Nature and Neuroplasticity: Towards Mental/Cognitive/Emotional Health

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Discuss the emerging literature on the benefits of Nature Exposure as it relates to:
- cognitive enhancement
- elevated mood/feeling of well-being
- enhanced coping skills and recovery from life stress
- re-establishing a sense of being for the individual (micro/macro)

The Negative Impact of Nature Deprivation:
- Green Time vs Screen Time
- Short-term and Long-term effects

Practical tips including minimal and optimal levels of natural exposure for:
(a) Memory, spatial, verbal, etc;
(b) depression; (c) anxiety;
(d) general maintenance of mental/cognitive health
What Does Nature Offer?

Exposure to Nature has benefits for:

• Cognition
• Mood
• General Well-Being
• Productivity
Florence Nightingale’s 3 principles Approach to Healthy Design:

- Fresh air
- Sunlight
- Natural surroundings
Can Nature Impact Recovery?

R.S. Ulrich examined recovery rates for post-op cholecystectomy patients (gallbladder removal) from one suburban Pennsylvania hospital from 1972 to 1981.

He compared records of patients that were placed in one of two rooms:
1. Rooms with a view to a mini-forest
2. Rooms with a view of a red brick building
Patients with greenery in their landscape had:

1. significantly shorter hospital stays (### days ave)
2. fewer postsurgical complaints (###)
3. less need for potent analgesic medications (i.e. using aspirin instead of narcotics)
4. fewer negative comments in their charts from their attending nurses
Dose Response to View from Hospital Bed

- Pain Medication Reduced by XXX% on Days 2-5
Name & name (yyyy) added to this theory reporting that 12 potted plants *in the room* showed:

1. Lower blood pressure and heart rate
2. Lower reports of pain, anxiety
3. Increased energy and positive thoughts
Earnest Moore (1981) studied the effect of nature exposure on health-care utilization within the Southern Michigan prison system. The study reported that inmates with cells facing greenery had ##% fewer medical visits compared to those facing the internal yard.
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The study reported that inmates with cells facing greenery had ##% fewer medical visits compared to those facing the internal yard.
How Much is TOO Much?
Norwegian research shows that having a plant at or within view of an office workstation significantly decreases the risk of sick leave.

What Can One Plant Do?

1. Up to xx% reduced sick leave
2. Anger, depressive thoughts, fatigue down about 40%
3. Stress down about 50%

Ref: The 2010 Study from the University of Technology (Sydney, Australia):
What Can a Few Plants Do?

Several studies identified the impact of nature on productivity and mood in the workplace. Office workers who had 4 plants in their office space had:

1. Reduced eye strain and operator fatigue (Japan)

2. Improved productivity and reaction time (visual concentration, mental processing and manual dexterity, perceived levels of attention) (N. America)

3. Improved memory recall and complex proofreading exercises (Illinois?)

4. Improved mood and performance scores among women on a task designed to evaluate creativity (Japan)
Can Nature Impact Work Related Stress?

The 2010 Study from the University of Technology (Sydney, Australia) reported that people who had a plant in their everyday view had reduced:

1. Anger, depressive thoughts, fatigue down about 40%
2. Stress down about 50%
3. Those without stress indicators rose over 20%
11,000 people in Denmark were involved in a study that correlated self-reports on health with their proximity to green space >1km (or <10%):

**Reports from those living >1km from green space**

- 26% Increased Stress
- 31% Increased risk of depression
- 43% Increased risk of anxiety
- 31% Lived near greenery

Green spaces included beaches, lakes, parks or forests.
11,000 people in Denmark were involved in a study that correlated self-reports with health with their proximity to green space >1km (or <10%).

- 58% less likely to report high stress
- 25% greater risk of depression
- 30% greater risk of anxiety disorders
- Worst scores on evaluations of:
  - General health
  - Vitality
  - Mental health
  - Bodily pain

Green spaces included beaches, lakes, parks or forests.
More Than Just Fresh Air?

Living within 3km of greenspace can buffer against the effects of life stressors:

• Fewer health complaints after
• major life stressors
  • Physiologically
  • Psychologically

Ref: A 2003 investigation involving 337 children
Impact on a Child’s Emotional Development

Higher levels of nearby nature diminished the psychological impact of stressful life events in developing children.

Ref: 2003 investigation involving 337 children.
Ref: "Reflected sadness" by Victor Bezrukov - reflected sadness. Licensed under Creative Commons Attribution 2.0 via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:Reflected_sadness.jpg#mediaviewer/File:Reflected_sadness.jpg
Closer than you think: Toronto nature spots (images)
The ability to concentrate on a task is limited:
- The brain expends energy to maintain attention or concentration
- This causes mental fatigue and requires recovery time

Mental Fatigue: Attention is “hampered” and efficiency declines:
- Things take longer than usual
- More mistakes are made
- Creativity becomes difficult
- We become more easily distracted by things we can usually ignore (inhibitory pathways that filter out non-pertinent stimuli)

Attention Restoration Theory
(Rachel and Stephen Kaplan, psychologists at University of Michigan)
Short-term and Long-term Effects of Mental Fatigue

Mental fatigue can impact the health behaviours we choose:

- **Tasks:** we start to move towards tasks that are more engaging and less challenging

- **Lifestyle:** we begin the uptake of sedentary life – lose motivation, productive role and sense of purpose
How can we improve concentration?

**Micro-Restoration:**
- Provides recovery time to offset fatigue
- A type of absorbing, restorative distraction

**Soft fascination:**
- Engagement that maintains our ability to concentrate with little effort
- Effective for recuperation; provides opportunities for reflection, is non-taxing, and deals less with attendant disturbances.

Natural environments provide a source of **fascination**.
- People have an instinctual inclination towards nature
- Most relate positively to natural environments.
Micro Restoration:
• Intermittent “breaks”
  - shifting thoughts to indirect or “effortless” forms of engagement
• Provides rest or recovery time to offset this fatigue.
• Nature offers just this type of absorbing, restorative distraction.

*Soft fascination:* invokes involuntary attention modestly, allowing directed-attention mechanisms a chance to replenish (Kaplan, 1995), versus tasks which often capture attention dramatically and additionally requires directed attention to overcome that stimulation (busy urban scenes, pressure to complete task)
• Engagement that maintains our ability to concentrate, willingly, with little effort, and most effectively.
• Effective for recuperation; provides opportunities for reflection, is non-taxing, and deals less with exaggeration and its attendant disturbances.

Natural environments provide a source of *fascination.*
• People have an instinctual inclination towards nature (as predators, nomads, domesticators, observers, and survivors.)
Most relate positively to natural environments. (hunter gatherer lead in)
Slide about 15 minutes at lunch

Experiment 1: Does nature exposure impact short-term memory?

Subjects: 38 University of Michigan students
Cognitive Task: Backwards Digit Span (WAIS): working memory

Experiment 2: Does nature exposure impact executive attention?

Subjects: 12 University of Michigan students
Cognitive Task: Attention Network Test: executive attention

The group who viewed the restorative nature scenes had:
- enhanced accuracy in target detection
- faster reaction time

<table>
<thead>
<tr>
<th>Measure</th>
<th>Natural setting Before</th>
<th>Natural setting After</th>
<th>Urban setting Before</th>
<th>Urban setting After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backward span</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Experiment 1</td>
<td>7.90 (0.37)</td>
<td>9.46 (0.11)</td>
<td>7.90 (0.30)</td>
<td>8.40 (0.33)</td>
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<tr>
<td>Experiment 2</td>
<td>7.92 (0.96)</td>
<td>9.33 (0.86)</td>
<td>7.83 (1.04)</td>
<td>8.83 (0.90)</td>
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<tr>
<td>ANT effects (ms)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Executive</td>
<td>86 (11.30)</td>
<td>67 (8.45)</td>
<td>81 (15.50)</td>
<td>93 (17.96)</td>
</tr>
<tr>
<td>Orienting</td>
<td>47 (6.46)</td>
<td>55 (7.33)</td>
<td>46 (10.01)</td>
<td>43 (4.73)</td>
</tr>
<tr>
<td>Alerting</td>
<td>32 (6.86)</td>
<td>31 (5.23)</td>
<td>36 (6.52)</td>
<td>46 (5.63)</td>
</tr>
</tbody>
</table>
Impact of Nature Exposure on Higher Level Cognitive Functioning

- Subjects viewed 25 photographs, over 6 minutes and repeated the cognitive testing for 5 minutes.
- 38 students underwent the backwards digit span to assess working memory.
- 8 students underwent the same, *plus* the Attention Network Test for executive attention.
- Half of each group were exposed to images high in restoration potential (forests, water views, mountains, ocean side etc).
- Half were exposed to low restoration pictures such as city streets with multiple cars, industrial zones, housing developments, factories etc.

Nature may also be more peaceful than other environments, thereby restoring directed-attention abilities. However, in Experiment 2, the environments were equally peaceful (i.e. both were in a quiet experimental room), yet only viewing pictures of nature produced cognitive improvements.

The Placebo Effect
Perhaps people feel better for being in natural environments because they think they will. In a seminal study into exercise and the placebo effect, a group of hotel cleaners were told their daily routine met all their exercise needs for health and well-being [17]. Their psychological and physiological health was later measured to be higher than that of a control group doing the same work who were not told their daily routine was good for them. The authors of the study, Alia Crum and Ellen Langer, found that compared with the control group, the group primed with the idea that cleaning and making beds was good exercise “showed a decrease in weight, blood pressure, body fat, waist-to-hip ratio, and body mass index.” The authors assert: “These results support the hypothesis that exercise affects health in part or in whole via the placebo effect.” I’ve yet to find a study that says something similar about being outdoors, but it appears that if you believe in something, that whole frame of expectations will have an effect (positive or negative).

The meaning structures that underlie nature myths are the same as those that affect empirical evidence gathering. Researchers seek evidence for the benefits of being outdoors thanks to the wealth of cultural affirmations supporting people’s affinity with gardens; for example, the Garden of Eden and the myth of the Primitive Hut, the first dwelling fashioned out of the trunks of trees [18]. We gather evidence from the world as encountered through our cultural conditioning.

I’m not aware of any studies that demonstrate a placebo effect among those who are persuaded that digital devices are good for them, make life simpler, increase access to knowledge, and enhance curiosity. Perhaps it makes less sense to speak of a placebo effect outside of a medical context. We are also in the realms of “self-fulfilling prophecies,” consumer behavior, brand loyalty, and the nature of desire [19]. It’s well known that consumers will claim benefits from something in which they have invested a great deal of money. Consumers will be reluctant to assert that their latest electronic device brings anything other than benefits.

“In sum, we have shown that simple and brief interactions with nature can produce marked increases in cognitive control. To consider the availability of nature as merely an amenity fails to recognize the vital importance of nature in effective cognitive functioning.”

- Berman study
“In sum, we have shown that simple and brief interactions with nature can produce marked increases in cognitive control. To consider the availability of nature as merely an amenity fails to recognize the vital importance of nature in effective cognitive functioning.” Berman study
Experiment: Physiological Benefits of Nature Exposure
Nature Scene versus Urban Scene (study; study)

“The greater effort required to run the brain in the modern urban world can catch up with us in the form of mental fatigue”
excerpt from Your Brain On Nature
Done:

Experiment: Physiological Benefits of Nature Exposure

What did YOU notice?

Cognitive
- Racing/intruding thoughts
- Reflecting on Life/earth/nature
- Reflecting on things you need to do

Physiological
- Heart Rate
- Tension or wringing hands
- Body Posture
What Just Happened to my Brain?

Ref: https://www.flickr.com/photos/tza/3214197147/
What Just Happened to my Brain?

Ref: https://www.flickr.com/photos/tza/321419
What Just Happened to my Brain?

Limbic System
- Thalamus
- Cingulate gyrus
- Fornix
- Amygdala
- Hippocampus
- Parahippocampal gyrus

Effect of Urban Scenes

1) The Anterior Temporal Pole:
   - Associated with negative subjective emotional responses
     - Anger
     - Depression

2) The Amygdala:
   - Active in response to danger
     - Impulsivity
     - Anxiety

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Ref: By Polygon data were generated by Database Center for Life Science (DBCLS). [CC-BY-SA-2.1-jp](http://creativecommons.org/licenses/by-sa/2.1/jp/deed.en)
Effect of Nature Scenes

1) The Insula:
   • Associated with positive emotions:
     • Love
     • Empathy
     • Happiness

2) The Anterior Cingulate:
   • Associated with emotional stability:
     • Positive outlook
     • Empathy
     • Preventing attention deficits

Urban scenes did not influence activity in the anterior cingulate or the insula.

Ref: Insula animation* von Polygon data were generated by Database Center for Life Science(DBCLS)[2]. - Polygon data are from BodyParts3D[1]. Lizenziert unter Creative Commons Attribution-Share Alike 2.1-jp über Wikimedia Commons -
What's the Brain Got to do with it?

Parahippocampal gyrus

- Opioid receptors (pain inhibition)
- Connects to Dopamine system
  - Reward system
  - Triggers feelings of wellness
  - Induce motivation for positive behaviour modification

A study in California used fMRI imaging to show that viewing pictures of nature resulted in increased firing in this area.

Ref: [http://commons.wikimedia.org/wiki/File:Parahippocampal_gyrus_-_inferior_view.png](http://commons.wikimedia.org/wiki/File:Parahippocampal_gyrus_-_inferior_view.png) Media ref: By Polygon data were generated by Database Center for Life Science
What’s the Brain Got to do with it?

Parahippocampal Gyrus
- Opioid receptors (pain inhibition)

Dopamine System (reward system)
- Motivates positive health behaviour
- Triggers feelings of wellness

Ref: [http://commons.wikimedia.org/wiki/File:Parahippocampal_gyrus_-_inferiror_view.png](http://commons.wikimedia.org/wiki/File:Parahippocampal_gyrus_-_inferiror_view.png) Mmedia ref: By Polygon data were generated by Database Center for Life Science(DBCLS)[2]. (Polygon data are from BodyParts3D[1]) [CC-BY-SA-2.1-jp](http://creativecommons.org/licenses/by-sa/2.1/jp) via Wikimedia Commons
Dopamine and Health Behaviours

Increased:
- “Comfort” Food Choices
- Sedentary Lifestyle
  - Anger
  - Impulsivity
  - Addiction

Increased:
- Healthy Food Choices
- Active Lifestyle
  - Patience
  - Concentration

Summary Statement: Summary Statement
How Busy Are We??

View of activity by light consumption

Name & name (1995) studied the cognitive effects of natural and non-natural views:

Those with an unobstructed view of nature outperformed peers on the objective measures of attention and reported higher subjective perceptions of attention.
Cognitive Benefits of Nature Exposure: Sustained Attention

In 2011, Korean researchers evaluated via cross-over design to assess the cognitive effects of a walk through a pine forest vs. downtown streets.

Participants underwent cognitive and mood tests *before* and *after* a 50 minute forest walk that resulted in:

- Cognitive improvements (%)
- Elevations in mood (data)
The 2010 Study from the University of Michigan examined the relationship between classroom views to nature and academic performance in 101 public high schools.

Students that were exposed to views with nature (trees and shrubs from their primary cafeteria) had increased:
1. Academic performance on standardized tests
2. Graduation rates overall
3. Future planning that included further academic pursuits

Note: Even after controlling for socioeconomic factors, class size, age of the school facilities, and other factors, the results showed that classroom and cafeteria views to green vegetation were significant factors in academic performance on standardized tests.

Note: “Trees” and “shrubs” are key words because the degree of naturalness within...
Name & name et al (yyyy) placed 3 plants in half of the classrooms of 350 middle-school students. Over 6 weeks, students that had this daily nature exposure improved significantly (10-14%) in:

1. Mathematics
2. Spelling
3. Science
(name & name, et al, (yyyy) analysed the relationship between classroom views and academic performance in 71 rural and urban public elementary schools.

Data of over 10,000 5th grade students showed that a view of nature (versus the parking lot or walls) were positively correlated with higher proficiency scores in:

1. Math
2. Language
3. Reading
Can a Natural Environment Reduce ADHD Symptoms?

In 2004, researchers at the University of Illinois compared reported ADHD symptom behaviours of children in greenspace environments with those in built environments.

Of 452 parents conducting 50 activities (from reading to playing sports):

1. Xxx% reported a nature environment reduced symptoms of attention deficit by xxx%
Can Nature Impact ADHD Symptoms?

A study involving a smaller sample (96 parents) found that:

1. the greenness of play areas was associated with milder symptoms of attention deficit

2. windowless indoor play areas were associated with more severe symptoms
More recently, investigators have performed objective testing of attention in children with ADHD after time spent in natural or built environments. In a European study, researchers conducted a test of concentration after children had engaged in a period of light to moderate physical activity in a natural wooded area or a built town area. The results showed...
Physical Benefits of Nature Exposure

Recovery – Ulrich Study
Motivation for Activity –
Decrease/combat Aging process –
Increase Healthy Environment – air quality
XXX Undergraduate students were shown a set of either urban scenes or photographic scenes of nature after their one-hour course examination.
The group who viewed the nature scenes reported:
1. a rapid improvement in positive mental outlook
2. a decline in reported fear and arousal.

Diagnostic tests were conducted on the students showing further reduction in markers of stress physiology:
1. Quicker ... via electromyography (EMG)
2. Reduced... via skin conductance (SC)
3. Reduced via pulse transit time (PTT)
Physical Benefits of Nature Exposure:  
Nature Aids Recovery from Everyday Life Stress (Ulrich, RS. 1979)

Adults were shown similar nature or urban scenes after viewing a stress-inducing video on accidents at work.

The physiological markers (EMG, SC, PTT) showed that adults were able to return to their natural, relaxed state faster and with less residual stress markers with exposure to vegetation-rich nature scenes.

Research on the Physiological Benefits of Nature Sound Exposure & Stress Recovery

The 2010 study from Stockholm University examined the impact of environmental noise; nature and urban sounds. Adults experienced brief mental stressors interspersed between sounds of road traffic noise or nature sounds.
Research on the Physiological Benefits of Nature Sound Exposure & Stress Recovery

Those who had nature background noise recovered faster from mental stressors with more rapid normalization of physiological markers.

Researchers have determined that listening to recorded bird sounds early in the morning can also:

1) lift mood and decrease fatigue
2) reset normal production of melatonin (sleep hormone)
How Do Nature Sounds Effect the Brain?

Shinrin-yoku experts Miyazaki and Juyoung Lee (yyyy) demonstrated that nature sounds:

1) cause blood flow changes to the brain similar to that induced during relaxation

2) are the opposite of what occurs during mental stress or mental fatigue
Shinrin-yoku experts Drs. Yoshifumi, Miyazaki and Juyoung Lee (yyyy, Chiba University) demonstrated that nature sounds (i.e. sounds of a creek):

1) Cause blood flow changes to the brain (similar to that induced during relaxation)
2) These blood flow changes are the opposite of what occurs during mental stress or mental fatigue
XXX and XXX examined the effect of natural sound in hospital settings:

- **Methods**

- **Results:** exposure to natural sound has been associated with
  1) better sleep in patients post cardiac surgery
  2) lowered stress hormones during surgery
  3) pain reduction during bronchoscopy

Recommendations based on studies: (i.e. Research published in Psychological Medicine in 2006 suggests that using a light box (10,000 lux), a birdsong melody mix on CD, or a negative ion–generating machine...
Forest Bathing in Japan
Cognitive Benefits of Nature Exposure: Executive Attention

### subjects participated in 35 minutes of challenging brain games designed to induce mental fatigue similar to that of a typical work day.

Then researchers led participants on a one hour walk:

1) one group in a vegetation-rich park
2) another on city streets
Cognitive Benefits of Nature Exposure: Executive Attention

After the walk, the cognitive tests were repeated.

Participants who went on a “nature” walk showed significant improvement in the ability to sustain attention through the repeated brain games.
Experimental studies by Name & name (yyyy) have shown that phytoncide produced from trees can:
1. lower the production of stress hormones
2. reduce anxiety
3. increase pain threshold
4. increases the antioxidant defense system
5. improve immune function (correlations found between air quality and immune function)
6. enhance production of gamma-aminobutyric acid (GABA)
7. increases production of serotonin (mood-regulation)

Higher levels of airborne phytoncide cause increased production of anticancer blood proteins and increased NK cells (active immune system cells)
Brief exposure to nature can reduce stress hormones and improve immune defense.
Screen Time

Green Time

↑ cyber-based overload  =  ↑ stress  ↓ health

(perceived cyber-based overload  =  self-reports of greater stress, poorer health)
Researchers Name & name (yyyyy) examined the “screen time” of over 10,000 healthy young adults for six years.

Participant spending the most screen time (xx%) (i.e. television, Internet) were over 30% more likely to develop a mental health disorder.

Those in the study who were the most physically active decreased their odds of a mental health disorder by 28%.
Moderate levels of physical activity are associated with positive psychological well-being.

Like Nature Exposure, exercise provides a buffer against stress. Those who report regular exercise are more resilient to illness during times of elevated stress.

Moderate Levels are those in which you can still carry a conversation:

- a brisk walk
- gardening
Subjects were reported to direct thoughts to the outside world during forest running, rather than internally focused thoughts.

Internal thoughts (i.e. focus on thoughts of fatigue, time passing, physical stressors) increase perceptions of fatigue and physical symptoms that often interfere with maximum and sustained effort during exercise.
Miyazaki & Motohashi (1990) also analysed mood changes and differences in objective stress physiology of exercise that involved nature exposure.

The subjects walked for 40 minutes in a Yakushima forest setting then on a treadmill in a laboratory.

Subjected reports comparing forest to indoor exercise showed:
1. elevated mood and vigor
2. reduced fatigue, tension and anger
3. reduced blood pressure and cortisol levels
How Does Nature Exposure Increase Physical Effort?

Pennebaker & Lightner (1980) examined the impact of environment on performance of novice runners.

Adults alternated both wooded and non-wooded 1,800 meter courses over a 10-day period.

Jogging in the wooded trails resulted in:

1. faster completion times
2. more satisfaction
3. more enjoyment
4. less frustration
Repeated in 2011, name & name reported similar results, reporting nature exposure and exercise leads to a “happier, less-tired individual who is ultimately burning more calories

Recommendations:
• 5 minutes of greenspace exercise, several times per day, at a light intensity can have mental benefits

• Set short-term Goals: Activity 5 days per week for 20 min
  - build as tolerance and motivational gains increased

• Setting and reaching long-term goals of 45 minutes (walking) or 38 minutes (jogging) has been shown to have a healing impact on depression and other mental health issues.
Fewer green resources?
(or just hidden!)
Dr. Martha Sanchez-Rodriguez (2006) reported urban residence is risk factor for cognitive impairment through the aging process.

The team compared groups of healthy, well-nourished urbanites and rural controls 60 to 80 years old, found:

1. Cognitive impairment was up to 5 times greater in urban areas

2. Urban residents had higher blood markers of oxidative stress (linked to cognitive impairment)

3. Rural residents scored better on mental tests used to evaluate cognitive decline impairment due to aging
The study by name & name (2011) showed that participants with the highest level of emotional stress showed the most cognitive and emotional gains from the “green exercise experience”.

Get outdoor exercise image
Focus in Research Turns to Long-Term Effects of Nature Exposure

Studies have already shown that walking in a forest environment (versus in an urban environment) is associated with a significant elevation in the neurosteroid dehydroepiandrosterone (DHEA) which:

1. encourages nerve growth factor production
2. preserves cognitive sharpness through the aging process

- Healthy older adults with highest levels of brain nerve growth factors more resilient against cognitive decline
“when inflammatory chemicals are elevated at even low levels in otherwise healthy, well-adjusted adults, depressive symptoms, anxiety, and brain fog are often the end result. Mental health disorders and cognitive decline are associated with ongoing low-grade inflammation, or as researchers call it, neuro-inflammation”
Opening line about “inflammatory chemicals are elevated” through everyday life stressors….LDL oxidation (risks) vs LDL levels (benefits)…ratio prevalence (H:G…25:1)

Over time this causes neuro-inflammation and can increase the risk of:
- Mental health issues and disorders
  (i.e. depressive symptoms, anxiety)
- Cognitive decline
  (i.e. difficulty with concentration/focus)
- Neurological Disorders
  (i.e. decreased ability of the brain to protect and repair damage)
“The lack of sufficient antioxidants can cause oxidative stress to alter the structure and function of delicate nerve cells.”

**Anti-oxidants:**
- anti-oxidants regulate the production of harmful free radical production (oxidative stress from normal day-to-day living and breathing).
  - benefit
  - benefit

**Found in:**
- 
- 
- 

**Recommendations:**
Other interventions have been found that alter cognitive performance, such as glucose consumption, which can improve performance on cognitive and self-regulatory tasks and worsen performance when glucose is depleted (Gailliot et al., 2007).

The 2010 Study from the University of Technology (Sydney, Australia):

*People who had a plant in their everyday view had reduced:*

1. Anger, depressive thoughts, fatigue down about 40%
2. Stress down about 50%
3. Those without stress indicators rose over 20%
Canadian researchers evaluated the psychological effects of walking different routes taken by young adult volunteers:

Walking for just 15 minutes through green space was associated with more positive mental outlook, which in turn facilitates a sense of *nature relatedness*. 
You Get What You Celebrate:

Our Worldview or Outlook on Life is a Product of:

CELEBRATION
RHEUMANATION
Canadian researchers evaluated the psychological effects of walking different routes taken by young adult volunteers:

Walking for just 15 minutes through green space was associated with more positive mental outlook, which in turn facilitates a sense of nature relatedness.
Bruce Trails
Rattle Snake Point
Getting to the Bottom of……
There may be a payoff to both personal mental well-being and environmental efforts by raising awareness of potential psychological benefits of local green space and its biodiversity.

Canadian researchers have recently reported that contact with nature can foster positive mood state, which in turn facilitates a sense of nature relatedness. The researchers evaluated the psychological effects of walking different routes taken by young adult volunteers - one through buildings and tunnels and the other outdoors through mixed green space - to specific locations in and around the campus. Walking for just 15 minutes through green space, as expected, was associated with more positive post-walk mental outlook.

However, the researchers also discovered that the university students were unable to forecast, prior to the walks, that taking differing indoor and outdoor routes could influence mood [94]. A lack of anticipation of benefits derived from urban nature might be cause for alarm, particularly if there is indeed a legitimate displacement of nature-based contact via the omnipresent screen.
Although the erosion of our connection to nature may be obscuring its perceived benefits, and research does show that young adults in university settings continue to have minimal awareness of and concern about global climate change and other environmental issues [95], there is reason for optimism - critically, the researchers also showed that walking in nature lifted mood, and mood elevation via nature exposure appears to increase relatedness to nature. The researchers refer to this as a happy path to sustainability, a cycle that can be maintained by fostering awareness that nature has the potential to influence mood [94].
The Macro/Micro of Sustainability and Being Green

Points on:
Community involvement
Increased Purpose, meaning and role
Increased ownership over your environment
Connecting to those seen and unseen

My Main point:
https://www.youtube.com/watch?v=0pEU8Q9uglc

Being a part of nature – emerged and connected gives a sense of connection to a greater world, purpose and good – like family
Overview of the Benefits of Nature Exposure:

• Cognitive/Perceptual
• Emotional/Psychological
• Physical/Physiological
Although the erosion of our connection to nature may be obscuring its perceived benefits, and research does show that young adults in university settings continue to have minimal awareness of and concern about global climate change and other environmental issues [95], there is reason for optimism - critically, the researchers also showed that walking in nature lifted mood, and mood elevation via nature exposure appears to increase relatedness to nature. The researchers refer to this as a happy path to sustainability, a cycle that can be maintained by fostering awareness that nature has the potential to influence mood [94]....worthy of efforts of preservation
Basic Outline for putting presentation together

What Does Nature Offer? (mostly studies)
- cognitive enhancement
- elevated mood/feeling of well-being
- enhanced recovery and coping with life stress
- re-establishing a sense of connection, belonging, meaning and purpose in the community and world (micro/macro)

How are We Missing Out: the adverse effects of nature deprivation
- Green Time vs Screen Time
- greater demands: decreased coping + increased multi-tasking + less recovery time/resources

How Can We Add Nature to Our Everyday Life...How Can We Take Back the Benefits??
(relevant for health prof, care givers, “patients”)
- fewer green resources? (or just hidden!)
- Reconnecting through Sustainability (here goes the bit re the wayfinder’s walk)

Where, how and how much?
Pragmatic tips re minimal and optimal levels of natural exposure for:

- cognitive enhancement  depression
- anxiety           general maintenance of mental/cognitive health
Overview of Natural Foods That Aid Brain Health
Overview of Natural Foods That Aid Brain Health
Sample

Study title

Methods:

Results:

Statement
Study title

Methods:

Results:

Statement