

CLA Conference on Integrative Medicine and Mental Health

**The Healing Power of Spirit:
Overcoming Fear of Death and Dying**



Objectives

- At the conclusion of this course, participants will be better able to:
- Discuss multidisciplinary approaches to patient-centered spiritual care in the palliative care setting
- Use spirituality-based therapeutic approaches to manage the fear of death and dying
- Apply the principles of traditional spirituality-based healing modalities to end-of-life care

Conscious Death and Dying

Conscious dying is the process of utilizing the dying process as an opportunity to become more present and loving, an opportunity for profound healing, for spiritual awakening.

- New Age** movement on death and dying rose out of Eastern traditions of Buddhism and Hinduism, and Native American Shamanism
- Medieval Christian literature on **Ars Moriendi** (art of dying) was lost in the 18-20th century
- Tibetan Book of the Dying and Living** and other sacred writings were not used in the West .
- In 1967, Dame Cicely Saunders founded the **first modern hospice** in London.
- In 1969, Elisabeth **Kübler-Ross** "**On Death and Dying**" was published.
- 1974 -The first American hospice was founded in New Haven.
- Ram Dass and Hanuman Foundation** and teachings on **conscious death**
- Mind and Life Institute** (Dalai Lama, Jack Kornfeld, Joan Halifax in Buddhist traditions)
- AGING OF THE POPULATION- BABYBOOMERS** LEADING NEW AGE MOVEMENT ARE GETTING OLDER and DYING

Steve Jobs

“No one wants to die. Even people who want to go to heaven don't want to die to get there. And yet death is the destination we all share. No one has ever escaped it. And that is as it should be, because Death is very likely the single best invention of Life. It is Life's change agent. It clears out the old to make way for the new.”

YOGI BHAJAN-*The Last Breath*

- **This last breath is also a last chance. As you die, you assess your actions and their karmas. According to the frequency of your last breath and your last thought, you can project beyond the reactions to your karmas. So in the act of dying, the projected frequency of your last breath establishes your relationship with the Infinite.**
- *"Why are you afraid of death? Because you do not understand death. What is death? Death is that constant calm."*
- Meditation for Conquering Death
- Meditation for Crossing the Hour of Death

The Importance of Death to Soul's Spiritual Evolution

- *“Of all footprints, that of the elephant is supreme. Similarly, of all mindfulness meditations, that on death is supreme.”*
–The Buddha
- *“When it comes time to die, be not like those whose hearts are filled with the fear of death, so when their time comes, they weep and pray for a little more time to live their lives over again in a different way. Sing your death song, and die like a hero going home.”*
–Mohican Chief Aupumut, 1725,

Logistics

- Provide 14.75 CME credits for both days– but will need your evaluations by the end of each day- we will collect those in the boxes at the registration desk daily
- CME certificates will be issued and mailed to you individually
- Breakfast and Refreshments are provided
- Networking is encouraged during breaks
- We are recording- please turn off your pagers/ phones
- Questions will be answered after each lecture
- On Saturday and Sunday we have 4 experiential workshops
- We will be out of the room by 5 pm each day
- We are LIVESTREAMING and ALL handouts are available on line
- <https://www2.semel.ucla.edu/integrativementalhealth>
- **Tonight's concert is free of charge** – but you have to be registered – Schoenberg Hall 6-8 pm- **Yuan Miao and Phoenix Rising band**



Resilience and Aging: Helpful for coping with death and dying?

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<https://www.semel.ucla.edu/latelife>

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2019

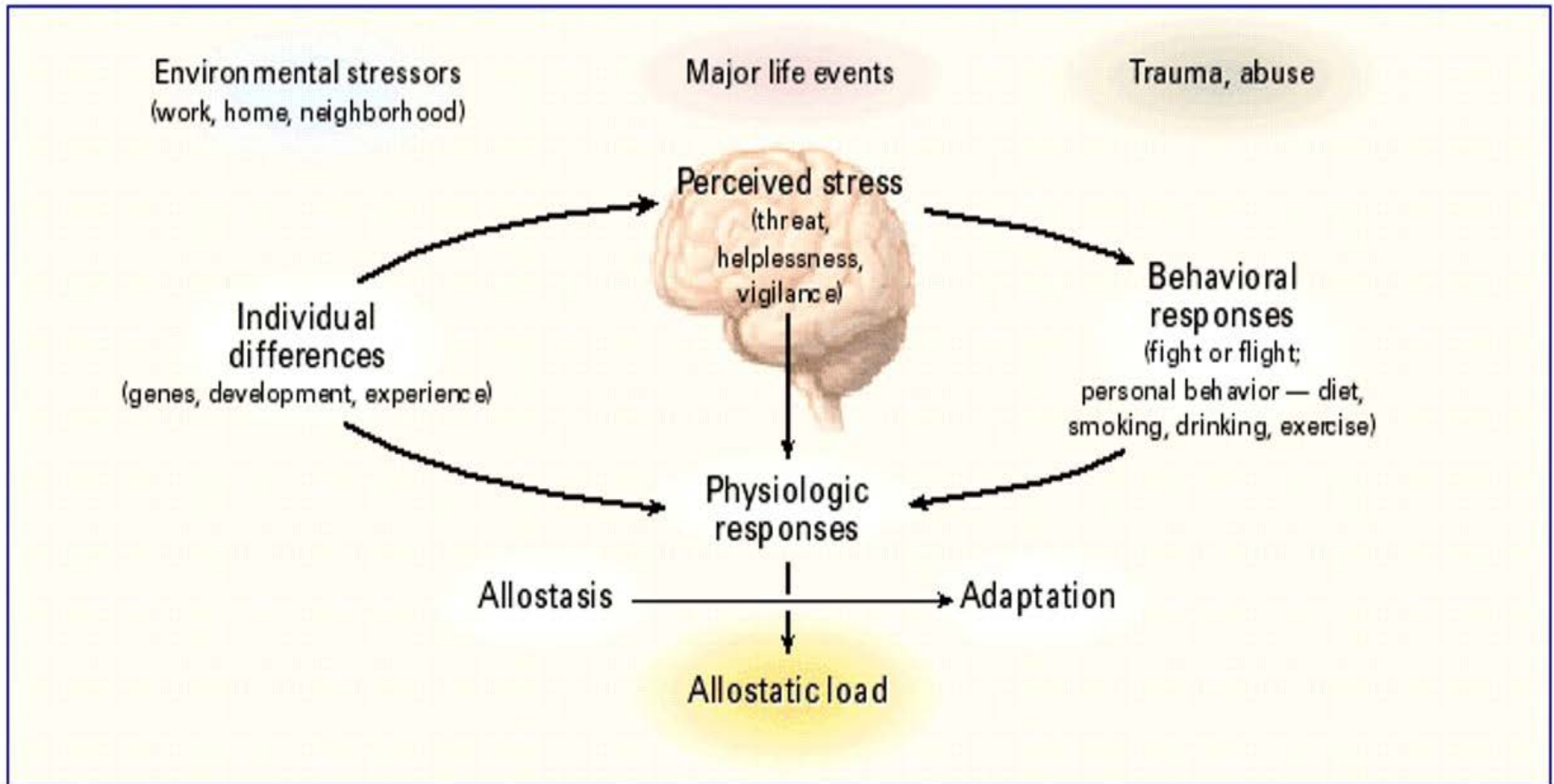
Disclosure

- **Grant funding** –NIMH MH097892; MH114981; NCCIH K24 AT009198 AT008383; 4AT008383S;
- PCORI OPTIMUM study
- Allergan
- Alzheimer's Research & Prevention Foundation
- Semel Fund

Resilience

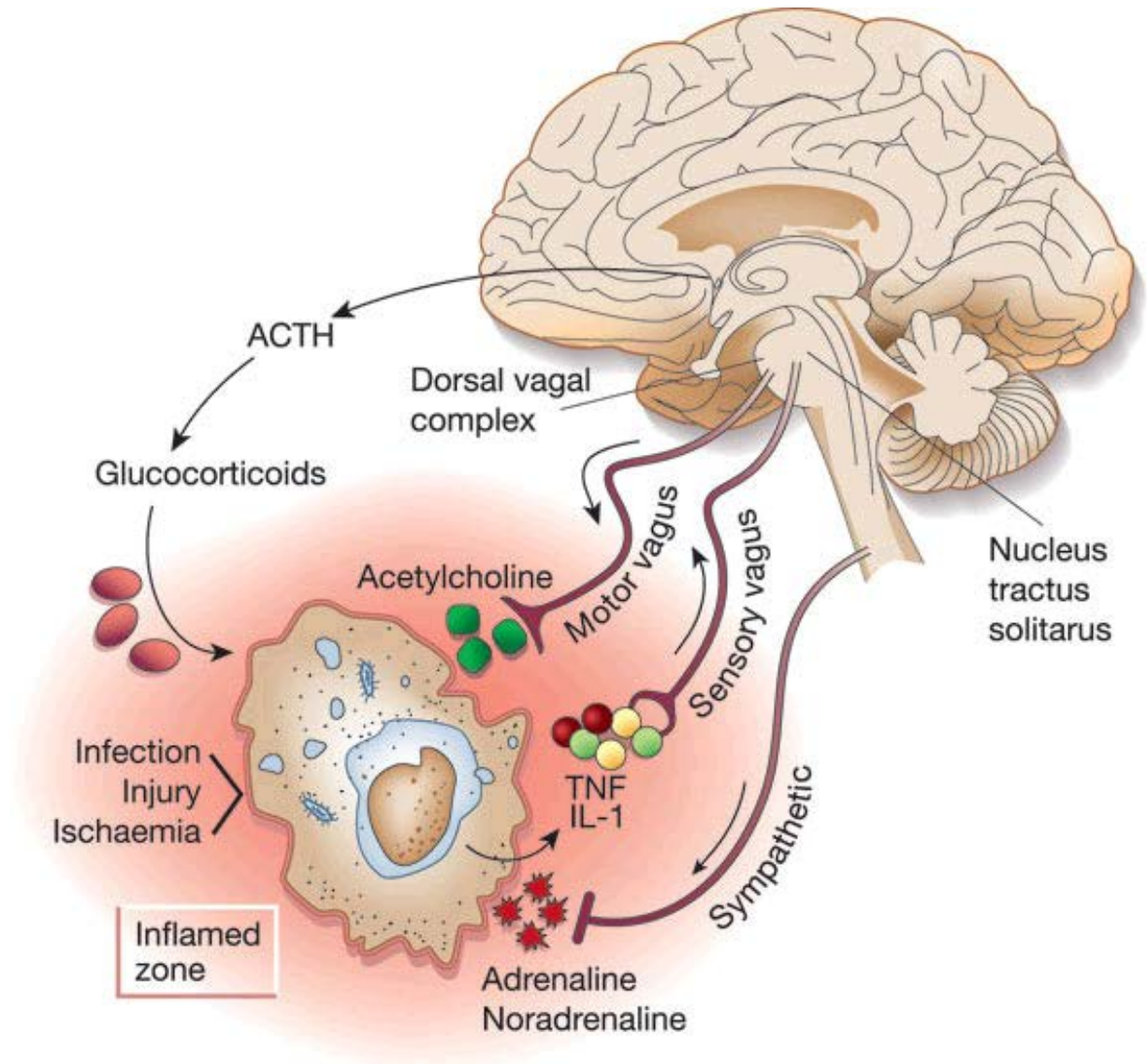
- **Resilience** is a dynamic characteristic of the interaction between individuals and their environments- Ability to recover from adversity / trauma / stress / depression
- **Does it require a major traumatic experience to manifest?- What about surviving day-to-day?**
- This construct can be fostered in both younger and older individuals- leading to:
 - **Effective and positive coping**
 - **Turning adversity into an opportunity for growth**
- Develop interventions that enhance resilience using integrative medicine approaches
- Consequentially leads to better outcomes for medical and mental disorders of aging

Model of Stress and Health:

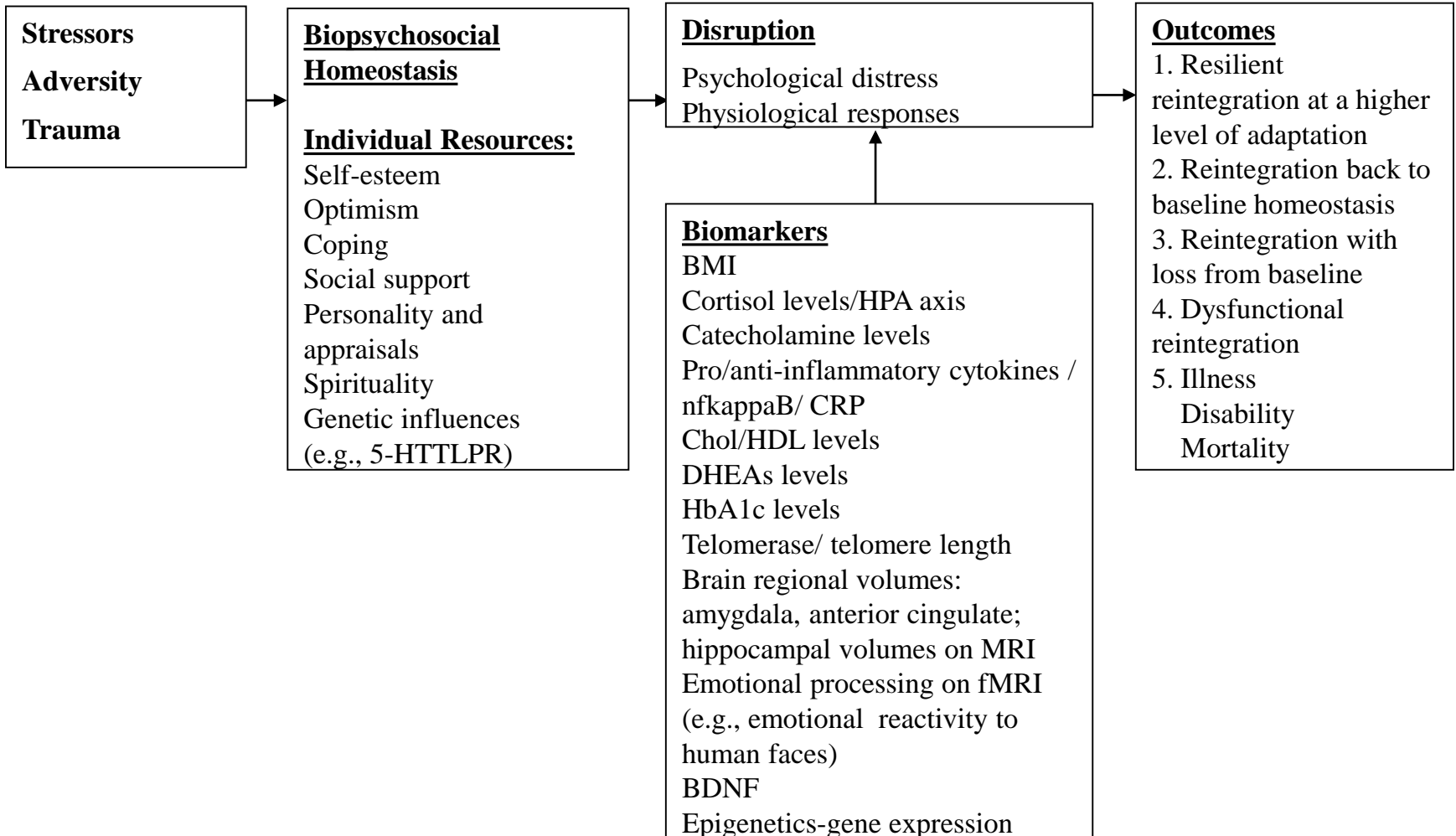


Model of Brain-Immune Interactions

- Bi-directional interactions between the brain, autonomic, neuroendocrine, and immune systems

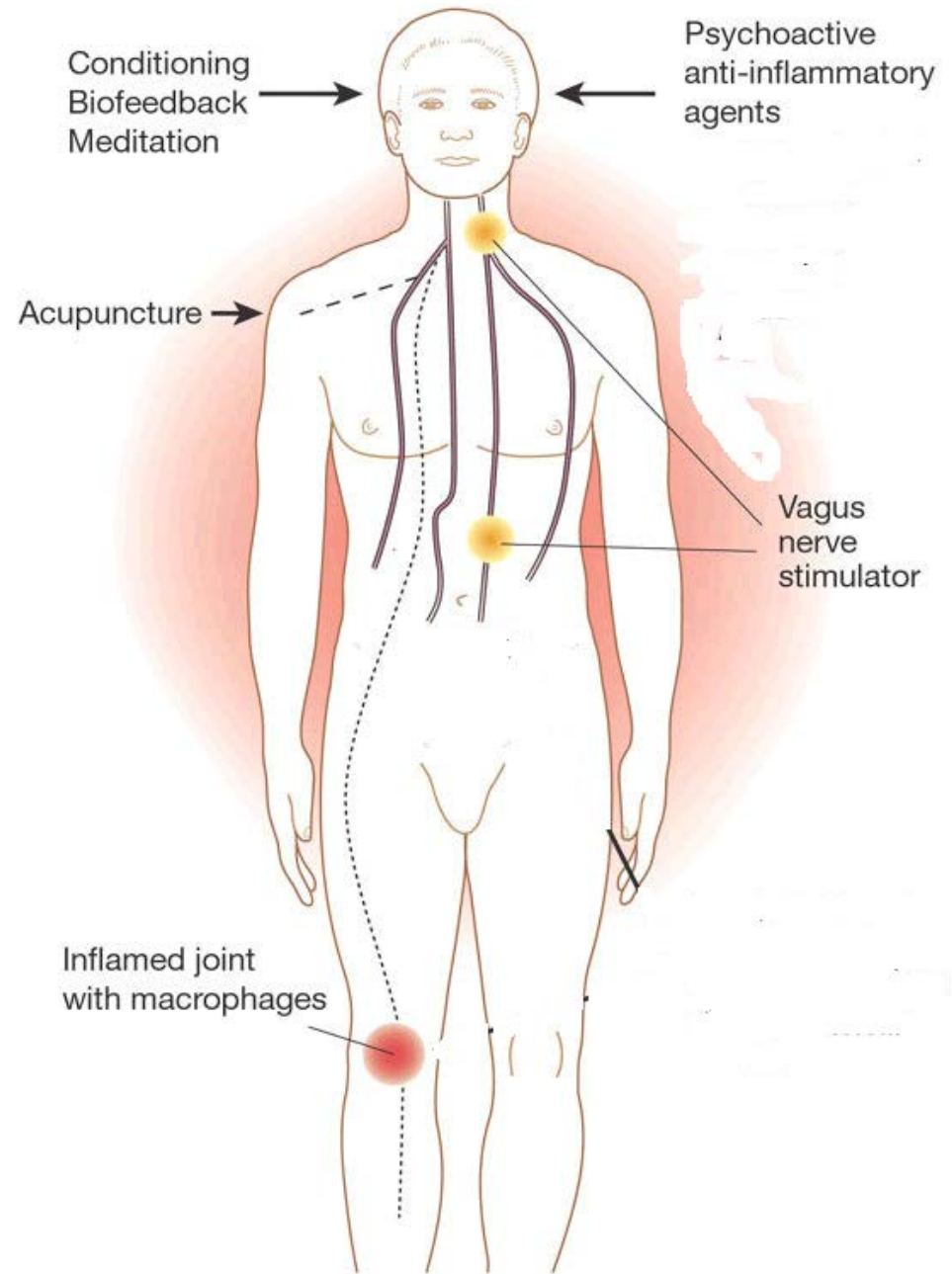


Theoretical model of resilience



Targeting therapies for the stress-disease diathesis

Physiological basis for modulating brain-autonomic-immune pathways



Resilience in Death and Dying

Is there a good death?

- End-of-life care is a profound psychosocial and spiritual crises manifesting as depression, anxiety and hopelessness in patients and families
- Problem-focused approach of Western medicine- addresses pain, sometimes spiritual needs, but individual dignity and spiritual preferences may not be recognized
- Dying process is the final opportunity for healing and spiritual growth – “forgive yourself- forgive others” “find love in your heart for yourself and your loved ones” “ultimate communion with the Divine” “coming into Oneness” “preparing for the last adventure”
- Gratitude for the experience of life and the lessons learned
- Completed journey on EARTH
- Readiness to go “HOME”

How to boost Resilience?

- **Resilient=recovering readily from adversity, depression, trauma**
- Enhance effective and positive coping with stress
- Turning adversity into an opportunity for growth
- **Stress-reduction; Hardiness training; Optimism**
- GLASS IS ALWAYS HALF-FULL!
- ATTITUDE OF GRATITUDE-COUNT YOUR BLESSINGS DAILY!
- Develop interventions that enhance resilience using integrative medicine approaches

Modifiable Risk factors: Health behaviors

- Sleep
- Exercise
- Limited alcohol and drug use
- Stress management (meditation, yoga, Tai Chi)
- Diet/nutrition and microbiome
- Preventive health care

Resilience-Building interventions

- **Resilience enhancing interventions** include wellbeing therapy, learned optimism training, hardiness training, all of which focus on positive aspects of difficult experiences thereby promoting more positive perceptions of challenges.
- **Lifestyle factors** such as diet, exercise, spirituality can enhance resilience by creating physical and mental wellbeing.
- **Complementary and alternative medicine (CAM)** is a holistic and integrative approach to wellness which encompasses varied approaches to wellness and stress reduction(e.g., yoga, meditation, humor therapy, aromatherapy and massage)
- Rehearsal of the death hour- e.g., “Crossing the Hour of Death” Kundalini Yoga Meditation

Complementary, alternative and integrative medicine therapies

Mind-body

Dietary

Physical activity

Body-based

Natural products

- Novel treatments
- Novel diagnostic and prognostic systems
 - Compression of morbidity
 - Improved side effect profiles
- Benefits to cardio-metabolic, bone and vascular health

Mechanisms of aging

Genomic instability

Epigenetic alterations

Telomere attrition

Loss of proteostasis

Chronic inflammation

Cellular senescence

Mitochondrial dysfunction

MINDFUL PRACTICES

- Effects of mindful practices that can help in achieving mental and physical HEALTH :
- Stress reduction
- Treatment and prevention of depression in high risk populations (e.g., stressed caregivers, older adults with chronic medical illnesses, victims of psychological and physical violence)
- Direct neuroplastic effects in the brain across lifespan
- Shifts in conscious awareness of reality
- **CULTIVATION OF WELLBEING, GRATITUDE**

Behavioral and other Holistic Interventions

| | | | | | |
|---|---|---|---|--|---|
| Animal Assisted Therapy | Facilitate social interaction Anxiety | Increases in b-endorphin, oxytocin, prolactin, dopamine phenylacetic acid & a decrease in cortisol. | One visit in 3 weekly sessions/long-term exposure (aquarium) | Allergies/infections from live animals. | Edwards et al., 2014; Kraemer et al., 2009; Odendaal, 2000; O’Haire, 2010 |
| Music Therapy & Social Interaction | Anxiety Depression Enhance Mental Well-being and Social Engagement Communication | Modulation of attention, memory and emotion (via limbic & paralimbic system). | One interactive performance. Weekly sessions from 4-24 weeks | No adverse effects reported | Guetin et al., 2009; Koelsch, 2009; Sung et al., 2006; Van der Vleuten et al., 2012 |
| Movement Therapy | Mood Concentration Sleep | Modulation of serotonin and dopamine | 4-10 weekly sessions | No adverse effects reported | Hamill et al., 2001; Jeong et al., 2005; Siddartha et al., 2013 |
| Light Therapy with Melatonin | Limited Support: Mood, Sleep, Agitation Depression | Entrainment of circadian/ melatonin rhythm | 2500 to 10,000 lux, am or pm. One to two hours for 10 days to two months. | Increased agitation in subgroups | Barrick et al., 2010; Burns et al., 2009; Diamond et al., 2003; Forbes et al., 2014;Hickman et al., 2007 |
| Acupuncture | Cognition, Mood | Increased activity in temporal and prefrontal lobes. Enhanced hippocampal connectivity. | One session | Organ and tissue injury, infection, & syncope have been reported. Frequency of adverse events are low. | Hempel et al., 2013; Kwok et al.,2013; Rodriguez-Mansilla et al., 2013; Wang et al., 2014;Zeng et al., 2013 |
| Aroma Therapy (lavender, hops, melissa essential oils) | Behavioral and psychological problems, agitation | Stimulates olfactory bulb, modulates limbic system, Influences pyriform, right amygdala, anterior cingulate & left insular cort | 5–10 drops (inhalation) 4 days-4 weeks | Contact dermatitis | Ballard, 2002; Diamond et al., 2003; Lin et al., 2007 |

Clinical suggestions for geriatric populations

Adapted from the Centers for Disease Control and Prevention Report

‘Physical activity is essential to healthy aging’

If 65 years or older, generally fit, and have no limiting health conditions.

- At least 150 minutes of moderate-intensity aerobic activity (i.e. brisk walking) every week and muscle-strengthening activities on 2 or more days a week that work all major muscle groups (i.e. legs, hips, back, abdomen, chest, shoulders and arms).

OR
- 75 minutes of vigorous-intensity aerobic activity (i.e. jogging or running) every week and muscle-strengthening activities on 2 or more days a week that work all major muscle groups.

OR
- An equivalent mix of moderate- and vigorous-intensity aerobic activity and muscle-strengthening activities on 2 or more days a week that work all major muscle groups.

Other comments:

- If there is a limiting condition, it is recommended the health professional and patient consult a qualified exercise physiologist.
- 10 minutes at a time is fine for physical activity.
- The following activities count as muscle-strengthening activities: yoga, heavy gardening.

Mind-Body Exercise

- **Mindful physical exercise** (e.g., yoga, Qigong, and Tai Chi) is increasingly utilized for improving psychological well-being, hypertension, cardiovascular disease, insulin resistance, depression, and anxiety
- Physical exercise executed with a profound inwardly directed contemplative focus or awareness
- **Key elements:**
- A non-competitive, non-judgmental meditative component,
- Mental focus on muscular movement and movement awareness combined with a low to moderate level of muscular activity,
- Centered breathing (conscious breath)
- A focus on anatomic alignment (i.e., spine, trunk, and pelvis) and proper physical form,
- Energy centric awareness of individual flow of intrinsic body energy (**prana, sekhem, life force, qi, or Kundalini**).

“Abbott, Lavretsky; Psychiatric Clinics 2013”



Mind-Body Medicine



- Yoga
- Guided imagery
- Meditation
- Hypnotherapy
- Spirituality
- Tai Chi
- Art, dance, music therapies

2017 National Health Interview Survey (NHIS)

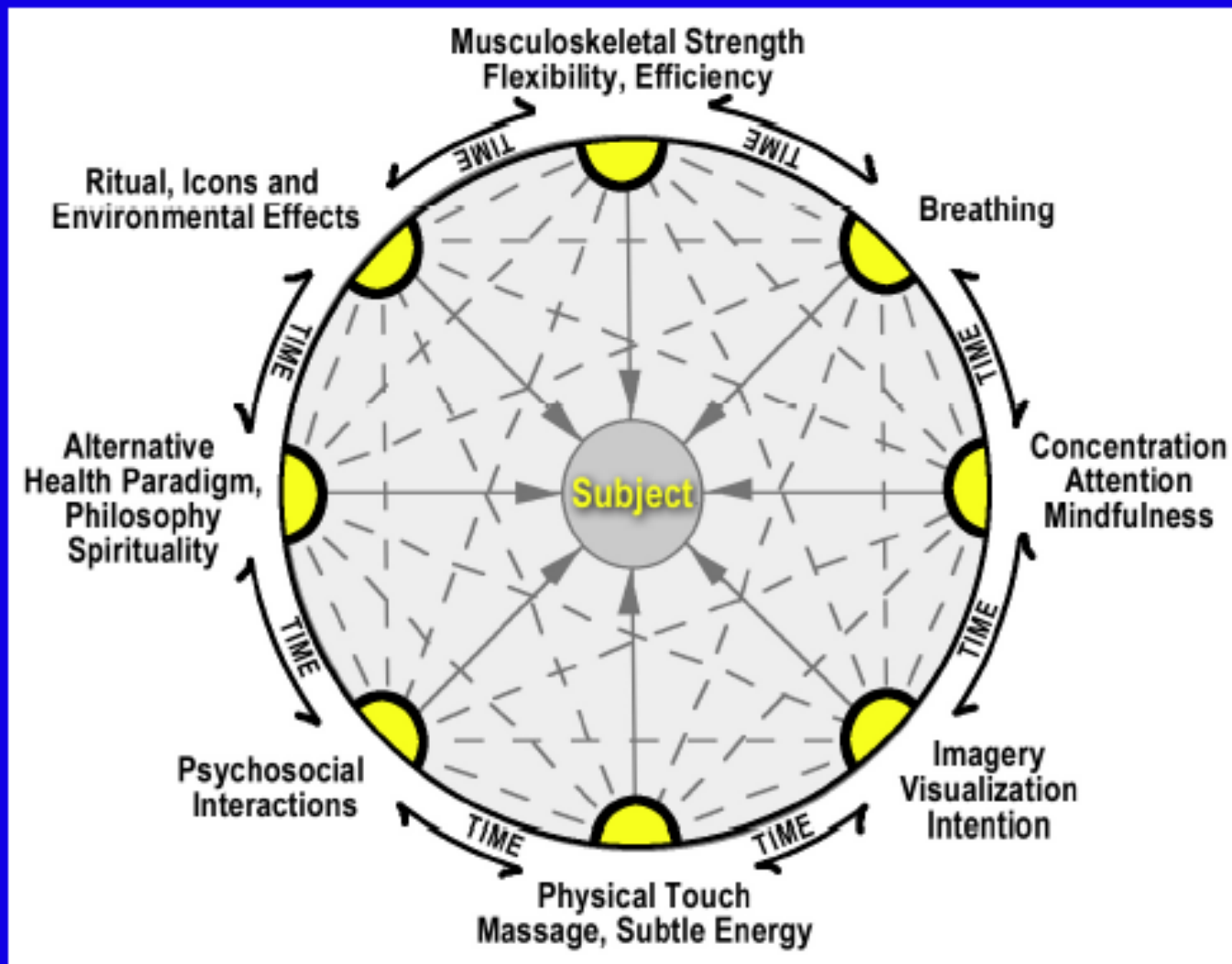
- Yoga was the most commonly used complementary health approach among U.S. adults in 2012 (9.5%) and 2017 (14.3%).
- The use of meditation increased more than threefold from 4.1% in 2012 to 14.2% in 2017. In 2012, chiropractic care was as popular as yoga, followed by meditation; however, the popularity of meditation surpassed that of chiropractic care to become the second most used approach among those surveyed in 2017.
- The use of chiropractors increased from 9.1% in 2012 to 10.3% in 2017.
- In 2017, women were more than twice as likely to use yoga compared with men (19.8% versus 8.6%). Women were also more likely than men to use meditation (16.3% versus 11.8%) and see a chiropractor (11.1% versus 9.4%).
- Non-Hispanic white adults were more likely to use yoga, meditation, and chiropractors compared with Hispanic and non-Hispanic black adults.
- The use of yoga was highest among adults aged 18 to 44 compared to older adults, while the use of meditation and chiropractic care was higher among adults aged 45 to 64 years compared with younger and older age groups.



Tai Chi and Qi Gong

- In 2002, over 2.5 million Tai Chi users and 500,000 Qi Gong users in the United States
- low-impact, traditional Chinese exercises with a low risk of side-effects and a lack of drug interactions.
- improve health-related quality-of-life in physical and mental health conditions.
- may be effective in reducing depressive symptoms, stress, anxiety, and mood
- evidence is promising but limited for Parkinson's disease, traumatic brain injury, sleep disturbance, substance abuse, and impaired cognitive functioning.

What are the key components or “active ingredients” of Tai Chi ?



From Wayne and Kaptchuk, JACM 2008

Putative mechanisms

- Promotes relaxation and decreases sympathetic output
- Reduces clinical somatic symptoms, and benefits anxiety, depression, blood pressure, and recovery from immune-mediated diseases
- Reduces levels of inflammatory markers (CRP), improves immune function and vaccine-response.
- Reduces stress hormones of the HPA axis
- Increases in peak oxygen uptake
- Increases blood levels of endorphins and baroreflex sensitivity, and
- Electroencephalopathy (EEG) studies have found increased frontal EEG alpha, beta, and theta wave activity, suggesting increased relaxation and attentiveness

Randomized Controlled Trials of Tai Chi and Qi Gong for Mental Disorders

| | Positive Findings | Negative Findings |
|---|--|--|
| Depression | 13 studies with significant positive findings, Only two with clinically diagnosed depression populations. | One study did not find effect on depressive symptoms. |
| Stress | 4 studies with significant positive findings subjective stress measures, body temperature, and salivary cortisol levels. | One study did not find effect on subjective stress measures. |
| Anxiety | 8 studies with significant positive effects | One study had negative findings on anxiety |
| Mood and psychological wellbeing | 7 studies with significant positive effects. | One study did not find positive effect on mood. |
| Self-Esteem | 1 study with significant positive | Two without positive effect. |
| Parkinson's Disease | 3 studies with significant positive effects. | |
| Sleep Disturbance | 3 studies with significant positive effects. | None reported |
| Substance Abuse | 1 study with significant positive effects | None reported |
| Cognition | 2 studies with significant positive effects. | None reported |

Abbott, Lavretsky, 2013

What is yoga?



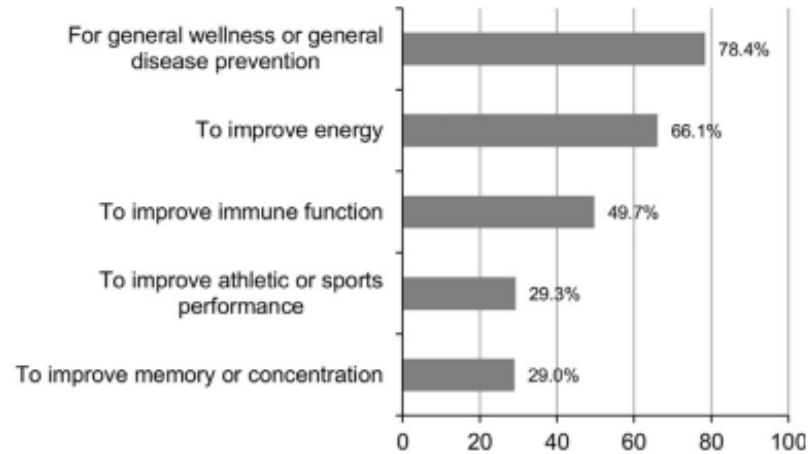
- Systems of ancient philosophy, practices, lifestyle
- Breath control (pranayama), specific bodily postures (asanas and mudras), and meditation
- World-wide use for health and stress-reduction

Prevalence of Yoga

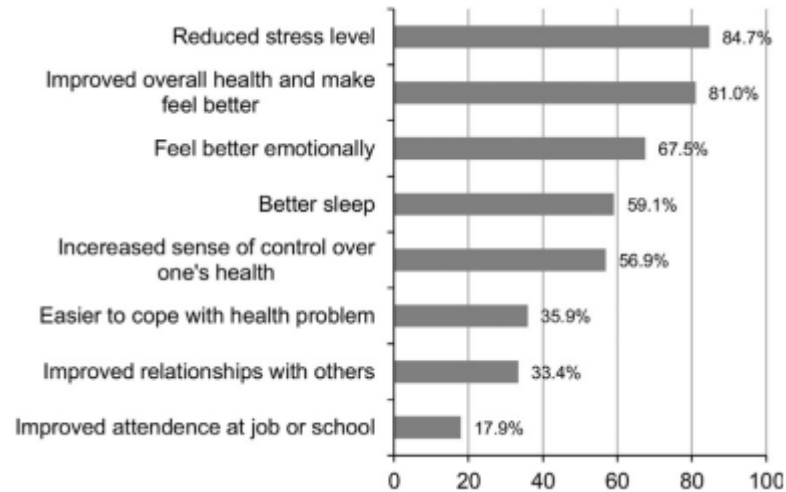
- About 31 million U.S. adults have ever used yoga
- About 21 million practiced yoga in the past 12 months

| Characteristics | Never used yoga (n=195,971,306) | Ever used yoga (n=30,998,492) | Used yoga in the past 12 months (n=20,955,758) |
|------------------------|--|--|---|
| Age (years) | | | |
| 18 to 29 | 40,840,640 (20.8) | 8,443,980 (27.2) | 6,160,335 (29.4) |
| 30 to 39 | 31,133,741 (15.9) | 7,277,198 (23.5) | 5,201,014 (24.8) |
| 40 to 49 | 35,198,461 (18.0) | 5,353,250 (17.3) | 3,656,161 (17.4) |
| 50 to 64 | 51,406,839 (26.2) | 7,056,198 (22.8) | 4,425,359 (21.1) |
| 65 or greater | 37,391,625 (19.1) | 2,867,866 (9.3) | 1,512,889 (7.2) |

Most Frequently Reported Reasons for Practicing Yoga



Most Frequently Reported Outcomes of Practicing Yoga



Mindfulness-based therapy vs. Mindful physical exercise

- Contemplative practices influence **BRAIN SYSTEMS** involved in the regulation of **attention, awareness, memory, sensory integration, and cognitive regulation of emotion.**
- Unique recruitment for mindfulness practices, in brain regions that regulate **body awareness and higher cognitive functions**
- Mindful physical exercise approaches showed unique effects in areas affect **social processes** (such as speech, language, empathy, and facial processing) and **self-regulation**
- Can be used for **stress-reduction and brain-fitness** throughout lifespan as they provide enhancements **of higher cognitive functions and social cognition, attention, memory, movement, emotional regulation** that can help in preventing mood, physical, and cognitive disorders throughout lifespan

Biological mechanisms of yoga

- Streeter and colleagues (2012): yoga alleviates stress by counteracting imbalances of the autonomic nervous system (ANS), with decreased parasympathetic nervous system (PNS) and increased sympathetic nervous system (SNS) activity.
- Yoga-based practices increase activity of the PNS and GABA system -increases GABA levels in the thalamus correlated with improved mood.
- Hypothalamic–pituitary–adrenal (HPA) axis with reductions in plasma cortisol- A review of 81 studies found that yoga surpassed exercise regimens in numerous outcome measures of health such as salivary cortisol, blood glucose, fatigue, pain, and sleep in both healthy and clinical samples.
- One study of yoga found an associated with increased dopamine release in the ventral striatum, a major area of the brain's reward system.

Randomized Controlled Trials of Yoga for the Disorders of Aging

| | Positive Findings | Uncertainty |
|-----------------------|---|--|
| Hypertension | 22 pooled showed decline in both systolic and diastolic blood pressure (−4.17 and −3.26 mmHg, respectively) | The type of yoga but not duration- yoga with postures, meditation, and breathing had larger reductions of −8.17 (systolic) and −6.14 (diastolic) mmHg |
| Osteoporosis | In 2 studies, yoga practice increases muscular strength of specific groups, and muscle endurance for repetitive tasks, and delay bone loss and prevent fractures. | Anecdotal reduction in osteopenia |
| Insomnia | One cluster randomized trial of Silver yoga | Unclear benefit for comorbid features like pain |
| Stroke | Several studies for emotional lability, poststroke hemiparesis improves | Unclear benefit for prevention |
| Dementia | 1 study with Preventing Loss of Independence through Exercise (PLIÉ) (Tai Chi, yoga, Feldenkreis, and dance movement)- improved memory | 1) Functional changes included increasing body awareness, movement memory and functional skills. (2) Emotional changes included greater acceptance of resting, and a positive attitude towards exercise. (3) Improved coherent social interactions |
| Diabetes | 2 studies with significant positive effects. decrease in glucose, HbA(1c), lipids, cortisol, ferritin, MDA and a significant increase in catalase activity | very few studies |
| Osteoarthritis | Several smaller studies for OA | 1. Sleep improved but not pain. |
| Healthy aging | Prevention of depression, cognitive decline, osteoporosis in high risk groups | Yoga has a very important role to play in this as it influences physical, intellectual, emotional and spiritual dimensions of life. |

Meta-analyses and review of yoga in older adults

Patel et al. *Altern Complement Med* 2012

- A systematic review with both narrative synthesis and meta-analysis.
- Original studies from 1950 to November 2010 were sought, evaluating the effects of yoga on older adults. The search was restricted to randomized controlled trials of yoga in subjects \geq age 60, and published in English.
- The search yielded 18 eligible studies (N=649). The studies reported on older adults across a range of settings, intervention intensity, and outcome measures. The majority of the studies had $<$ 35 participants (range 9-77).
- The benefits of yoga may exceed those of conventional exercise interventions for **self-rated health status, aerobic fitness, and strength.**
- **However, the effect sizes were modest, and the evidence was mixed for yoga's effect on depression, sleep, and bone-mineral density.**
- **Studies did not find an effect on cognition.**

Meditation (MBSR) Programs for Psychological Stress and Well-being

A Systematic Review and Meta-analysis

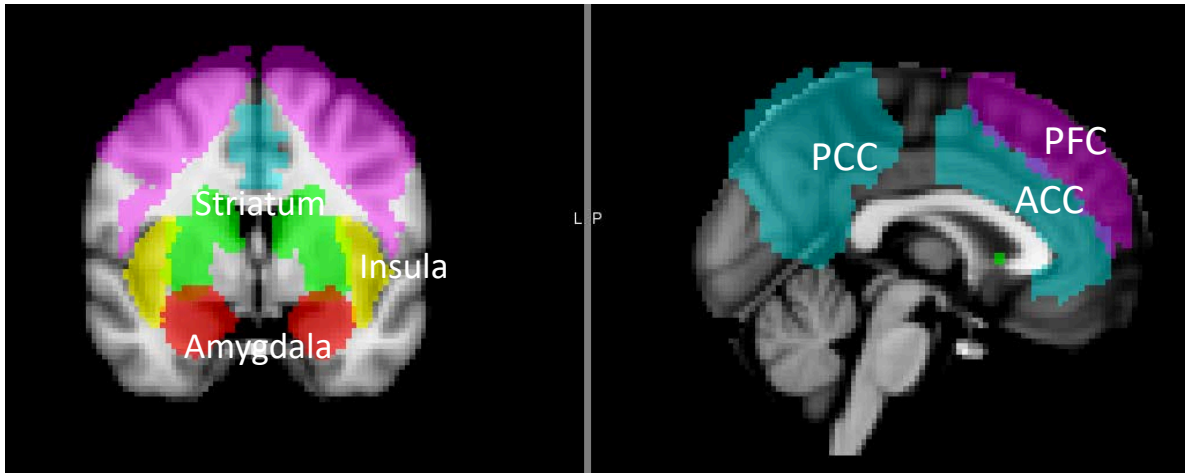
Goyal, et al 2014

- Meta-analyses- after 18 753 citations, included 47 trials with 3515 participants.
- Mindfulness meditation programs had moderate evidence of improved **anxiety** (effect size, 0.38 [95%CI, 0.12-0.64] at 8 weeks and 0.22 [0.02-0.43] at 3-6 months), **depression** (0.30 [0.00-0.59] at 8 weeks and 0.23 [0.05-0.42] at 3-6 months), and **pain** (0.33 [0.03- 0.62])
- **Low evidence** of improved stress/distress and mental health–related quality of life, positive mood, attention, substance use, eating habits, sleep, and weight.
- Clinicians should be aware that meditation programs can result in small to moderate reductions of multiple negative dimensions of psychological stress.

Mindfulness-based therapy vs. Mindful physical exercise

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- Unique recruitment for mindfulness practices, in brain regions that regulate **body awareness and higher cognitive functions**
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Neural mechanisms of mindfulness meditation



- Prefrontal cortex -cognitive processing and executive control, attention
- Anterior and posterior cingulate- mood regulation, memory
- Insula -sensory awareness
- Striatum-reward, learning, and motivation
- Amygdala -Emotional processing (fear, anxiety)

Neural mechanism differences between mindfulness and mindful exercise

- *Unique to mindfulness- four regions*

- Premotor area (PMA)
- Mid-cingulate
- Angular gyrus (AG)
- Primary and secondary somatosensory cortex (SSI and II)
- =Areas of motor and emotional, and somatosensory integration- greater awareness of Self=Consciousness
- Can be used for treatment of mood disorders, anxiety, ADHD, impulsivity, movement disorders, stress

- *Unique to yoga-based practices- seven regions*

- Dorsolateral prefrontal cortex (DLPFC)
- Medial frontal cortex
- Superior temporal area
- Paracentral lobe
- Precentral and postcentral gyrus
- Superior parietal lobule (SPL)
- =Areas of judgment- discernment; memory, language; visual-spatial and somatosensory integration =Social cognition/behavior
- Useful for enhancing judgement and self-control on deliberate actions
- Can be used-criminal system, at risk youth, substance abuse, mood disorders, neurological illness, dementia, cognitive decline, caregiver stress

Complementary Use of Tai Chi
Improves Resilience, Quality of life,
and Cognitive Function in
Depressed Older Adults.

METHODS

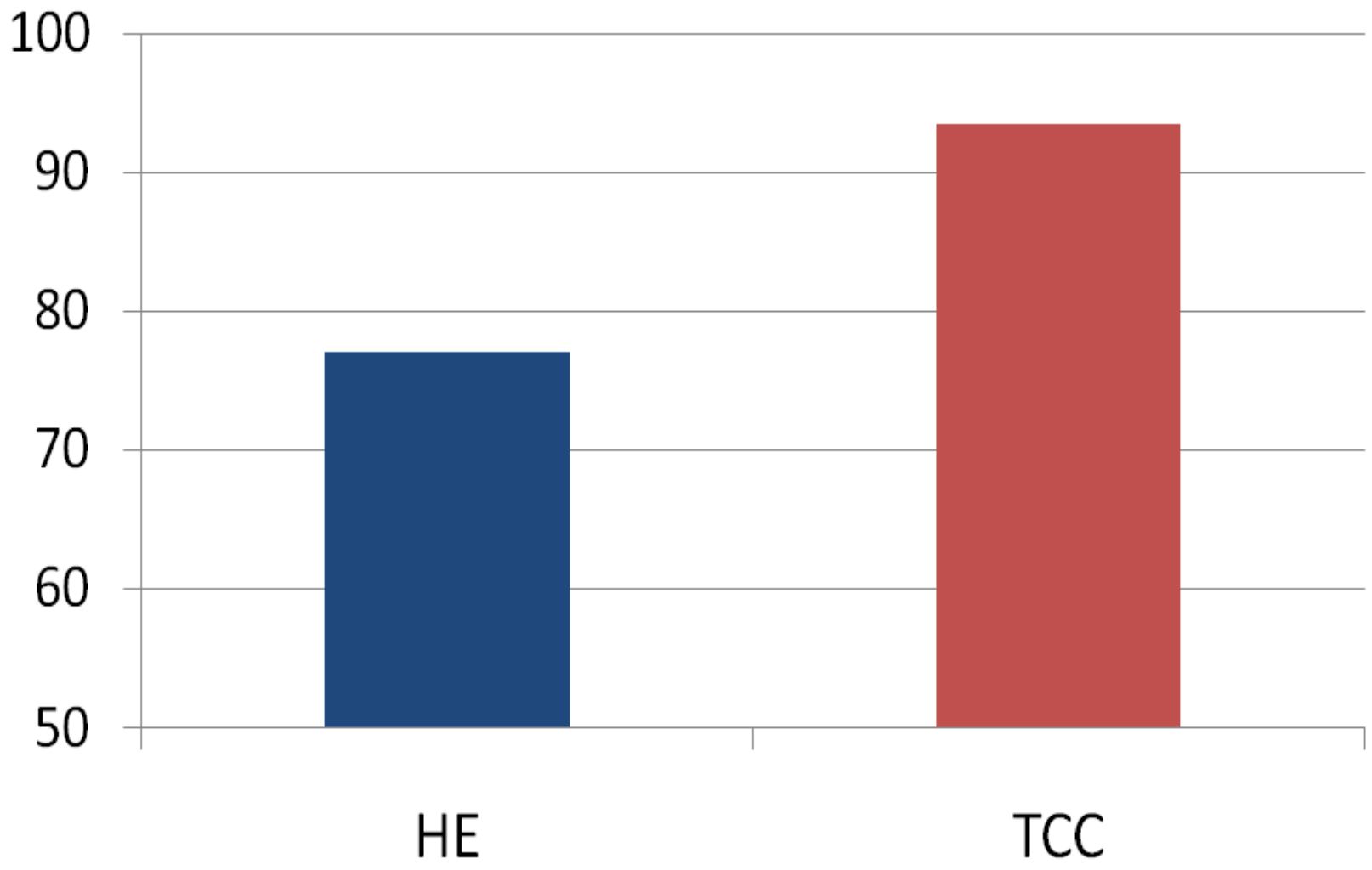
- 112 older adults with major depression age 60 years and older were recruited and treated with 10 mg of escitalopram for the first 6 weeks.
- 73 partial responders (Ham-D >6 and more than 30% improvement) to escitalopram continued to receive 10 mg of escitalopram per day and were randomly assigned to 10 weeks of either complementary intervention :
- 1. Tai Chi Chih for 2 hours per week; or 2. Health Education Program for 2 hours per week.

Results

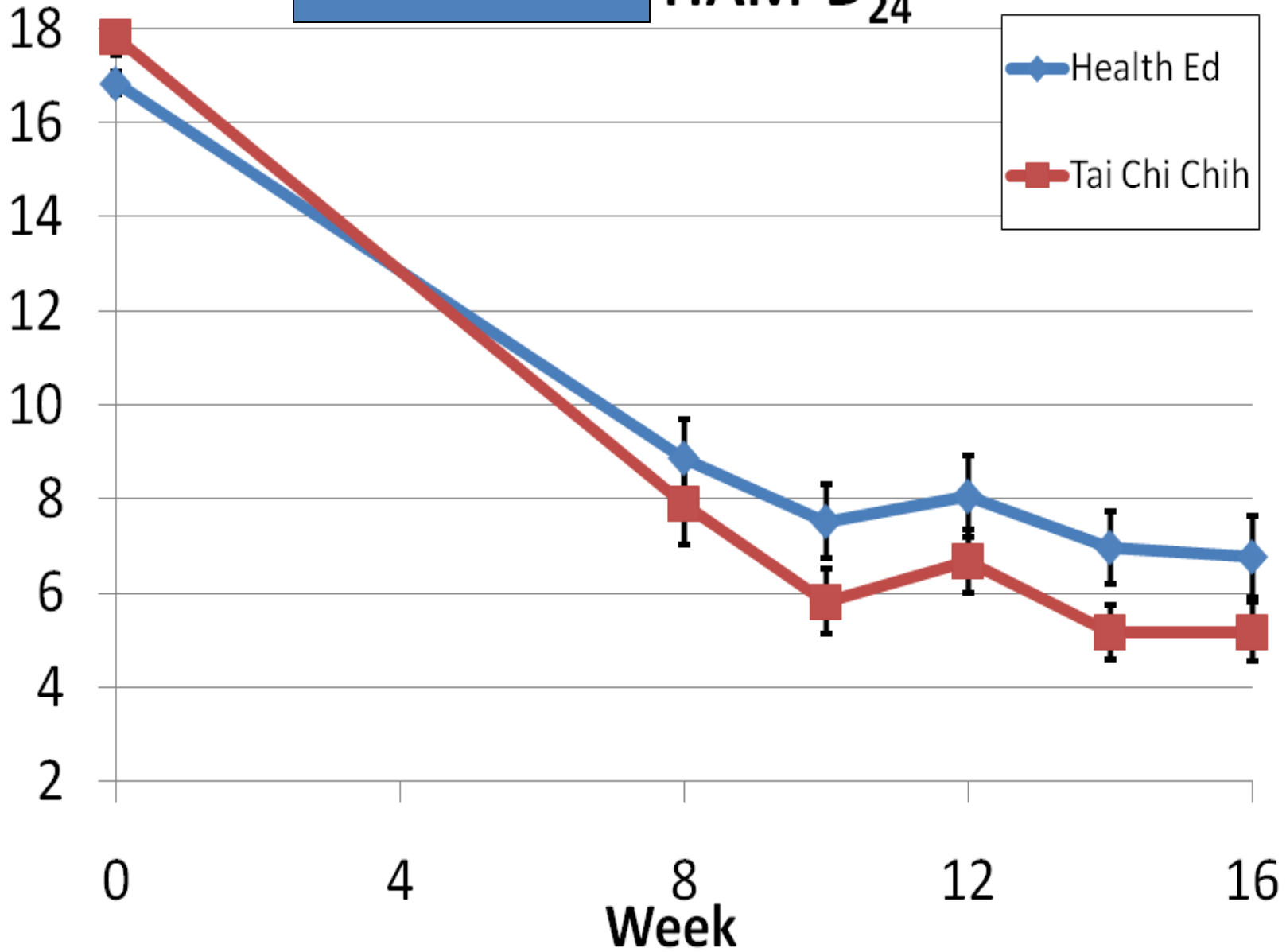
- Both Tai Chi (TC) and Health education (HE) participants demonstrated improvement in the severity of depression, but TC subjects >HE
- Tai Chi group demonstrated significantly greater improvement compared to HE group in:
 - Resilience
 - Energy and psychomotor retardation
 - Physical functioning
 - Cognitive measures of executive cognitive function, attention, and memory

RESPONSE

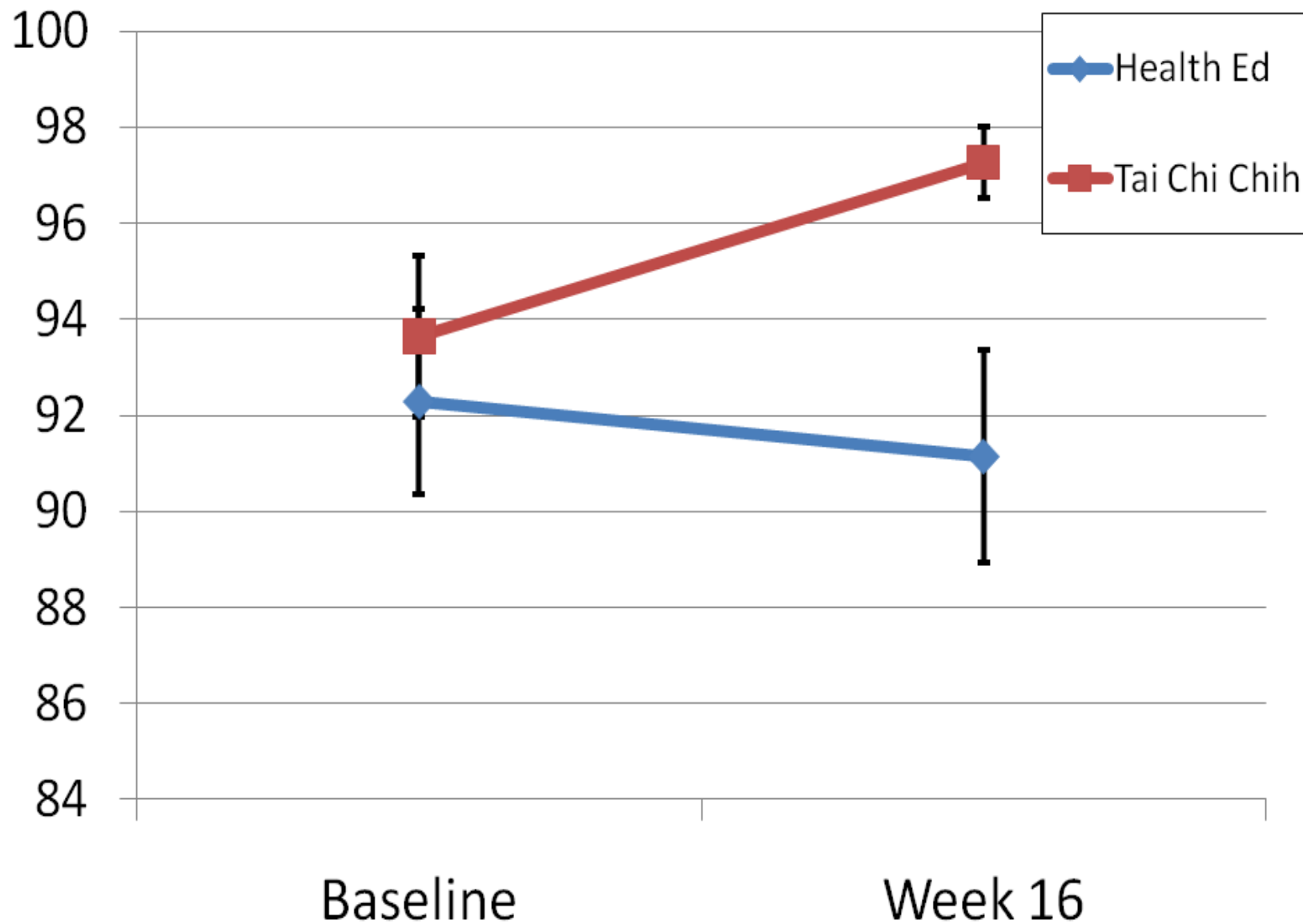
% Responders at Week 16 (HAM-D₂₄ ≤ 10)



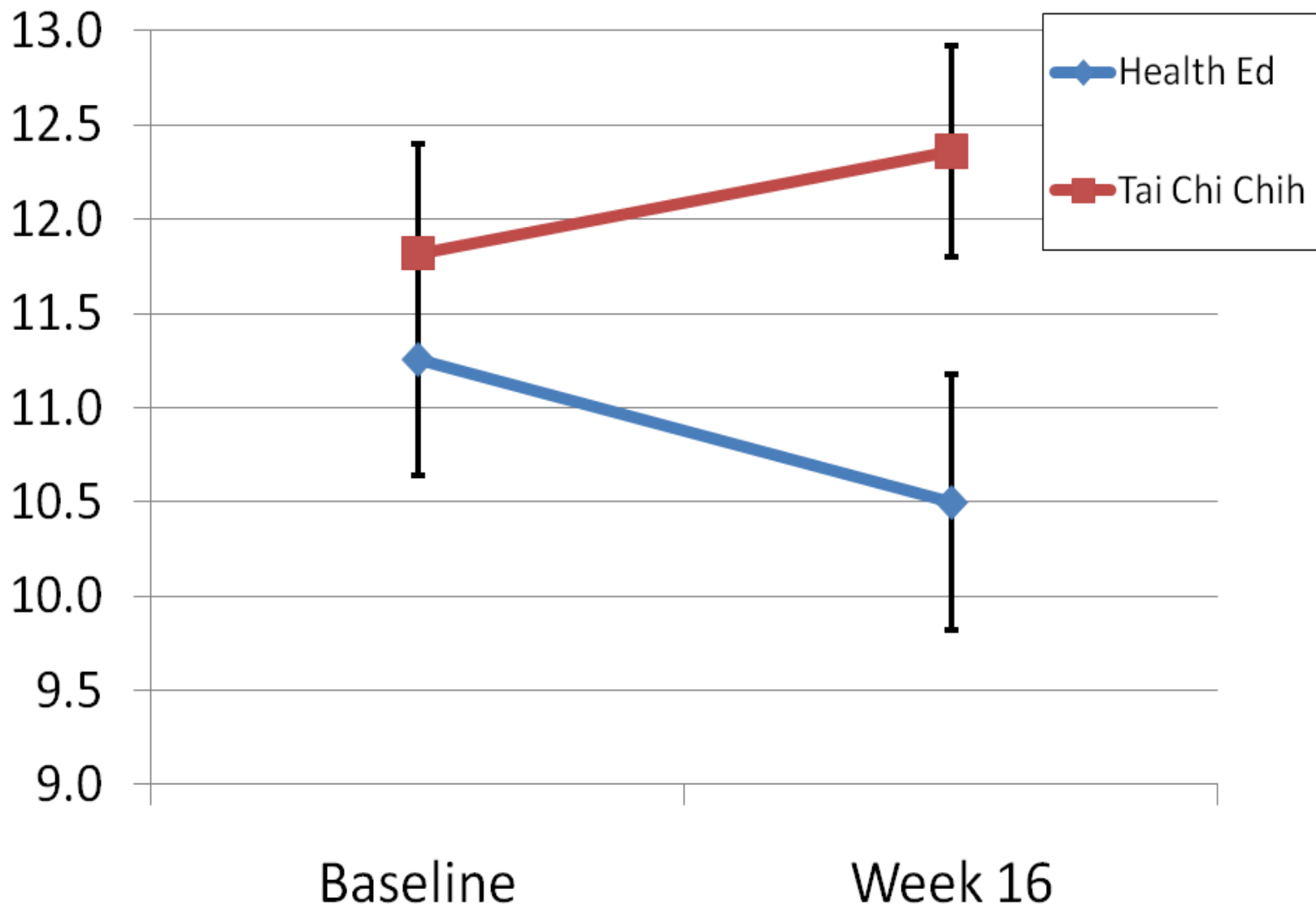
DEPRESSION: HAM-D₂₄



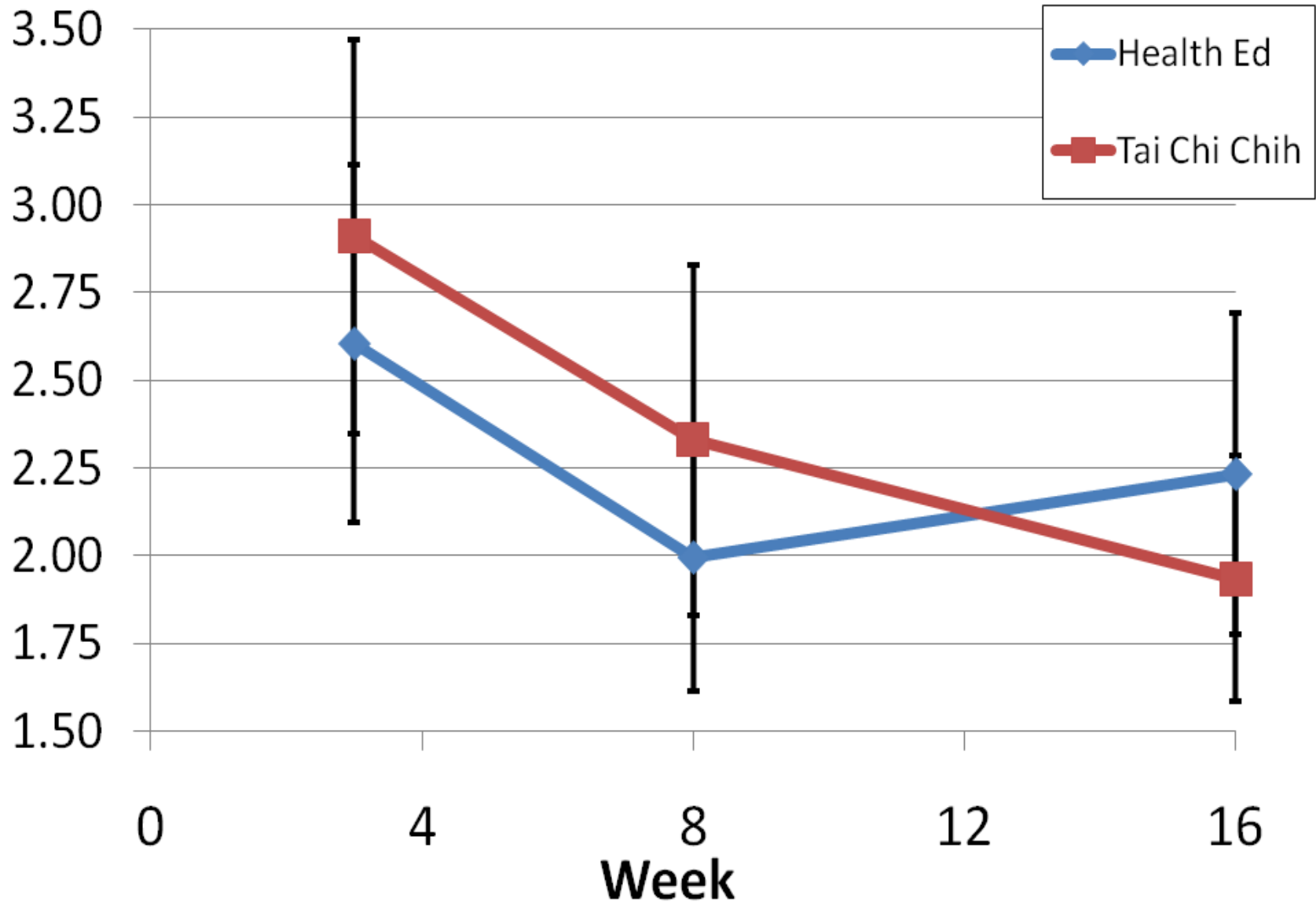
HRQOL: SF-36 Physical Functioning



MEMORY: CVLT Long Delayed Recall (Cued)



INFLAMMATION: C-Reactive Protein



What else did I learn?

- HE is an active control -boosting social support and it is easy to follow
- TCC– not everybody “gets” it
- Adherence and satisfaction did not differ
- Personalized approach of Mind-Body medicine may improve treatment response to standard antidepressants on multiple outcomes and reduce exposure to multiple drugs

Conclusions

- Complementary use of mind-body exercise combined with standard antidepressants may provide additional improvement in clinical outcomes of geriatric depression such as resilience, quality of life, and cognitive function
- **Putative Mechanisms** – via stress reduction, decreased inflammation, epigenetic changes
- More direct testing – in the Yogic meditation in family caregivers who are stressed and depressed

Yogic meditation to reduce stress and improve functioning in family dementia caregivers

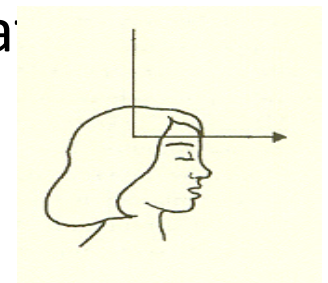
- Sponsored by the Alzheimer's Research Prevention Foundation
- To compare psychological, cognitive, and neurobiological effects of yogic meditation versus relaxation in stressed and depressed family dementia caregivers
- Practice for 12 minutes per day for 8 weeks.

Kirtan Kriya versus Relaxation for stressed dementia caregivers

- 39 stressed caregivers with minor depression randomized to 12 minutes per day meditation versus listening to music tapes for 8 weeks
- **NEW CONCEPT:** “ I have 20 minutes to myself”
- Breathing and chanting versus relaxing
- Distress, depressive symptoms, anxiety, burden
- Cytokines, cortisol, catecholeamines, cognition, PET scan, fMRI, NFkappaB, telomerase, gene expression

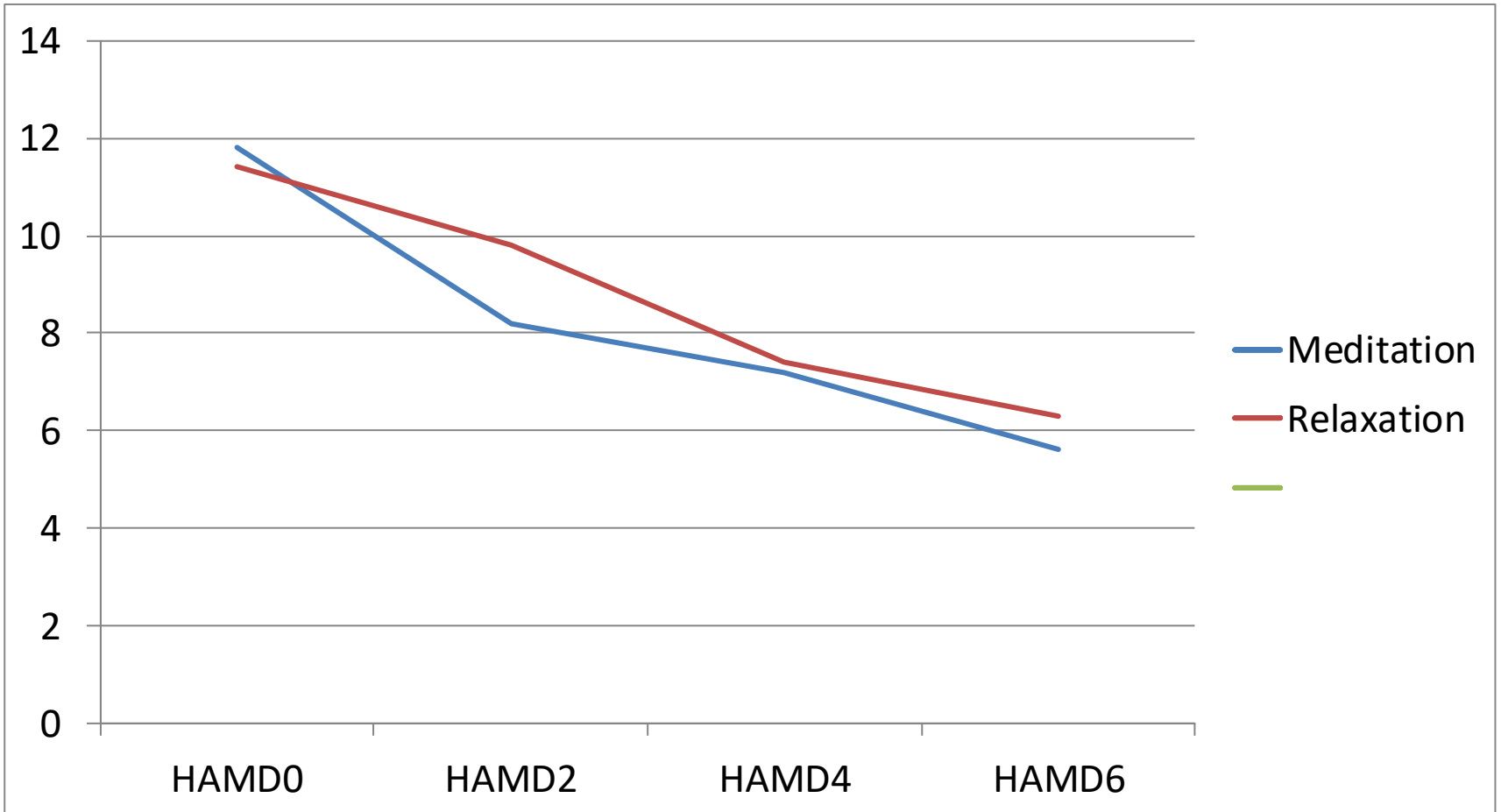
What is Kirtan Kriya?

- **Kirtan Kriya** is a 11-minute chanting exercise in the Kundalini yoga tradition that people have been practicing for thousands of years. This meditation involves repetitive finger movements, or mudras, plus verbal chanting and silent chanting of the mantra “**Saa Taa Naa Maa.**”
- **What does Kirtan Kriya mean in English?**
A kirtan is a song. These ancient primal sounds from Sanskrit mean “birth, life, death, rebirth.” Kriya refers to a specific set of movements or chants.
- In the yogic tradition, kriyas are used to help bring the body, mind, and emotions into balance. thus creating healing

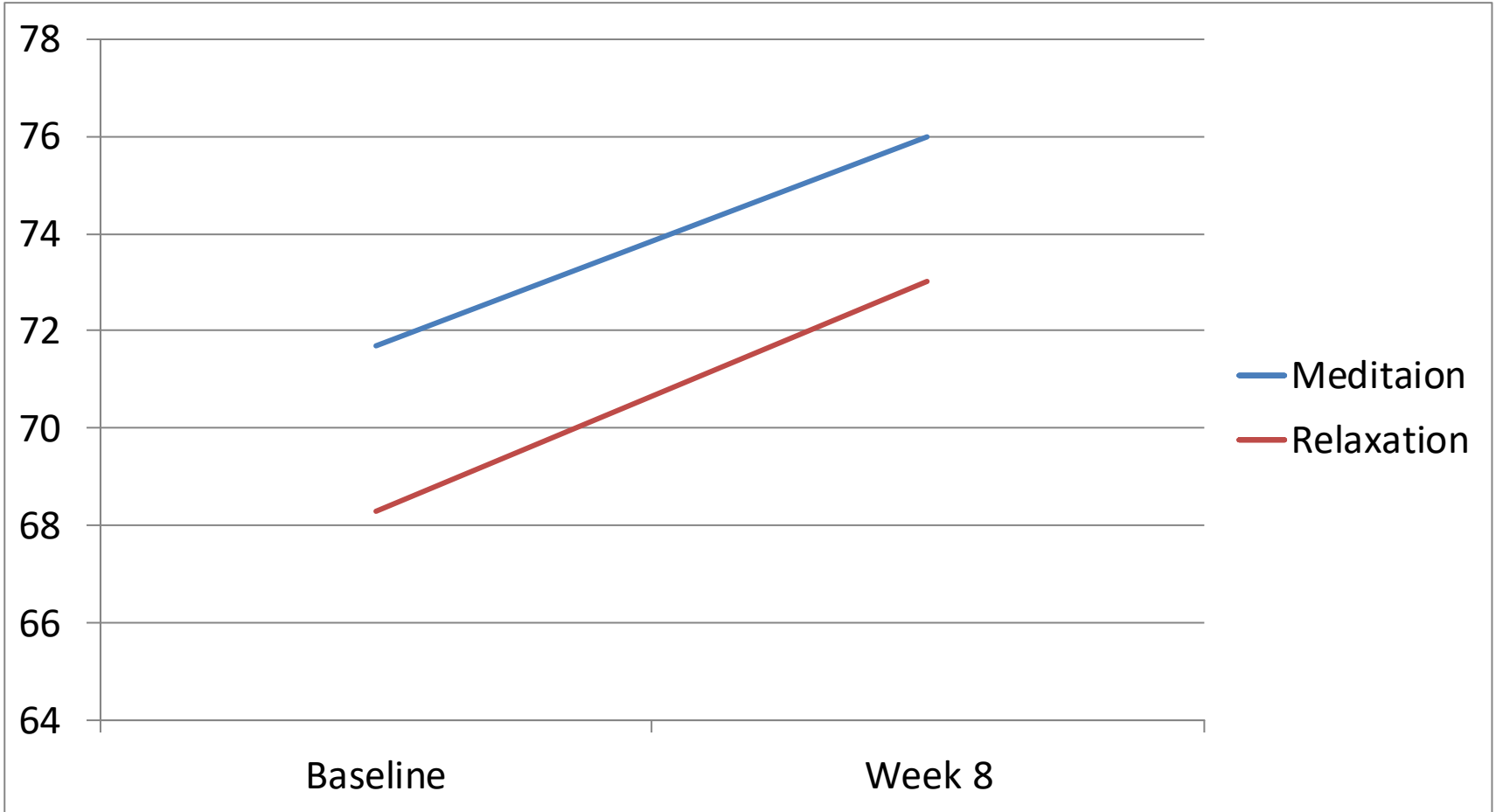


- Focus of attention

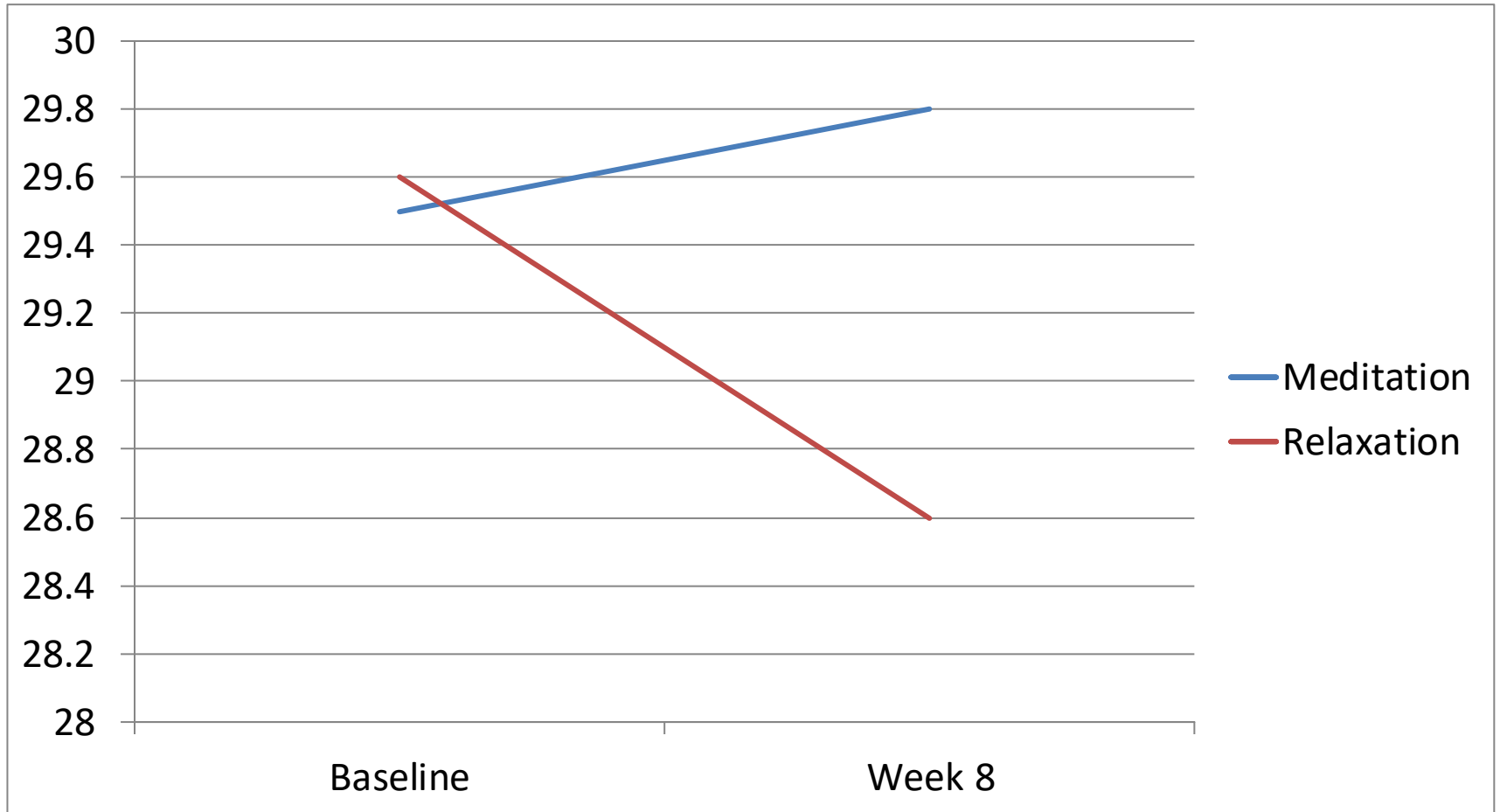
HAMD scores over time



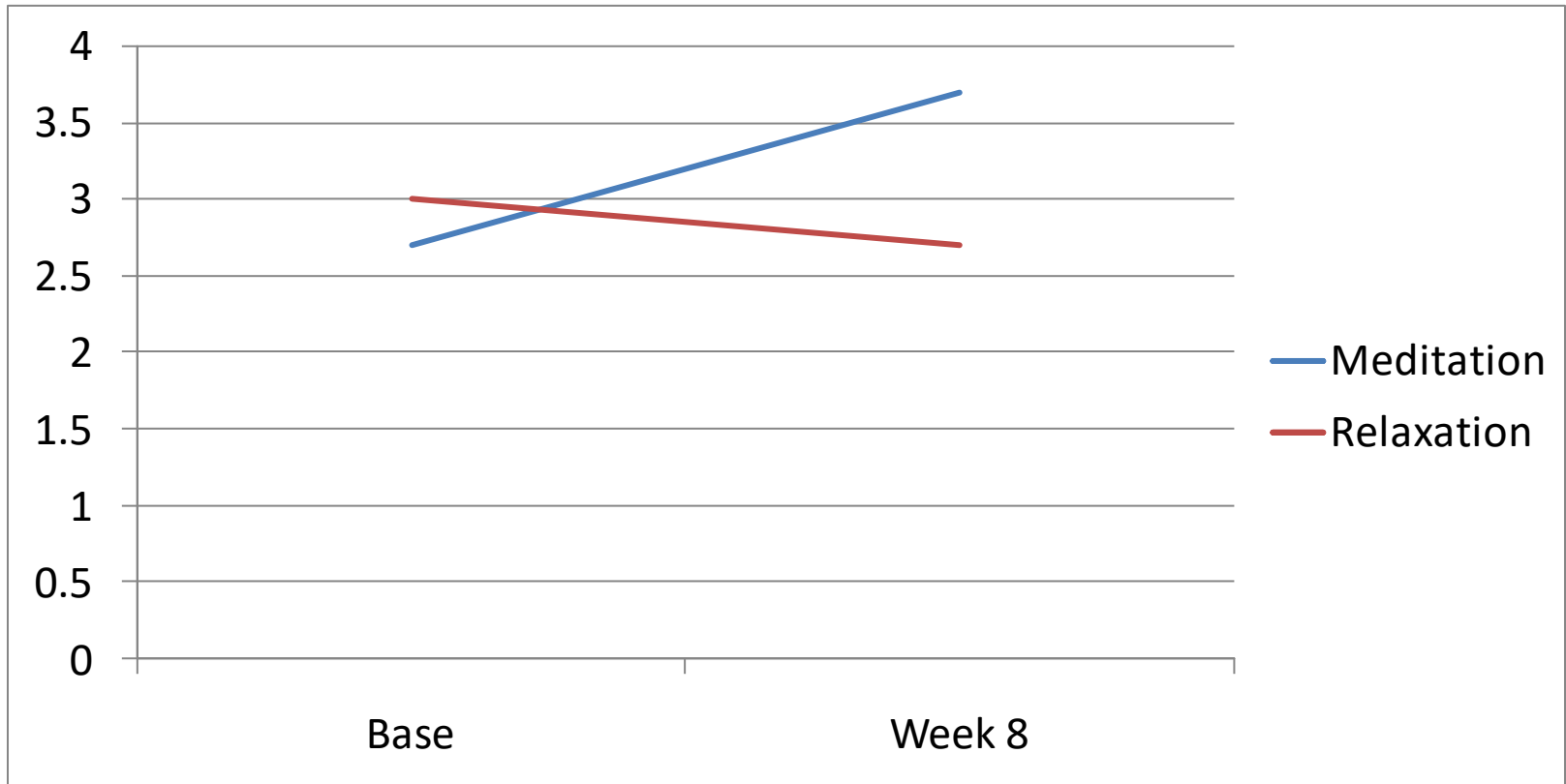
Resilience

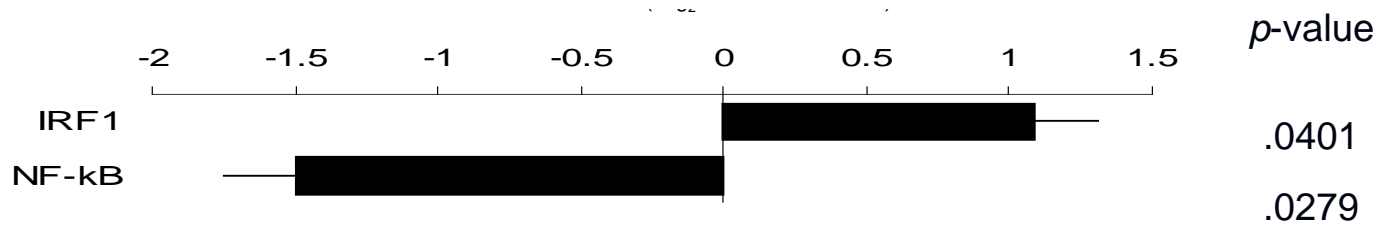


Cognition-MMSE



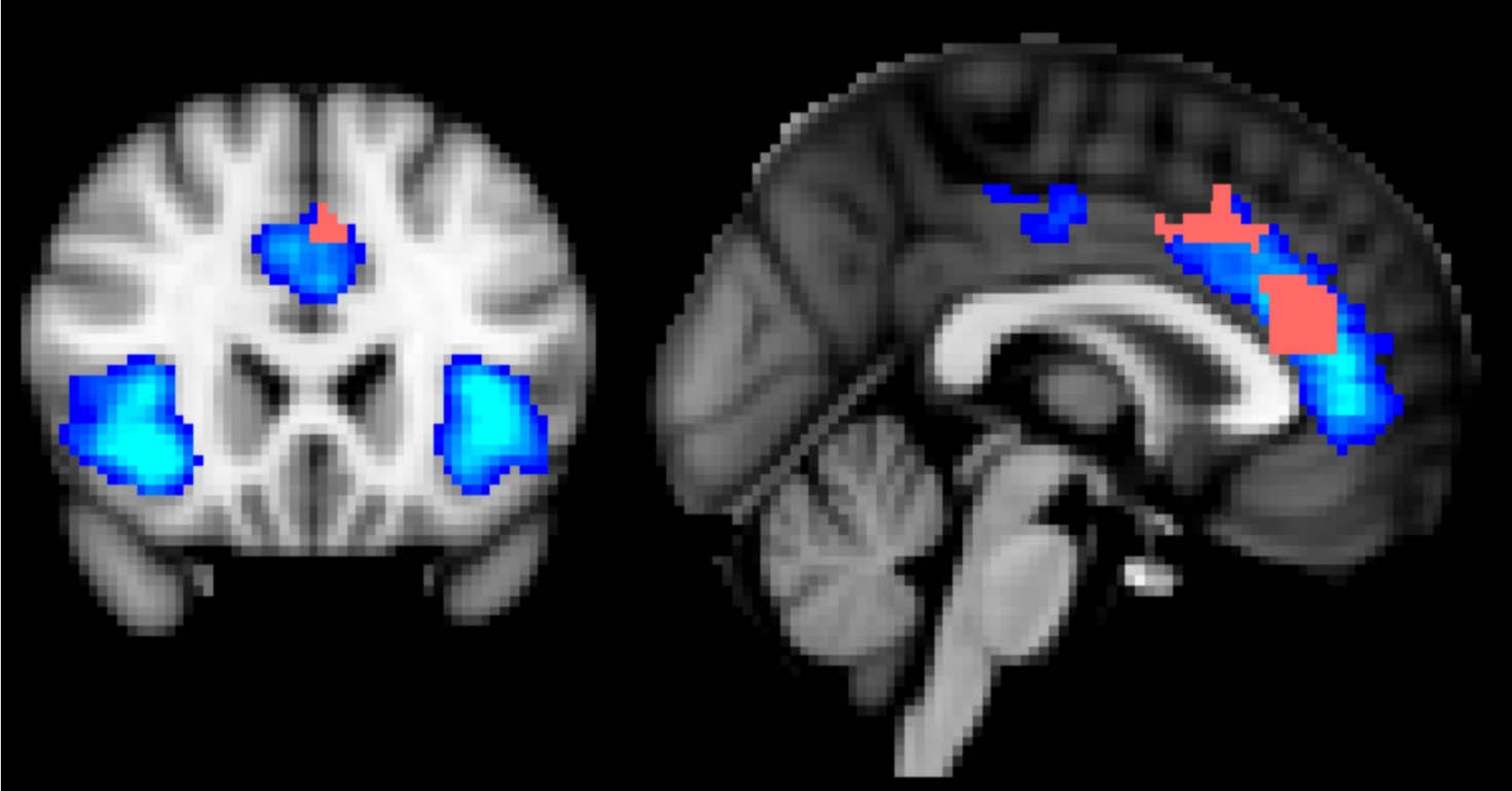
Telomerase activity





fMRI in meditators showed higher activity in a functional network including the anterior cingulate, fronto-orbital cortex and insula

(Light blue areas show the ACC-orbito-insular network, pink for group difference, $z=1.7, p<.05$)



Neural mechanisms of Kirtan Kriya

- The elements of Kirtan Kriya activated regions known to be associated with each task
- Meditation strongly activated bilateral temporal pole, known to be involved in empathy.
- The difference between meditators and non-meditators showed higher activity in the anterior cingulate, fronto-orbital cortex and insula
- DMN activity was largely suppressed throughout the course of Kirtan Kriya meditation, meaning that Meditation \neq Rest;
- Meditation has “brain fitness effect.”

Yoga for mild cognitive impairment



Yoga and Cognition: Meta-Analysis

- **Studies in field:** 15 RCTs and 7 acute exposure studies examined the effects of yoga on cognition.
- **Result:** Yoga practice seems to be associated with moderate improvements in cognitive function.
- **Effect sizes:** 0.33 for RCTs; 0.56 for acute studies.
- **Limitations of field:** sample size, heterogeneous population characteristics, varied doses of yoga interventions, and a myriad of cognitive tests, these findings warrant rigorous systematic RCTs

Methods

Procedures:

- UCLA Outpatient Clinic; 2013 – 2015.
- NCT01983930

Key inclusion:

- ≥ 55 ; subjective memory complaint; MCI (CDR 0.5).

Key exclusion:

- Axis 1 disorder; MMSE ≤ 24 ; significant disabilities

Randomization: computer-generated

Blinding: investigator, statistician, data managers blinded.

Outcome Measures

Cognitive:

- Verbal memory: HVLT; WMS-IV
- Visual-spatial: Rey-O
- Executive function: TMT-B, Stroop Word-Color, Animal Naming.

Mood and Other:

- GDS, AES, CD-RISC

Time:

- Baseline, 12 weeks, 24 weeks

Yoga

Kundalini Yoga (KY):

- 60 mins per week, 8 – 10 group.
 - Tuning In; Warm Up; Breath Techniques; Kirtan Kriya; Meditation; Rest.

PLUS

Kirtan Kriya:

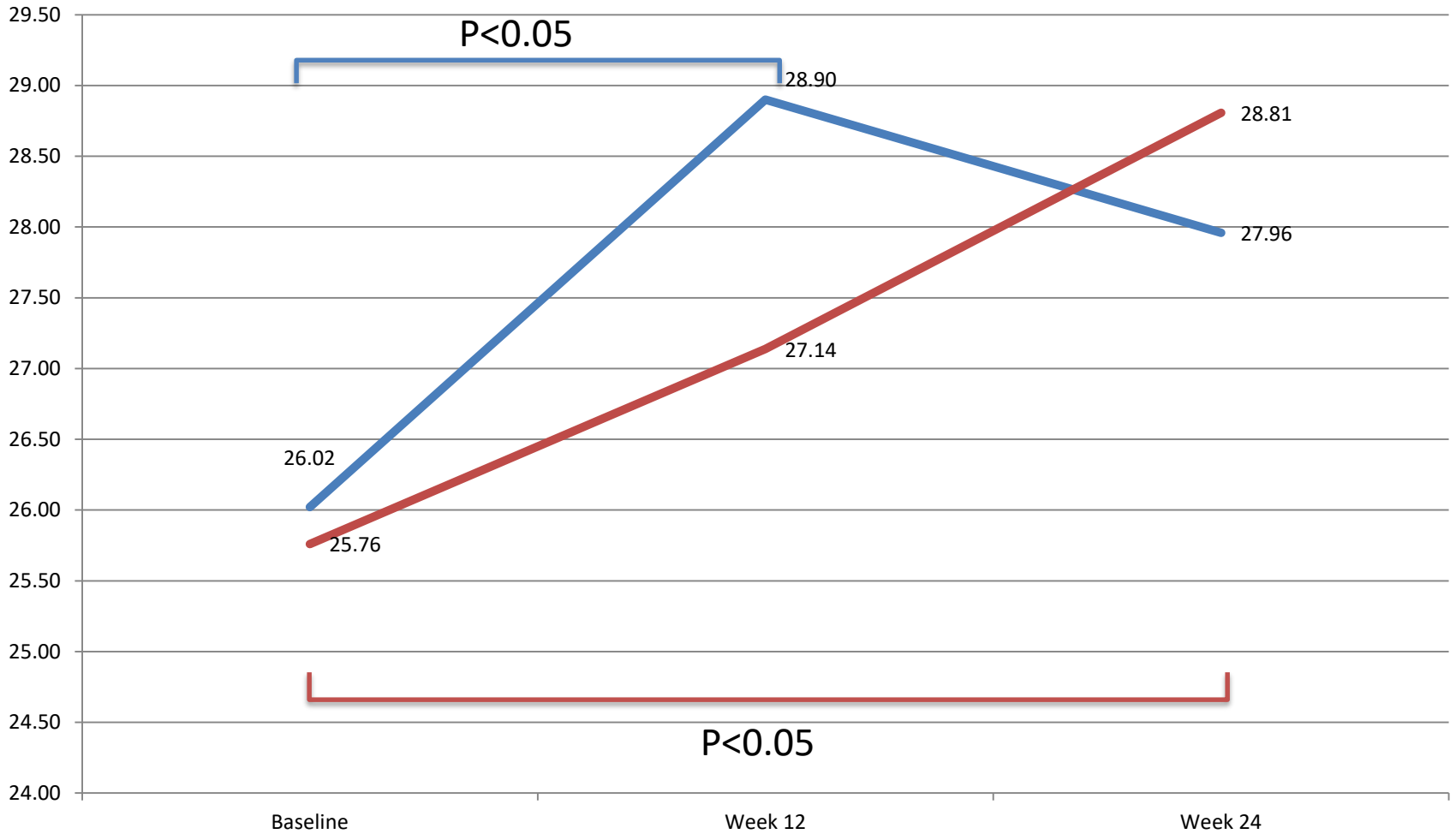
- Daily homework, 12 mins.
 - Finger movements, mantras, deep breathing.

Memory Enhancement Training (MET)

- ‘Gold standard’.
- Developed by UCLA Longevity Center.
- Verbal and visual association strategies and practical strategies for memory.
- Weekly group session of 60 mins and daily homework (memory exercise for about 15 min a day).

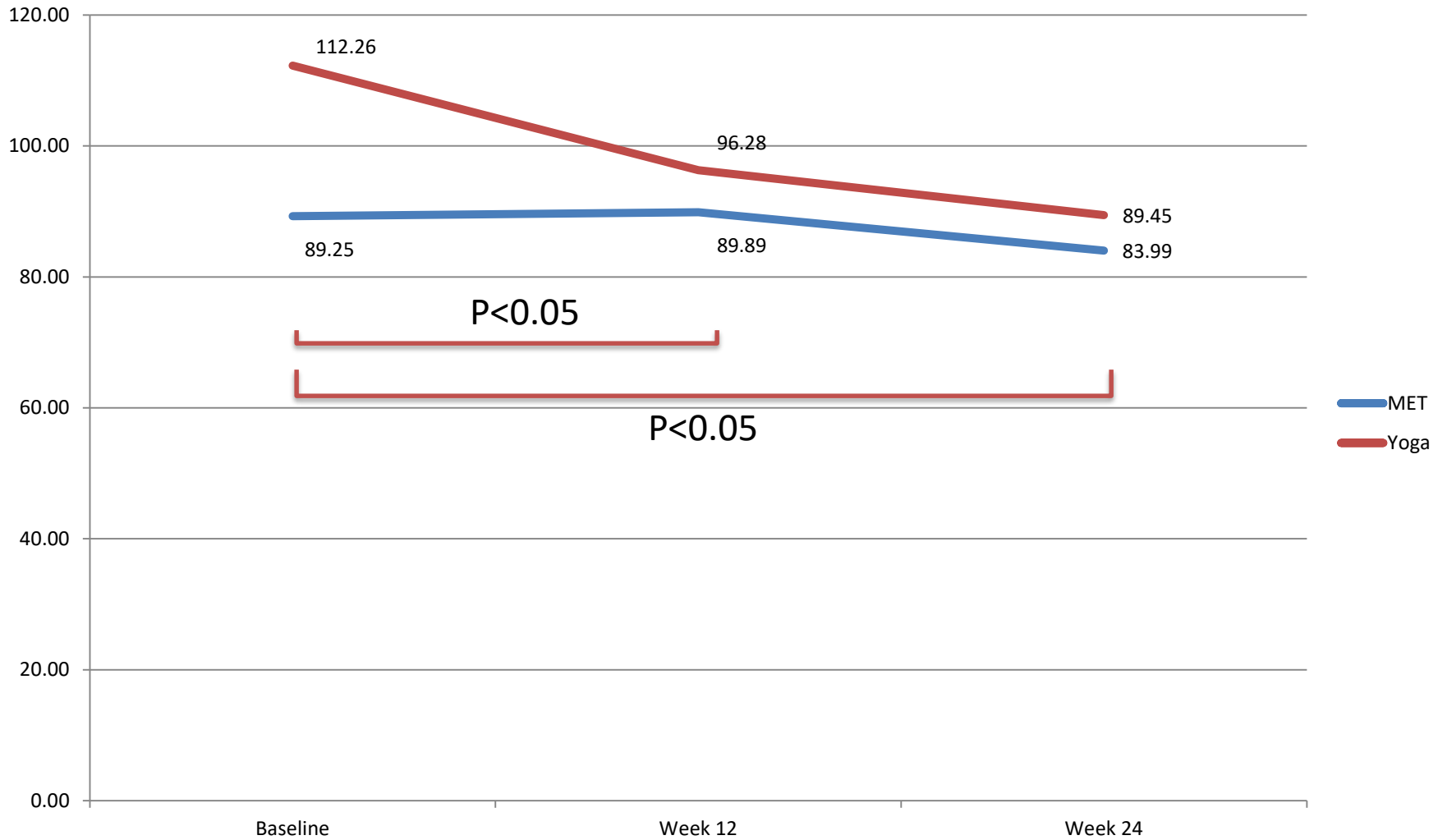
Verbal Memory

HVLT total recall



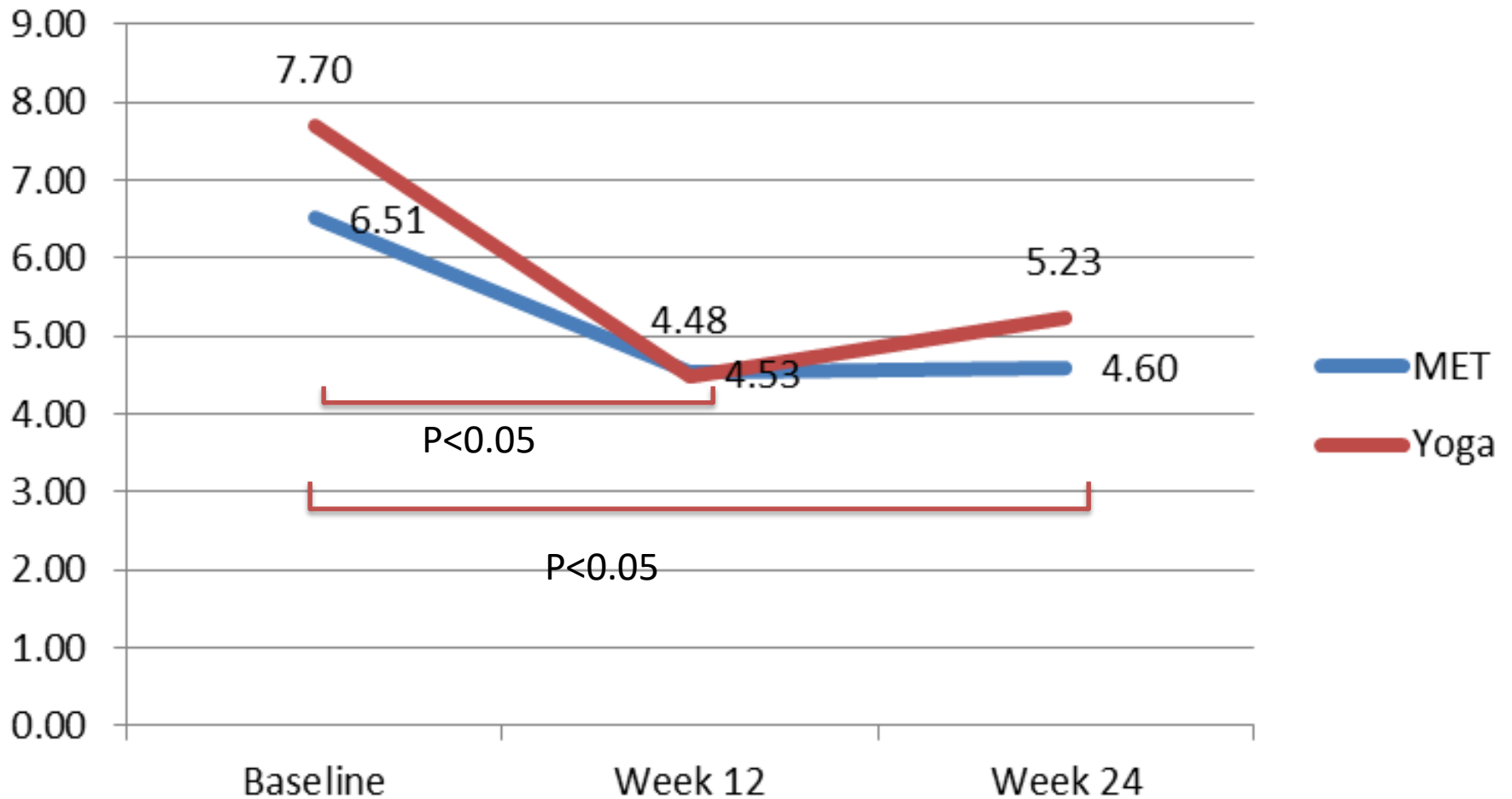
Executive Function

Trail B (seconds)



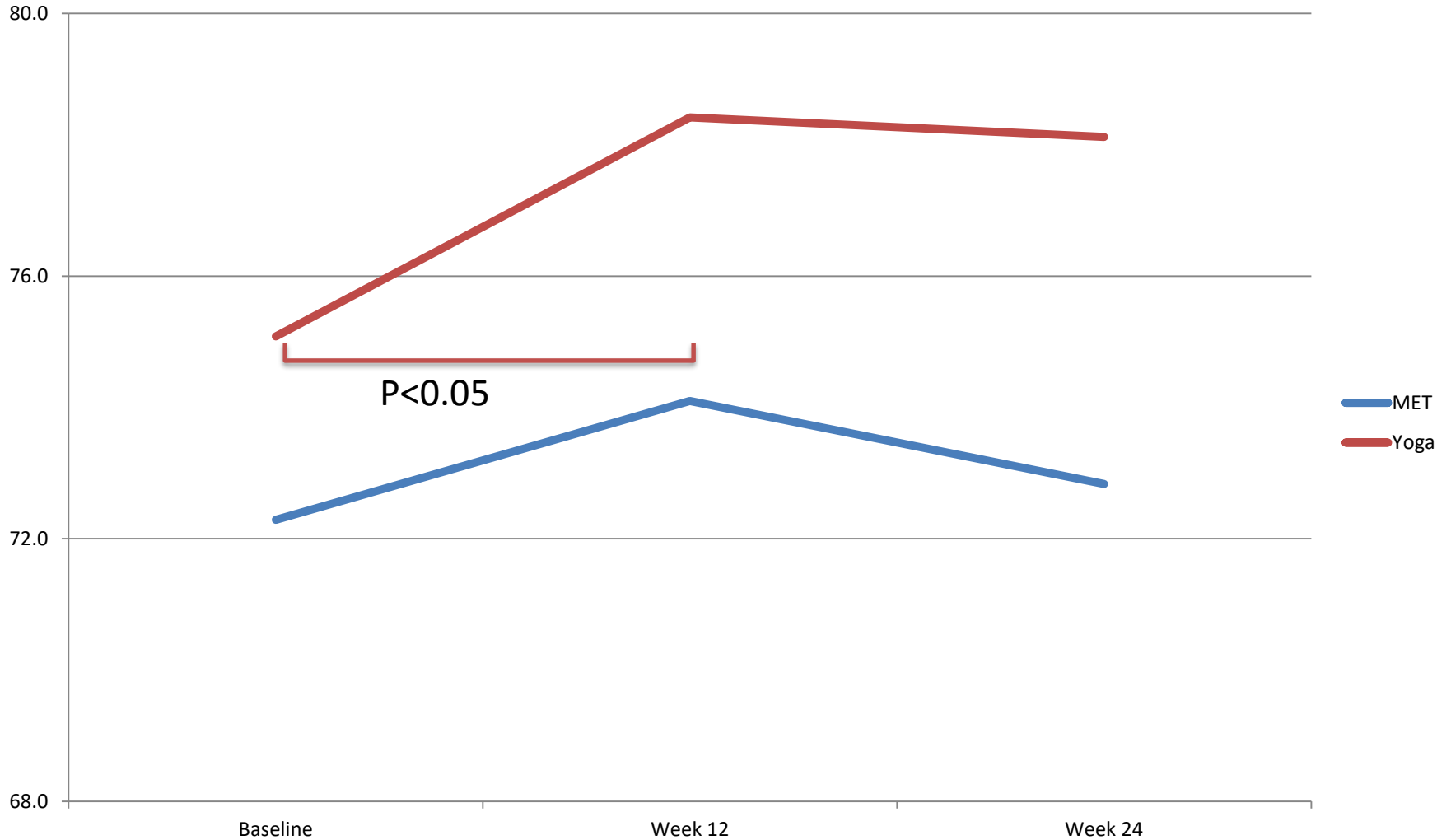
Depressive Symptoms

GDS



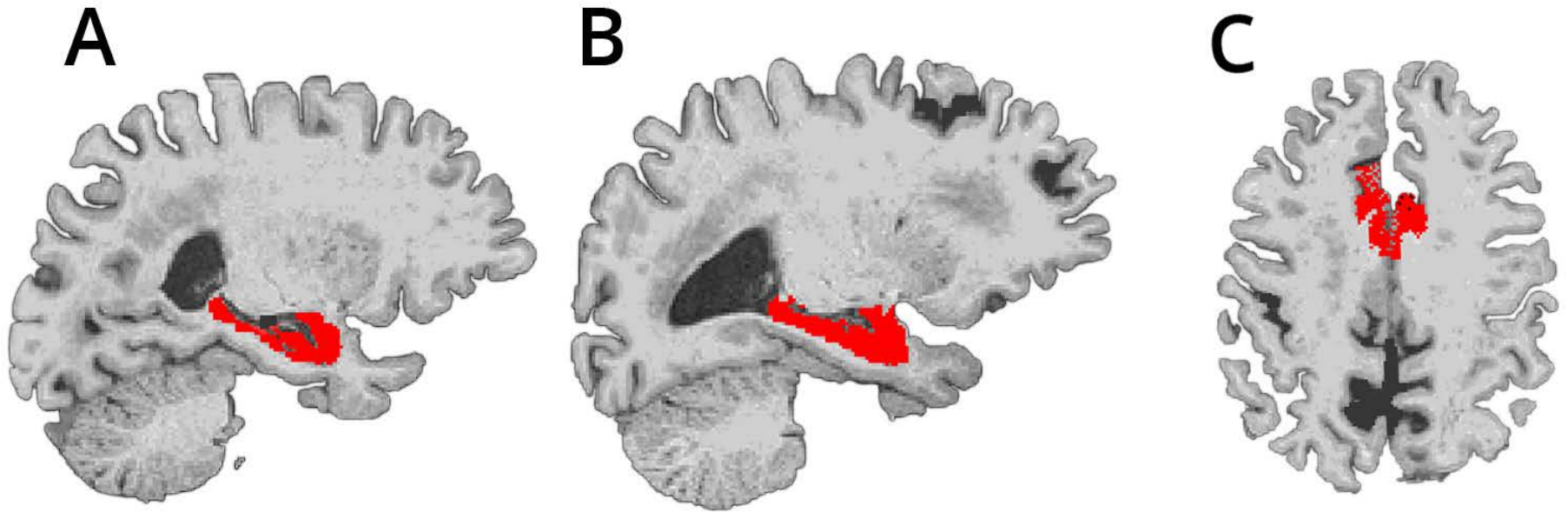
Resilience

CDRISC



NEUROPLASTICITY AND BRAIN CONNECTIVITY

- 14 YOGA and 11 memory enhancement training (MET) participants (55 y.o. and older) were compared after 12 weeks of Kundalini yoga (with Kirtan Kriya), or memory training in older adults with MCI using resting-state fMRI
- Groups did not differ by age, sex, education, handedness

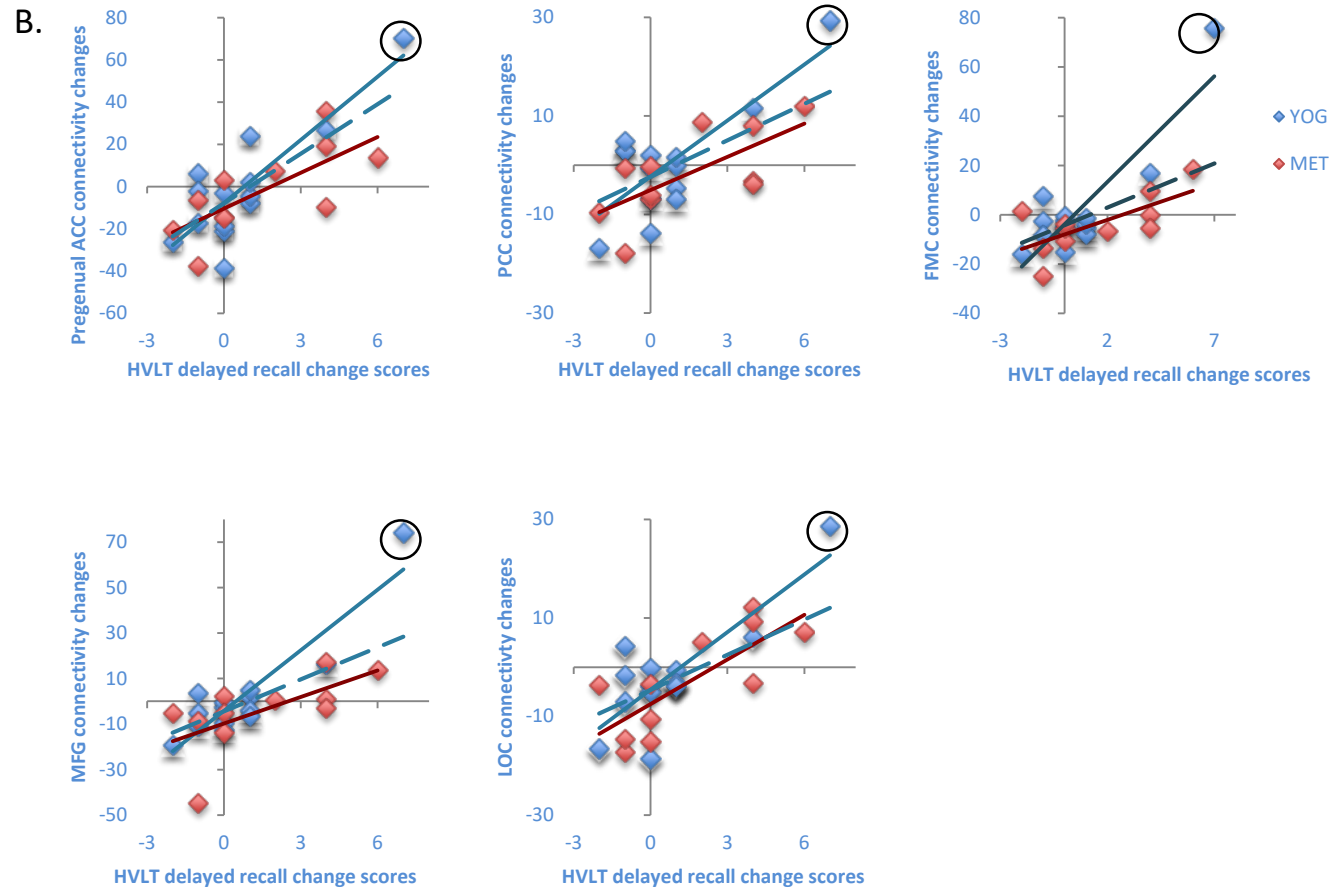
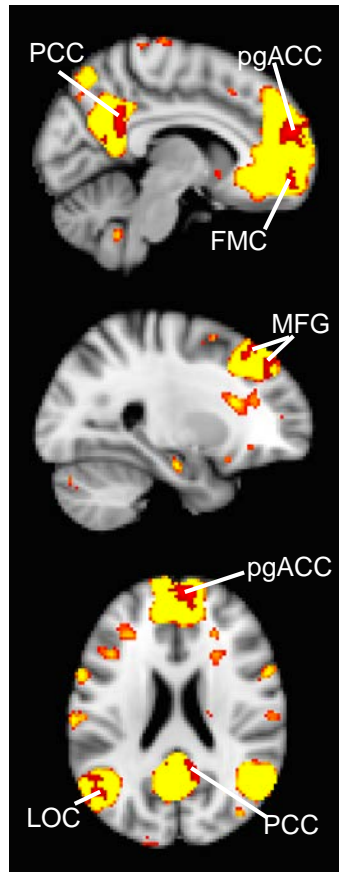


Example locations of bilateral hippocampus and dorsal ACC regions used in Freesurfer volume analyses. The right hippocampus (A), left hippocampus (B), and dorsal ACC (C) are displayed in red on a representative subject's brain image.

RESULTS

- The yoga group demonstrated a statistically significant improvement in **depression and visuospatial memory**.
- In both groups, we observed improved verbal memory performance correlated with increased connectivity between the **Default Mode Network (DMN)** and frontal medial cortex, pregenual anterior cingulate cortex (ACC), right middle frontal cortex, posterior cingulate cortex (PCC), and left lateral occipital cortex.
- Improved verbal memory performance positively correlated with increased connectivity **between the language processing network and the left inferior frontal gyrus**.
- **MET** increased hippocampal volume, but not ACC, and language domain score at baseline inversely predicted change in hippocampal volume

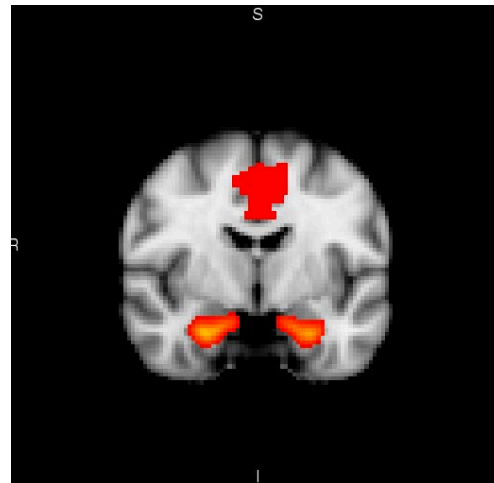
Changes in functional connectivity within the default mode network correlated with improved verbal memory performance.



A. The default mode network (DMN) is displayed in yellow on a template brain in neurological convention. Regions that exhibited significant correlations between changes in DMN connectivity and changes in HVLt delayed recall are shown in red ($z > 2.3$, $p < 0.05$, corrected). All correlations were positive, and significant clusters included the pregenual anterior cingulate cortex (**ACC**), frontal medial cortex (**FMC**), posterior cingulate cortex (**PCC**), middle frontal gyrus (**MFG**), and lateral occipital cortex (**LOC**). B. Scatter plots indicate positive correlations in the clusters displayed in A in yoga (YOG, blue) and memory enhancement training (MET, red) groups. Trend lines are plotted for each group; dashed lines indicate trendlines without the outlier (marked with a black circle) for the yoga group.

MRI structural analysis

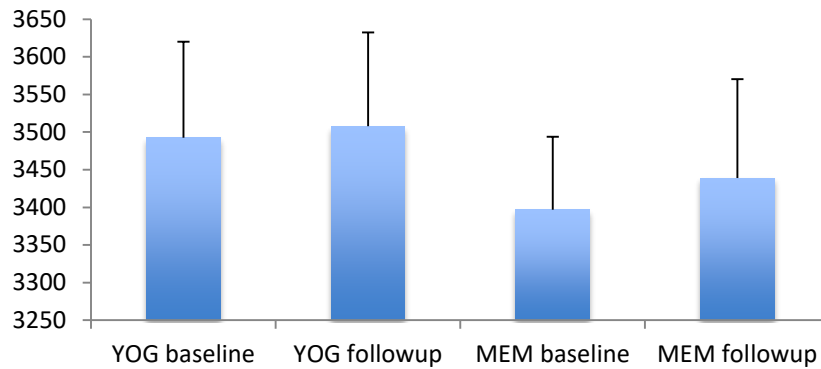
Dorsal ACC and bilateral hippocampus structure changes for yoga and MET groups



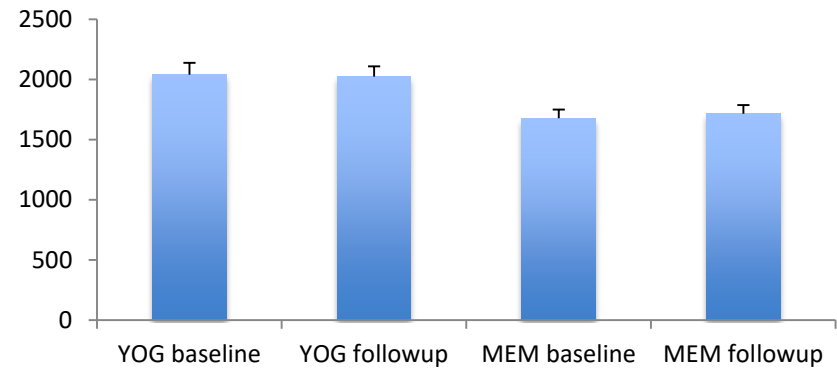
Dorsal ACC

Bilateral hippocampus

Bilateral hippocampus volume



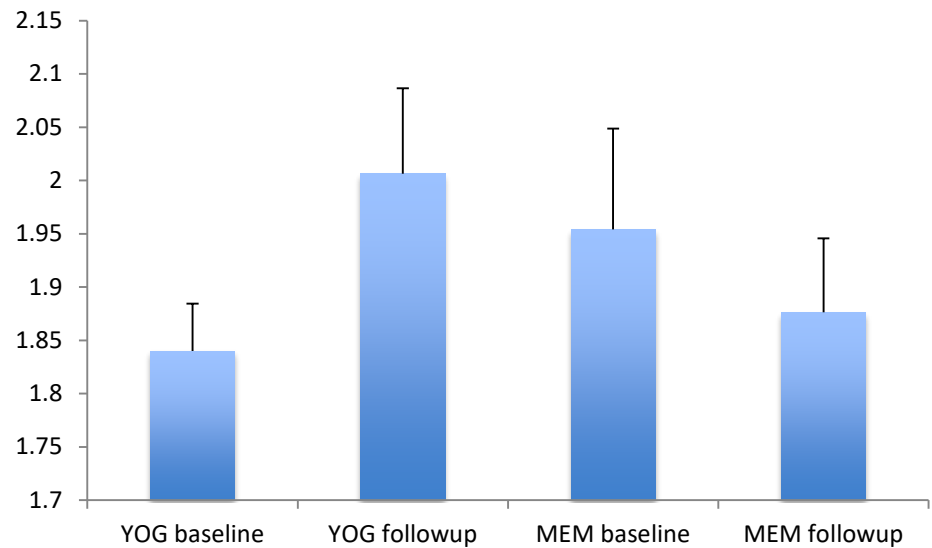
Dorsal ACC volume



Interaction between time*Group (hippo), $F=4.53$, $P=0.0443$,
Main group effect (dACC), $F= 7.56$, $P=0.0114$,
No other significant result was found.

MRS chemical analysis for dorsal ACC and bilateral hippocampus

Bilateral hippocampal Choline changes for yoga and MET groups



Interaction between time*Group, $F=4.62$, $P=0.0434$
Choline = phosphocholine + glycerophosphocholine
No other significant result was found for Creatine, NAA and Glx.

Conclusion

First study to examine changes in cognition with a yoga and MET in MCI.

Cognitive outcomes:

- Comparable changes for both yoga and MET in memory performance.
- Yoga>MET improved in executive function test performance.
- Yoga>MET continued to improve at 6 month

Mood outcomes:

- Yoga>MET had a broader impact on mood and resilience.

Brain outcomes:

- Both YOGA and MET group showed resting-state brain activity changes reflecting improvement in memory.
- MET increased hippocampal volume, associated with baseline language scores
- Yoga increased and MET decreased hippocampal Choline concentration

Acceptability is improved with the use of non-pharmacological and spiritual interventions



PHYS ED

Yoga May Be Good for the Brain

By GRETCHEN REYNOLDS JUNE 1, 2016 5:31 AM 116

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The Telegraph

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Yoga relief for Alzheimer's

Sponsors and Collaborators

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RESILIENCE

and

AGING

Research

and

Practice

Helen Lavretsky, MD, MS

Complementary and
Integrative Therapies for
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Thanks!

