2024 International Congress
on Integrative Medicine & Health

APRIL 9-13 • CLEVELAND, OH, USA

Livestream Group Movement Program for People Living with Cognitive Impairment and Care Partners

Francesca M. Nicosia, PhD, C-IAYT

Associate Professor, University of California, San Francisco

Integrative Health, San Francisco VA Healthcare System

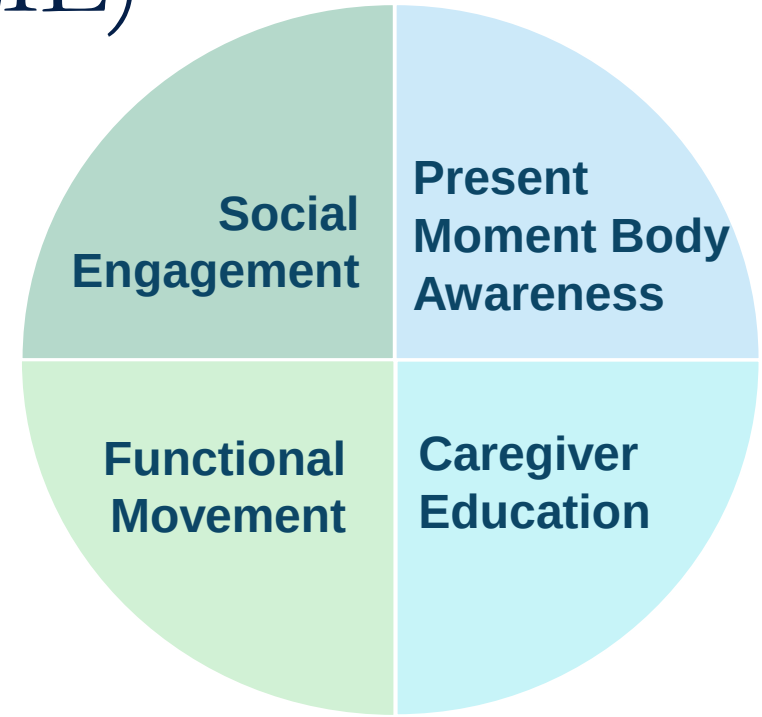
DISCLOSURES

- This work was funded by the National Institute on Aging (NIA, R44AG059520)
  - Views do not necessarily reflect those of NIA
- Together Senior Health, Inc., owns Moving Together™
- Dr. Nicosia has no conflicts

Preventing Loss of Independence through Exercise (PLIÉ)

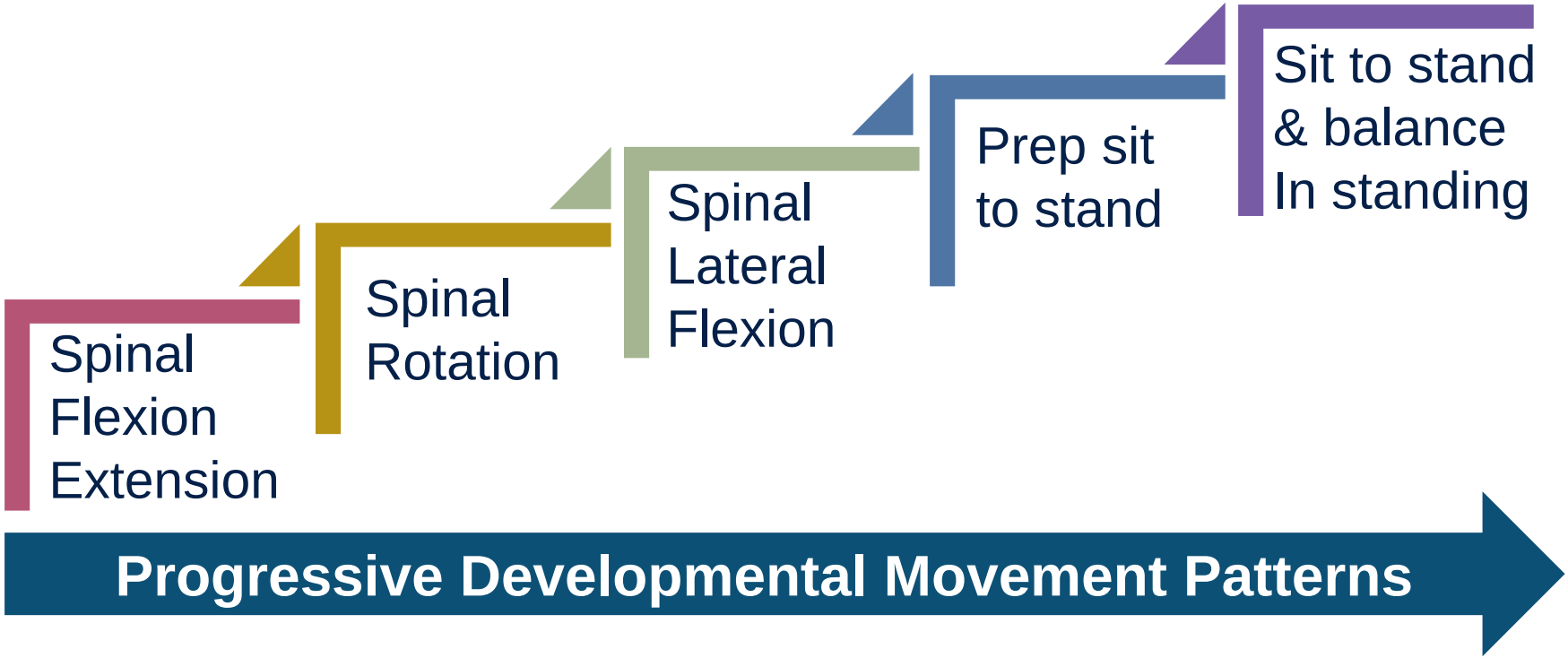
Multimodal mind-body group movement program

- Improved quality of life
- Physical, cognitive, emotional and social benefits



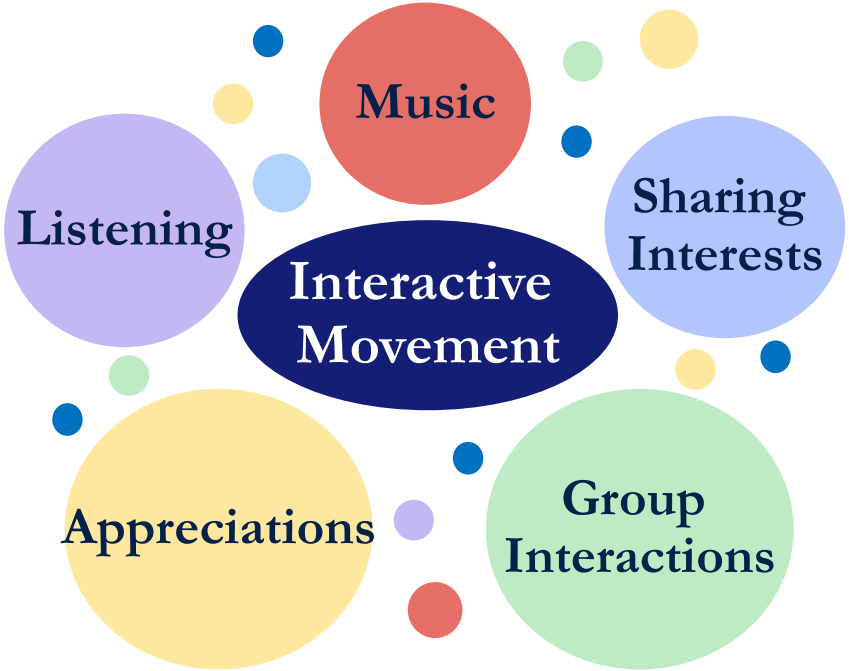
Barnes et al, 2015; Wu et al, 2015; Casey et al, 2019; Mehling et al, 2020; Akram et al, 2021; Chao et al, 2021

PLIÉ Functional Movement



PLIÉ Social Engagement

Building community through interaction



Research 2010 to Present

UCSF Osher Center for Integrative Medicine

PLIÉ Pilot Studies
Mild to Moderate Dementia

UCSF alzheimer's association

Paired PLIE Efficacy Study
Mild to Moderate Dementia

PLIÉ DoD Neuroimaging Pilot Study
Sujective Cognitive Decline or Mild Cognitive Impairment

PLIÉ-CLC VA Skilled Nursing Implementation Study
Advanced Dementia Complex Behavior

UCSF

Neuroimaging MOTION Study
Mild Cognitive Impairment

2015 2020 2025

PLIÉ-VA Efficacy Study
Mild to Moderate Dementia

PLIÉ-CLC VA Skilled Nursing Facility Clinical Demonstration
Advanced Dementia Complex Behavior

Moving Together Proof of Concept Pilot Study
Mild to Moderate Dementia
SBIR·STTR America's Seed Fund
NIH National Institute on Aging

Moving Together Efficacy Study
Mild Dementia or Cognitive Impairment
SBIR·STTR America's Seed Fund
NIH National Institute on Aging

Brain Health Together Efficacy Study
Subjective Cognitive Decline or Mild Cognitive Impairment
NIH National Institute on Aging
SBIR·STTR America's Seed Fund

2024 International Congress on Integrative Medicine & Health

SBIR·STTR America's Seed Fund

Together SENIOR HEALTH UCSF

MT Proof of Concept Pilot

Moving Together
Proof of Concept Pilot
Mild to Moderate Dementia

SBIR·STTR America's Seed Fund | NIH National Institute on Aging

Development

Determine elements to retain & identify adaptations

- Human-Centered Design, in-home interviews (n=31)

Refinement

Refine prototype through iterative testing

- Four 12-week cycles 1-hour class 2x week (n=25)

Pilot Test

Assess feasibility & satisfaction

- Four 12-week cycles (n=29)

MT Proof of Concept: Key Findings

Innovations in mind-body research: Remote delivery of mindful movement interventions - Original Article

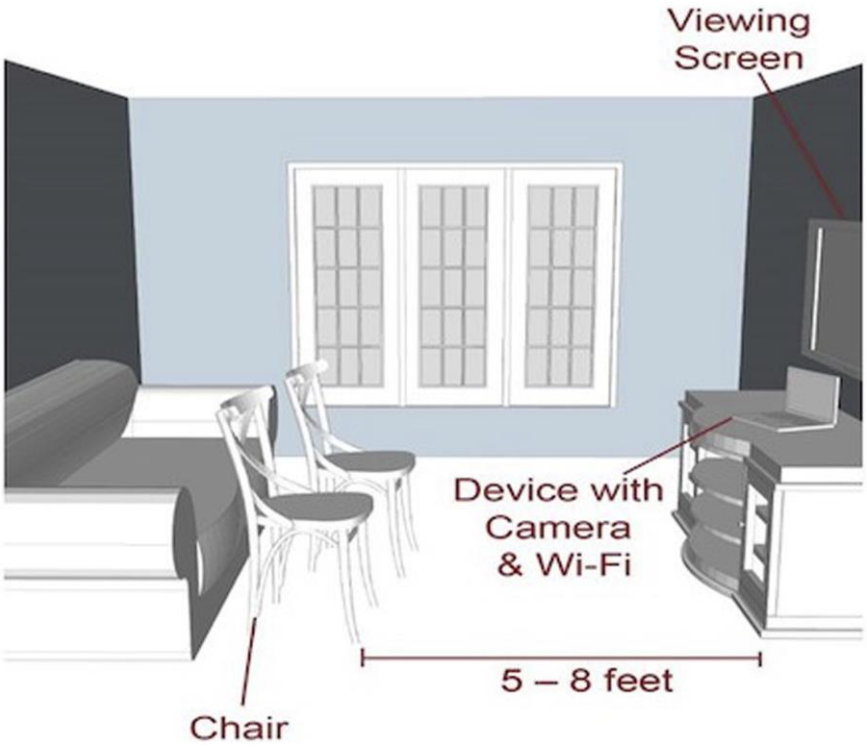
Adaptation of an In-Person Mind-Body Movement Program for People with Cognitive Impairment or Dementia and Care Partners for Online Delivery: Feasibility, Satisfaction and Participant-Reported Outcomes

Francesca M. Nicosia, PhD, C-IAYT, Jennifer A. Lee, GCFP, Margaret A. Chesney, PhD, Cynthia Benjamin, MBA, MS, Amanda N. Lee, MS, Wolf Mehling, MD, Rebecca L. Sudore, MD, and Deborah E. Barnes, PhD, MPH

- Social aspect of in-person program important to maintain
- Key refinements to technology
- Instructional strategies

Nicosia et al, GAIMH 2024

Online Program Set-up



Key Adaptations

- Tech & home set-up
- Real-time tech support
- Online program set-up

Online Program Set-up

Adaptations for Online Program Delivery

Program Component	In-person	MT Online
Goals assessment	●	●
Live classes 1hr 2x/wk for 12 weeks	●	●
Same group to participate together over time to foster social connection	●	●
Content adheres to PLIÉ Principles	●	●
Tech & home set-up assessment		●
Welcome kit		●
“Real-time” tech support		●

MT Efficacy Study

2020-2023
Moving Together Efficacy Study Mild Dementia or Cognitive Impairment
SBIR·STTR America's Seed Fund
NIH National Institute on Aging

Design: Randomized, controlled trial with waitlist control
Participants: Dyads of PWCI and CPs (n=97)

Measures (BL, 12, 24 weeks)

Primary Outcome:

- Self-rated QOL

Secondary Outcomes:

- **PWCI:** Well-being, isolation, mobility, cognitive function
- **CP:** Stress, burden, healthy days, self-efficacy, positive affect

Other: Falls, open-ended questions

Analysis

Intention-to-treat:

- Linear mixed models

Mediation:

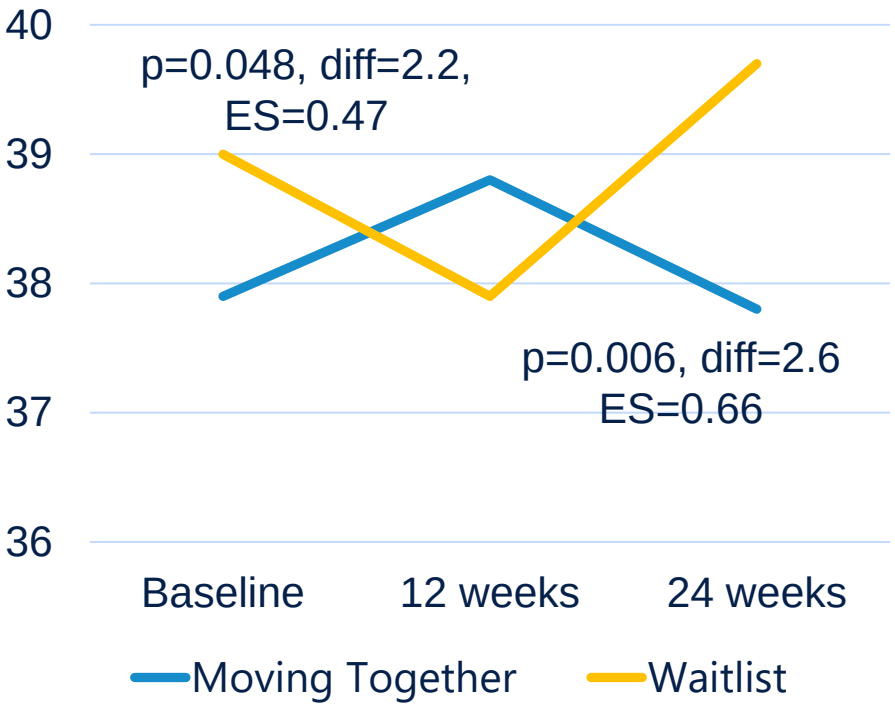
- "On" vs. "off" treatment

Qualitative:

- Content analysis

Barnes et al, TCRI 2024

Results: Quality of Life for PWCI

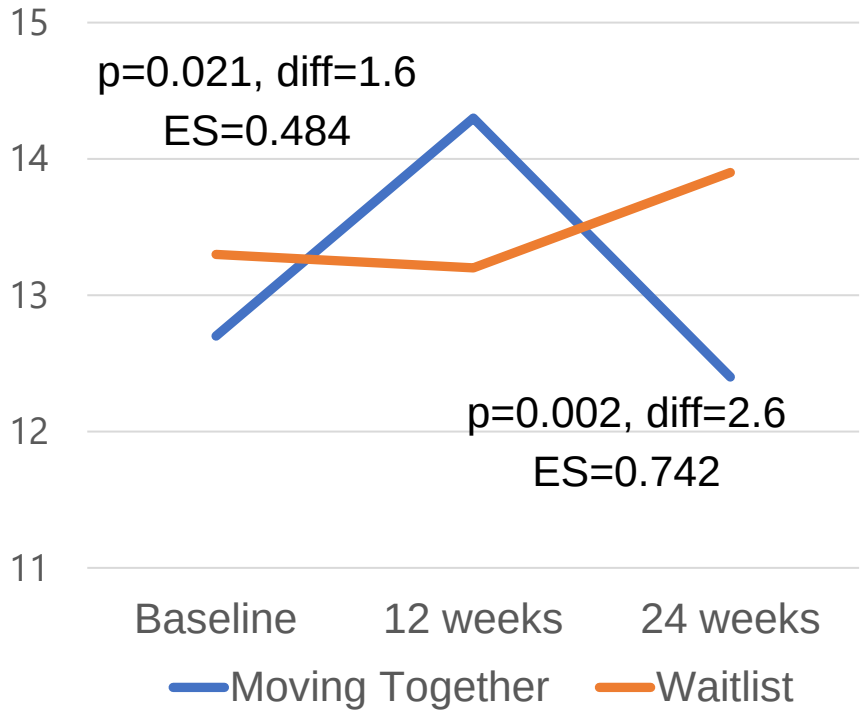


"Felt more relaxed and calm"

"Enhanced balance and freedom of movement"

"Participating as a group made me feel more connected to the world, happier, and energized"

Results: CP Ability to Manage Stress

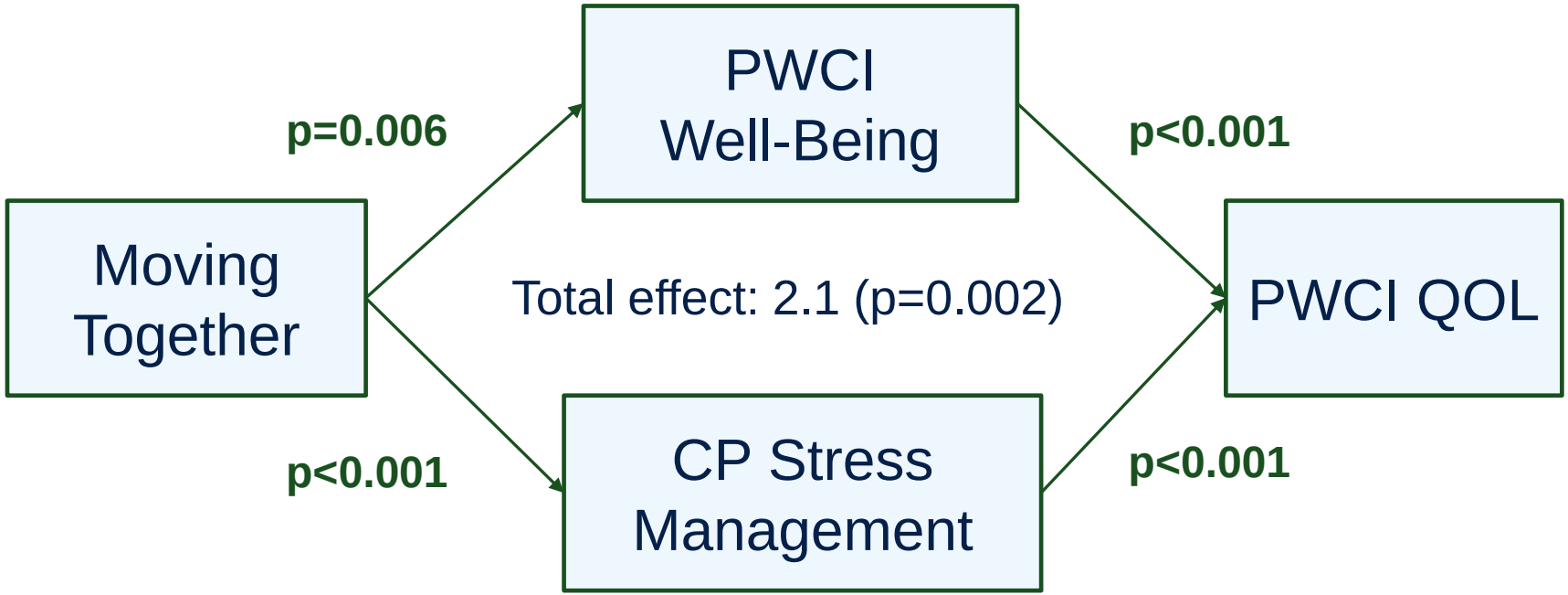


"I started using deep breathing when I was in stressful situations or when trying to fall asleep"

"Realized how important to my well-being to take time to slow down, breathe, and be aware of my body"

"I was able to use some of the techniques to help myself relax when needed"

Mechanisms of Action



Indirect through well-being: 1.1 (p=0.01)
Indirect through stress management: 0.5 (p=0.002)

Barnes et al, TCRI 2024

Thank You

PLIÉ Website
plie4dementia.com

Moving Together Website

francesca.nicosia@ucsf.edu @francescanicosia @fran_nicosia

Mindful Steps and Mind2Move:
Utilizing Web Platform and Wearable Technology

Gloria Y. Yeh, MD, MPH
Associate Professor of Medicine, Harvard Medical School
Beth Israel Deaconess Medical Center, Division of General Medicine
Director of Clinical Research, Osher Center for Integrative Health
Harvard Medical School and Brigham and Women's Hospital

Beth Israel Lahey Health

OSHER CENTER FOR INTEGRATIVE HEALTH

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Brigham and Women's Hospital

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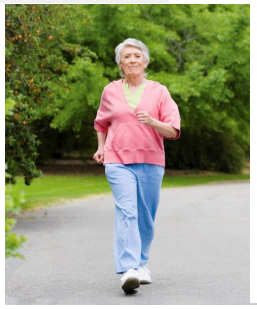
New Directions: Virtual delivery and Multi-Modal Interventions

Multi-Modal Mindful Movemen
Web Platform + Fitbit for
COPD and Heart Failure

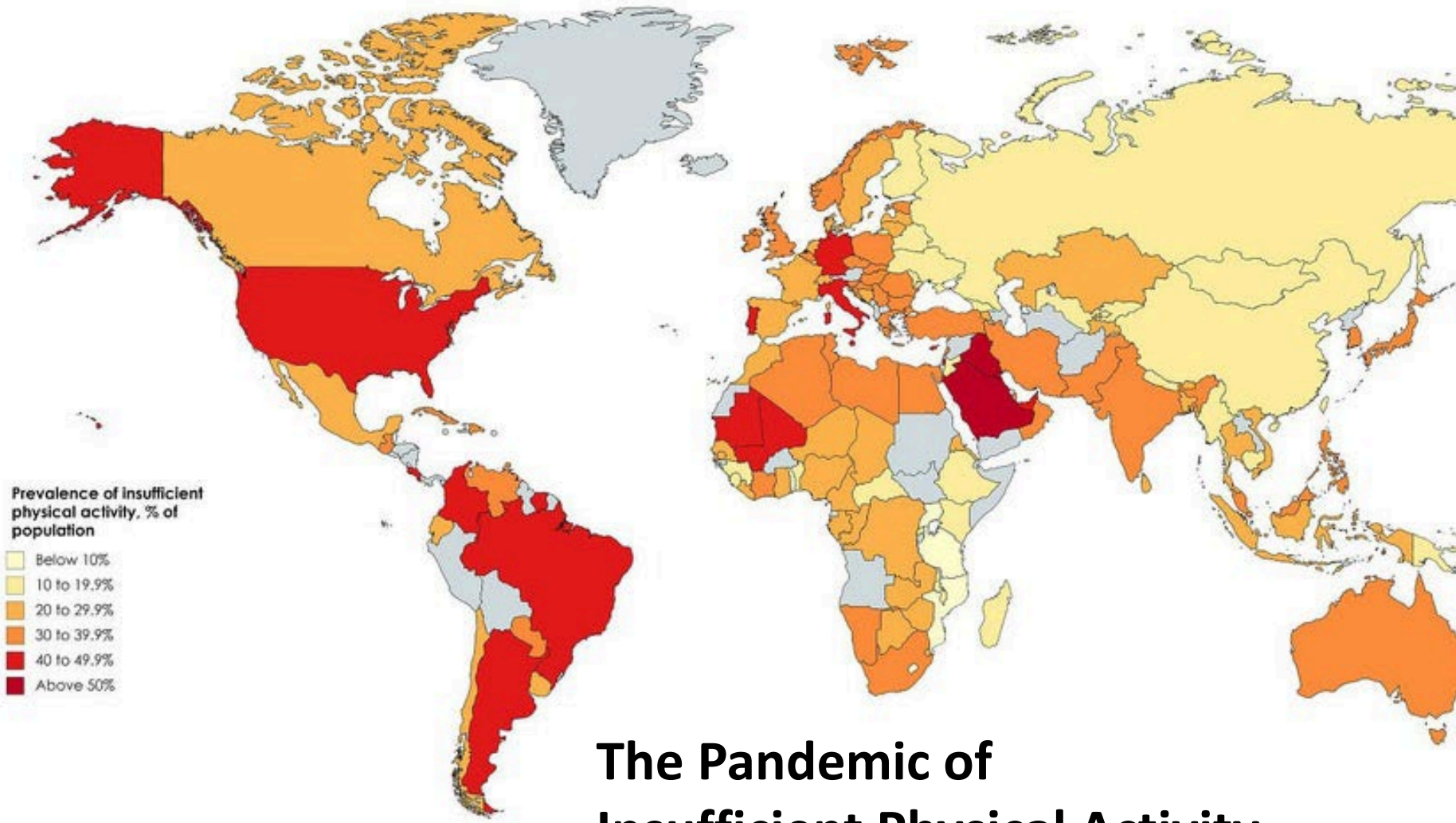
CT.gov NCT05934565

Online Tai Chi + Fitbit
after Acute Coronary
Syndrome

CT.gov NCT05699642



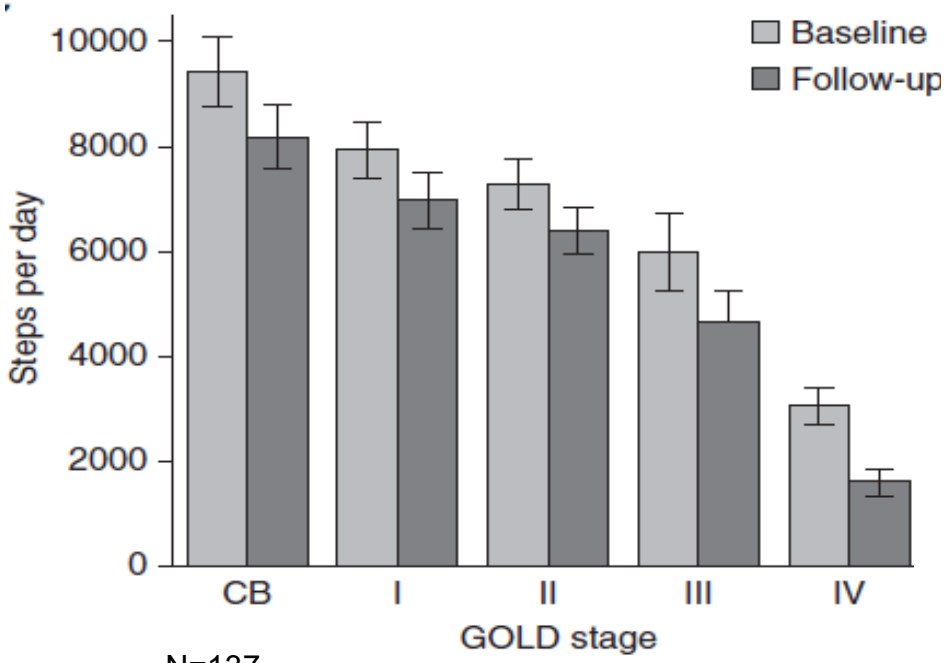
R01AT012072-01
R01AT012166-01A1
Yeh (PI) Beth Israel Deaconess Medical Center, Harvard Medical School



The Pandemic of Insufficient Physical Activity

Disease Progression and Changes in Physical Activity in Patients with Chronic Obstructive Pulmonary Disease

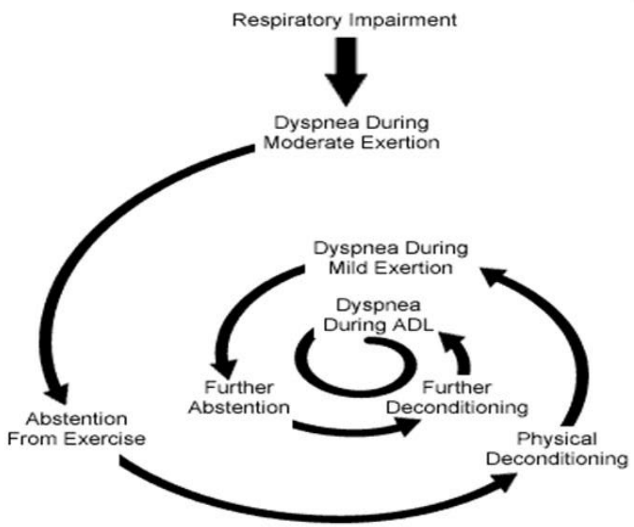
Benjamin Waschki[1,2], Anne M. Kirsten[1], Olaf Holz[3], Kai-Christian Mueller[2], Miriam Schaper[1], Anna-Lena Sack[1], Thorsten Meyer[4], Klaus F. Rabe[2], Helgo Magnussen[1], and Henrik Watz[1]



N=137

Mean annual decline
393 steps/day

Spiral of Disability



ADL = activities of daily living

Am J Resp Crit Care Med, 2015

Web-mediated tech and mHealth in clinical care and research to promote physical activity

- **Interest in remote home-based programs–**
  - Combine supervised and independent exercise with self-monitoring devices, web- based coaching
  - Many tailored approaches, combine face-to-face with scalability, increased access, potential cost effectiveness of remote intervention
- **Fast developing literature** for web interventions and wearable devices **to promote behavior change**
  - E.g., >1000 Fitbit publications
  - Socioecological models of change, impact self regulation
  - More recent approaches- online social networks, gamification, more mobile- tablets smartphones
- **Older adults** are fastest growing group of internet users

Mouton et al. Arch Pub Health 2013.

Mindful Steps v1.0

Protocol

Development of a Novel Intervention (Mindful Steps) to Promote Long-Term Walking Behavior in Chronic Cardiopulmonary Disease: Protocol for a Randomized Controlled Trial

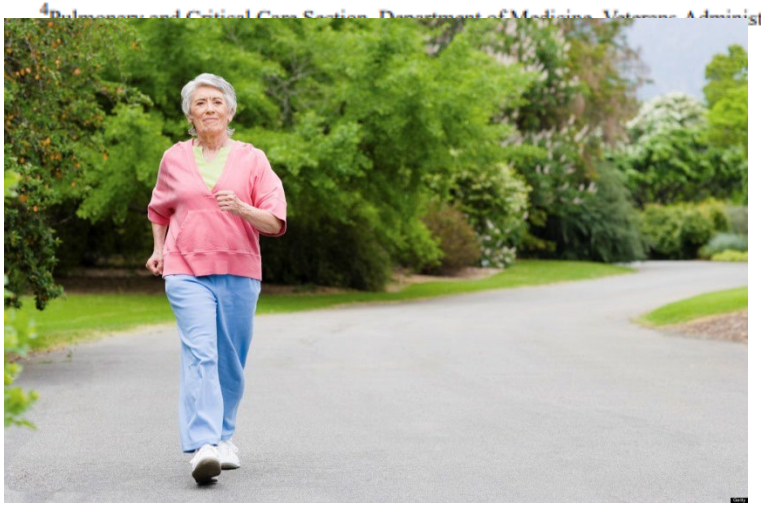
Daniel Litrownik[1], BA; Elizabeth A Gilliam[1], MA; Peter M Wayne[2], PhD; Caroline R Richardson[3], MD; Reema Kadri[3], MLIS; Pamela M Rist[2], ScD; Marilyn L Moy[4], MD, MSc; Gloria Y Yeh[1,2], MD, MPH

[1]Division of General Medicine, Department of Medicine, Beth Israel Deaconess Medical Center, Boston, MA, United States

[2]Osher Center for Integrative Medicine, Harvard Medical School and Brigham and Women's Hospital, Boston, MA, United States

[3]Department of Family Medicine, University of Michigan, Ann Arbor, MI, United States

[4]Pulmonary and Critical Care Section, Department of Medicine, Veterans Administration Boston Healthcare System, Boston, MA, United States



Litrownik, Yeh et al. JMIR Res Protocol 2021

Individualized Step Feedback (integration with Fitbit)

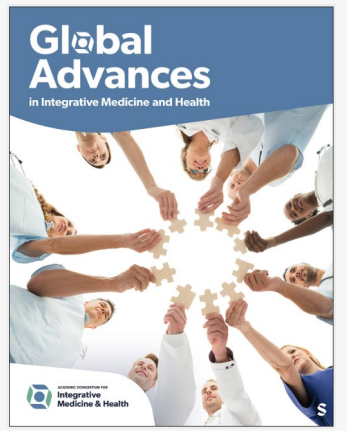
Litrownik, Yeh et al. JMIR Res Protocol 2021

Mind-Body Video Curriculum

Litrownik, Yeh et al. JMIR Res Protocol 2021

Motivational Messaging

Litrownik, Yeh et al. JMIR Res Protocol 2021



Innovations in mind-body research: Remote delivery of mindful movement interventions - Original Article

A Web-Based Mind-Body Intervention (Mindful Steps) for Promoting Walking in Chronic Cardiopulmonary Disease: Insights From a Qualitative Study

Global Advances in Integrative Medicine and Health
Volume 12: 1–14

DOI: 10.1177/27536130231212169
journals.sagepub.com/home/gam
Sage

Kristen M. Kraemer, PhD[1,2], Karen Kilgore, PhD[3], Daniel Litrownik, BA[1,4], Brianna Jean-Laurent[3], Peter M. Wayne, PhD[4], Caroline R. Richardson, MD[5], Marilyn L. Moy, MD[6,7], and Gloria Y. Yeh, MD, MPH[1,4]

Qualitative Findings

- **Most helpful**: pedometer w/ feedback, group movement classes, MB videos
- **Learned strategies** to help walking (breath regulation, body awareness, mind-body techniques, pacing)

- Cultivate more ‘internal’ reasons to walk (e.g., feel good)
- Physical, mental health benefits

- **Suggestions**: more instructions on how to make best use of website, better matching weekly video content with classes, more time for participant check-ins

Mindful Steps v2.0

R01AT012166-01A1

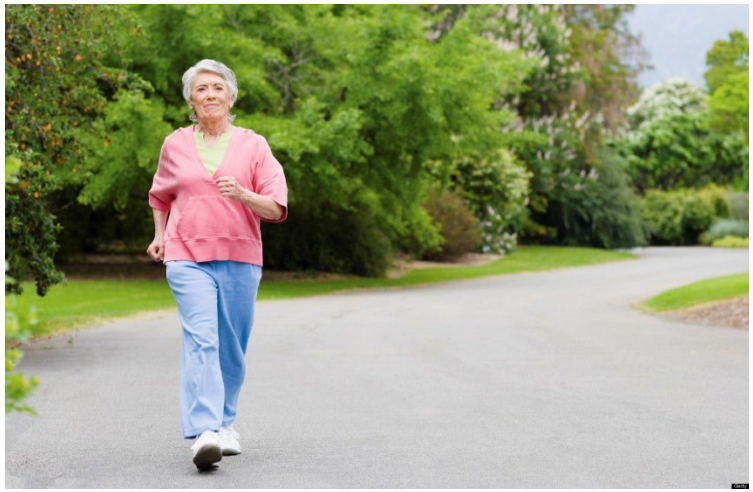
N= 136 RCT

- All Remote, National Recruitment, 12 mos

MS vs usual care

Primary outcome: daily step counts as a measure of overall PA

- Cognitive-behavioral
- Patient-centered clinical outcomes



Use of Wearable Health Trackers

- **Consumer interest**- 30% of US adults regularly use 'wearables' in 2020, estimated exponential growth by 25% annually thru 2026
- **Research interest**- Published studies of noninvasive, consumer-grade wearables increased by 400% from 2016 to 2020
  - Wide spectrum of research across mental and physical health
- **Enabled by tech advances**: many devices include
  - Accelerometers, gyroscopes
  - Photoplethysmography
  - Electrodermal activity
  - Thermometer
  - GPS
  - Connected apps and external-linked software

Roos and Slavitch. Brain Behav Immun 2023

Common metrics available in wearables

PHYSIOLOGICAL

Heart rate – resting
Heart rate – reactive (e.g., during a logged exercise)
Heart rate variability (typically overnight)
Blood pressure
Respiration rate
Blood oxygen saturation (SpO_2)
ECG
Skin temperature
EDA/galvanic skin response/skin conductance

BEHAVIORAL- PHYSICAL ACTIVITY

Step count
Physical activity types
Physical activity duration
Metabolic equivalent for the task or minutes spent in "heart rate zones"
Sedentary behavior (e.g., total time spent sitting, sitting events, number of periods of prolonged sitting time)

BEHAVIORAL- SLEEP

Total sleep time
Sleep efficiency
Sleep onset latency
Wake after sleep onset
Sleep stages
Time in bed

BEHAVIORAL- LOCATION

Location variability
Distance traveled
Time spent at home and/or work

Roos and Slavitch. Brain Behav Immun 2023

Important Considerations for Using Wearables in Research

- **"Objective"– BUT many subjective components**

  E.g., decisions in algorithm development that affect numbers, interpretation of data

- **Choice of device– If not 'research grade' then Consumer Comes First**
  - Companies balance/sacrifice data quality for other priorities- battery life, interface, screen quality, etc.
  - Internal validity/external validity of the device and metrics collected?
  - Access to raw, unfiltered data- most don't provide

Roos and Slavitch. Brain Behav Immun 2023

Important Considerations for Using Wearables in Research

- **Market forces and availability of the device**
  - Fitbit→ Google
- **Diversity and equity**
  - Cost, access
  - Skin color and body type/weight affecting sensors
- **Confidentiality and privacy**- Who owns the data
- **Plan for adequate research staff** to troubleshoot and provide tech support

Roos and Slavitch. Brain Behav Immun 2023

Thank you!

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Gloria Y. Yeh, MD, MPH
Associate Professor of Medicine, Harvard Medical School
Beth Israel Deaconess Medical Center, Division of General Medicine
Director of Clinical Research, Osher Center for Integrative Health
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HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Remote Delivery of Mindful Movement for Health Care Professionals

Mindfulness in Motion

Maryanna D. Klatt. Ph.D.
Director, Center for Integrative Health
Professor, Family and Community Medicine
The Ohio State University, College of Medicine

A Multi-Modal Intervention Delivered Virtually-Once a Week

Mindfulness in Motion

From in Person to Fully Virtual

2004

8 Week MIM Program

2008-2017

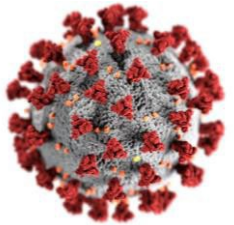
Research: Significant improvements in burnout, stress, resilience, work engagement

2019

Scale ⟶ Trained 28 Facilitators

2020

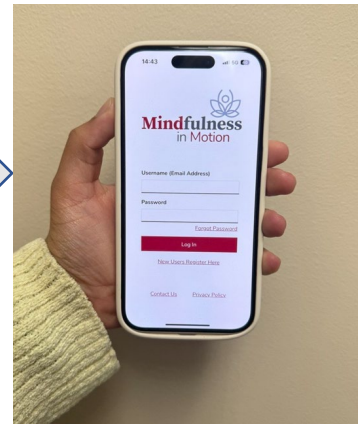
MIM results are sustainable beyond a year



2021-2022

Fully virtual delivery is as effective

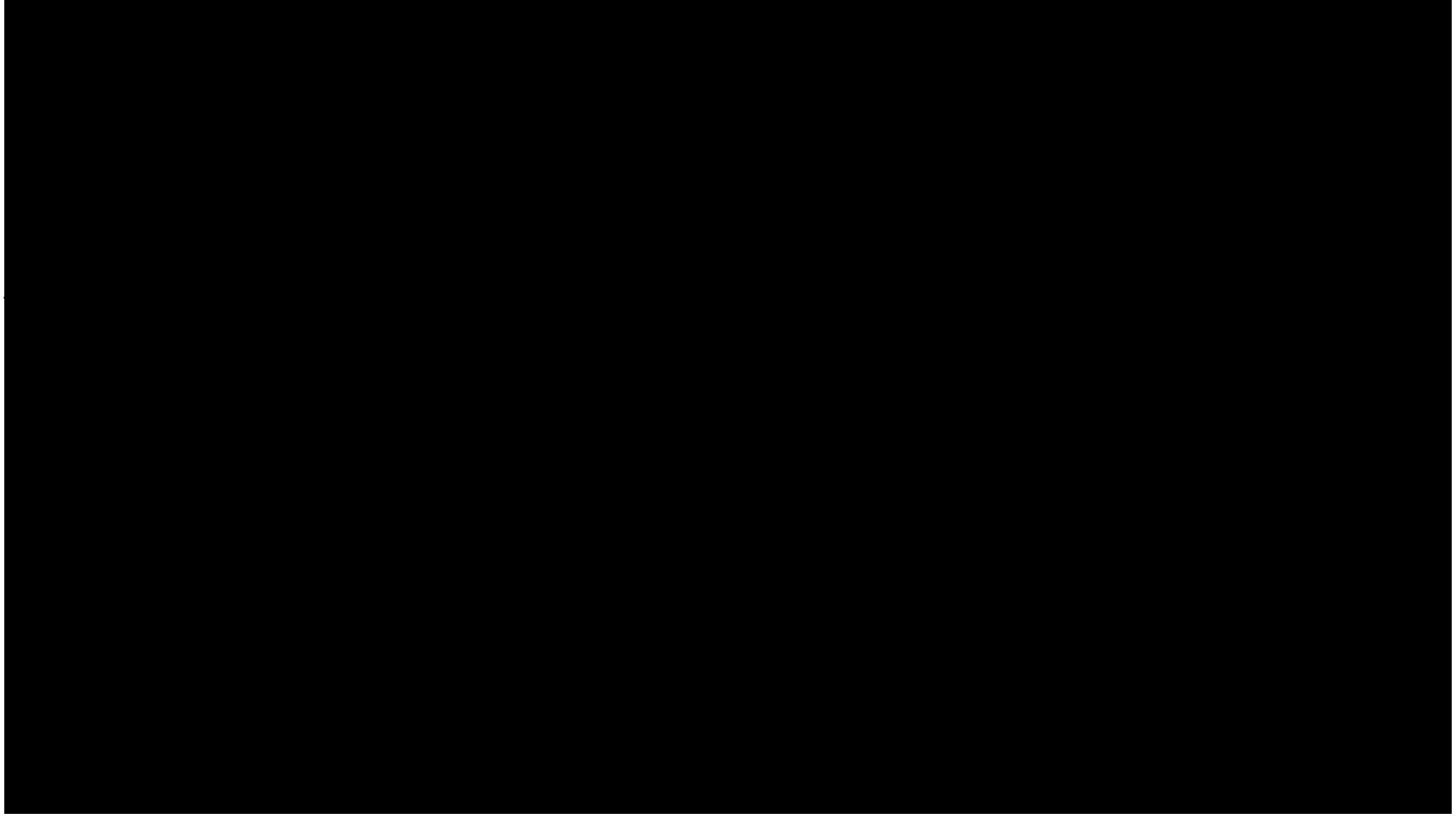
Spread health systems/ corporations



References on all studies: https://www.ncbi.nlm.nih.gov/myncbi/1VWK7hiovdckt/bibliography/public/

The Ohio State University
Wexner Medical Center

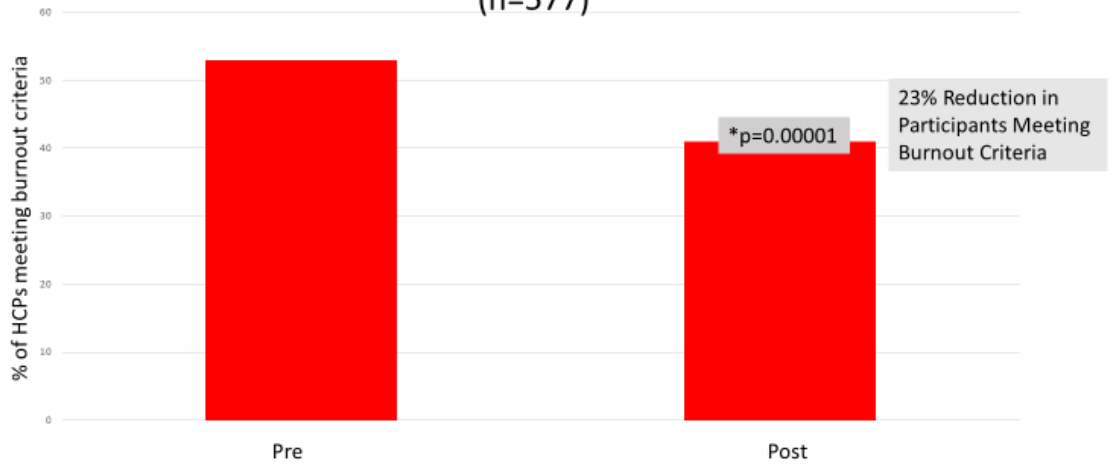
How to conduct the Mindful Movement pieces remotely and still create community?



Mindfulness in Motion

The Ohio State University
Wexner Medical Center

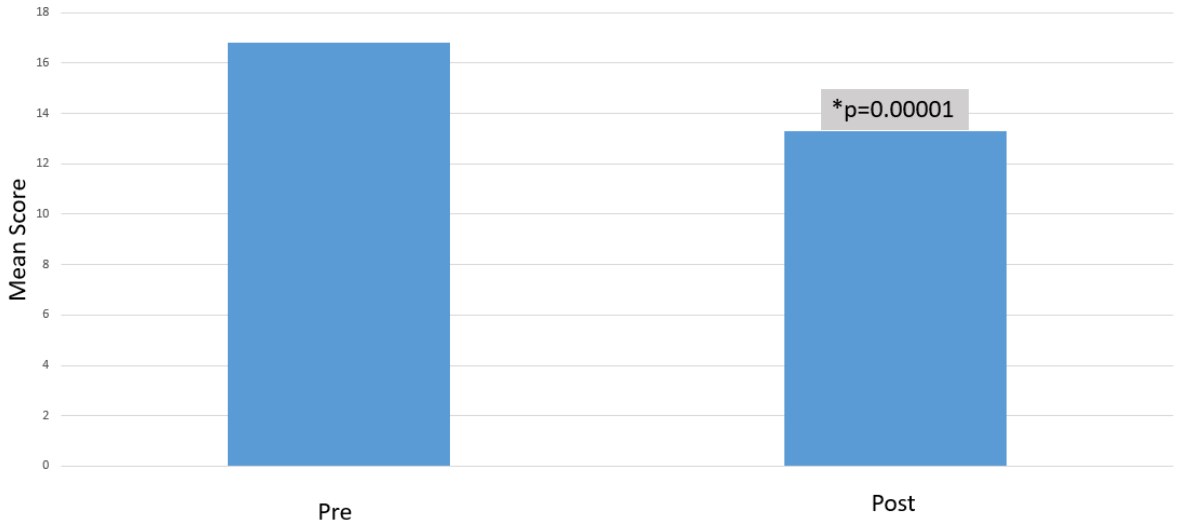
Maslach Burnout Inventory (MBI) Scores:
(n=577)



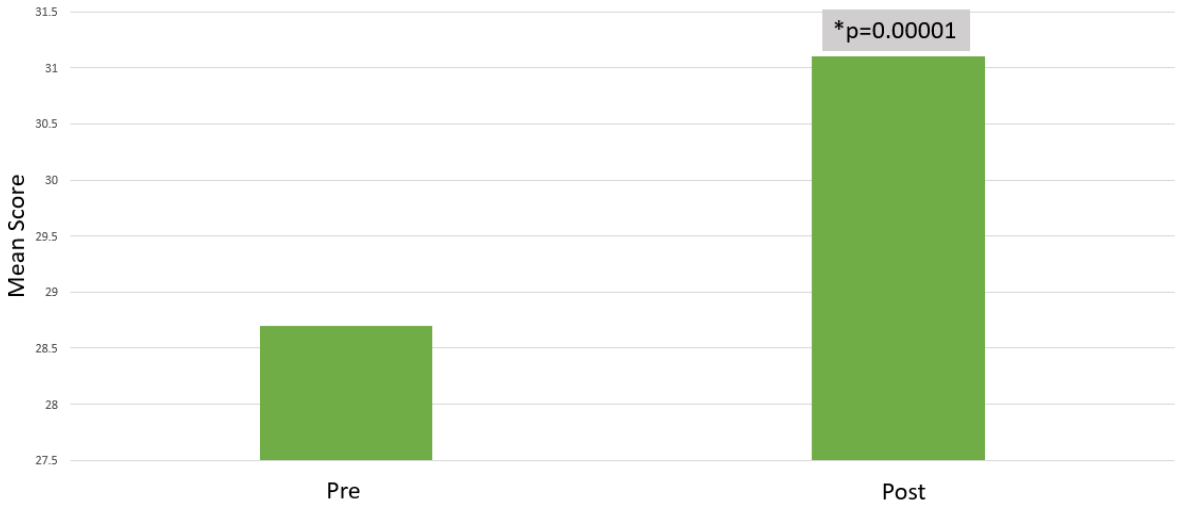
Burnout Criteria:
EE>27 or DP>13 or PA<31

*denotes significant p value, p<0.05

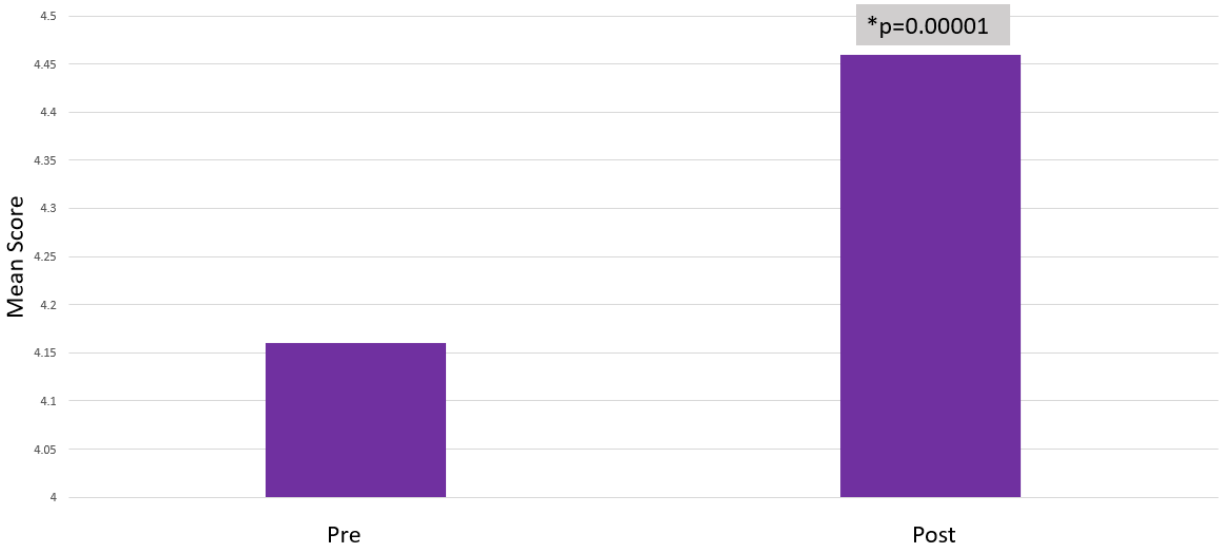
Perceived Stress Scale (PSS) Scores:
(n=577)



Connor-Davidson Resilience Scale (CDRS) Scores:
(n=577)



Utretch Work Engagement Scale (UWES) Scores:
(n=577)



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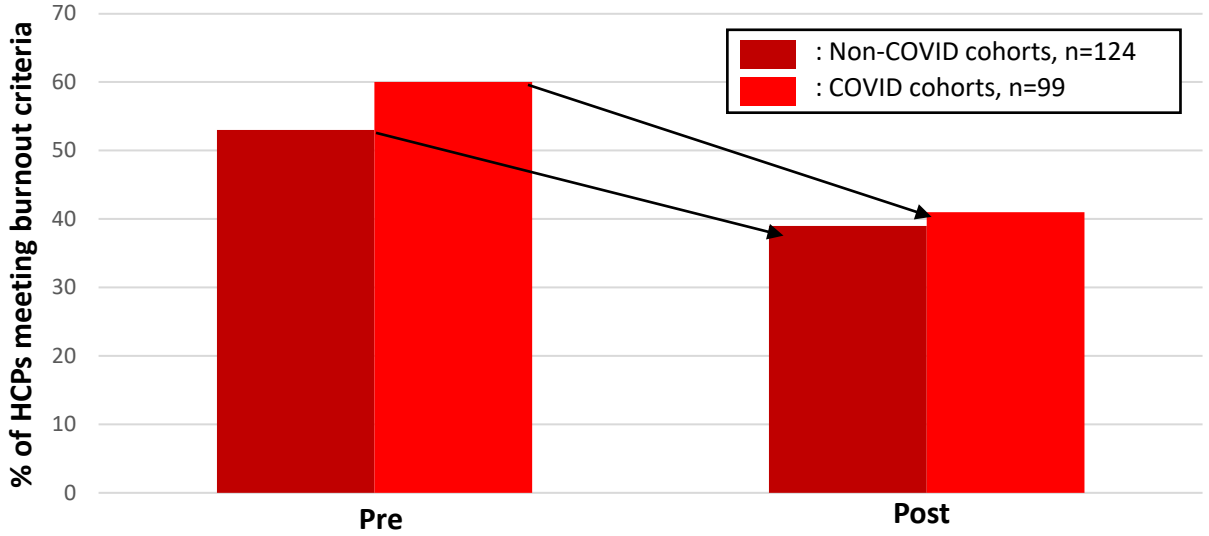
WEXNER MEDICAL CENTER

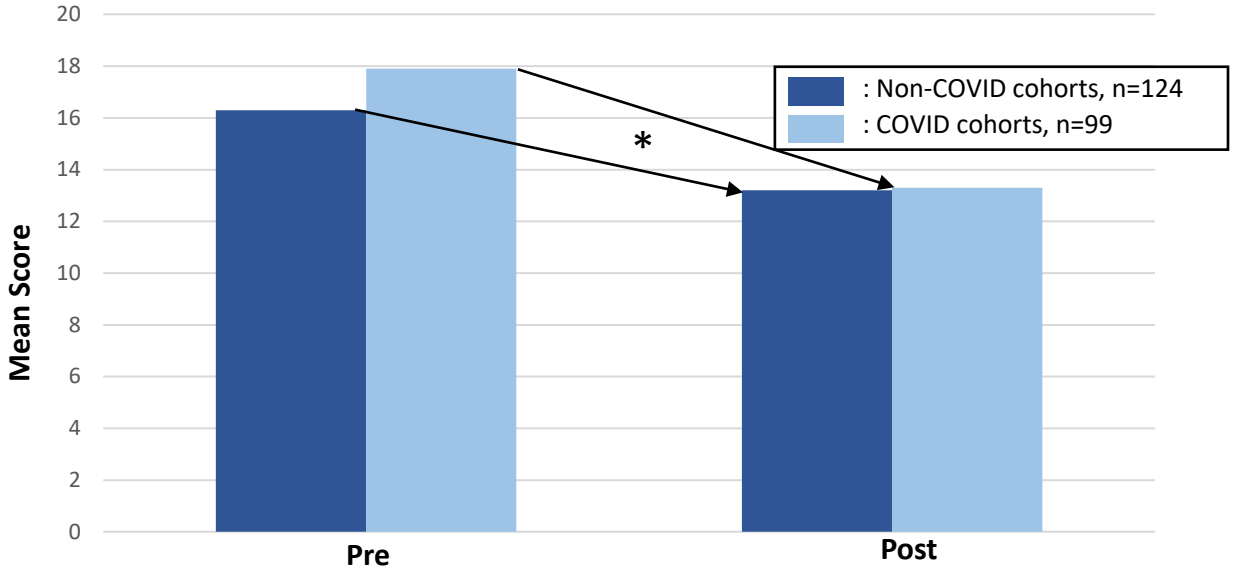
Maslach Burnout Inventory (MBI) Scores:

Non-COVID cohorts vs. COVID cohorts



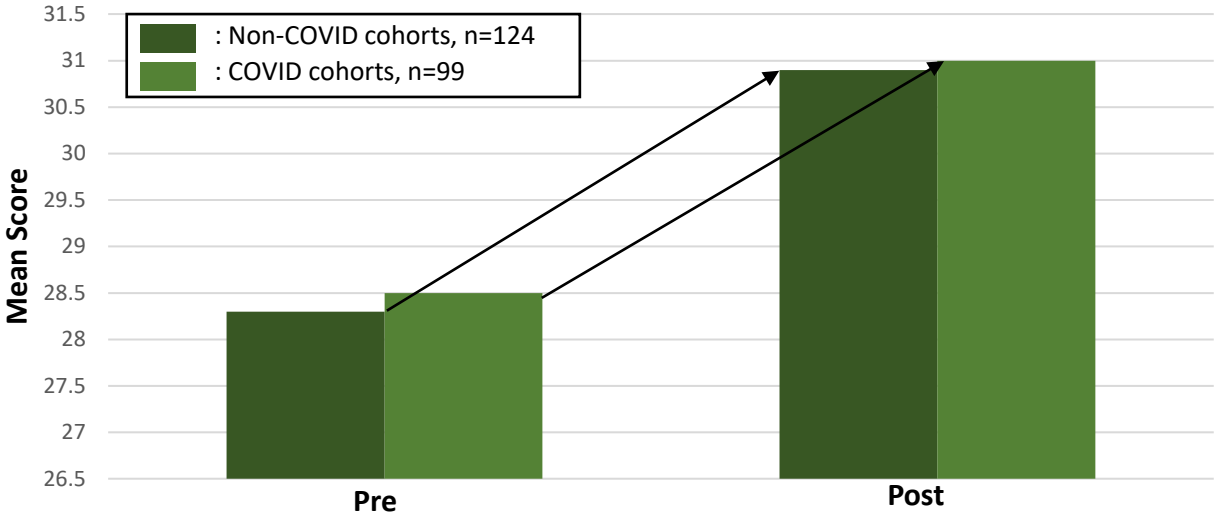
Perceived Stress Scale (PSS) Scores:

Non-COVID cohorts vs. COVID cohorts



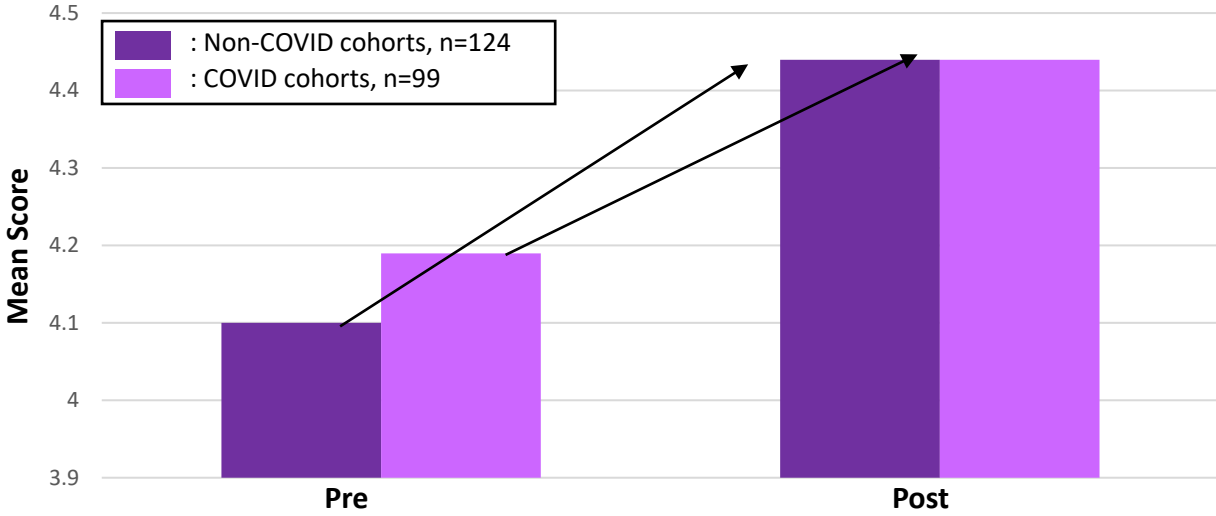
Connor-Davidson Resilience Scale (CDRS) Scores:

Non COVID cohort vs. COVID cohort



Utretch Work Engagement Scale (UWES) Scores:

Non-COVID cohort vs. COVID cohort



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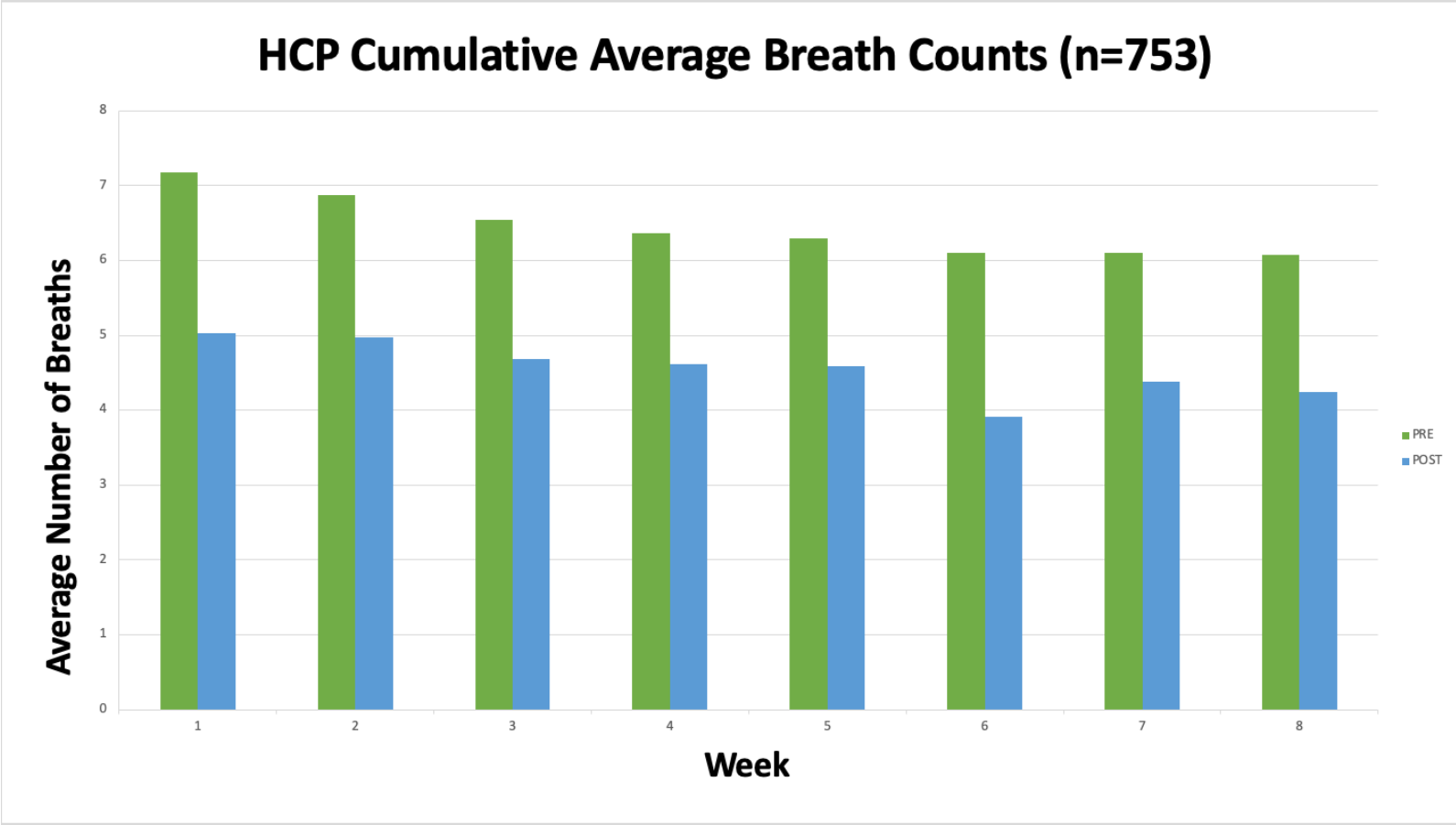
From 2004- 2024:



My assumptions:

1. Showing participants their own data encourages buy in.
2. Having participants take their own respiration rates kept them tuned into the connection between mind/body.

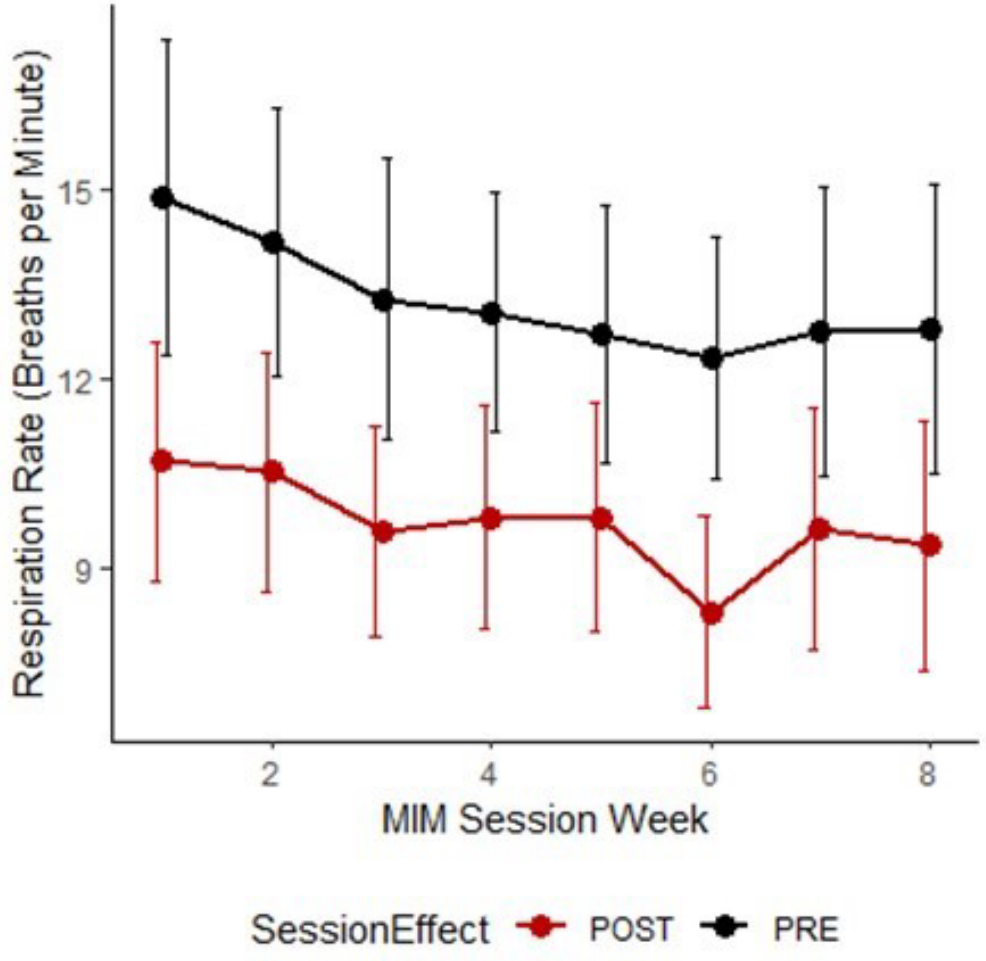
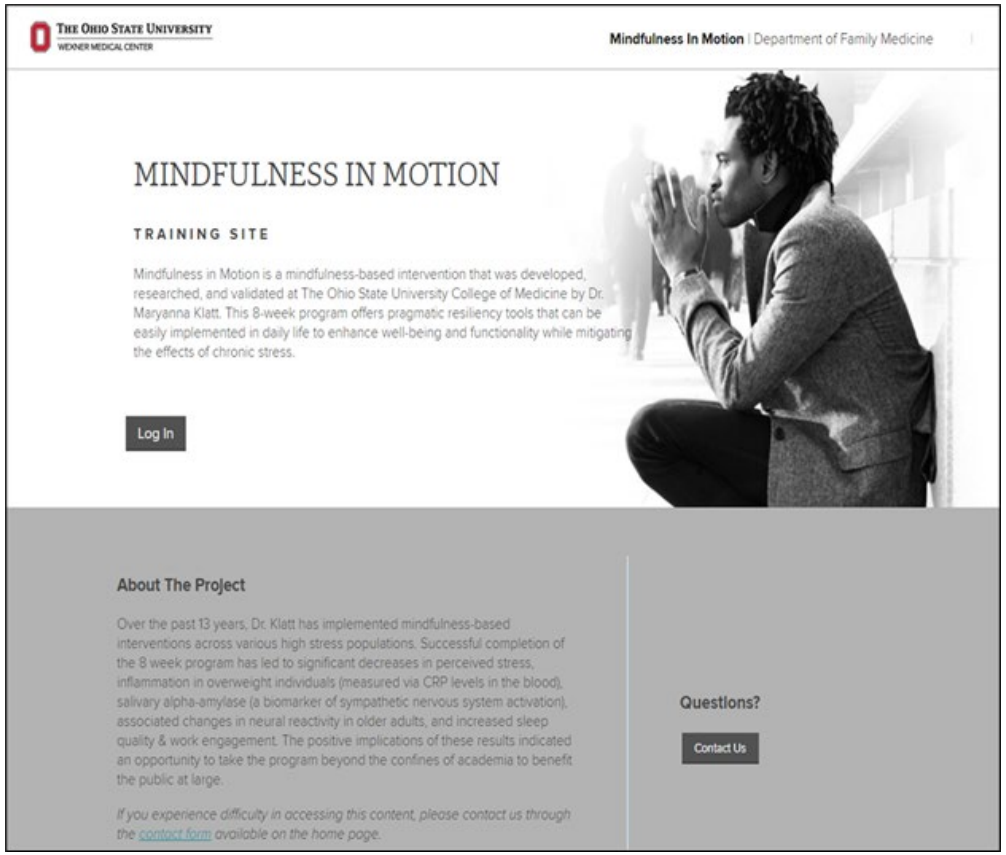


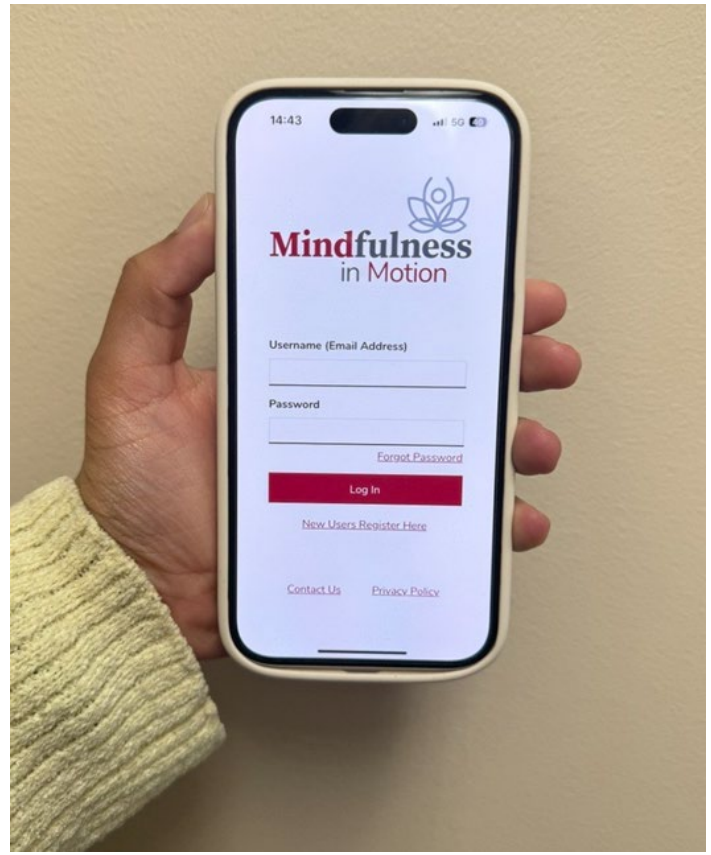
Figure 2. (n=275 fully virtual) Respiration rates per minute across each week at the start (PRE) and end (POST) of Mindfulness in Motion (MIM) sessions.

Merrigan, J. J., Quatman-Yates, C., Caputo, J., Daniel, K., Briones, N., Sen, I., ... & Klatt, M. (2023). Assessment of Virtual Mindfulness-Based Training for Health Care Professionals: Improved Self-Reported Respiration Rates, Perceived Stress, and Resilience. Global Advances in Integrative Medicine and Health, 12, 27536130231187636.

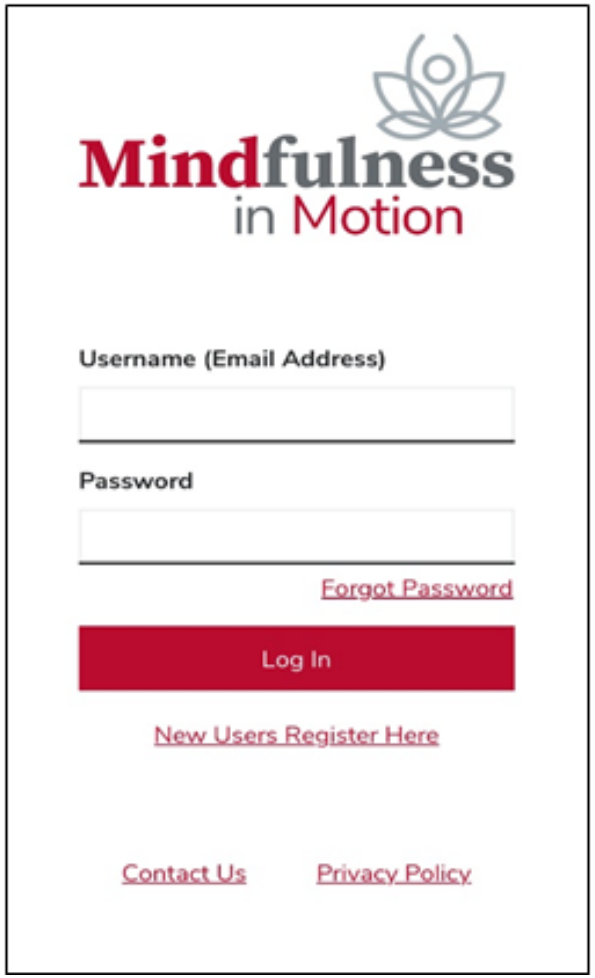
Improvement Requested for years

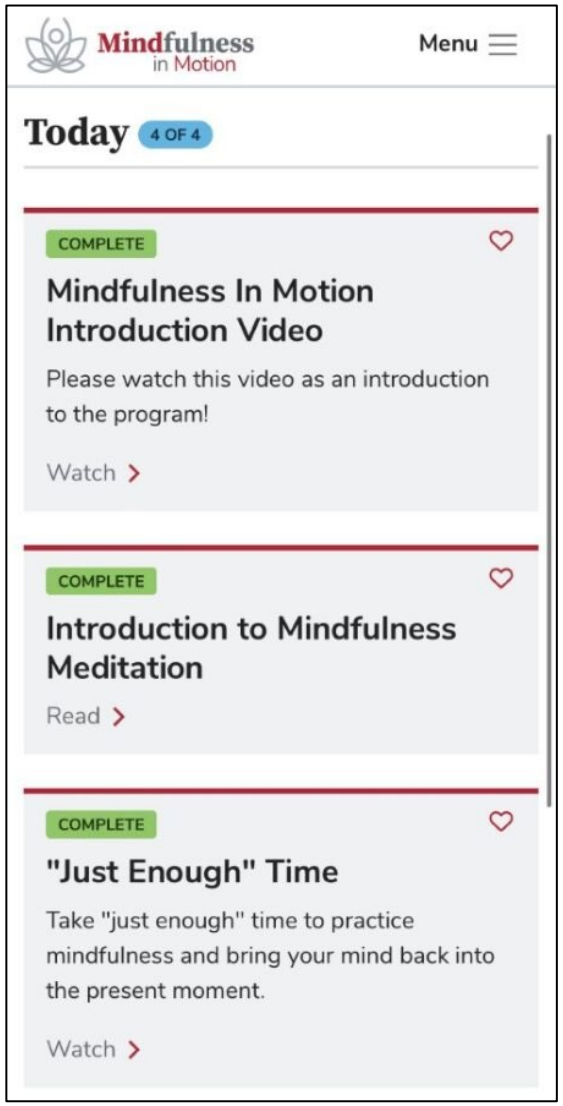
Mobile App for practice “On-the-go”

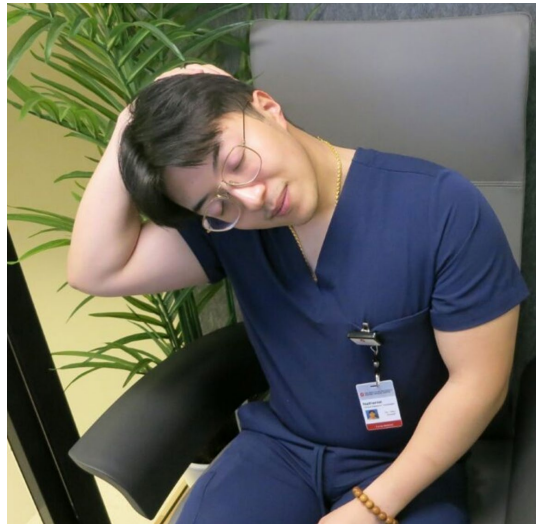




Program Includes a Mobile App With Practices for the Healthcare Professionals







HCP MINDFULNESS APP USAGE (n=47 from Autumn 24)

Mindfulness in Motion

Total Hours of Individual HCP Engagement via Mobile App

107.3 Hours

Total Video Views via Mobile App

1343 views

TOP THREE VIDEOS WATCHED VIDEOS

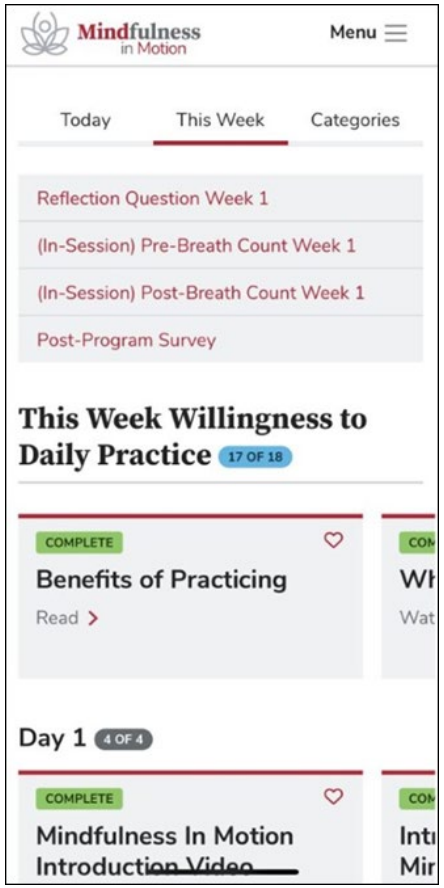
1) Guided Meditation: Strength of the Mountain (20 min) (5.8 hours)

2) Clarity and Release (10 min) (5.2 hours)

3) Movement Through Balance - 20 min (3.3 hours)

***Average length of each video is 4.2 minutes. Average watch time per individual is 2.28 hours.**

In between patient visits, I take my breath count. It makes me aware if I'm anxious or relaxed. I think my patients are benefiting from my mindfulness practice.



Lessons learned and remaining questions- Thank you!

Murdoch University

Centre for Molecular Medicine + Innovative Therapeutics

JOINT RESEARCH WITH THE PERRON INSTITUTE

Remote Delivery of Yoga for Mental Health and Remote Heart Rate Variability Collection

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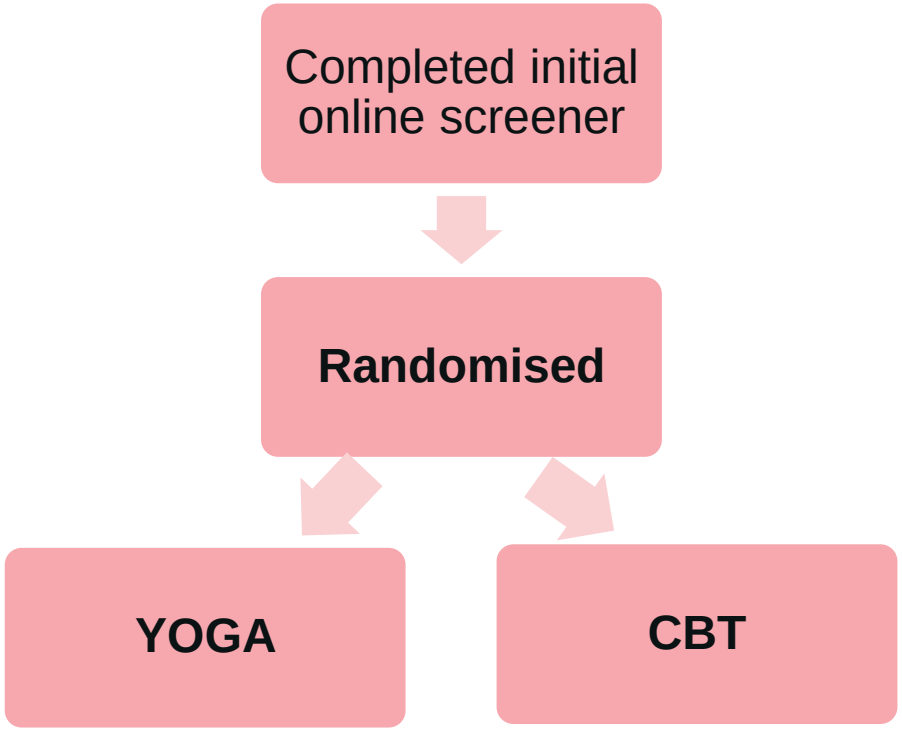
JOINT RESEARCH WITH THE PERRON INSTITUTE

GOVERNMENT OF WESTERN AUSTRALIA

Department of Jobs, Tourism, Science and Innovation

DEFENCE SCIENCE CENTRE WESTERN AUSTRALIA

Yoga vs. CBT for Transdiagnostic Emotional Disorders



ACTRN12622000544774

How **and** ***for whom*** **does Yoga improve mental health difficulties?**

HRV improves with Yoga but not CBT

Mathersul et al. BMC Psychiatry (2022) 22:268
https://doi.org/10.1186/s12888-022-03886-3

BMC Psychiatry

RESEARCH Open Access

Emotion dysregulation and heart rate variability improve in US veterans undergoing treatment for posttraumatic stress disorder: Secondary exploratory analyses from a randomised controlled trial

Danielle C. Mathersul[1,2,3,4*], Kamini Dixit[1], R. Jay Schulz-Heik[1], Timothy J. Avery[1,2,5], Jamie M. Zeitzer[2,6] and Peter J. Bayley[1,2]

Baseline HRV identifies who responds best to Yoga or CBT

frontiers | Frontiers in Psychiatry

TYPE Original Research
PUBLISHED 08 February 2024
DOI 10.3389/fpsyt.2024.1331569

OPEN ACCESS

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Emotion regulation and heart rate variability may identify the optimal posttraumatic stress disorder treatment: analyses from a randomized controlled trial

Danielle C. Mathersul[1,2,3*], Jamie M. Zeitzer[4,5], R. Jay Schulz-Heik[3†], Timothy J. Avery[3†] and Peter J. Bayley[3,4]

Tips & Tricks for Remote HRV Collection

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- Pre-activated
- Reply-paid padded envelopes
- Infographic card
- Emailed instructions

Pros & Cons of Remote HRV Collection

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Cons

- Not returned (or missing)
- Recording during mail time
- Participant adherence
- Adverse reaction to ECG stickers
- RCT design-specific cons

Pros

- Low resource intensive
- Raw data accessibility
- Increased scope
- Long battery life