Forests, Forestry, and Human Health – a Topic for Forest Pedagogy?

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What am I doing here?

- I am not a forester
- Not a teacher
- Not an expert in pedagogics

I just know a little bit about health....
A little travel

From the hospital to the forest...

Disease-model

Health, Salutogenesis

and now to Bilbao...
Health depends on many things

Genes

Environment

Education

HEALTH
Education

High level of education
• High levels of good self-reported health
• High levels of physical functioning
• Low levels of morbidity, mortality, and disability

Lower level of education
• High rates of infectious diseases
• Many chronic diseases
• Self-reported poor health
• Shorter life expectancy
Environment

- Toxics, pollutants, and other harmful agents
+ Green environments
Interactive and positive feedback loops
Since forests are improving children’s education they will implicitly also be good for their future health.

In addition to the immediate health effects of forests…
HEALTH AND FOREST

Stress relief

Physically active

Better cognitive capacity

Improved attention capacity

Less behavioural disturbances

Improved general wellbeing
Forests: Pathways to health

- Promote stress recovery
- Encourage physical activity
- Increase social cohesion, decrease anti-social behaviour
- Enhance general well-being
Stress recovery

VR-nature + sound

Control

VR-nature, no sound

R +10 R +20 R +30 R +40

Δ HF-HRV (ms²)

CONDITON

R +20 R +30 R +40

Flinear = 7.55; p = .003
Physical activity

OR

GREENERY

Obesity
Physical Activity

Ellaway & Macintyre
BMJ 2005;331;611-2
Social capital

Aggressive behavior against partner

Proportion
Yes

Spiteful
Threatened to hit
Threw or smashed
Threw at partner

no trees
trees
General well-being

Walks in a Shopping Centre vs. Woodland

<table>
<thead>
<tr>
<th></th>
<th>Improvement</th>
<th>No Change</th>
<th>Got Worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Esteem</td>
<td>90% outdoor walk</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>17% indoor walk</td>
<td>39%</td>
<td>44%</td>
</tr>
<tr>
<td>Depression</td>
<td>71%</td>
<td>23%</td>
<td>6%</td>
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<tr>
<td></td>
<td>45%</td>
<td>33%</td>
<td>22%</td>
</tr>
<tr>
<td>Tension</td>
<td>71%</td>
<td>29%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>28%</td>
<td>22%</td>
<td>50%</td>
</tr>
</tbody>
</table>

MIND / Pretty J, Peacock J, Hine R et al 2007
Shinrin-Yoko – Forest bathing

- Improved immune system
- Decreased risk of cancer
“Urban trees can reveal income inequality”

“You can identify poor neighbourhoods from space” (Google Earth)
Reduced health inequalities in green areas (Mitchell & Popham, 2008)

“Effect of exposure to natural environment on health inequalities: an observational population study”

![Graph showing the effect of exposure to green areas on health inequalities. The x-axis represents different levels of exposure to green areas: No green, Little green, Some green, More green, Very green. The y-axis represents the incidence rate ratio. The graph shows a decrease in incidence rate ratio with an increase in exposure to green areas, with a linear trend for each income group.]

Legend:
- Highest Income
- Middle Income
- Lowest Income
- Linear (Highest Income)
- Linear (Middle Income)
- Linear (Lowest Income)
Why?

- Evolutionary bond – Biophilia
- Attention restoration (fascination)
- Stress recovery (immediate reactions, positive feelings)
- Prevent sedentary behaviour
- Affects the brain
Biophilia and well-being
Attention restoration & fascination
Stress recovery
Non-sedentary behaviour
Affecting the brain directly

FRACTALS
Nature and the brain

Those benefits are so important

Because:

Most diseases today are so called non-communicable
- Stress related
- Lack of physical activity

Mental disorders, obesity, and cardio-vascular diseases

35 million deaths globally (2005)
## Ten leading causes of burden of disease, world, 2004 and 2030

<table>
<thead>
<tr>
<th>Disease or injury</th>
<th>As % of total DALYs</th>
<th>Rank</th>
<th>As % of total DALYs</th>
<th>Rank</th>
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</tr>
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<tbody>
<tr>
<td>Lower respiratory infections</td>
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<td>6.2</td>
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<td>Unipolar depressive disorders</td>
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<td>Diarrhoeal diseases</td>
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<td>Ischaemic heart disease</td>
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<tr>
<td>Unipolar depressive disorders</td>
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<td>Road traffic accidents</td>
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<td>4.3</td>
<td>4</td>
<td>Cerebrovascular disease</td>
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<tr>
<td>HIV/AIDS</td>
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<td>5</td>
<td>3.8</td>
<td>5</td>
<td>COPD</td>
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<tr>
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<td>6</td>
<td>3.2</td>
<td>6</td>
<td>Lower respiratory infections</td>
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<tr>
<td>Prematurity and low birth weight</td>
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<td>7</td>
<td>2.9</td>
<td>7</td>
<td>Hearing loss, adult onset</td>
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<tr>
<td>Birth asphyxia and birth trauma</td>
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<td>8</td>
<td>2.7</td>
<td>8</td>
<td>Refractive errors</td>
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<td>HIV/AIDS</td>
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<tr>
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<td>Diabetes mellitus</td>
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<tr>
<td>COPD</td>
<td>2.0</td>
<td>13</td>
<td>1.9</td>
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<td>Neonatal infections and other(^a)</td>
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<tr>
<td>Diabetes mellitus</td>
<td>1.3</td>
<td>19</td>
<td>1.6</td>
<td>18</td>
<td>Diarrhoeal diseases</td>
</tr>
</tbody>
</table>

Source: Health Statistics and Informatics, WHO
Urban environment & stress

Urban environments increase the brain’s vulnerability to stress (Lederbogen et al. 2011)

3 independent fMRI-studies
Compared urban and rural environments
Affect the limbic system (memory, emotions, and stress management)
Hard wired changes in the central nerve system
Anatomy, urban genes....
“Nature Deficit Disorder”

• “Last child in the woods” Richard Louv
• Lost the natural connection to forests and other natural landscapes
• Affecting the health of the children negatively
• Affecting the environment negatively
• Negative impact on the future of our children
Can Forest Pedagogics prevent Nature Deficit Disorder?

- Outdoor learning – immediate relationship from early years
- Learn to be active and interact with natural elements
- Learn that they feel good from this interaction

*Photo: Fredrika Mårtensson*
Can forest pedagogics prevent obesity and increase physical activity?

- **Variation** in the school yard with much green promotes physical activity (**Dyment & Bell, 2008, Mårtensson, 2013**)

- **More trees** in schoolyard predict increased use and physical activity (**Arbogast et al. 2009**)

- It is important to introduce **physical activity at school** to create a physical life style later on (**Goldfield et al. 2012**).
Can forest pedagogics decrease stress and improve mental health?

- Natural environments at schools improve *mental health* and reduce behavioural disturbances (*Flom et al. 2011*)

- More *harmonious* (*Blizard & Schuster, 2004*)

- Lower levels of *stress* hormones (*Söderström et al. 2013*)

*Photo: Fredrika Mårtensson*
Can forest pedagogics have other health effects?

- Reduced sun-exposure
- Reduced noise
- Less sleeping problems
- Decreased risk for visual impairment
- Better motoric function
- Social interactions
- Better self confidence and self esteem
- General well-being

ADHD, Attention Deficit Hyperactivity Disorder and Nature

- Better general functioning
- Healthier behaviour
- Better mood
- Better cognitive capacity and attention capacity
  (van den Berg, 2011; Taylor & Kuo, 2009; Kuo & Taylor, 2004)

Forest schools for children suffering from ADHD?
In memory of Roger Bucklesby. Who hated this park, and everyone in it.
What do our children need to learn about?

Pro-environmental behaviour

Healthy behaviour

What will the trees we plant today be used for tomorrow?
The idea is that education and public health are fundamentally interconnected and by finding means to improve either of them we will at the same time gain benefits for the other.

This is important to recognise for joining fields, for learning from each other, for deepening our understanding of nature’s impact on humanity.
Early tree huggers...
THANKS for listening and let’s continue the discussion!