The Potential of Mindfulness Training for Slowing Age-related Cognitive Decline

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Most cognitive abilities decline with age

Hedden and Gabrieli, 2004
Preventing cognitive decline
Mindfulness is...

- focusing attention and awareness on the present moment
- accepting one's feelings, thoughts and bodily sensations
- not goal-directed: "being" rather than "doing"
Origins in Buddhist traditions

Jon Kabat-Zinn: Mindfulness Based Stress Reduction

Developed to help patients with chronic pain and other treatment-refractory conditions
Cultivating mindfulness

- **Formal** and **informal** practice

**Formal**
- Mindful breathing
- Mindful walking
- Body scan

**Informal**
- Mindfulness during daily activities
General effects of mindfulness

Eberth and Sedlemeier, 2012
Mindfulness training and cognition

Mrazek et al., 2013

Tang et al., 2007

Morrison et al., 2014
r = -0.61, p = .002

Wong et al., in review

Dr. Kinjal Doshi

Test session #1

1. Mindfulness and the breath
2. Mindfulness of the body
3. Mindfulness and the senses
4-5. Body, senses and emotions
6-7 Mindful relationships
8. Summary

EEG; sustained attention test (PVT)

Dr. Kinjal Doshi

SingHealth

Test session #2

EEG; sustained attention test (PVT)
Mindfulness training and cognition

Fig. 2. Study effect sizes and their confidence intervals for cognitive processes.

Lao et al., 2016
Fig. 1. Convergent brain structure differences in meditation practitioners. Note: Convergent findings from all morphometric studies of meditation practitioners (from both long-term practitioners and novices undergoing short-term training). Regional labels are approximate, and are shown for illustrative purposes only. Blue circles: gray matter regions; red circles: white matter pathways. ACC: anterior/mid cingulate cortex; ITG: inferior temporal gyrus; RLPFC: rostrolateral prefrontal cortex; SLF: superior longitudinal fasciculus.
Mindfulness for Alzheimer’s Disease

Quintana-Hernandez et al., 2016
Benefits of Mindfulness Training for Patients With Progressive Cognitive Decline and Their Caregivers

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Table 5. Results for Tests Given to Caregivers Only.a,b

<table>
<thead>
<tr>
<th>Measure</th>
<th>Number of Participants</th>
<th>Caregiver Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre</td>
</tr>
<tr>
<td>RMPBC—Patient</td>
<td>20</td>
<td>37.5 ± 4.9</td>
</tr>
<tr>
<td>RMPBC—Caregiver</td>
<td>19</td>
<td>28.8 ± 7.9</td>
</tr>
<tr>
<td>ADLQ, %</td>
<td>17</td>
<td>52.4 ± 4.3</td>
</tr>
<tr>
<td>Health Survey Well-being Subscales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>19</td>
<td>77.4 ± 4.9</td>
</tr>
<tr>
<td>Energy</td>
<td>19</td>
<td>52.6 ± 15.1</td>
</tr>
<tr>
<td>Emotional</td>
<td>19</td>
<td>66.3 ± 22.3</td>
</tr>
<tr>
<td>Social</td>
<td>19</td>
<td>73.1 ± 15.2</td>
</tr>
<tr>
<td>Pain</td>
<td>19</td>
<td>70.7 ± 12.7</td>
</tr>
<tr>
<td>General</td>
<td>19</td>
<td>69.2 ± 6.2</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>66.7 ± 10.1</td>
</tr>
<tr>
<td>Caring role—Physical</td>
<td>19</td>
<td>68.4 ± 17.8</td>
</tr>
<tr>
<td>Caring role—Emotional</td>
<td>19</td>
<td>52.6 ± 27.9</td>
</tr>
</tbody>
</table>

Abbreviations: RMPBC, Revised Memory Problem and Behavior Checklist; ADLQ, Activities of Daily Living Questionnaire; SEM, standard error of the mean.

*aMean scores ± SEM.

bSignificant pre–post differences indicated by * (see text).
Meditation in general, and mindfulness training in particular, can produce cognitive benefits

Observable volumetric and functional brain changes

Growing evidence that behavioral intervention can slow the rate of cognitive decline

Intervening early is important – treatment may have limited effect after conversion to AD
Potential mechanisms?

- Stress and depression
  - Reduction of steroid hormones
  - Decrease in systemic inflammation

- Metabolic syndrome
  - Normalizing oxidative status
  - Reduction of white matter hyperintensities

- Sleep
  - Beta amyloid clearance

Larouche et al, 2015
Sleep architecture changes over the lifespan

Ohayon et al., 2004
Elderly sleep quality and cognition

MrOS study
✓ Community sample of ~ 6,000 people in the US
✓ 3 visits to assess change in cognition over time

Song et al., 2015
Mindfulness and sleep

Howell et al., 2008; Howell et al., 2010
Mindfulness improves sleep quality

Pattanashetty et al., 2010

Sulekha et al., 2006
Mindfulness improves sleep quality

Black et al, 2015
Mindfulness therapy for insomnia

Ong et al., 2014
Potential mechanisms

- **Metacognitive model of insomnia**
  - **Primary arousal**: thoughts that interfere with sleep, beliefs about consequences of poor sleep
  - **Secondary arousal**: meanings and emotions associated with primary thoughts

- Mindfulness allows for a wider range of responses to thoughts and feelings

- “Reperceiving” experiences

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Ong et al., 2012
Summary

- Ageing is associated with
  - Declines in most facets of cognition
  - Changes in sleep architecture that predict cognitive decline

- Mindfulness training
  - Improves cognitive function (particularly executive abilities)
  - Improves sleep in both normal and patient populations
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