Emotion regulation pathways in Mindfulness and Negative Emotion

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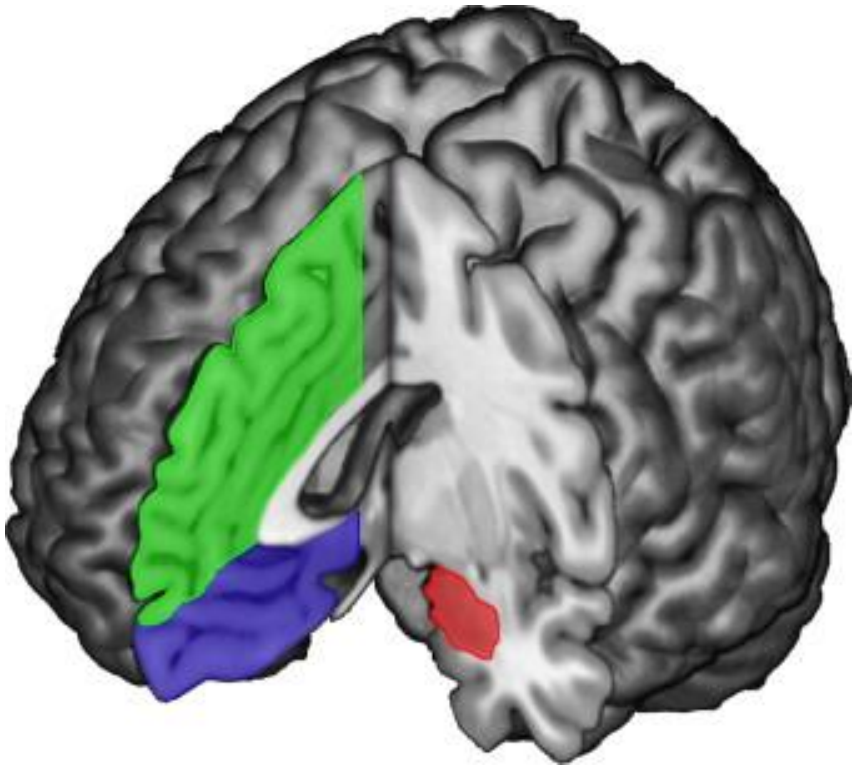
February 10, 2014

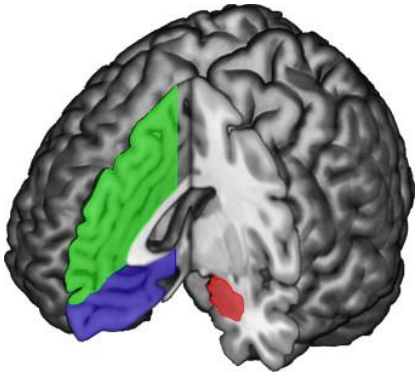


University of Massachusetts Medical School

This talk focuses on emotion regulation and the role of mindfulness

Clinical problems arising from emotion regulation deficits

Mindfulness-based interventions for emotion regulation problems



Neuroimaging of emotion regulation and effects of mindfulness

Clinical problems arising from emotion regulation deficits

Emotion regulation and psychopathology

A person with social anxiety clenches her hands to avoid shaking as she tries to answer a professor's question. A person with alcohol dependence drinks himself into oblivion following a bitter divorce. A person with bulimia has a spat with a friend and then gorges herself, all the while feeling out of control. A person with obsessive–compulsive disorder feels intense anxiety and washes his hands until they bleed. A person with depression fights back tears during an unpleasant work meeting.

- **Primary disturbance of mood - mood and anxiety disorders**
- **Prominent features – borderline and antisocial personality disorders, PTSD, alcohol and drug use disorders**
- **Altogether, nearly 200 DSM diagnoses involve emotion dysregulation**

Werner, K.W. & Gross, J.J. (2009) Emotion regulation and psychopathology: A conceptual framework. In Kring, A. & Sloan, D. (Eds.), Emotion Regulation and Psychopathology. The Guilford Press, New York.

Dysregulation of negative emotions is a common clinical problem

Anger and aggression in psychiatric outpatients

- Anger – 1/2 moderate-to-severe problems in past week
- Aggression – 1/4 aggressive behavior

Posternak & Zimmerman M. J Clin Psychiatry 63(8):665-72, 2002

MacArthur Study

- 43% history of violence, 27.5% violent within 1 year post-discharge from hospital

Monahan, J et al *Rethinking Risk Assessment*, 2001

CATIE

- 19.1% violent in 6 mo follow-up period (3.6% serious)

Swanson, JW. Arch Gen Psychiatry. 63:490-9, 2006

Mindfulness-based interventions for emotion regulation problems

Habits of mind and behavior

Auto-pilot

Multi-tasking

Past ←  **→ Future**

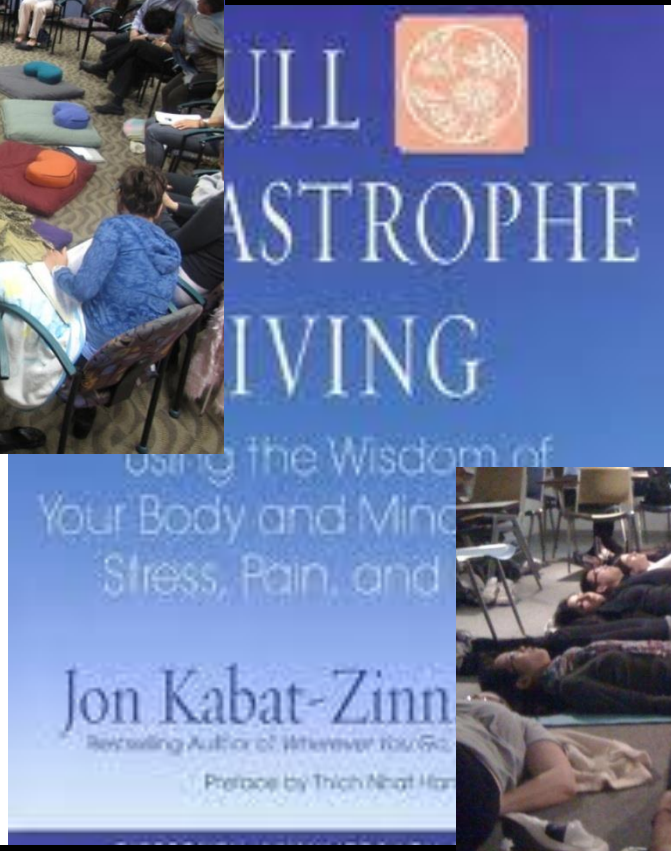
A definition of Mindfulness

“The awareness that emerges from paying attention, on purpose, to the unfolding of experience from moment to moment.”

- Jon Kabat-Zinn, 2003

Mindfulness-Based Stress Reduction

Classroom format facilitates discussion and group teaching of practices



Classes include teaching of formal meditation practices and how to incorporate mindfulness into daily life

Effective Health Care Program

Comparative Effectiveness Review
Number 124

Meditation Programs for Psychological Stress and Well-Being

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

JAMA Intern Med. 2014 Jan 6. doi: 10.1001/jamainternmed.2013.13018

METHODS

- Databases searched: MEDLINE, PsycINFO, EMBASE, PsycArticles, Scopus, CINAHL, AMED, the Cochrane Library.
- Tools used: Systemic review software; random-effects meta-analyses using standardized mean differences (effect size [ES]; Cohen d)
- Only included RCTs with active control groups
- Excluded studies in which meditation was not the foundation – yoga, tai chi, ACT, DBT
- 18, 753 citations title-abstract reviewed, 1,651 full-text articles reviewed - 47 trials (N=3515) met inclusion/exclusion criteria

RESULTS

- **Low or insufficient evidence that mantra meditation programs had an effect on any outcomes examined**
- **Mindfulness meditation programs had moderate evidence of improved anxiety, depression and pain**

Outcome	8 weeks	Range	3-6 mos	Range
Anxiety	0.38	[0.12-0.64]	0.22	[0.02-0.43]
Depression	0.30	[0.00-0.59]	0.23	[0.05-0.42]
Pain	0.33	[0.03- 0.62]		

RESULTS

Low evidence of improved quality of life and stress/distress

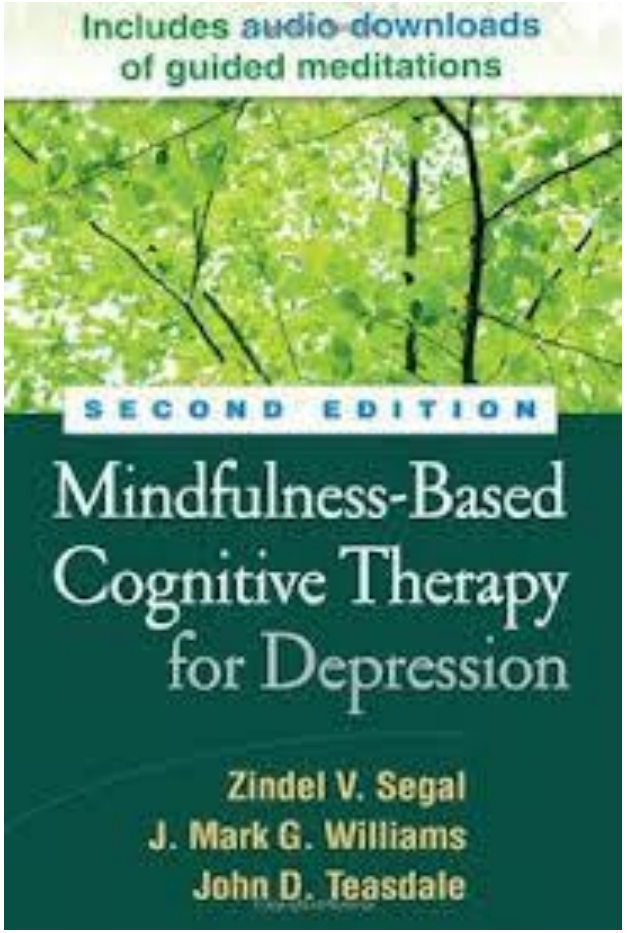
Low evidence of no effect or insufficient evidence on positive mood, attention, substance use, eating habits, sleep, and weight

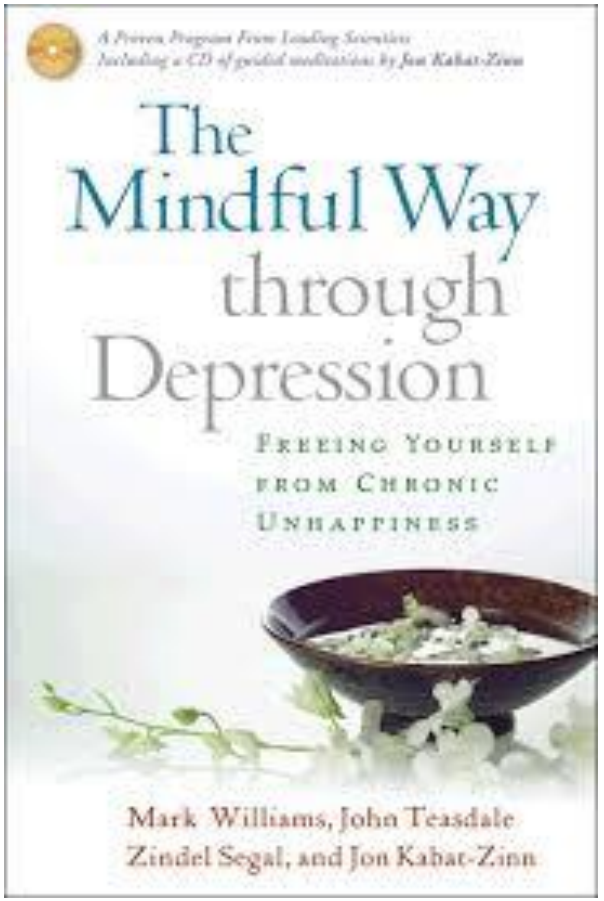
No evidence that meditation programs were better than any active treatment (ie, drugs, exercise, progressive muscle relaxation, CBT and other behavioral therapies)

CLINICAL IMPLICATIONS

- **The evidence suggests that mindfulness meditation programs could help reduce anxiety, depression, and pain in some clinical populations**
- **Clinicians should be prepared to talk with their patients about the role that a meditation program could have in addressing psychological stress**

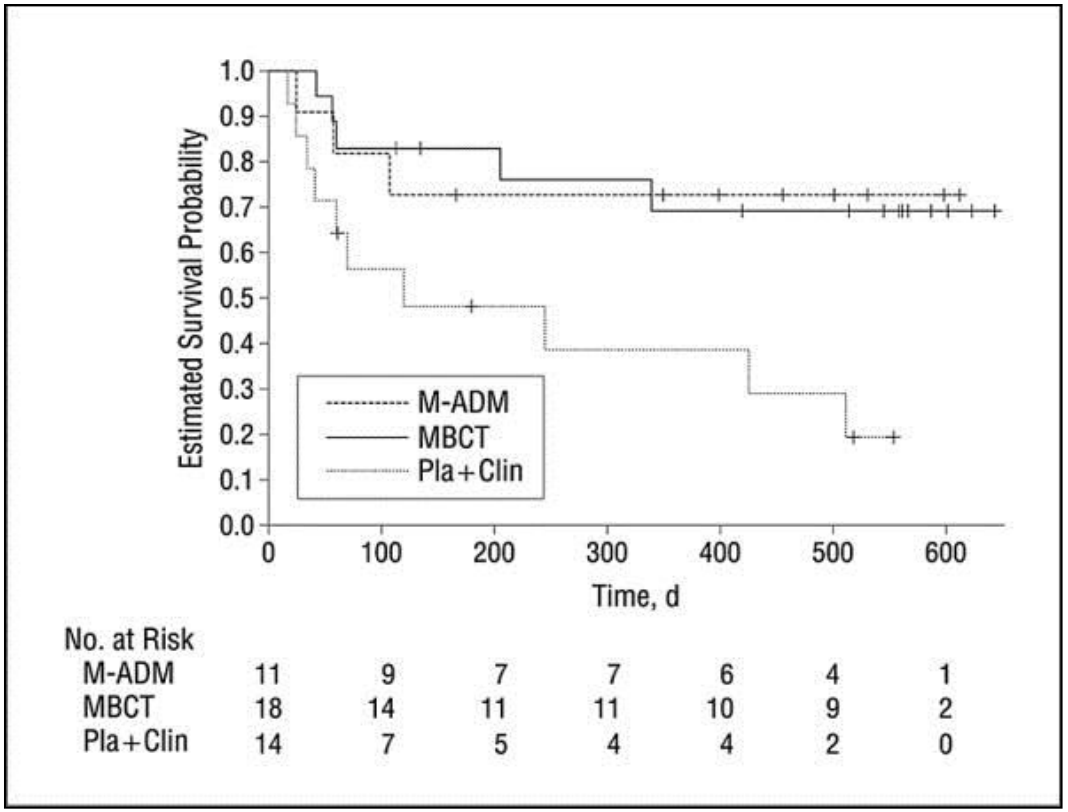
Mindfulness-based cognitive therapy for depression





Antidepressant Monotherapy vs Sequential Pharmacotherapy and Mindfulness-Based Cognitive Therapy, or Placebo, for Relapse Prophylaxis in Recurrent Depression

Zindel V. Segal, PhD; Peter Bieling, PhD; Trevor Young, MD; Glenda MacQueen, MD; Robert Cooke, MD; Lawrence Martin, MD; Richard Bloch, MA; Robert D. Levitan, MD



27%

28%

71%

Segal Z, et al. Arch Gen Psychiatry. 2010 Dec: 67(12):1256-64

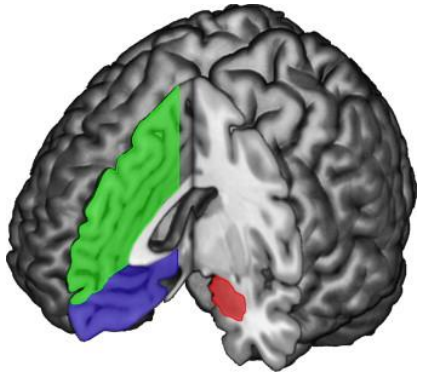
Emerging evidence for efficacy of MBCT for current episodes of depression

Geschwind 2012 Br J Psychiatry

- N = 130 randomized to MBCT vs. TAU
- Reduction in depression scores greater with MBCT: 30-35% improvement vs. 10%, $p<.001$

van Aalderen 2012 Psychol Med.

- N = 205 randomized to MBCT vs. TAU
- MBCT as effective for patients who were currently depressed as for patients who were in remission

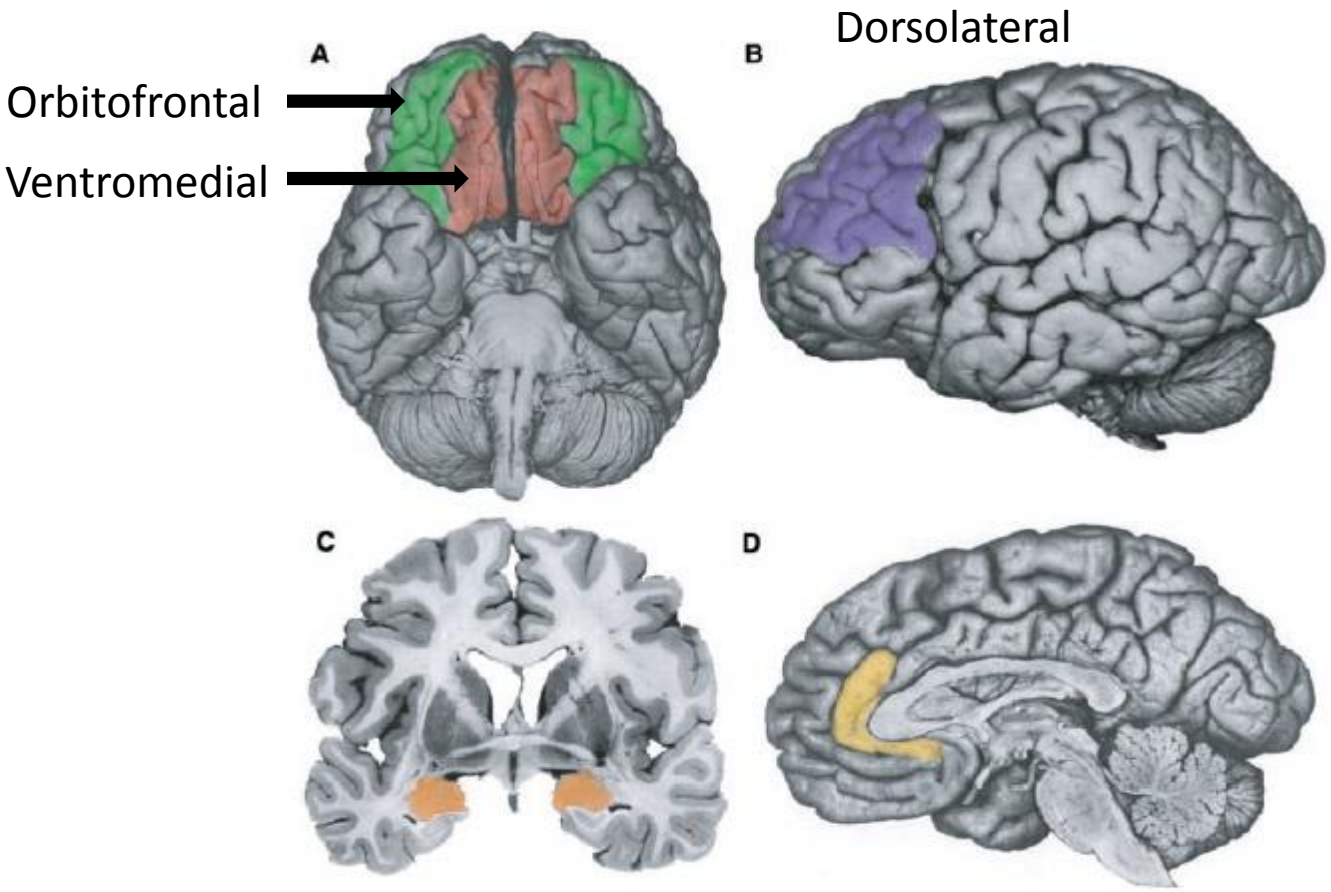


Neuroimaging of emotion regulation and effects of mindfulness

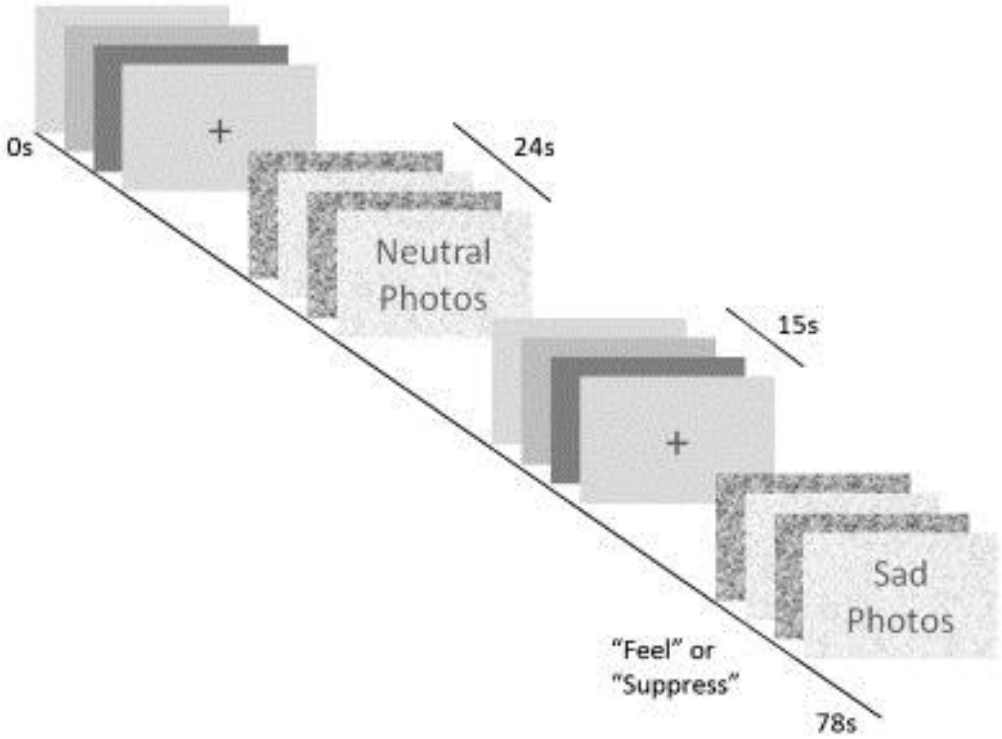
REVIEW

Dysfunction in the Neural Circuitry of Emotion Regulation—A Possible Prelude to Violence

Richard J. Davidson,* Katherine M. Putnam, Christine L. Larson



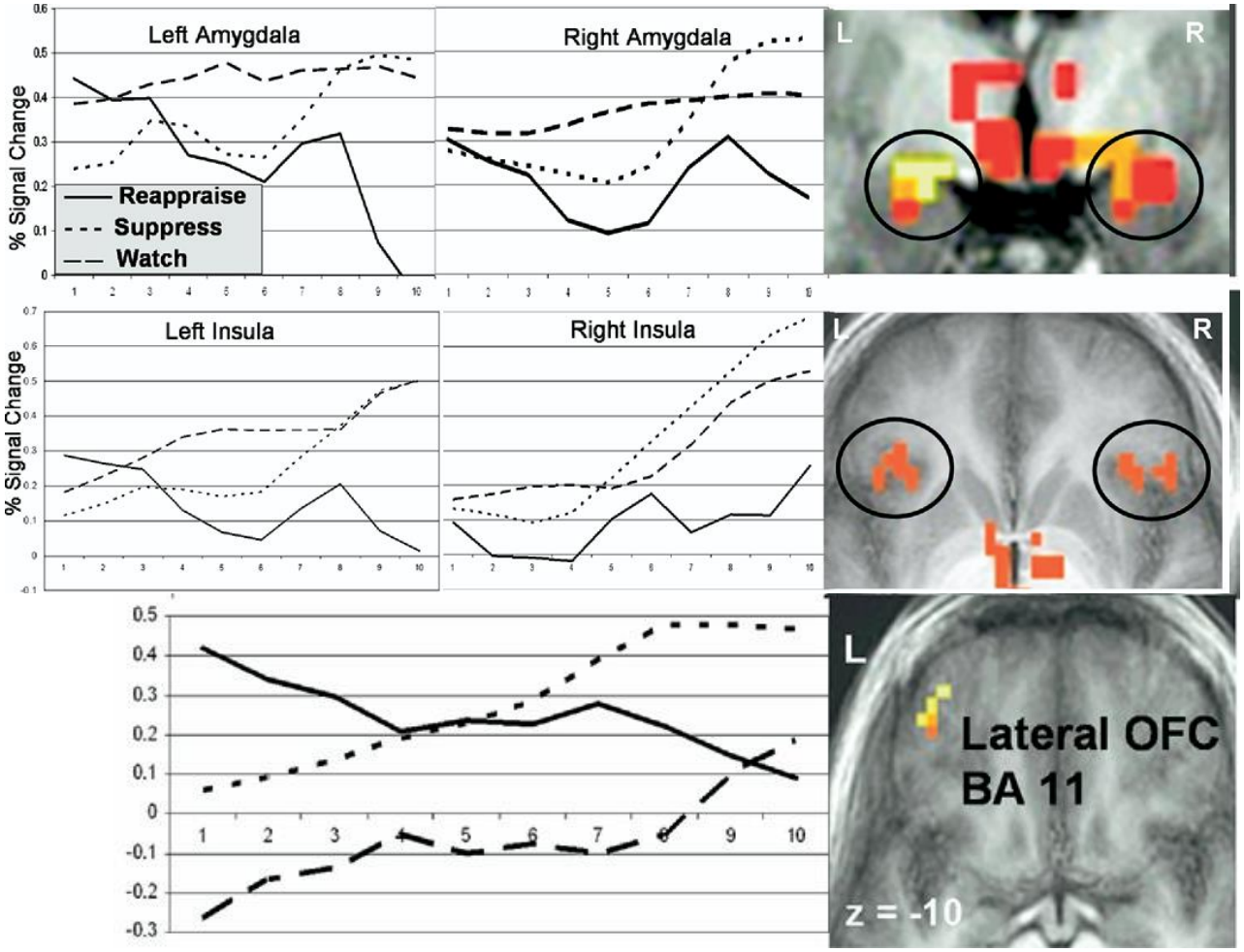
Functional MRI paradigms for studying emotion regulation



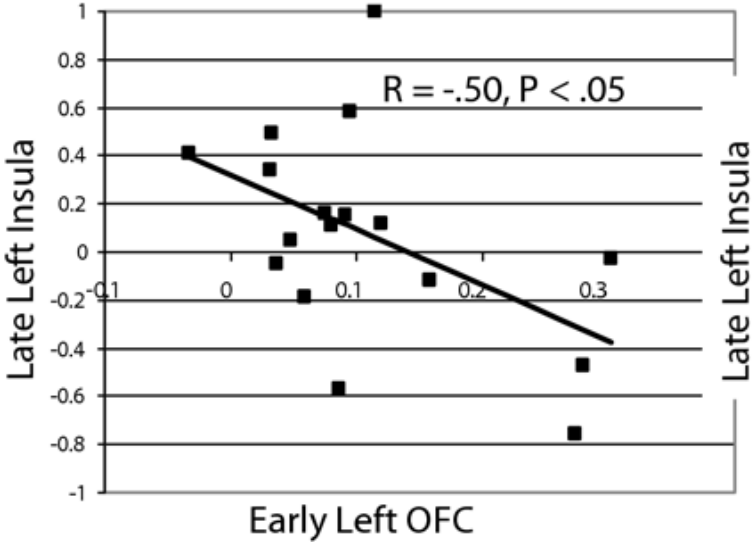
BIOL PSYCHIATRY 2008;63:577–586

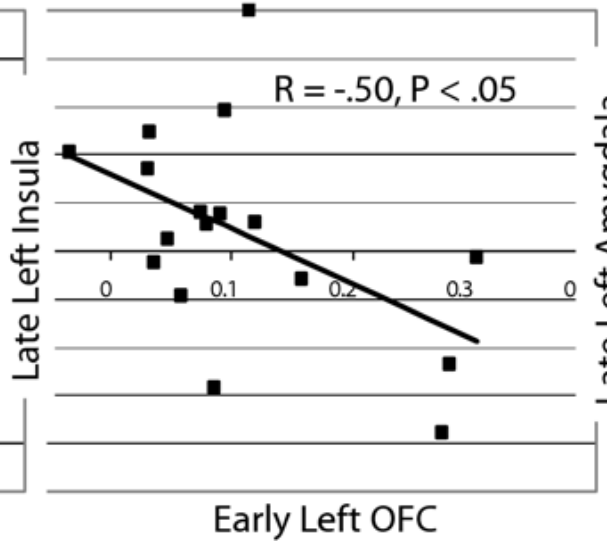
The Neural Bases of Emotion Regulation: Reappraisal and Suppression of Negative Emotion

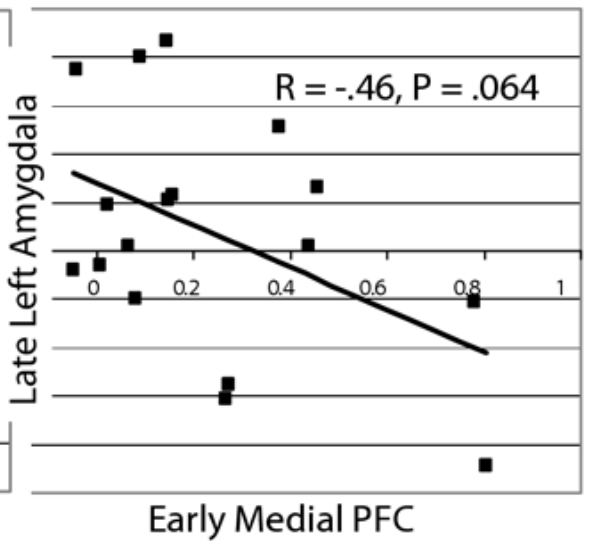
Philippe R. Goldin, Kateri McRae, Wiveka Ramel, and James J. Gross



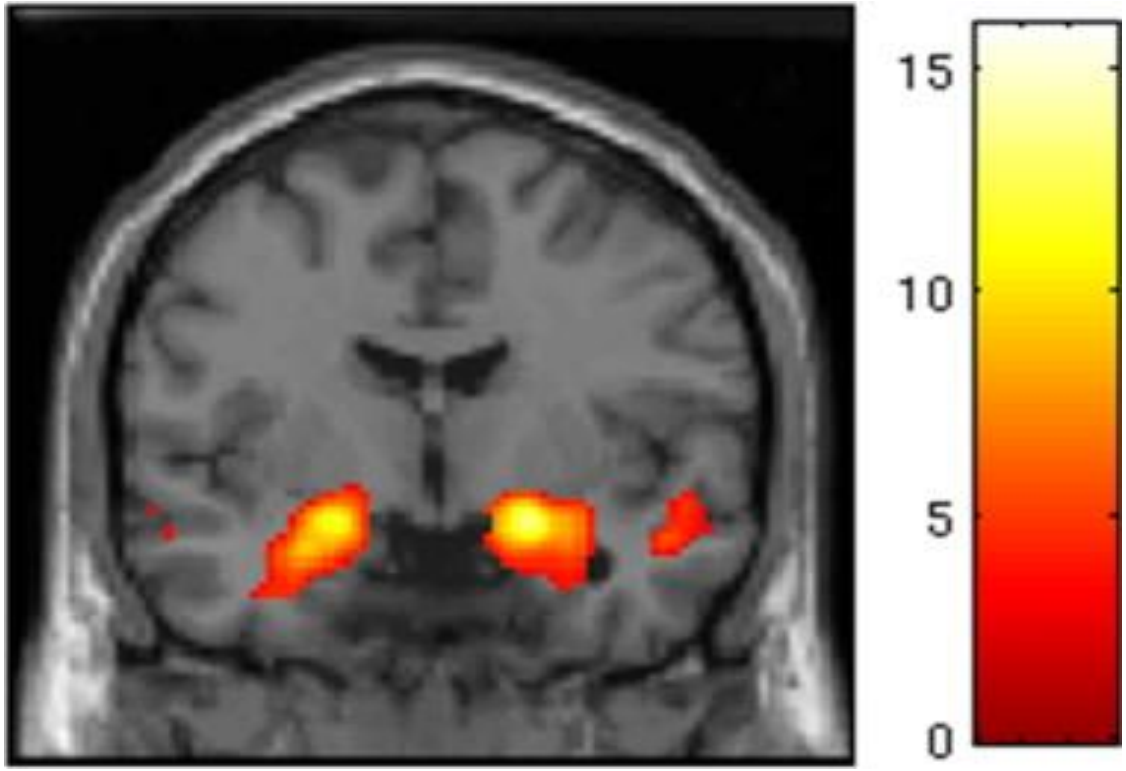
Activation of emotion-generative and emotion-regulatory regions by reappraisal are inversely correlated



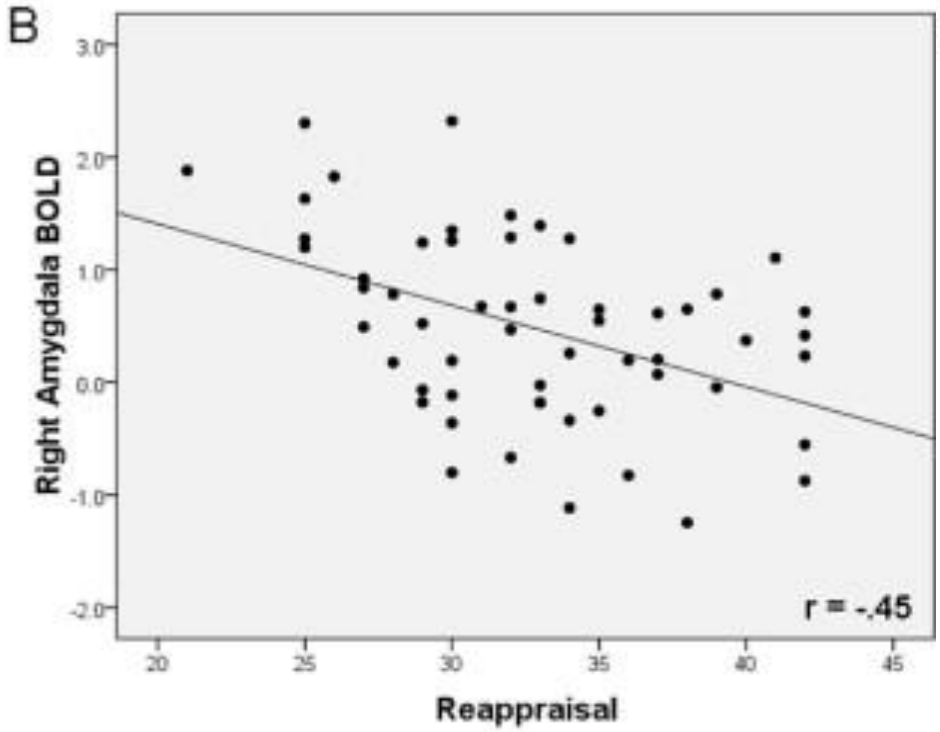


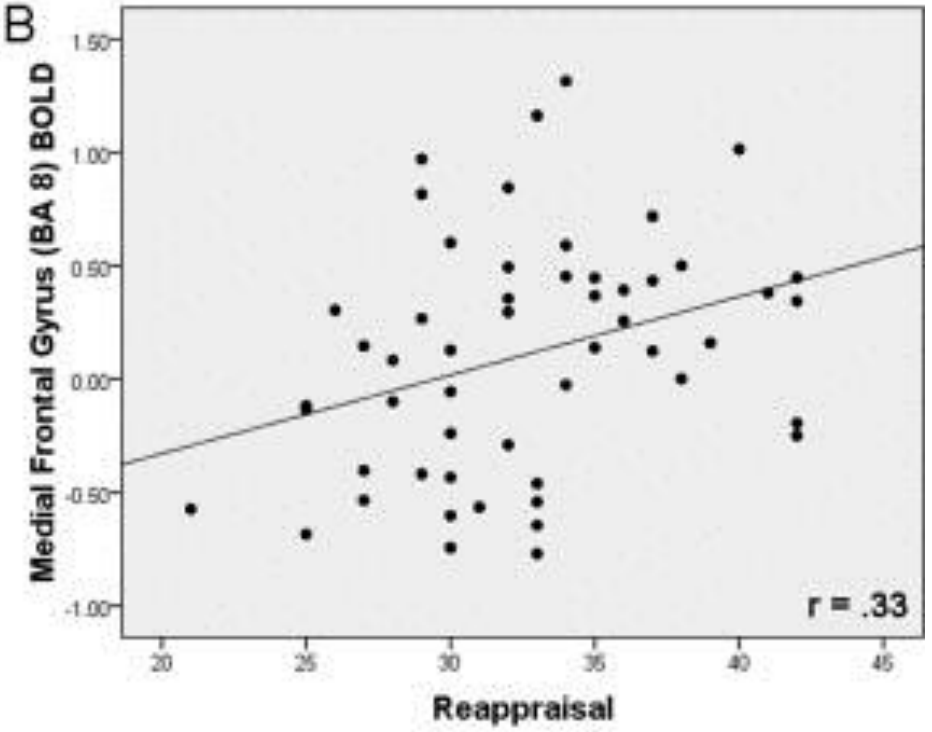


Trait differences in emotion regulation traits (reappraisal) are related to individual differences in amygdala and prefrontal responses



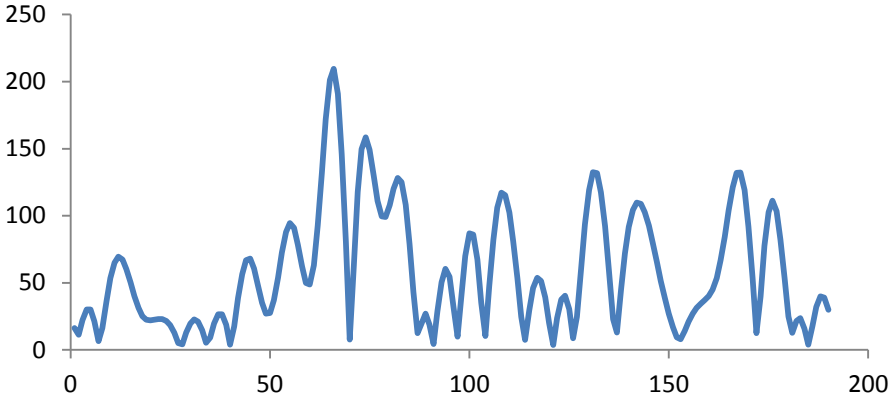
Drabant, EM. Biological Psychiatry 65, (5):367 – 373, 2009

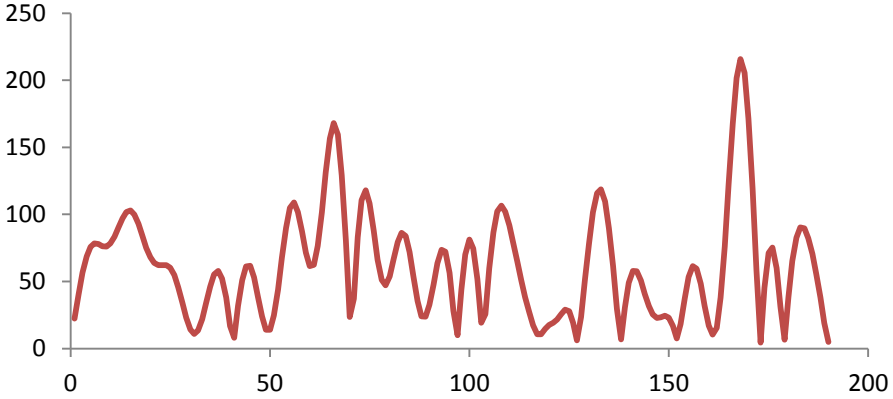




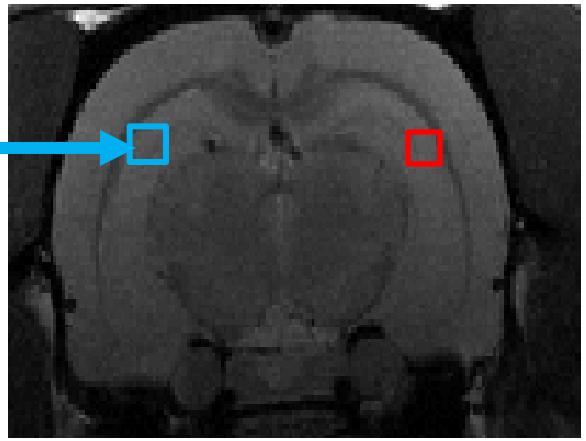
Drabant, EM. Biological Psychiatry 65, (5):367 – 373, 2009

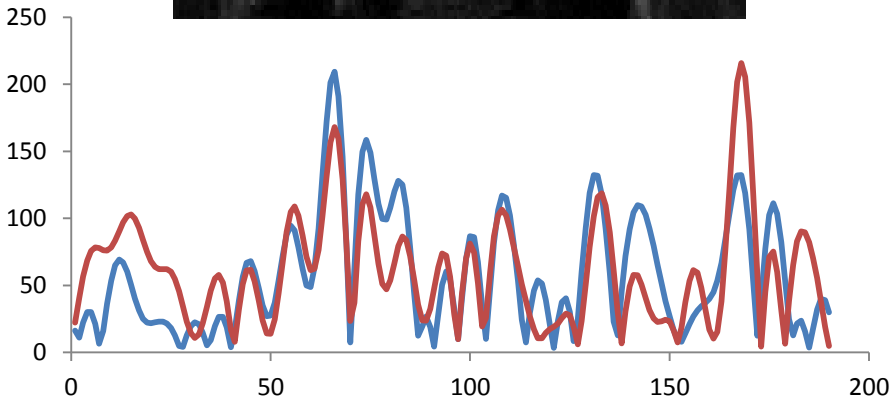
Resting state fMRI provides a measurement of functional brain connectivity



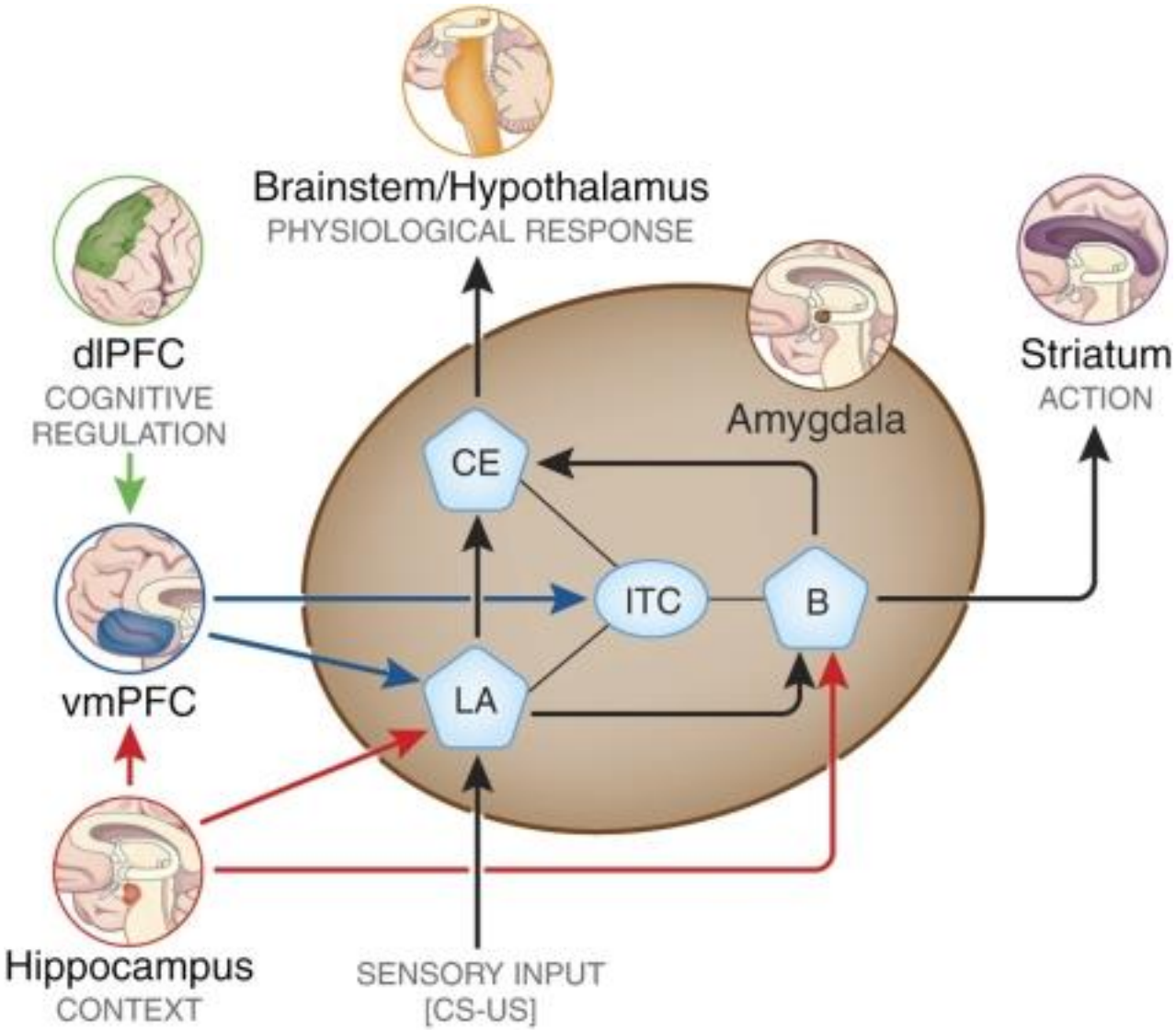


Seed ROI

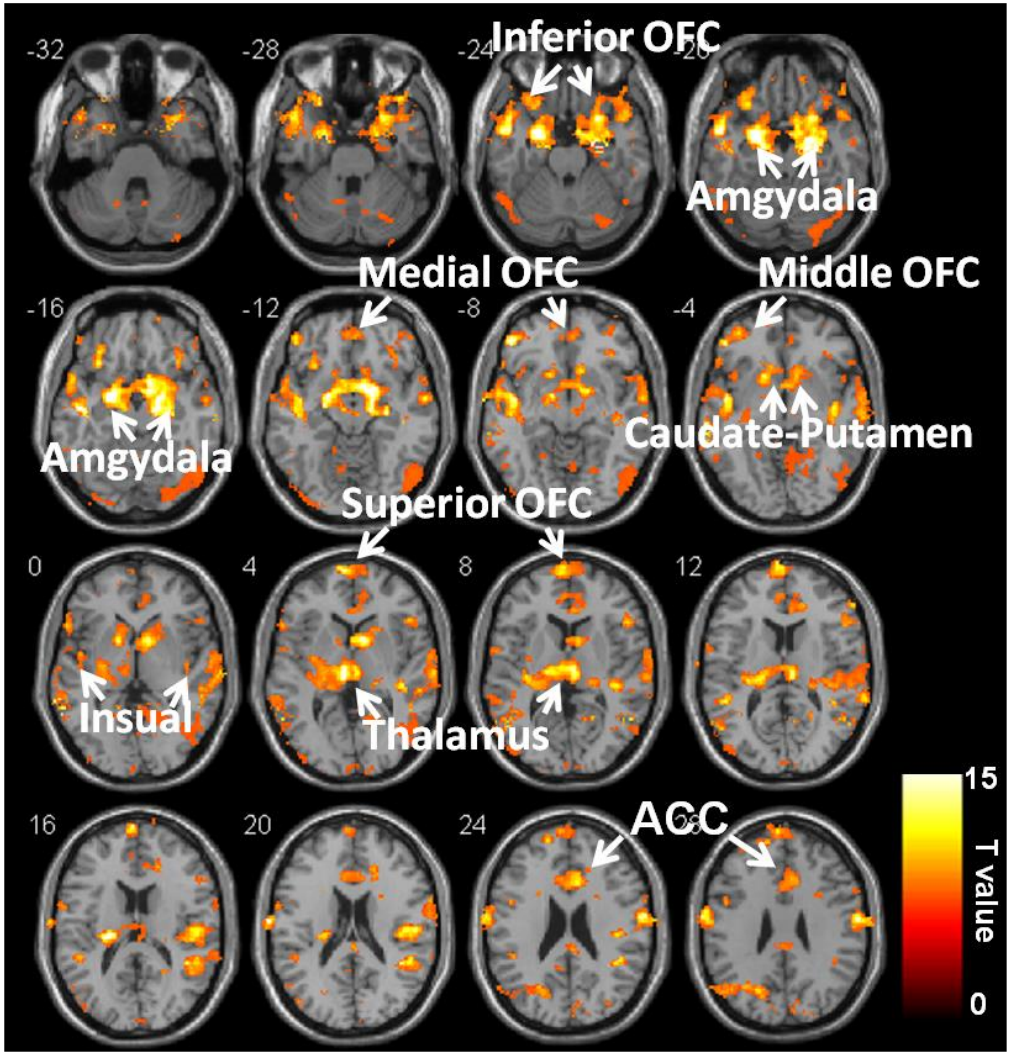




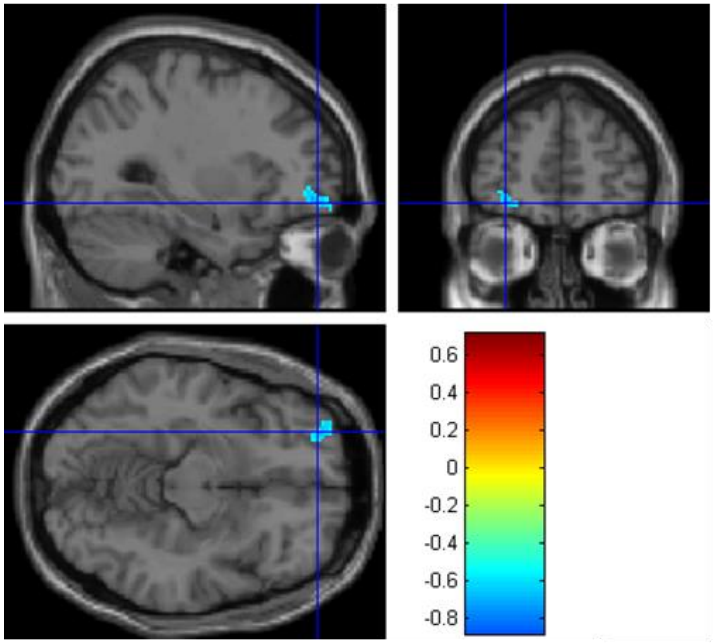
Correlation between seed ROI and other voxels


Brainstem/Hypothalamus
PHYSIOLOGICAL RESPONSE
dlPFC
COGNITIVE
REGULATION
Amygdala
Striatum
ACTION
CE
ITC
B
LA
vmPFC
Hippocampus
CONTEXT
SENSORY INPUT
[CS-US]

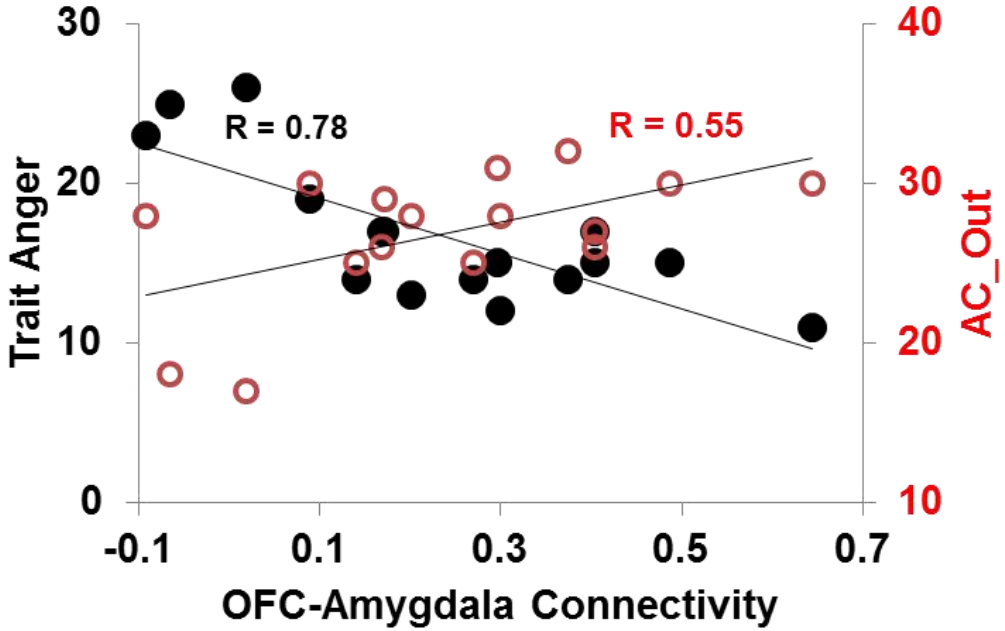
Functional connectivity map from Amygdala



Amygdala-orbitofrontal functional connectivity is inversely related to trait differences in anger

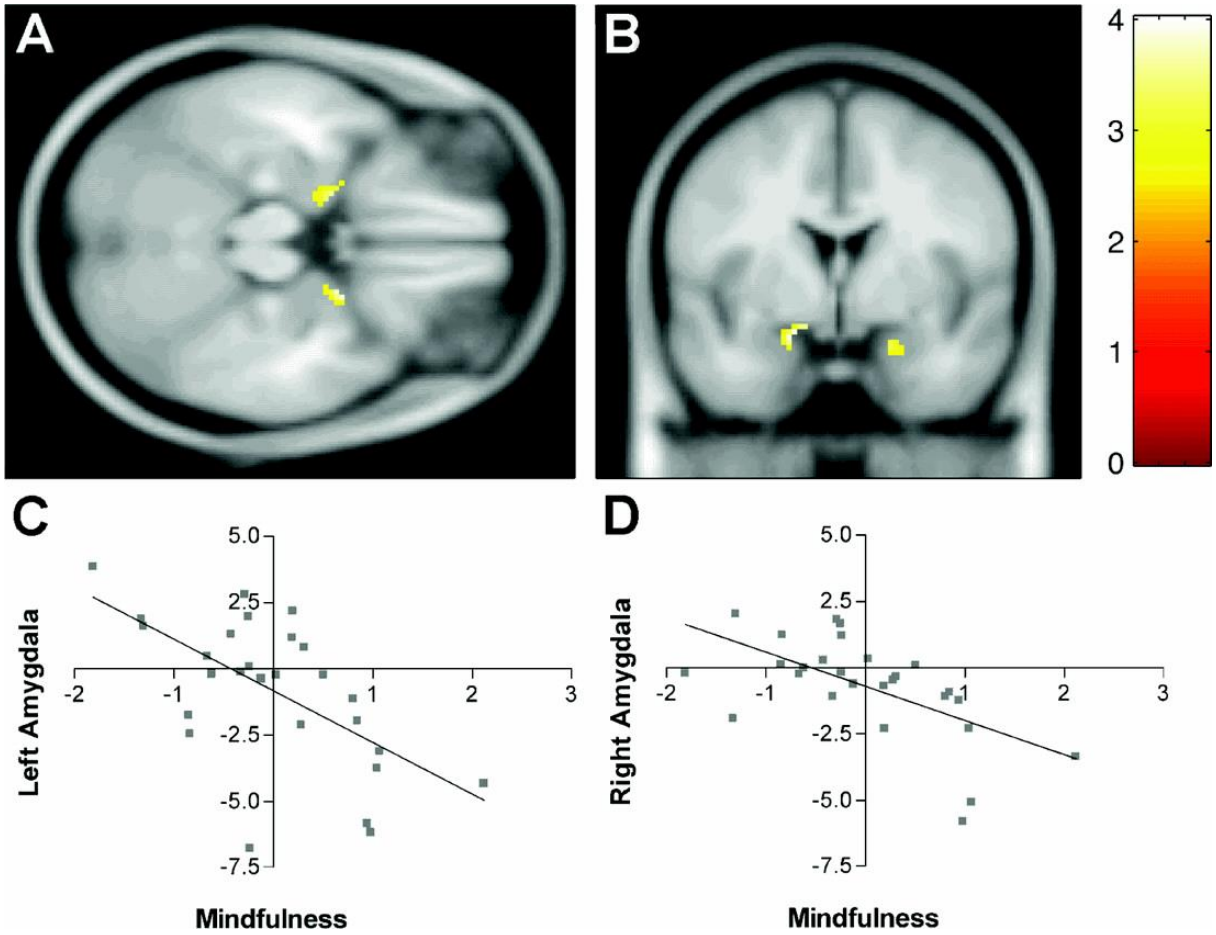


(a)

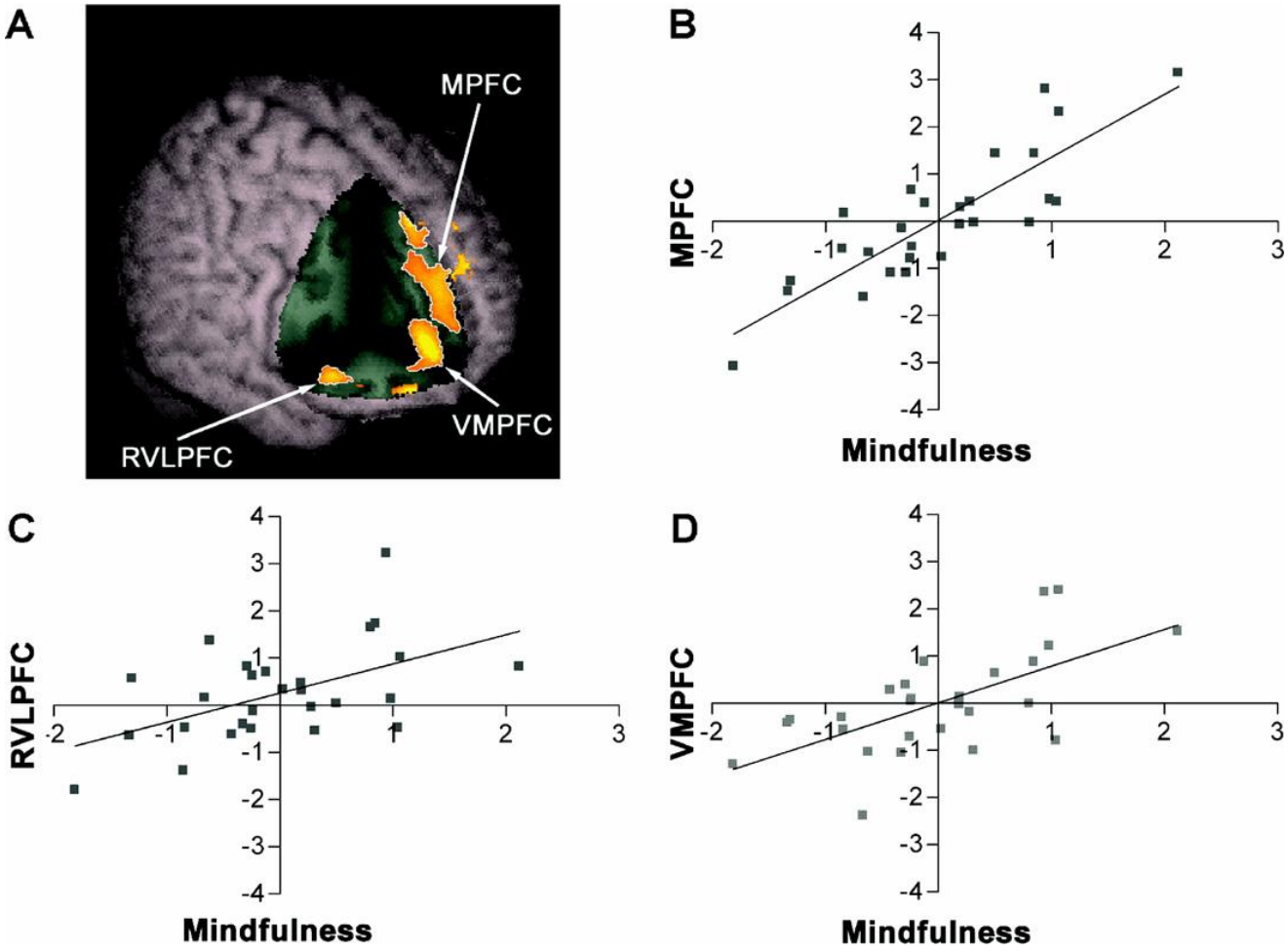


(b)

Trait mindfulness predicts functional activation in emotion regulation pathways



Creswell et al., Psychosom Med 69:560-565 2007



Creswell, J et al., Psychosom Med 69:560-565 2007

Emotion
2010, Vol. 10, No. 1, 25–33

1528-3542/10/$12.00 DOI: 10.1037/a0017151

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

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

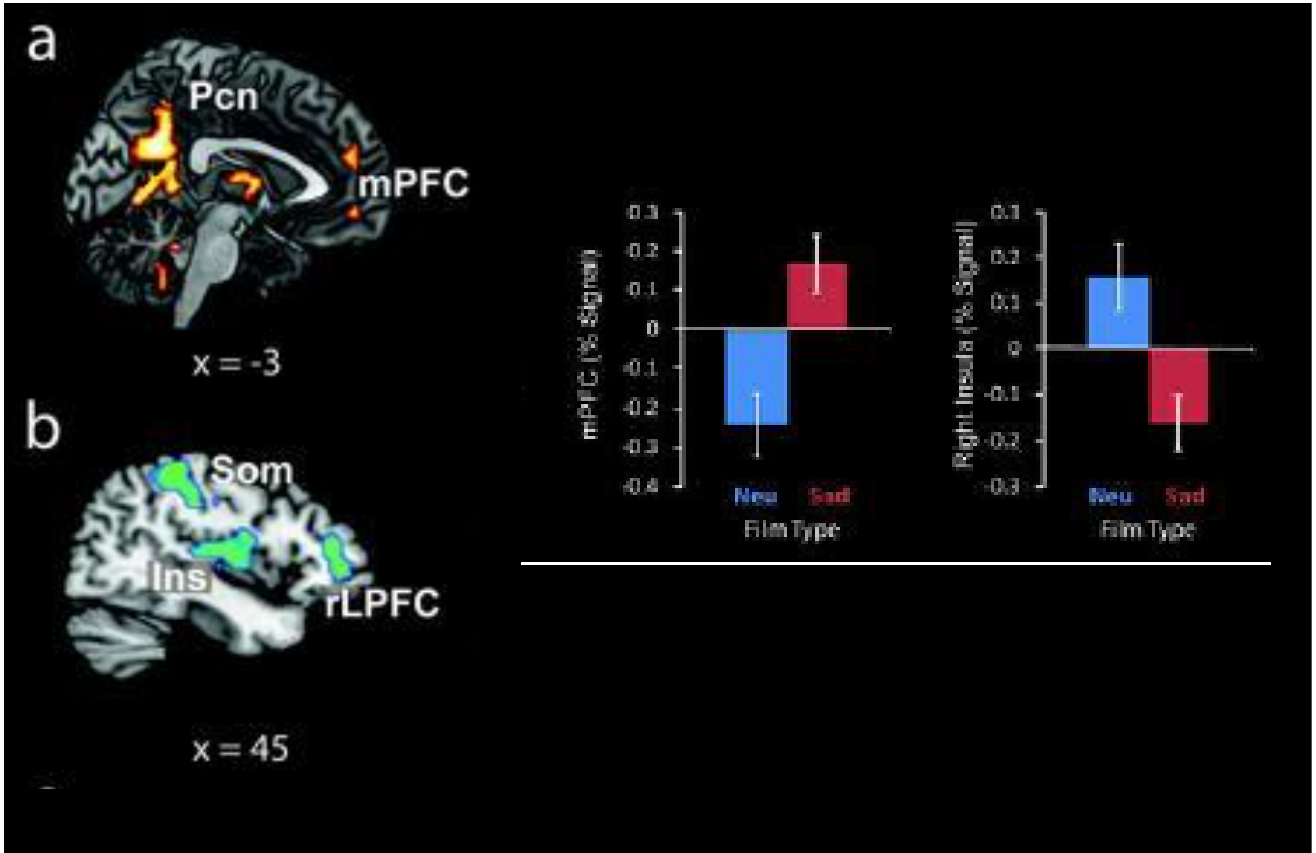
Helen Mayberg
Emory University

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

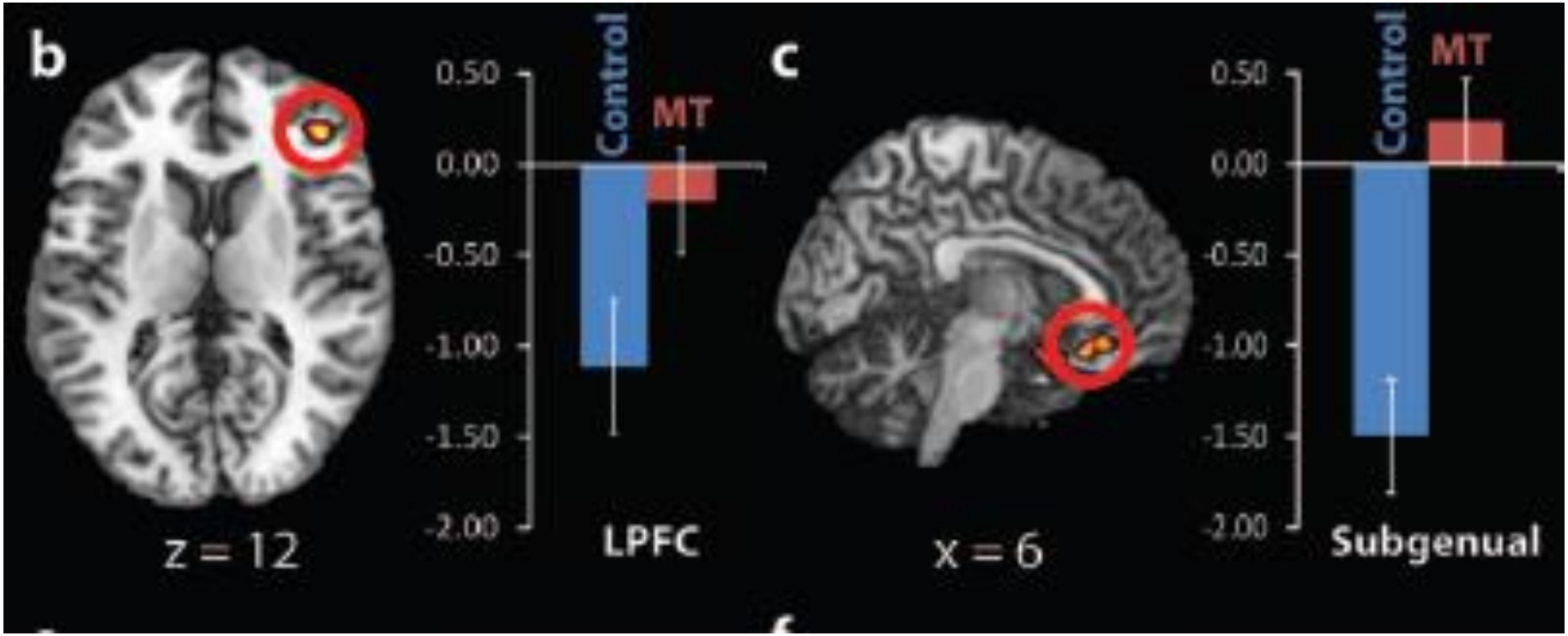
Zindel V. Segal
Centre for Addiction and Mental Health, Toronto, Canada
and University of Toronto

Sadness provocation elicits neural activation in midline self-referential processing areas,

and deactivation in visceral & somatic processing areas



Mindfulness training changes neural response to sadness provocation

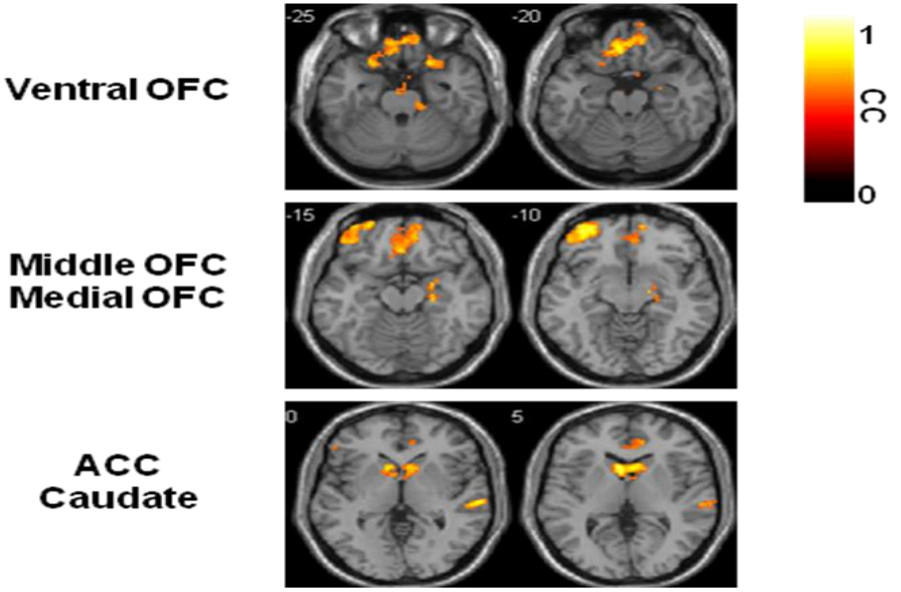


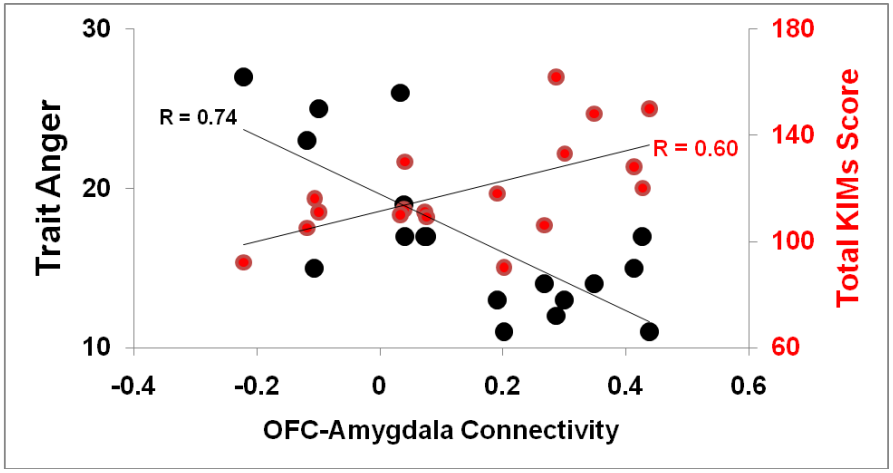
Farb et al., 2010

Trait mindfulness components: Kentucky Inventory of Mindfulness Scale

1. Observing (Observe) - “I pay attention to how my emotions affect my thoughts and behavior”
2. Describing (Describe) - “I'm good at finding the words to describe my feelings”
3. Act with awareness (Aware) – “When I'm doing something, I'm only focused on what I'm doing, nothing else”
4. Accept without judgment (Nonjudge) - “I tell myself that I shouldn’t be feeling the way I’m feeling” (reverse scored)

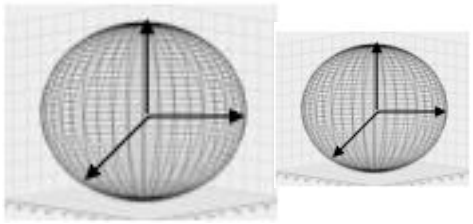
Amygdala – OFC functional connectivity is positively correlated with trait mindfulness



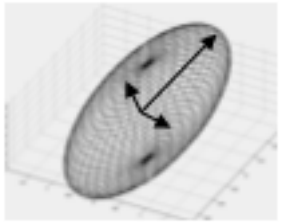


Diffusion Tensor Imaging

A

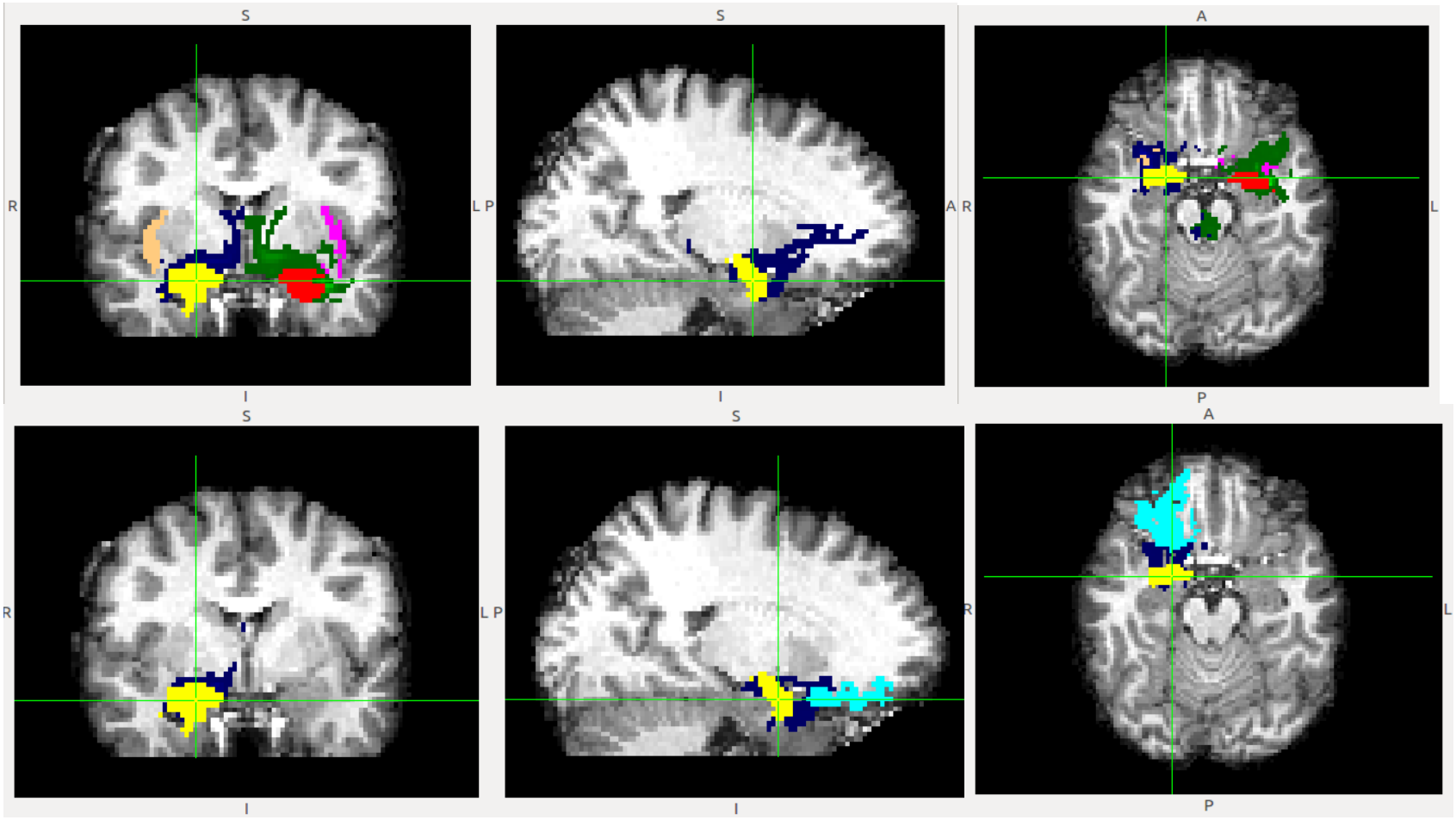


B



- Measures diffusion (motion) of protons in water molecules.
- Magnitude and direction of proton motion within a voxel can be described by a “tensor”.
- Proton diffusion in “free” water (or cerebrospinal fluid) is isotropic, and also tends to be relatively isotropic in gray matter.
- The linear structure of fiber tracts hinders proton diffusion and produces anisotropy.

Amygdala structural connectivity with Insula and lateral OFC



MBSR for maintenance of health behavior change

- Relapse prevention model focused on role of stress and negative emotion
- 3 year NIH grant will recruit healthy participants who have lost 5% weight in past year and randomize to MBSR or an active control (Healthy Living Course)

  Aims:

  1. MBSR will produce greater increases in amygdala-orbitofrontal FC compared to HLC control
  2. Changes in FC will be correlated with change in negative emotions and weight
  3. FC change will predict improvement in health behaviors and weight loss maintenance at 6 mos follow-up

University of Massachusetts UMASS Medical School

Have you lost weight?

- ❑ We are conducting a **Research Study** of two programs for helping people who have lost weight **KEEP IT OFF**.
- ❑ The study also uses Magnetic Resonance Imaging (**MRI**) to determine how the brain responds to these programs.

You may be eligible to participate if you are:

- Healthy and 25 to 55 years old
- You have lost 5% or more of your weight over the past year without weight-loss surgery

Participants will be enrolled in an 8-week program at UMASS Medical School and will be asked to:

- Undergo a non-invasive **MRI** before and after the program
- Fill out **surveys**

❑**You will be COMPENSATED for your time**

UMass IRB Docket #H00001808 v. 1

Contact us: If you are interested in participating or want more information, call 508-856-1225 or email **keepitoff@umassmed.edu**.

Keep weight off study keepitoff@umassmed.edu **508-856-1225**	Keep weight off study keepitoff@umassmed.edu **508-856-1225**	Keep weight off study keepitoff@umassmed.edu **508-856-1225**	Keep weight off study keepitoff@umassmed.edu **508-856-1225**	Keep weight off study keepitoff@umassmed.edu **508-856-1225**	Keep weight off study keepitoff@umassmed.edu **508-856-1225**	Keep weight off study keepitoff@umassmed.edu **508-856-1225**	Keep weight off study keepitoff@umassmed.edu **508-856-1225**	Keep weight off study keepitoff@umassmed.edu **508-856-1225**

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Shattuck-Tufts-Suffolk

David Gansler

Matt Jerram

Athene Lee

Rafeeque Bhadelia

Sam Patz

Coming soon! →

Assumption/Tufts

Sarah Cavanagh

Heather Urry

Phil Opitz

Jeff Birk