

**Growing up in the Inner City**  
 Research Evidence and Potential Applications  
  
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 Landscape and Human Health Laboratory  
 University of Illinois, Urbana-Champaign

A little about me...

- ❖ Researcher
  - ❖ Environment and behavior, landscape design
- ❖ Instructor
  - ❖ Landscape Graphics & Design
  - ❖ Perennials
  - ❖ Children & Nature
- ❖ Parent

Children's *physical* environments  
 Supporting development?

Physical environments & children's healthy development

Remember the languishing bean seed...?



Kids are always growing,  
 whether their physical environments are  
 supporting them *or not*

Contact with nature & children's healthy lifestyles

Supportive physical environment ⇒ Healthy day-to-day functioning ⇒ Healthy development into young adults

Children's healthy lifestyles  
 How can communities foster healthy day-to-day functioning in children?

## Children's healthy lifestyles

How can communities foster healthy day-to-day functioning in children?

Provide frequent (daily?) contact with green spaces

## Norwegians know this

- ❖ You value time outdoors as an important part of healthy development
- ❖ Empirical evidence backs up what you believe
- ❖ The evidence can guide urban planning

We need frequent contact with green spaces



## Humans and urban living

Greenspace as accessory?

Or....

Greenspace as *necessity*

*Why greenspace is a necessity*  
Research evidence

## Overview

*Why greenspace is a necessity*

1. Why does nature help?
2. What we studied
3. What we found
4. What this means for families and communities

## Why does nature help?

### Why does nature help?

*Attention Restoration Theory*

being in nature is mentally restorative



## Attentional fatigue

- ❖ Something we all experience!
- ❖ Information overload drains our attentional capacity
- ❖ Your capacity to direct your attention is crucial

*Attention Restoration Theory*

We need to frequently restore our attention from fatigue

How do YOU restore when mentally fatigued?

Theory

**Two types of attention**

Directed attention

Involuntary attention

Theory

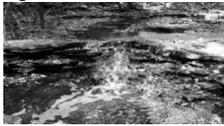
**Directed Attention** (*effortful*)  
necessary for daily activities

**Finite capacity**

Theory

**Involuntary attention** (*easy*)  
watching fire, moving water, wildlife

Does not fatigue



Attention Restoration Theory

Natural settings

■ engage our *involuntary attention* (easy)

■ REST our *directed attention* (effortful)

*Nature can foster...*

attention restoration in fatigued children, students

attention restoration in fatigued adults

attention restoration...

translates into

- ❖ Improved focus and learning
- ❖ Improved mental functioning, productivity
- ❖ Reductions in aggressive behavior, impulsive behavior



*Theory of Loose Parts*

*Theory of Loose Parts*

*"In any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportional to the number and kind of variables in it."*

Nicholson, S. (1971). How not to cheat children: The Theory of Loose Parts.

*The Loose Parts Theory* - not limited to nature

Natural environments in some ways superior provide many **loose parts**

- ❖ leaves and twigs
- ❖ nuts and berries
- ❖ rocks and shells
- ❖ flowers to pick
- ❖ Water to scoop and splash
- ❖ Sand to move, etc.

### Snails



A snail 'boat'

Construction and experimentation are possible with natural materials




Creativity - fostered when we *design and manage* spaces to provide accessible loose parts

### Fostering creative play in today's communities –

Time Magazine  
Aug 9, 2010



**Life**  
A CHILDREN'S WORLD

**Building a Better Playground.** Swings and slides don't foster much creativity. Why aren't we joining the loose parts revolution?

## What we studied

### What we studied

*Day-to-day functioning*

- Self-discipline
- Concentration
- Impulse control
- Delay of gratification



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- Play and creative forms of play



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Day-to-day functioning

- Self-discipline
  - Concentration
  - Impulse control
  - Delay of gratification
- Play and creative forms of play
- Access to / interaction with adults
- Attention Deficit & Hyperactivity Disorder (ADHD) symptoms



### What we studied

Day-to-day functioning

- Self-discipline
  - Concentration
  - Impulse control
  - Delay of gratification
- Play and creative forms of play
- Access to / interaction with adults
- ADHD symptoms
- Adults' functioning



### What we studied

Greenspace

- Tree cover
- Grass cover
- Residential space greenness
- Play space greenness
- Activity setting greenness



### What we studied

Greenspace

- Private spaces (e.g., private residential yard)
- Public / common spaces (e.g., public housing courtyard)
- Greenness of space around home
- Greenness of views from home

### What we studied

Techniques

- Performance measures
- Parent ratings
- Raters blind to hypothesis
- Within and Between Subjects design
- Statistical testing
- Testing for alternative mechanisms

- Many participants
- Many settings
- High vs. low green conditions
- Conditions otherwise identical

### What we found

### What we found

Greenspace & healthy functioning

- Findings:
- Statistically significant
  - Build on theory (*Attention Restoration Theory*)

### What we found

Barren & green courtyards

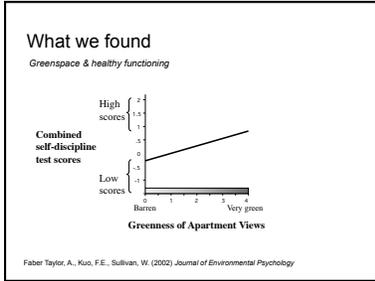
Chicago Public housing



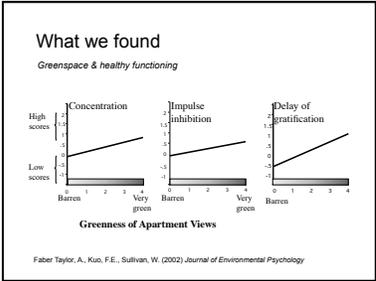
A green view  
 makes a measurable difference  
 in functioning

What we found  
*Greenspace & healthy functioning*  
**Psychological functioning - children**

What we found  
*Greenspace & healthy functioning*  
**The greener the view  
 the greater girls' self-discipline**  
 Faber Taylor, A., Kuo, F.E., Sullivan, W. (2002) *Journal of Environmental Psychology*



What we found  
*Greenspace & healthy functioning*  
 On average, the greener a girl's view from home:  
 ❖ the better she concentrates  
 ❖ the less she acts impulsively  
 ❖ the longer she delays gratification  
 7-12 years old



What we found  
*Greenspace & healthy functioning*  
**Psychological functioning - adults**  
 ↑ Cognitive functioning  
 ↑ Management of major life issues  
 ↓ Aggression  
 ↓ Violence  
 www.lhhl.illinois.edu

What we found  
*Greenspace & healthy functioning*  
**Social functioning - adults**  
 ↑ Strength of community  
 ↑ Courtesy, mutual support  
 ↓ Graffiti, noise, litter  
 ↓ Loitering, illegal activity  
 ↓ Property Crime  
 ↓ Violent Crime  
 www.lhhl.illinois.edu



**What we found**  
*Greenspace & healthy functioning*

**Green common spaces:**

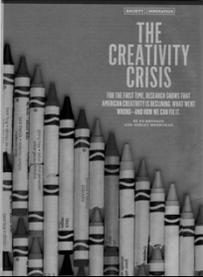
- ❖ Twice as much play
- ❖ more creative play
- ❖ No difference in other activities

Inner city, low SES, ages 3-12

Faber Taylor, Wiley, Kuo, Sullivan, (1998) *Environment & Behavior*

Creative play is important - maybe now more than ever

Newsweek  
 July 19, 2010



**What we found**  
*Greenspace & healthy functioning*

**Green common spaces: more accessible adults**

Inner city, low SES

Faber Taylor, A. Wiley, Kuo, Sullivan, (1998) *Environment & Behavior*

**What we found**  
*Greenspace & healthy functioning*

**ADHD**

a **neurobiological disorder** characterized by developmentally inappropriate impulsivity, inattention, and in some cases, hyperactivity.

9.5% 4-17 yr olds diagnosed in U.S.  
(<http://www.nimh.nih.gov/science/news/2011>)

Prevalence and treatment increasing in Norway, but lack of agreement regarding numbers

**What we found**  
*Greenspace & healthy functioning*

Children with ADHD – Midwestern U.S.

**What we found**

**Play environments**



"Places where there are big trees and grass"

**What we found**

**Play environments**



"Places indoors where it feels very much outdoors"

**What we found**  
*Greenspace & healthy functioning*

Frequent play in greener spaces → less severe ADHD symptoms overall

Children with ADHD - Midwestern U.S.  
 7-12 years old

**What we found**  
*Greenspace & healthy functioning*

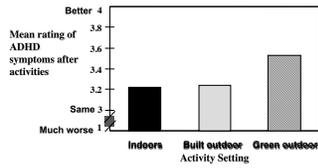
Activities in green settings → reduced ADHD symptoms

**Post-activity**

Children with ADHD - Midwestern U.S.

### What we found

Greenspace & healthy functioning



Faber Taylor, A., Kuo, F.E., Sullivan, W. (2001) *Environment & Behavior*

### What we found

Greenspace & healthy functioning

Children with ADHD - **Nationwide U.S.A.**

(over 450 participants)

### What we found

Greenspace & healthy functioning

Frequent play in greener spaces → less severe ADHD symptoms overall

Children with ADHD - **Nationwide U.S.A.**

Faber Taylor, A., & Kuo, F. (2011) *Applied Psych: Health & Well-being*

### What we found

Greenspace & healthy functioning

Children who typically play in greener spaces have less severe ADHD symptoms overall...

*Even when family income level is controlled*

Children with ADHD - **Nationwide U.S.A.**

### What we found

Greenspace & healthy functioning

Activities in green settings → reduced ADHD symptoms

Post-activity

Children with ADHD - **Nationwide U.S.A.**

### What we found

Green activity settings related to better attentional functioning

❖ Regardless of:

Community size (rural to large city)

Region of the U.S.

Gender

Age (5-18)

Severity of symptoms

Kuo, F.E., Faber Taylor, A. (2004) *Amer. Journal Public Health*

### What we found



Field study –

Controlled walks through

- ❖ park
- ❖ neighborhood
- ❖ downtown

### What we found

After a walk in PARK  
higher scores - measure of attention  
than after neighborhood or downtown walks

### What parents say...

Greenspace & healthy functioning

“...my son can fish for hours and afterwards his symptoms are hardly noticeable.”

- parent of child with ADHD

What parents say...

"...two weeks camping in a pop-up camper is just bliss. We have a great time. He's great."

- parent of child with AD/HD



What we found



Summary

Trees / greenspace	Healthy functioning	Populations
Views from apartment	"Self discipline" Concentration	Low SES Middle SES Upper SES
Overall home greenness	Impulse control Delay of gratification	Children with AD/HD
Play space greenness	Play & creative play	Children with regular attention function
Public/common space greenness	Adult supervision	
Activity setting greenness	Reduced AD/HD symptoms	

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University of Illinois

Summary others' research

Nature - health link in children

Residential nature - attentional functioning (Wells, N.)

Residential nature - coping with stressors (Wells, N. & Evans, G.)

Residential nature - lower obesity rates (Liu, Bell, et al., 2007)

Residential nature - lower asthma rates (Lovasi, 2008)

Summary others' research

Nature - health link in children

Daycare nature - attentional functioning (Graham, P., 1997)

Schoolyard nature - better outcomes high school (Matsuoka, R., 2010)

Summary others' research

Future stewards

Childhood experiences of nature (bonding) → pro-environmental ATTITUDES and BEHAVIORS as adults

Wells, N. & Lekies, K. 2006;  
Chawla, L. 2007

Summary

Evidence suggests

trees / green space support:

- Healthy day-to-day functioning
- Healthy development & outcomes
- Future stewards of the earth



What this means

Implications for design and urban planning...

Design and urban planning

Trees / green space -

a *necessity* for supporting

- ❖ Children's healthy development
- ❖ Adults' healthy functioning

A *necessity* for our cities

Children and adults' daily experiences  
of nature are valuable

It DOES make a measurable difference.

A *necessity* for our cities

Even a few trees and  
grass make a  
difference in intensely  
built environments



Design and urban planning

Intensely urban areas need greenspaces:

- ❖ frequently
- ❖ easily accessible
- ❖ woven into everyday life
- ❖ variety of forms



Design and urban planning

Intensely urban areas need green spaces:

Where adults and children

- ❖ Work
- ❖ Live
- ❖ Play

Greenspaces where adults and children  
**Work**

Children 'work' at school and daycare

Greenspaces where adults and children  
**Work**

Children 'work' at school and daycare

"Green" schoolyards and daycare centers

- ❖ for recess
- ❖ class activities
- ❖ outdoor learning
- ❖ within view from classroom, cafeteria?

Schoolyard green spaces for:

- relaxation
- attention restoration





Schoolyard green spaces for: Play



Schoolyard green spaces for:

- food production
- science lessons

### Greenspaces where adults and children Work

Adults often work in intensely built settings

Do they have a view of greenspace?

Can they take a break in greenspace?

(e.g., Shin WS. The influence of forest view through a window on job satisfaction and job stress. *Scand J Forest Res*.2007;22(3):248-53.  
Kaplan, R. (1993). The role of nature in the context of the workplace. *Landscape and Urban Planning*, 26, 193-201.)



### Greenspaces where adults and children Live

Daily doses' appear to be beneficial

Weave green spaces into daily routines

- ❖ Traveling routes
- ❖ Quick trip after school or work
- ❖ Pre-homework, especially children with ADHD

(e.g., Maas, J., Verheij, R.A., Vries, S., Spreeuwenberg, P., Schellevis, F.G., Groenewegen, P.P. (2009) Mobility is related to a green living environment. *J Epidemiol Community Health*, 63, 1-7.)

### Design and urban planning

Intensely urban areas need green spaces

within view from inside the:

- ❖ home
- ❖ hospital
- ❖ long-term care facility

(Ditch, B.(2004) View through a window may influence recovery from surgery. *Science*, 324, 420-421.  
Teasdale, C.M., Clapperton, B.(1995) Views to nature: effects on attention. *Journal of Environmental Psychology*, 15, 73-88.  
Kaplan, R. (2001). The nature of the view from home: psychological benefits. *Environment & Behavior* 33, 507-542.)

### Greenspaces where adults and children Play



Greenspaces where adults and children  
Play

Design greenspaces compatible with  
'real life' schedules

It is not enough to tell adults,

"Greenspace is good for you, good for  
your kids, you should go there"

Greenspaces where adults and children  
Play

Community design should make  
greenspace:

- ❖ attractive to parents
- ❖ supportive of parents' needs (benches,  
bathroom, drinking water)
- ❖ easy to get children there (consider traffic  
barriers, bike paths, etc)

"People do not usually compensate for  
lack of green environments in their own  
residential area with more visits to public  
parks or urban forests."

"...laying out more green areas close to apartment  
houses, and making these areas more accessible, could  
make for more restorative environments. Outdoor areas that provide environments  
free from demands and stress, and that are available as part of everyday  
life, could have significant positive effects on the health of town-dwellers in  
Sweden."

Grahn, P., & Stigsdotter, U.A. (2003). Landscape planning and stress. Urban Forestry  
and Urban Greening, 2(1), 1-18



"These trends and these profound disconnects  
from nature...suggest the time is ripe to revisit  
how we design and plan our communities and  
cities."

Timothy Beatley (2011) *Biophilic Cities: Integrating Nature into  
Urban Design and Planning*

*Perhaps more than just sustainable cities, we  
need nature-rich cities*

Richard Louv, 2013



Intensely urban areas need green spaces...

incorporating characteristics of  
restorative environments (restore from mental fatigue)

- ❖ Soft fascination
- ❖ Sense of being away
- ❖ Extent
- ❖ Compatibility

Design for *soft fascination* -

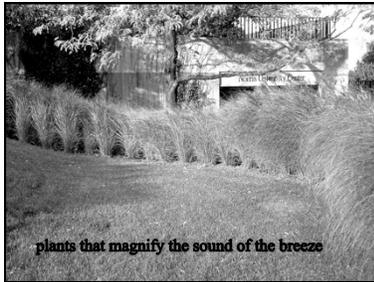
benches and foot bridges, natural materials - foster lingering and reflective  
thinking



Design for *soft fascination* -

attracting birds and other wildlife





*To foster restoration from mental fatigue...*

Design with 4 characteristics of restorative settings:

1. Soft fascination
2. Sense of being away

Kaplan, Kaplan, & Ryan (1998) *With People in Mind: Design and Management of Everyday Nature*. Island Press.



*To foster restoration from mental fatigue...*

Even just a *view* out of an office window, or home, can provide a momentary

**Sense of being away**

Kaplan, Kaplan, & Ryan (1998) *With People in Mind: Design and Management of Everyday Nature*. Island Press.

*To foster restoration from mental fatigue...*

Design with 4 characteristics of restorative settings:

1. Soft fascination
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3. Extent

Kaplan, Kaplan, & Ryan (1998) *With People in Mind: Design and Management of Everyday Nature*. Island Press.

*To foster restoration from mental fatigue...*

In addition to "sense of being away" a space needs

Extent – depth, no signs of everyday life, or feels like whole different place

- ◆ Looking through a microscope
- ◆ Small but richly planted backyard



*Gateways and Partitions*

*To foster restoration from mental fatigue...*

Design with 4 characteristics of restorative settings:

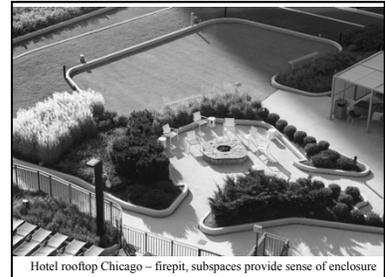
1. Soft fascination
2. Sense of being away
3. Extent
4. Compatibility

*To foster restoration from mental fatigue...*

Compatibility = nothing working against desired actions / inclinations

- ◆ Domestication
- ◆ Observation
- ◆ Fire building
- ◆ Constructing shelter
- ◆ Locomotion
- ◆ Predation (fishing & hunting)
- ◆ Gathering?

Design for *compatibility*-  
locomotion and fire building



Hotel rooftop Chicago – firepit, subspaces provide sense of enclosure

Useful design guidelines  
for restorative  
environments

*With People  
in Mind*



DESIGN AND MANAGEMENT OF EVERYDAY NATURE

RACHEL KAPLAN, STEPHEN KAPLAN,  
AND ROBERT L. RYAN

Use the research publications  
to leverage for adding / preserving  
greenspaces

Empirical evidence propels greening



Chicago, IL

*Chicago Tribune*

◆ *growing evidence...  
trees can help temper  
social ills*

◆ **20,000 trees -- more  
than ever in Chicago's  
history**

Some resources  
 Our research  
[www.lhhl.illinois.edu](http://www.lhhl.illinois.edu)  
  
*The Children and Nature Network*  
[www.childrenandnature.org](http://www.childrenandnature.org)  
  
*Evergreen*  
[www.evergreen.ca](http://www.evergreen.ca)

Useful summary of research

Parks and Other Green Environments: Essential Components of a Healthy Human Habitat  
 National Recreation and Park Association

Where LFCCS are planted, communities grow.

www.lhhl.illinois.edu

KIDS & CONCENTRATION

Kids who spend more time outside end up paying more attention inside.

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

A *necessity* for our cities

We can't "fix" all the stressors families endure...

... we CAN make it easy for them to put themselves in supportive environments

We need contact with nature in everyday living

In America I quote you ...

"There is no bad weather, ...just bad clothing"

Scandinavian saying