCT	8.6 (3.3)	6.7 (3.6)	5.4 (3.1)	- 4.24	< .001	0.83
	TAU	9.4 (3.6)	8.8 (4.1)	8.8 (3.9)			
POMS-anxiety	MBCT	20.5 (4.5)	17.4 (4.1)	16.4 (3.4)	- 4.43	< .001	0.92
	TAU	20.2 (4.4)	19.8 (5.1)	19.4 (5.0)			
HADS-depression	MBCT	8.2 (3.8)	5.6 (4.0)	5.2 (3.6)	- 2.89	.004	0.51
	TAU	9.2 (3.9)	8.6 (4.7)	8.2 (4.5)			
POMS-depression	MBCT	25.3 (5.8)	21.4 (4.5)	21.8 (4.7)	- 2.41	.016	0.48
	TAU	26.7 (6.3)	26.2 (7.0)	25.7 (7.3)			
Diabetes distress	MBCT	35.5 (17.8)	28.7 (21.0)	25.0 (19.7)	- 2.12	.034	0.41
	TAU	36.6 (18.9)	33.5 (22.0)	32.8 (20.1)			

# Average Effect Size=0.65



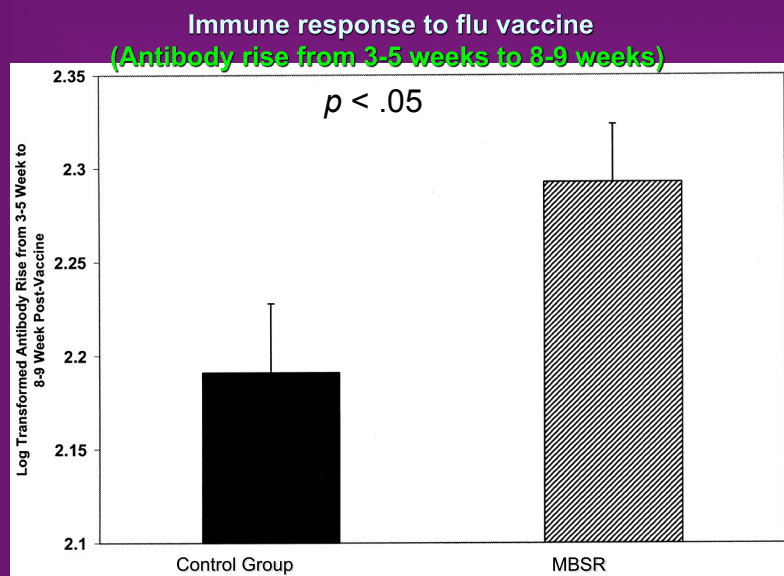
# MBSR/MBCT for Wellbeing





## Evidence of physiological benefits of MBSR and other MBI's

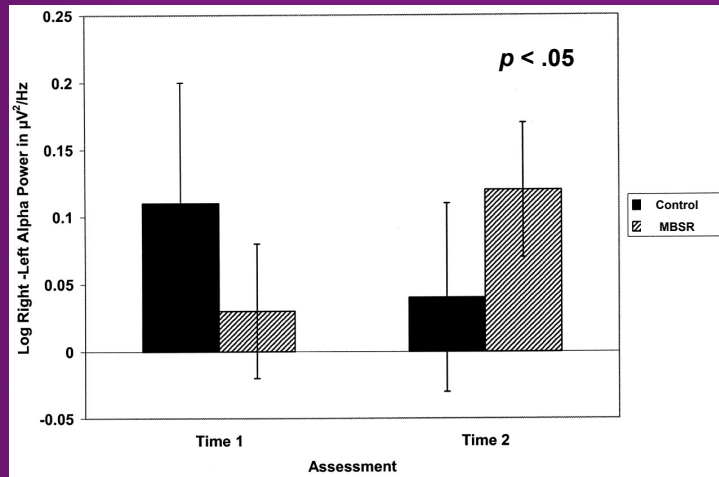
### Evidence that MBI improves immune function



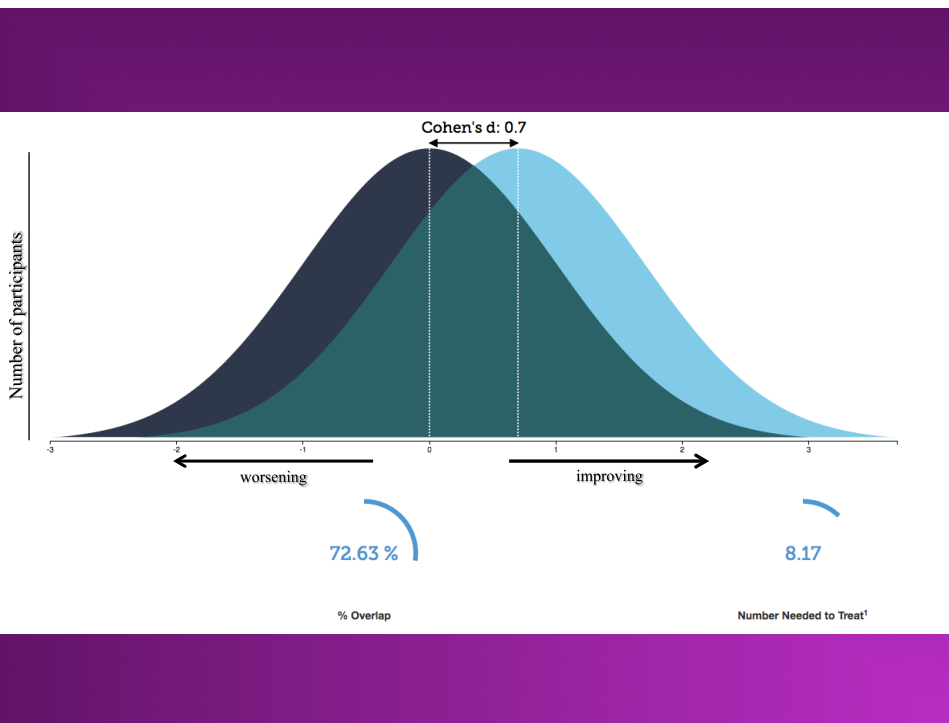
(Davidson et al. 2003, Psychosom Med)

## Cortical brain function associated with positive emotions improve

Left Frontal Hemisphere Activation (EEG)  
(Change to positive emotion induction)

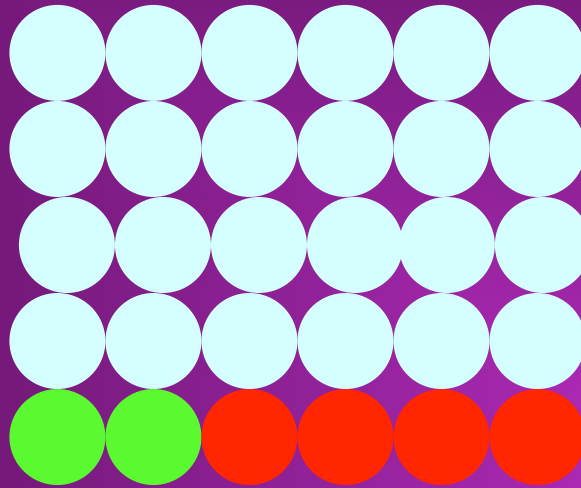


(Davidson et al. 2003, Psychosom Med)



## Immune system benefits

NNT = 8



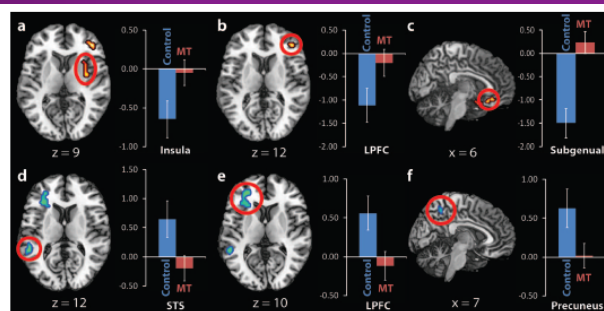
## Minding One's Emotions: Mindfulness Training Alters the Neural Expression of Sadness

Norman A. S. Farb and Adam K. Anderson  
University of Toronto

Helen Mayberg  
Emory University

Jim Bean and Deborah McKeon  
St. Joseph's Health Centre, Toronto, Canada

Zindel V. Segal  
Centre for Addiction and Mental Health, Toronto, Canada  
and University of Toronto



**Figure 2.** Differences in regional activation and deactivation between control and mindfulness training (MT) groups in response to sadness provocation (the interaction between-groups and sad vs. neutral within-group contrasts). Top panel: sadness-related deactivations in the control group with nonsignificant activity in the MT group (red clusters = MT > control); bottom panel: sadness-related activations in the control group with nonsignificant activity in the MT group (blue clusters = control > MT). Error bars are 95% confidence intervals. LPFC = lateral prefrontal cortex; STS = superior temporal sulcus/Wernicke's area.

## Effects of Mindfulness-Based Stress Reduction (MBSR) on Emotion Regulation in Social Anxiety Disorder

Philippe R. Goldin and James J. Gross  
Stanford University

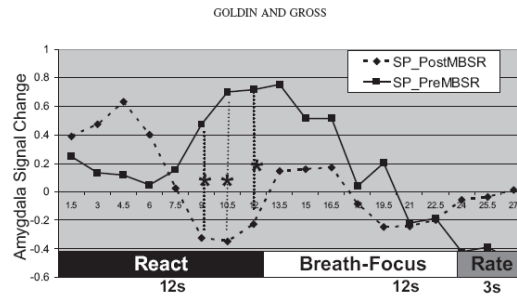


Figure 5. Right dorsal amygdala blood oxygenation level-dependent (BOLD) contrast signal time series during reacting to negative self-beliefs and breath-focused attention in social phobics (SP) at both pre- and post-mindfulness-based stress reduction (MBSR). \*  $p < .05$ . Rate = negative emotion rating; React = reacting to the negative self-belief; Breath-Focus = instruction to focus attention on breath sensation.



Contents lists available at ScienceDirect

### Psychiatry Research: Neuroimaging

journal homepage: [www.elsevier.com/locate/psychresns](http://www.elsevier.com/locate/psychresns)



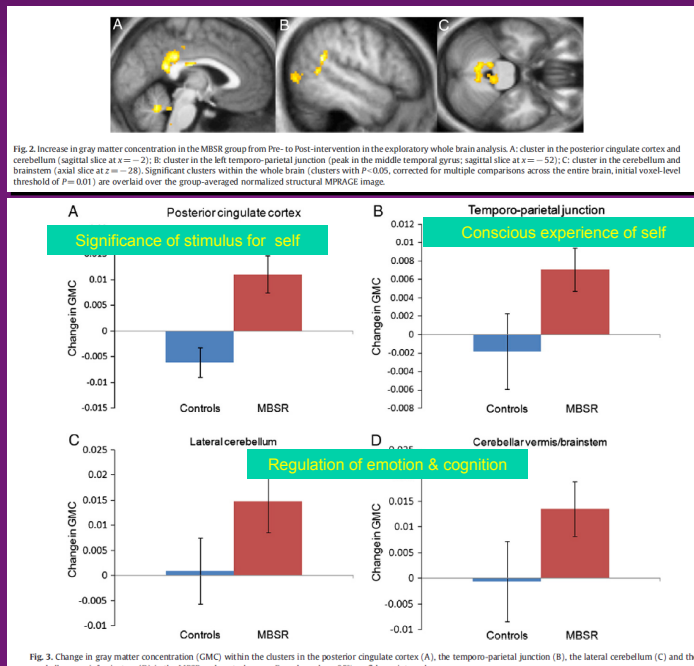
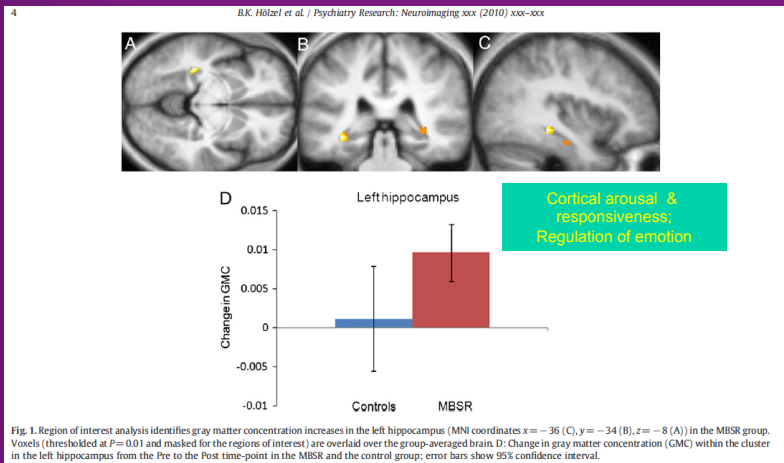
#### Mindfulness practice leads to increases in regional brain gray matter density

Britta K. Hölzel<sup>a,b,\*</sup>, James Carmody<sup>c</sup>, Mark Vangel<sup>a</sup>, Christina Congleton<sup>a</sup>, Sita M. Yerramsetti<sup>a</sup>, Tim Gard<sup>a,b</sup>, Sara W. Lazar<sup>a</sup>

<sup>a</sup>Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA  
<sup>b</sup>Rendler Institute of Neuroimaging, Justus Liebig Universität Gießen, Germany  
<sup>c</sup>University of Massachusetts Medical School, Worcester, MA, USA

- 18 MBSR vs. 17 controls (38 years)
- Not randomized
- No one is sure what these increased density measures mean

## Recent evidence that even brain structures change in density after 8-weeks of MBSR



Overview of morphometric studies on meditation.

Study	Meditation tradition	N meditators/controls	Morphological measures	Regions identified greater in meditators than controls
Lazar et al. (2005)	Insight	20/15	Cortical thickness	Right anterior insula and right middle and superior frontal sulci
Pagnoni and Cekic (2007)	Zen	13/13	Gray matter volume (VBM in SPM5)	Meditators showed no age-related decline in the left putamen as compared to controls
Hölzel et al. (2008)	Insight	20/20	Gray matter density (VBM in SPM2)	Left inferior temporal lobe, right insula, and right hippocampus
Vestergaard-Poulsen et al. (2009)	Tibetan Buddhist	10/10	Gray matter density and volume (VBM in SPM5)	Medulla oblongata, left superior and inferior frontal gyri, anterior lobe of the cerebellum and left fusiform gyrus
Luders et al. (2009)	Zazen, Vipassana, Samatha and others	22/22	Gray matter volume (VBM in SPM5)	Right orbito-frontal cortex, right thalamus, left inferior temporal lobe, right hippocampus
Grant et al. (2010)	Zen	19/20	Cortical thickness	Right dorsal anterior cingulate cortex, secondary somatosensory cortex

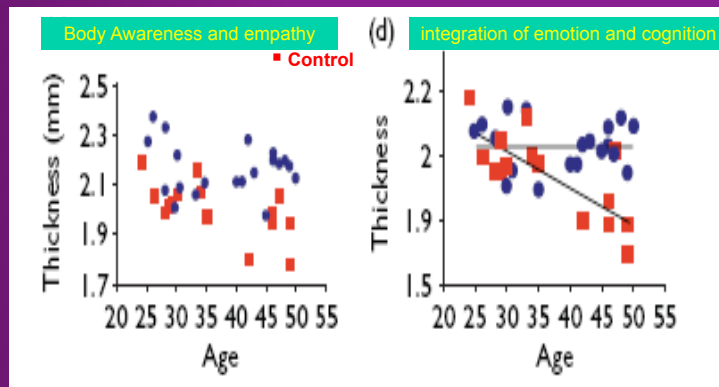
VBM: voxel-based morphometry (Gaser), SPM: Statistical Parametric Mapping, (Wellcome Department of Cognitive Neurology, London).

## Can long-term meditation slow aging effects on the brain?

Age-related effects of cortical thinning inhibited?

Insula

R middle & superior frontal sulci



### **Conclusions? Some thoughts and inferences**

1. Various notions of mindfulness, but each provides some focus upon legitimizing and validating aspects of the inner lives & experience of human beings.
2. Mindfulness programs appear mildly more effective than mere nonspecific psychosocial support control interventions (which often also, themselves, appear to produce beneficial effects)
3. MBI's, in general, are as effective as clinically established psychotherapeutic interventions
4. Scientific pursuit of contemplative practices is all very new, and progress is possible (especially if we don't overemphasize current knowledge and create empty bubbles).
5. To progress, we need to resist the corrupting elements of current science (e.g. pressure to publish positive results, to publish prolifically and quickly, to massage our data so it looks much better than it is).
6. +1st person: self awareness of our own hindrances, strengths, motives & limits as we participate in fabrication of mindfulness.

**Punchline: Modesty is the best policy**

## **Early experiments in transportation**

