MINDFULNESS-BASED STRESS REDUCTION AND INFLAMMATORY DYNAMICS AMONG LONELY OLDER ADULTS: A RANDOMIZED CONTROLLED TRIAL

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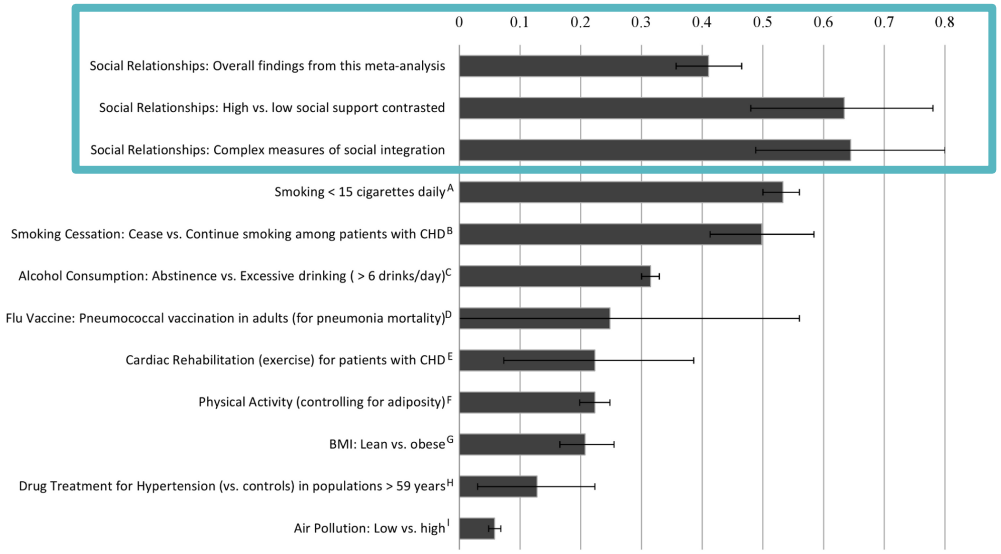
SOCIAL FACTORS & HEALTH

Social isolation is a robust risk factor for poor health and early mortality *(Holt-Lunstad et al., 2010, 2015)*



Loneliness may accelerate age-related declines in immune function *(Hawkley & Cacioppo, 2004, 2010)*

MINDFULNESS INTERVENTIONS

Mindfulness interventions show promise for…

- Reducing loneliness
  - *(Creswell et al., 2012; Lindsay et al., 2019)*
- Improving a variety of physical health outcomes
  - *(Creswell, Lindsay et al., 2019)*

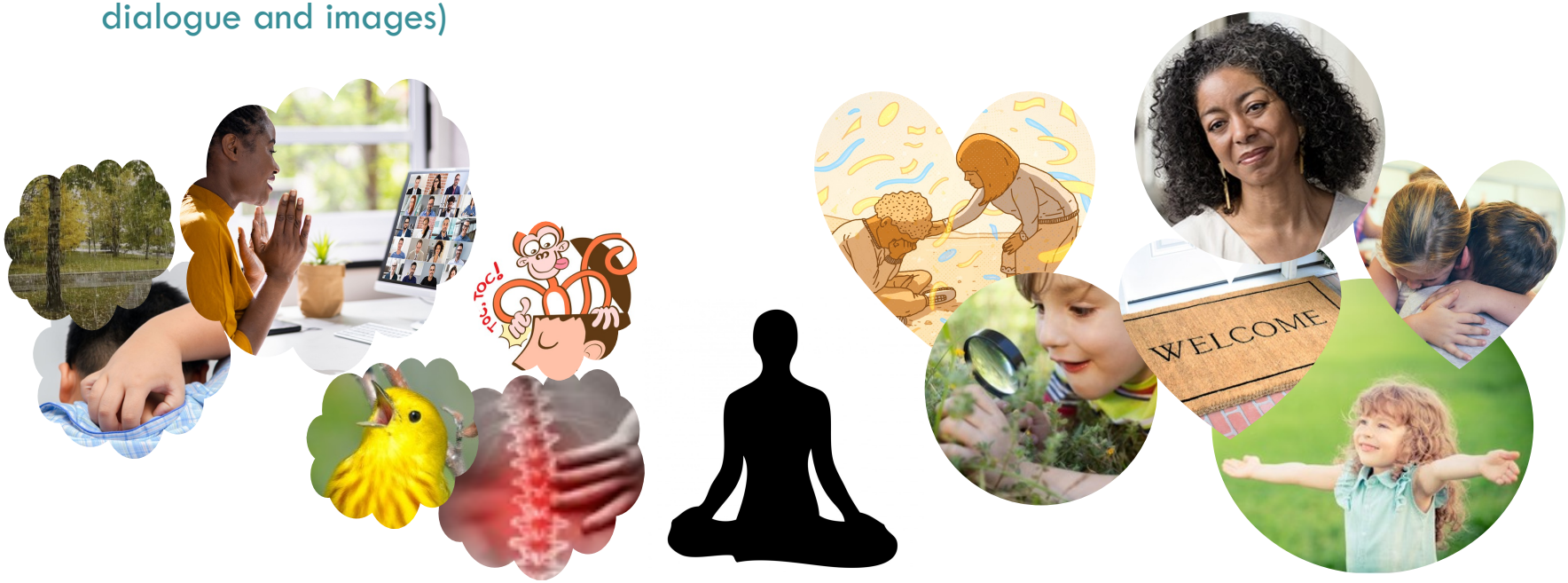
MINDFULNESS MEDITATION

(1) ***monitoring*** present-moment experiences

ongoing awareness of present-moment sensory experiences (e.g., sounds in the environment, body sensations, mental dialogue and images)

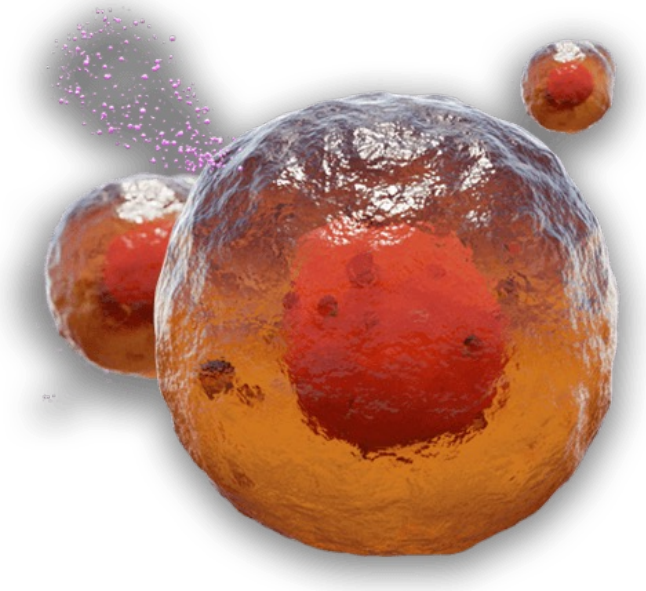
(2) with an orientation of ***acceptance***

attitude of openness, receptivity, and equanimity toward momentary experiences



MINDFULNESS FOR HEALTHY AGING

Does mindfulness training alter immune pathways linking stress with accelerated aging?

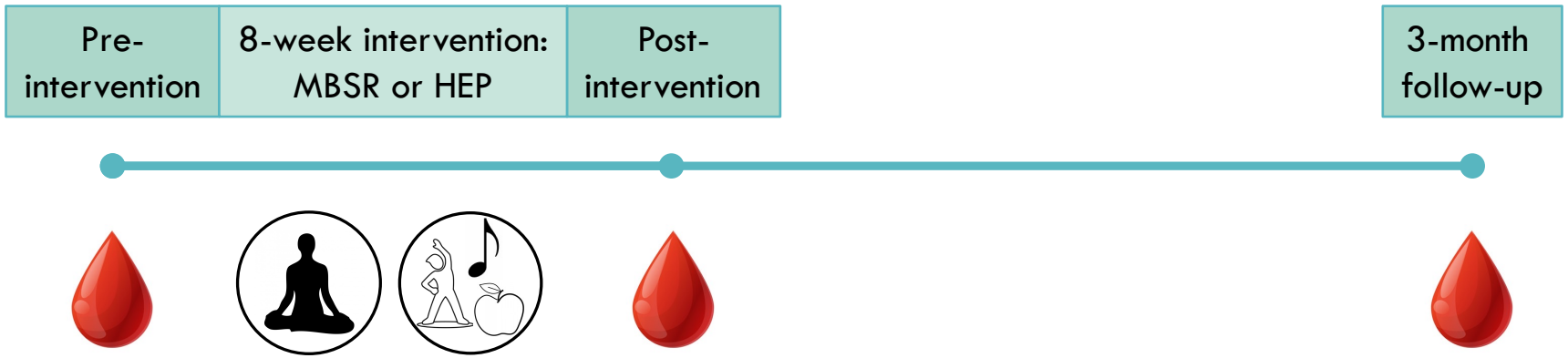


STUDY OVERVIEW

Does mindfulness training impact immune pathways underlying health risk among lonely older adults?

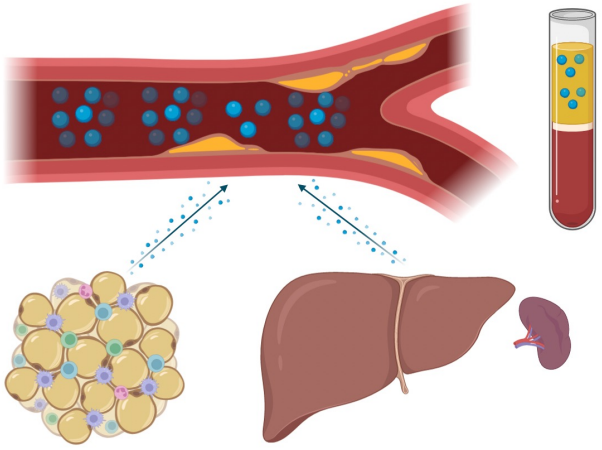
Participants

- N=190 lonely older adults (ages 65-85 years)
  - Mean age: 70 years
  - 78% female
  - 85% white, 12% Black, 1% Asian, 3% multi-racial
- Randomized to 8-week Mindfulness-Based Stress Reduction (MBSR) or matched Health Enhancement Program (HEP)

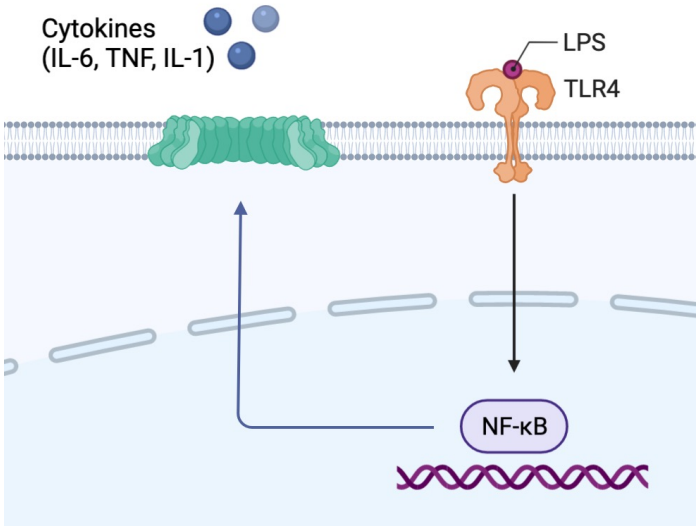


IMMUNE PATHWAYS

1. **Inflammatory biomarkers IL-6 and CRP**
   - Circulating markers of systemic inflammation
   - Loneliness accelerates with “inflammaging”
   - Assessment:
     - Measure circulating IL-6 and CRP in plasma



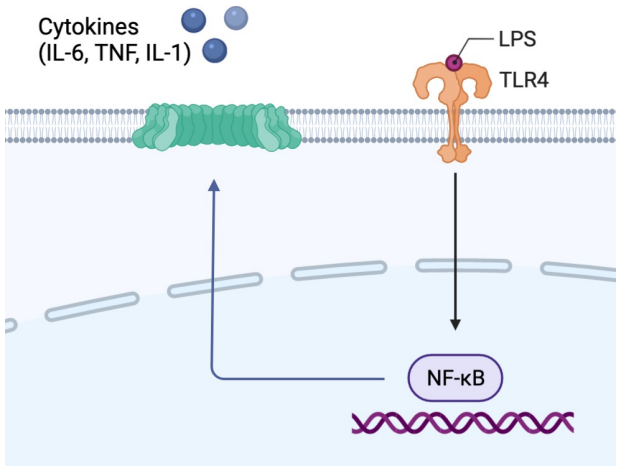
2. **NF-κB gene expression**
   - Intracellular signaling pathway
   - Loneliness upregulates expression of proinflammatory genes transcribed by NF-κB
   - Assessment:
     - Isolate PBMCs and extract RNA
     - Differential gene expression change by condition
     - Condition differences in NF-κB transcription factor activity



IMMUNE PATHWAYS

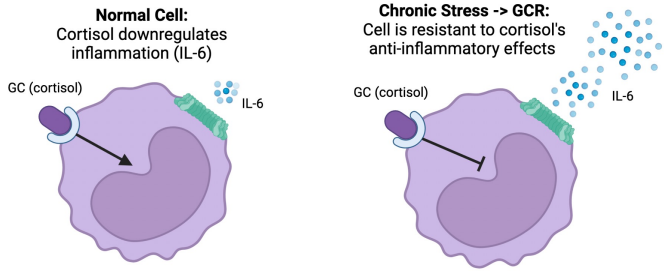
3. Innate immunocompetence

- Need a rapid and robust inflammatory response to recover from illness and injury
- Loneliness accelerates age-related declines in innate immunocompetence
- Assessment:
  - Stimulate immune cells with endotoxin
  - Measure stimulated IL-6 production



4. Glucocorticoid (GC) Sensitivity

- Acute stress activates a coordinated physiological response
  - Inflammatory response
  - Cortisol → downregulates inflammation
- Immune cells adjust to chronic social stress by decreasing GC sensitivity to cortisol
- Assessment:
  - Stimulate immune cells with endotoxin
  - Incubate with increasing concentrations of synthetic cortisol
  - Measure IL-6 production and calculate sensitivity to cortisol's anti-inflammatory effects

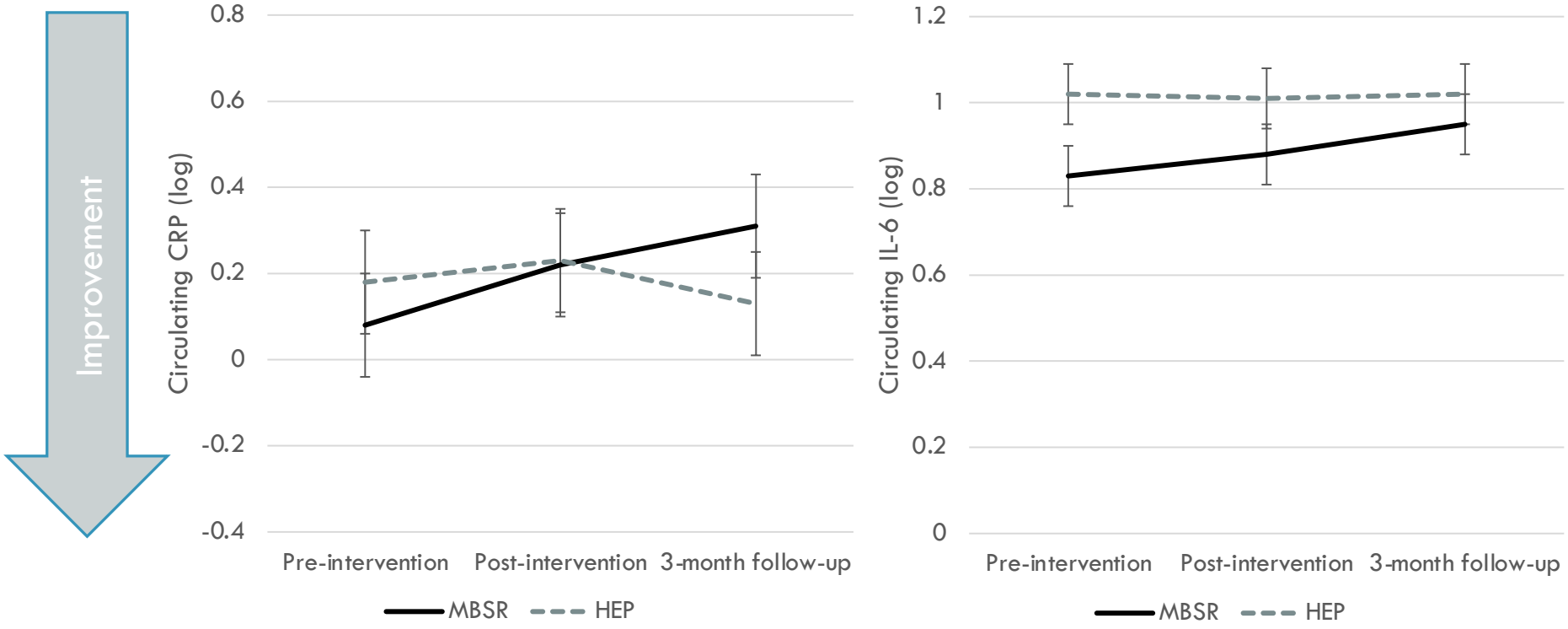


HYPOTHESES

MBSR (vs. HEP) was predicted to:

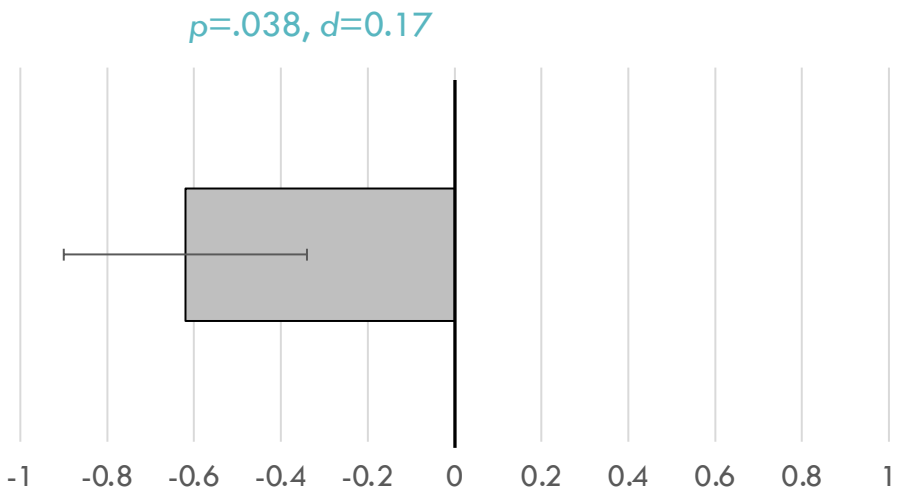
- ⬇️ inflammatory markers IL-6 and CRP
- ⬇️ proinflammatory NF-κB gene expression
- ⬆️ innate immunocompetence (stimulated IL-6 production)
- ⬆️ glucocorticoid (GC) sensitivity

INFLAMMATORY BIOMARKERS



Lindsay et al., in press, Psychosomatic Medicine

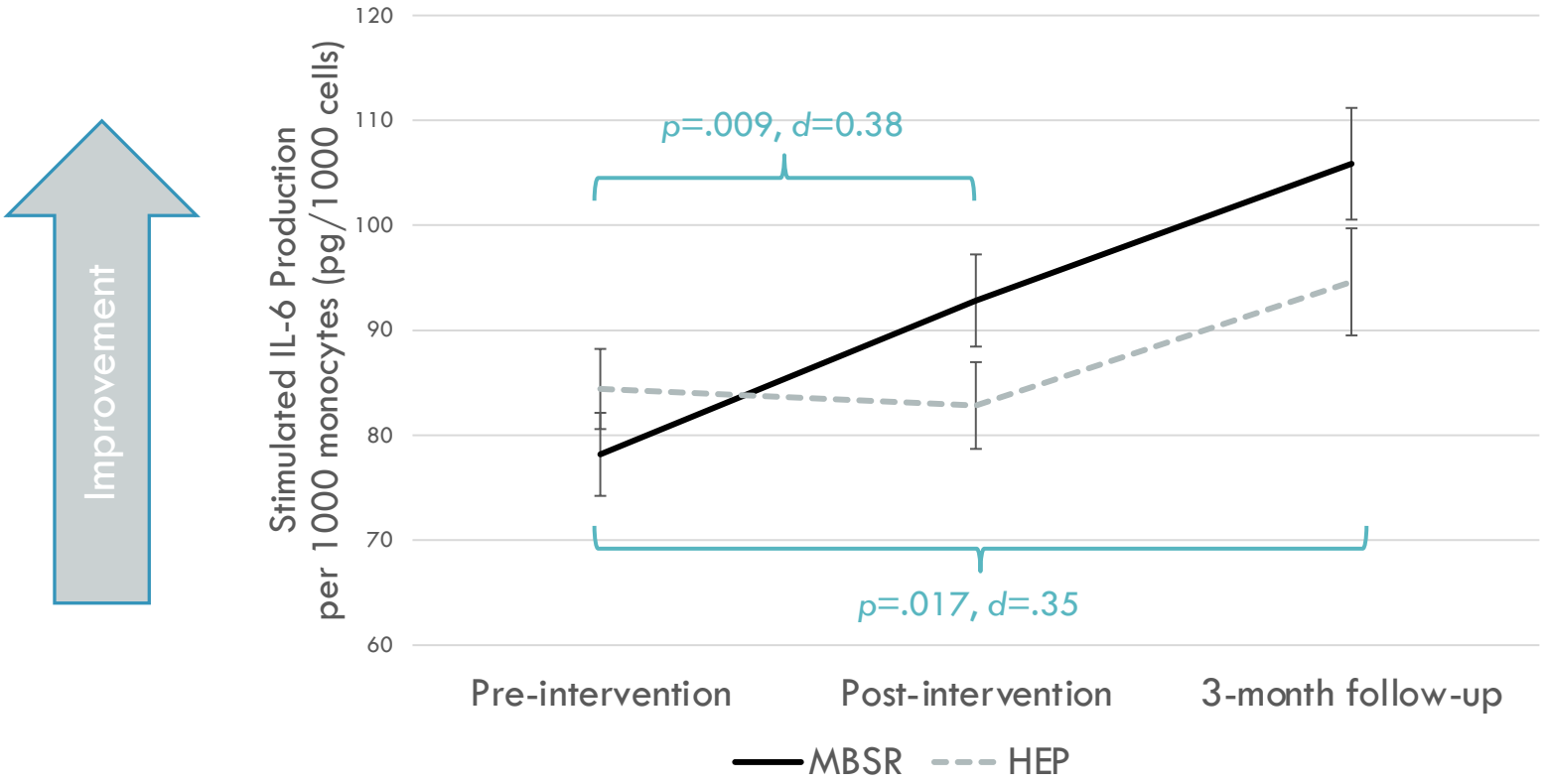
NF-KB GENE EXPRESSION



Improvement

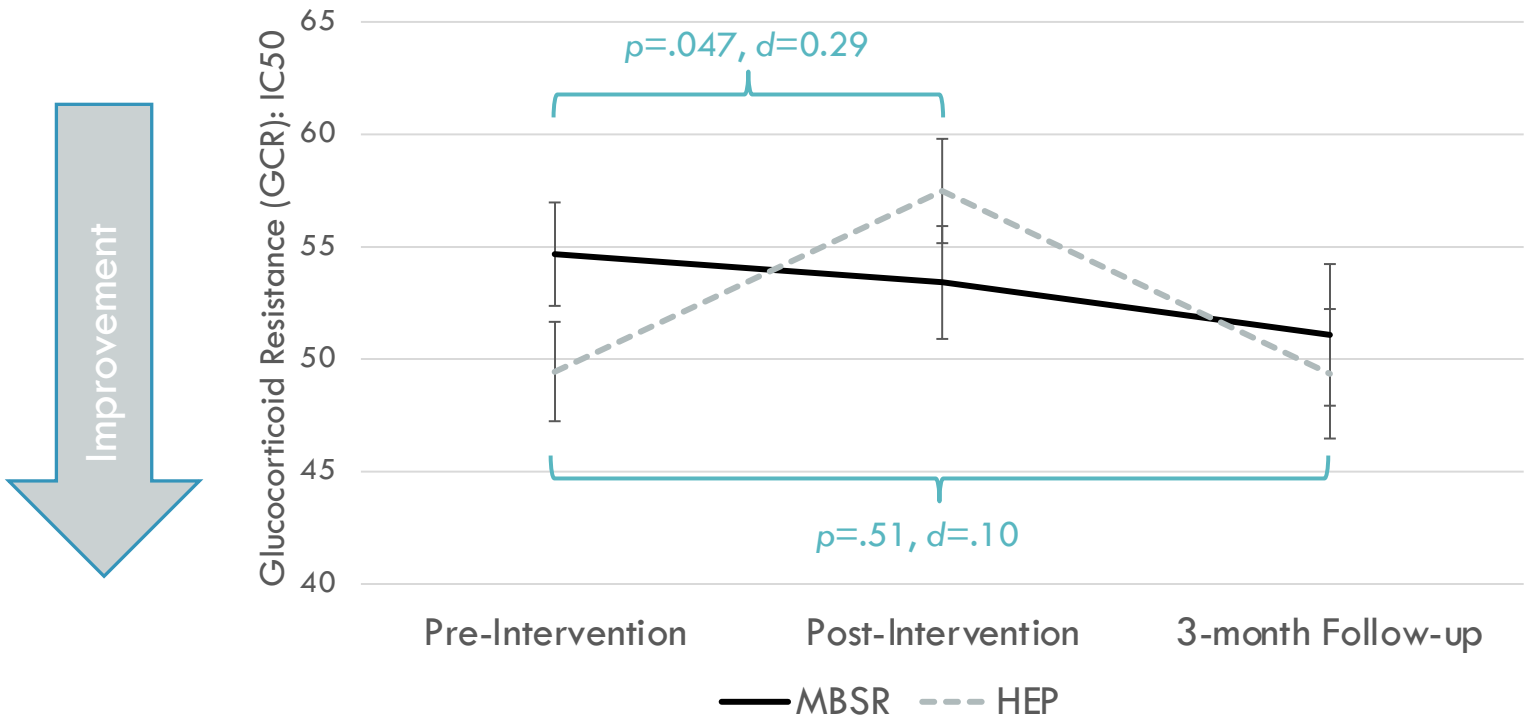
Lindsay et al., in press, Psychosomatic Medicine

INNATE IMMUNOCOMPETENCE



Lindsay et al., 2022, Brain, Behavior, & Immunity

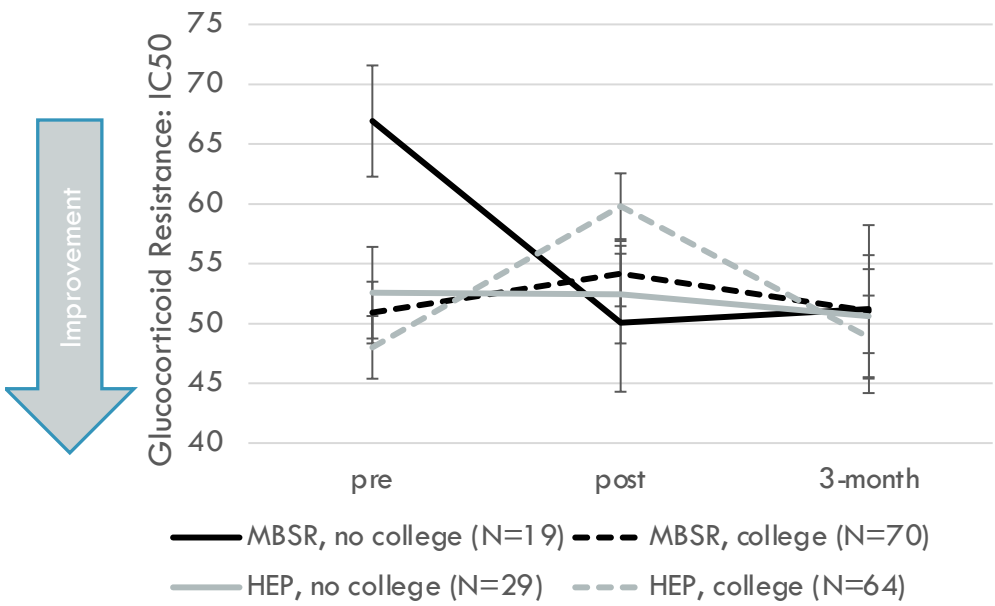
GLUCOCORTICOID SENSITIVITY



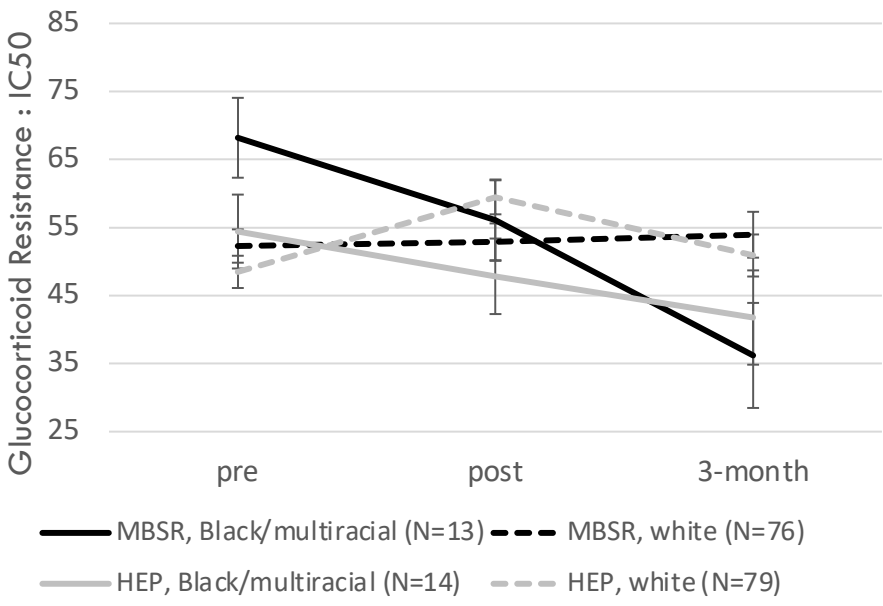
Lindsay et al., 2021, Psychosomatic Medicine

GLUCOCORTICOID SENSITIVITY IN HIGHER RISK GROUPS

SES: Educational Attainment



Race



Lindsay et al., 2021, Psychosomatic Medicine

CONCLUSION

Mindfulness training may be effective for improving immune function among lonely older adults

- ⬇️ proinflammatory NF-κB gene expression
- ⬆️ innate immunocompetence
- ⬆️ glucocorticoid (GC) sensitivity in higher risk subgroups
- = no changes in inflammatory markers IL-6 or CRP

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THANK YOU!