Emotional Stress Reduction and Parkinson’s Disease – Could Mindfulness Help?

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What The 1960s Got Right About Health, Happiness And Well-Being

By Carolyn Gregoire
Overview

• Emotional stress and the brain
• What is emotional stress?
• Emotional stress and Parkinson’s
  • Development of disease
  • Symptoms
  • Disease progression
• Mindfulness
  • Audience participation
• Mindfulness successes
• Mindfulness resources
Chronic Stress

- Hippocampal Neurogenesis
  - BDNF
  - BrdU+ Cells

- Oxidative Stress
  - $\uparrow O_2^-$
  - Protein/lipid peroxidation

- Neurodegeneration
  - $\uparrow$ Dendritic atrophy
  - $\uparrow$ Caspase-3
  - $\downarrow$ Bcl-2

- HPA Axis Hyperactivity
  - $\uparrow$ CRH
  - $\uparrow$ ACTH
  - $\uparrow$ Glucocorticoids
  - $\downarrow$ Dexamethasone feedback

- Neuroinflammation
  - $\uparrow$ Pro-inflammatory molecules: IL-6β, IL-1, TNFα, NF-κB
  - $\downarrow$ Anti-inflammatory molecules: IL-10, TGFβ

Hemmerle 2012
What is emotional stress?
The Holmes-Rahe Life Stress Inventory
The Social Readjustment Rating Scale

INSTRUCTIONS: Mark down the point value of each of these life events that has happened to you during the previous year. Total these associated points.

<table>
<thead>
<tr>
<th>Life Event</th>
<th>Mean Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Death of spouse</td>
<td>100</td>
</tr>
<tr>
<td>2. Divorce</td>
<td>73</td>
</tr>
<tr>
<td>3. Marital Separation from mate</td>
<td>65</td>
</tr>
<tr>
<td>4. Detention in jail or other institution</td>
<td>63</td>
</tr>
<tr>
<td>5. Death of a close family member</td>
<td>63</td>
</tr>
<tr>
<td>6. Major personal injury or illness</td>
<td>53</td>
</tr>
<tr>
<td>7. Marriage</td>
<td>50</td>
</tr>
<tr>
<td>8. Being fired at work</td>
<td>47</td>
</tr>
<tr>
<td>9. Marital reconciliation with mate</td>
<td>45</td>
</tr>
<tr>
<td>10. Retirement from work</td>
<td>45</td>
</tr>
<tr>
<td>11. Major change in the health or behavior of a family member</td>
<td>44</td>
</tr>
<tr>
<td>12. Pregnancy</td>
<td>40</td>
</tr>
<tr>
<td>13. Sexual Difficulties</td>
<td>39</td>
</tr>
<tr>
<td>14. Gaining a new family member (i.e., birth, adoption, older adult moving in, etc.)</td>
<td>39</td>
</tr>
<tr>
<td>15. Major business readjustment</td>
<td>39</td>
</tr>
<tr>
<td>16. Major change in financial state (i.e., a lot worse or better off than usual)</td>
<td>38</td>
</tr>
<tr>
<td>17. Death of a close friend</td>
<td>37</td>
</tr>
<tr>
<td>18. Changing to a different line of work</td>
<td>36</td>
</tr>
<tr>
<td>19. Major change in the number of arguments w/spouse (i.e., either a lot more or a lot less than usual regarding child rearing, personal habits, etc.)</td>
<td>35</td>
</tr>
<tr>
<td>20. Taking on a mortgage (for home, business, etc.)</td>
<td>31</td>
</tr>
<tr>
<td>21. Foreclosure on a mortgage or loan</td>
<td>30</td>
</tr>
<tr>
<td>22. Major change in responsibilities at work (i.e. promotion, demotion, etc.)</td>
<td>29</td>
</tr>
<tr>
<td>23. Son or daughter leaving home (marriage, attending college, joined mil.)</td>
<td>29</td>
</tr>
<tr>
<td>24. Change in 3-5 day vacation</td>
<td>29</td>
</tr>
</tbody>
</table>

(Data not entirely clear, hard area to study)
What is psychological stress?

• Perhaps
• Data not entirely clear
• Hard area to study

Now, add up all the points you have to find your score.

150 pts or less means a relatively low amount of life change and a low susceptibility to stress-induced health breakdown.

150 to 300 pts implies about a 50% chance of a major health breakdown in the next 2 years.

300 pts or more raises the odds to about 80%, according to the Holmes-Rahe statistical prediction model.
Does emotional stress increase risk of developing Parkinson’s disease?
Average number of stressful life events:

- 7.2 in Parkinson’s
- 0.93 in persons without Parkinson’s
Does emotional stress affect Parkinson’s symptoms?
Mechanisms underlying emotional variation in parkinsonian tremor
C. D. Marsden and D. A. L. Owen
*Neurology* 1967;17:711
DOI 10.1212/WNL.17.7.711
Does emotional stress affect PD symptoms?
Does stress affect Parkinson’s symptoms?

• Tremor
• Dyskinesias
• Freezing of gait
Does stress affect Parkinson’s progression?
Parkinson’s Outcomes Project

- 9,000 patients
- 6,000 caregivers
- 150+ neurologists
- 25 Centers of Excellence
- 20,000+ clinic visits

- Goal: Understand the best care and teach others to provide it.
Our Stress Analysis

• For 4,155 subjects we calculated:
  • A stress proxy score (derived from PDQ-39 and MCSI),
  • A mobility proxy score (derived from TUG and PDQ-39),
  • An overall health status score (derived from PDQ-39, falls score, hospital admissions, and cognitive score)
  • An excess stress score derived from the 3 above
Higher Stress Associated with Worse Mobility

Baseline stress Score (z score)

Worsening of mobility on follow-up (TUG)

Small but significant effect:
$R^2=0.026$
$p<<0.0001$
So what to do about stress...
Exercise
Meditation
Breathing Space

• https://www.youtube.com/watch?v=amX1luYFv8A
THE MINDFUL REVOLUTION
The science of finding focus in a stressed-out, multitasking culture

BY KATIE PICKERT
Mindfulness

• Mindfulness is a means of improving mental health and reducing symptoms of stress. Mindfulness is as a moment-to-moment non-judgmental awareness and a means to reduce stress and improve coping. Programs focus on tools to cope with intense physical and emotional situations, relaxation practices such as meditation and yoga, and discussion of techniques.
The Muddied Meaning of ‘Mindfulness’

First Words
By VIRGINIA HEFFERNAN  APRIL 14, 2015
### Mindfulness Based Stress Reduction (MBSR)

#### TABLE 1. MBSR Program Outline

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic/Theme</th>
<th>Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introductions: There is more right with you than wrong with you</td>
<td>Mindful eating, grounding practice, body scan</td>
</tr>
<tr>
<td>2</td>
<td>Stress: Our perceptions of our experience impacts our mood and physiology</td>
<td>Body scan, mindfulness of the breath</td>
</tr>
<tr>
<td>3</td>
<td>Noticing experience and savoring that which is pleasant</td>
<td>Mindful movement, spaciousness practice, mindfulness of sounds</td>
</tr>
<tr>
<td>4</td>
<td>Getting unstuck, noticing unhelpful habitual patterns</td>
<td>Mindful movement, short loving kindness, 3-minute breathing space</td>
</tr>
<tr>
<td>5</td>
<td>Spaciousness, the lifelong work of moving from reacting to responding</td>
<td>Mindful movement, loving kindness, choiceless awareness, walking meditation</td>
</tr>
<tr>
<td>6</td>
<td>Chronic pain</td>
<td>Mindful movement, mindfulness of the breath, loving kindness</td>
</tr>
<tr>
<td>Retreat</td>
<td>Deepening the practice on silent retreat</td>
<td>Mindful movement, body scan, mindfulness of the breath, walking meditation, loving kindness, mountain meditation, mindful eating, walking loving kindness</td>
</tr>
<tr>
<td>7</td>
<td>Interpersonal mindfulness, staying open in an unpredictable process</td>
<td>Mindful movement, mindfulness of the breath, walking meditation</td>
</tr>
<tr>
<td>8</td>
<td>Forgiveness and moving on, how to support your ongoing practice</td>
<td>Mindful movement, grounding practice, loving kindness</td>
</tr>
</tbody>
</table>
Mindfulness Exercise

https://www.youtube.com/watch?v=X5DfLKgJP8c
Mindfulness Successes
A randomized trial of stress management for the prevention of new brain lesions in MS

Figure 2
Percent of participants free of gadolinium-enhancing (Gd+) and T2 lesions by treatment group during 24-week treatment period

SMT-MS = stress management therapy for multiple sclerosis.
Standardised Mindfulness-Based Interventions in Healthcare: An Overview of Systematic Reviews and Meta-Analyses of RCTs

### a) Depression

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Population</th>
<th>SMD</th>
<th>SE</th>
<th>Total</th>
<th>Control</th>
<th>Total</th>
<th>Weight</th>
<th>Std. Mean Difference</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott 2014</td>
<td>Cardiovascular</td>
<td>-0.35</td>
<td>0.09</td>
<td>193</td>
<td>192</td>
<td>24.0%</td>
<td>-0.35 [-0.53, -0.17]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cramer 2012</td>
<td>Cancer</td>
<td>-0.37</td>
<td>0.14</td>
<td>91</td>
<td>99</td>
<td>9.9%</td>
<td>-0.37 [-0.64, -0.10]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Klinein-Yobas 2012</td>
<td>Mental disorders</td>
<td>-0.39</td>
<td>0.08</td>
<td>475</td>
<td>489</td>
<td>30.4%</td>
<td>-0.39 [-0.55, -0.23]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piet (2012)</td>
<td>Cancer</td>
<td>-0.44</td>
<td>0.1</td>
<td>477</td>
<td>478</td>
<td>19.5%</td>
<td>-0.44 [-0.64, -0.24]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veenhof 2011</td>
<td>Chronic Pain</td>
<td>-0.26</td>
<td>0.11</td>
<td>156</td>
<td>164</td>
<td>16.1%</td>
<td>-0.26 [-0.48, -0.04]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td></td>
<td></td>
<td></td>
<td>1392</td>
<td>1422</td>
<td>100.0%</td>
<td><strong>-0.37 [-0.45, -0.28]</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: $I^2 = 0.00; Chi^2 = 1.60; df = 4 (P = 0.81); I^2 = 0$
Test for overall effect: $Z = 8.32 (P < 0.00001)$

#### b) Anxiety

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Population</th>
<th>SMD</th>
<th>SE</th>
<th>Total</th>
<th>Control</th>
<th>Total</th>
<th>Weight</th>
<th>Std. Mean Difference</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott 2014</td>
<td>Cardiovascular</td>
<td>-0.5</td>
<td>0.1</td>
<td>149</td>
<td>144</td>
<td>14.2%</td>
<td>-0.50 [-0.70, -0.30]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chan 2012</td>
<td>Anxiety</td>
<td>-0.51</td>
<td>0.06</td>
<td>435</td>
<td>434</td>
<td>31.3%</td>
<td>-0.51 [-0.63, -0.39]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cramer 2012</td>
<td>Cancer</td>
<td>-0.61</td>
<td>0.14</td>
<td>85</td>
<td>94</td>
<td>7.0%</td>
<td>-0.51 [-0.78, -0.24]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galante 2012</td>
<td>Mental Disorders</td>
<td>-0.42</td>
<td>0.16</td>
<td>69</td>
<td>80</td>
<td>6.1%</td>
<td>-0.42 [-0.73, -0.11]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piet (2012)</td>
<td>Cancer</td>
<td>-0.37</td>
<td>0.06</td>
<td>479</td>
<td>480</td>
<td>31.3%</td>
<td>-0.37 [-0.49, -0.25]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regehr 2012</td>
<td>Healthy</td>
<td>-0.73</td>
<td>0.14</td>
<td>222</td>
<td>192</td>
<td>7.8%</td>
<td>-0.73 [-1.00, -0.46]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veenhof 2011</td>
<td>Chronic Pain</td>
<td>-0.55</td>
<td>0.32</td>
<td>26</td>
<td>16</td>
<td>1.6%</td>
<td>-0.55 [-1.18, 0.08]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td></td>
<td></td>
<td></td>
<td>1465</td>
<td>1440</td>
<td>100.0%</td>
<td><strong>-0.48 [-0.56, -0.40]</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: $I^2 = 0.00; Chi^2 = 7.00; df = 6 (P = 0.32); I^2 = 14$
Test for overall effect: $Z = 11.72 (P < 0.00001)$
Mindfulness in Parkinson’s Disease

- 3 small studies
- Increased density of grey matter in the hippocampus
- One showed some improvement in Parkinson’s motor symptoms and increased mindfulness and reduced pain
- One a qualitative study – groups support, dualism of calm with classes different than how usually felt with Parkinson’s
Mindfulness Resources

• University of Massachusetts Center for Mindfulness
  • On-line courses

• University of California at San Diego Center for Mindfulness
  • Mediation recordings

• Local Resources
Guided Audio Files to Practice Mindfulness Based Stress Reduction

The UC San Diego Center for Mindfulness has prepared a number of practices that are available here in MP3 format. Please feel free to download and/or share these guided practices.

To download one of the files, please right click on the title and select “Save Target As” from the popup selection. This will then prompt you to select a location on your desktop to save the file to.

Please note: These MP3 files are rather large. If you do not have a broadband internet connection, you may not want to download them.

Guided Audio Meditations  Guided Yoga Audio & Video

45 Minute Body Scan guided by Steven Hickman
(55 Mb) This is the “regular” Body Scan.

Mono 45 Minute Body Scan guided by Steven Hickman
(33 Mb) This is a smaller file (mono) version of the Body Scan above.

20 Minute Body Scan guided by Steven Hickman
Thank you!

Acknowledgements:
Photos – Avram Hiller
Parkinson’s Foundation and Peter Schmidt
Dr. Victoria Holiday and Dr. Kathrin LaFaver at the University of Louisville Physicians Movement Disorder Clinic are conducting a research study to determine if mindfulness can improve anxiety symptoms in people with Parkinson’s disease.

This study will use the Spire tracker. This device clips on to your clothing and tracks your breathing and activity throughout the day. At the end of the study, you can keep the tracker for personal use.
Parkinson’s Disease and Mindfulness Research Study

For more information, contact
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Phone: 502-582-7654