

Restorative environments: Theory and research

On behavioral changes resulting from
spending time in specific environments

Nature as a Restorative Agent

- Central Park, New York: Created because one believed that nature was important to people's emotional and physiological health
- As most people today live in urban settings, nature may be even more important than earlier

Motives and benefits associated with nature

- Cognitive freedom
- Escape
- Experience nature
- Growth
- Challenge
- Guidance
- Social
- Health
- Self-control
- Eco-system connectedness

Identity, Connectedness, and Nature

- Environmental identity: How deeply we identify with nature
 - When nature becomes associated with the self, we may be motivated to protect it as we would protect ourselves
 - "Loving nature to death"?

Mental fatigue as a problem in modern society: Negative consequences

- Aggressiveness
- Less tolerance
- Reduced sensitivity to social signals
- Less helpfulness
- Reduced self-control
- "Chronic Fatigue Syndrome"

Current theories on restorative environments

- Focus on conditions that make restoration necessary
- Focus on urbanites who seek nature in order to recover/ "recharge the batteries"

Early research on health effects of nature

- The quality of the view from the window as a factor in the recovery of hospitalised persons (Verderber,1986)
- The view of nature as important for recovery after surgery (Ulrich,1984)
- Clear relation between prisoners' use of health services and the view from the cell window (Moore,1981)

Theories on restorative environments

- What is being restored?
- How is the process of restoration described?
- Descriptions of restorative environments
- A resource must have been depleted, such as the ability to maintain or improve adaptation to the the environment

The process of restoration

- A number of processes leading to renewal or recovery of adaptive resources or abilities
- The processes are of a psychological nature
- The theory should define the restorative process in terms of the resources being restored and the psychological, physiological and/or social mechanisms at work
- How much time is needed for recovery?

Description of restorative environments

- A theory of restorative environments should be able to predict changes resulting from spending time in specific environments

Roger Ulrichs theory: Psychophysiological recovery from stress

- Preceding state: Stress
 - Reaction to challenge or threat to well-being/survival
 - Assumes an innate emotional response leading to "fight or flight"
 - Mobilisation of necessary resources
 - Indications:
 - Negative emotions
 - Activation of the autonomous nervous system

The process of recovery

- Exposure to scenes eliciting mild to moderate interest, well-being and calm, without a need to be "on the guard"
- Negative emotions are being substituted by positive, negative thoughts are blocked and activation of the sympathetic nervous system decreases

Restorative environments

- Restorative responses are switched on through attention to preferred environmental patterns:
 - Moderate complexity
 - Focal point
 - Natural elements: Vegetation, water (both are survival signals and elicit positive emotions)

Ulrich's theory: Empirical findings

- Measurement of emotional and physiological changes of relatively short duration
- Exposure to photographic simulations of natural and urban environments
 - Emotional and physiological results under or directly after exposure depended on the type of environments being exposed
 - Nature scenes resulted in decreased sadness and anger/aggression and increased positive emotions

Attention Restoration Theory (Kaplan & Kaplan)

- Preceding state
 - Depletion of the ability to inhibit competing stimuli in order to focus on something uninteresting
 - Leads to irritability, a lack of planning ability, reduced self control etc

The process of recovery

- Through the experience of *fascination*:
 - F. is effortless and has unlimited capacity
 - Lessens demands on the central inhibitory mechanism

Kaplan & Kaplans theory on restorative environments

- Preferred environments are also restorative because humans are assumed to be genetically prepared for processing of information that are typical of natural environments (Kaplan & Kaplan, 1989; Hartig, 1993).

Two types of attention (James, 1892)

- «Involuntary» attention
 - When attention is drawn towards something we experience as interesting
 - When something exciting or interesting happens and we focus upon it without effort
 - Restoration of mental energy
- «Voluntary» or directed attention
 - Focusing on something that does not draw our attention by itself

Kaplan & Kaplan's (1989) Attention Restoration Theory

- Mental fatigue: A consequence of "directed attention"
- "Involuntary attention":
 - Elicited by fascinating qualities found for example in natural environments
 - Restores the capacity for directed attention

Kaplan & Kaplan (1989): Four key components in restorative environments

- Being away
 - Involvement in cognitive content different from the usual
- *Extent*
 - *Experience of totality and meaning*
- *Fascination*
 - *Fascinating stimuli elicit involuntary attention*
- *Person – environment compatibility*
 - Matching the characteristics of the environment and the needs and behaviours of the individual

Comparing Ulrich and Kaplan & Kaplan

- Are the theories complementary?
 - Preceding states that are not necessarily interrelated
 - Ulrich: Psychophysiological stress
 - Kaplan & Kaplan: Failure of focused attention
 - Description of attention in natural surroundings
 - K&K: effortless
 - U: Unguarded
 - Differing implications: Attentional capacity versus physiological reactions
 - Different effects of recovery
 - Attentional versus physiological and emotional
- Probably simultaneous processes

Article 1:
THE RESTORATIVE BENEFITS OF NATURE: TOWARD AN
INTEGRATIVE FRAMEWORK

Article author: STEPHEN KAPLAN
Department of Psychology, University of
Michigan, Ann Arbor, USA

Main points

- Directed attention and its fatigue has far-reaching consequences.
- Introduces Attention Restoration Theory, as an explanation of the processes leading to recovery from fatigue.
- Natural environments as promotive of restorative experiences
- Proposes a framework integrating directed attention and stress in the context of human-environment relationships.

Background/point of departure

- Rapidly accumulating evidence on to the psychological benefits of nature but less developed theoretical understanding
- Theory has been dominated by conflicting positions: stress reduction versus recovery of the capacity to focus attention
- The purpose of this paper:
 - To propose an integration of the apparently conflicting positions mentioned above

Background for the concept of Directed Attention

- William James (1892): ‘voluntary attention’
 - Supporting a weak intention by protecting it from competing thoughts > inhibition of distractions
- Olmsted (1865): The need for urban dwellers to recover the capacity to focus
- Clinical neurology: Deficits in “Directed attention” (Mesulman, 1985) due to damage in prefrontal cortex and ‘executive functioning’

Directed attention fatigue and basic processes

- The mechanism of directed attention
 - Requires effort
 - central in focusing
 - under voluntary control
 - susceptible to fatigue
 - works through inhibition
- Evolutionary mechanism
 - In nature, being alert was more important than being able to contrate over time
 - Today the split between the important and the interesting has become extreme

Directed attention fatigue can have serious consequences

- **Selection:** Attentional capacity under voluntary control is essential for problem solving
- **Inhibition and affect:** An inhibitory capacity under voluntary control is essential for behaving appropriately
- **Fragility:** Susceptible to fatigue
- **Perception:** Impaired by lack of directed attention
- **Thought:** D.a. necessary for stepping back from the immediate situation
- **Action:** Lack of inhibition makes behaviour less adaptive and appropriate
- **Feeling:** Irritability, less willingness to help

The Restorative Experience: Involuntary attention/Fascination

- To rest directed attention, it is necessary to find other basis for maintaining focus, rendering directed attention temporarily unnecessary
- Involuntary attention (W. James) = Fascination (Kaplan & Kaplan)
 - effortless, thus resistant to fatigue
 - Allows directed attention to rest
 - Hard fascination: the city
 - Soft fascination: characteristic of natural settings

The Restorative Experience: Three additional components

- Being away: Conceptually or physically
- Extent: A whole other world
- Person-environment compatibility

Nature and the restorative environment

- Being away: Nature provides an opportunity
- Soft fascinations: clouds, sunsets, motion of leaves, water...
- Extent: Wilderness, Japanese gardens
- Compatibility: Functioning in nature require often less effort and allows many patterns

Nature and the restorative environment:
Empirical findings

- Hartig et al (1991): Wilderness group showed better performance on attention demanding task
- Hartig et al (1991): Exposure to nature after fatiguing task resulted in better subsequent performance
- Cimprich (1992, 1993): Attentional deficits in cancer patients improved after nature-based activities
- Tennessen & Cimprich (1995): Restorative benefits of natural view from dormitory window: More effective functioning in daily life

Toward an integration of stress-oriented and attention-oriented theories

- Point of departure: "Physiological and psychological stress reactions are interrelated, and do not occur alone" (Fisher et al, 1984)
- Three factors leading to stress
 - Direct
 - Perceptual pattern
 - ...or signal

Three patterns leading to both resource deficiencies and stress responses

1. Resource deficiency as precursor to stress
2. Stress leading to resource deficiency
3. Circumstances that simultaneously lead to stress and resource deficiency

Studies supporting the integrativ framework

- Bognen et al. (1990): Stress response may be due to ineffective coping with demands (i.e., resource depletion)
- Lundberg et al (1993): Stress responses interpretable as resulting from resource depletion

Conclusion

- Purpose of paper: Propose a framework that distinguishes between the stress-related and the attentional components that lead people to seek restorative experiences
- Points to two distinct but interacting benefits of restorative experiences: stress reduction and recovery from mental fatigue
- Points to the role of directed attention in coping with challenges

Article 2 RATING SCALE MEASURES OF RESTORATIVE COMPONENTS OF ENVIRONMENTS

KARIN LAUMANN, TOMMY GARLING
AND KJELL MORTEN STORMARK
Journal of Environmental Psychology (2001) 21, 31-44

Purpose of research

- Develop rating scale measures of the four components postulated by Kaplan and Kaplan (1989) in order to:
 - Evaluate Kaplan and Kaplan's (1989) theory by showing that the hypothesized components being away, extent, fascination, and compatibility are separate
 - Develop a measure of the restorative components

Earlier similar attempt (Hartig et al, 1996, 1997):
Hartig's PRS scale

- Did not consistently confirm the four-factor structure, as only two factors emerged.
- Laumann's purpose is to remedy the shortcomings of Hartig's PRS scale

Restorative components as preference predictors

- Kaplan & Kaplan (1989): a preferred environment is more likely to be a restorative environment'
- The measures of the restorative components would predict preferences for the environments

Study 1: Method

- Recalling environments from memory as an initial test of whether the measures could distinguish between environments differing in restorative capacity.
- Measures
 - Descriptive phrases were selected on the basis of Kaplan and Kaplan's (1989) description of the four restorative components
 - Pilot study: descriptors removed if they failed to show high correlations with other descriptors intended to tap the same component or if inclusion reduced Cronbach's alpha. Resulted in 38 unipolar rating scales
- Translation check

Study 1: Method

- Questionnaire
 - Seven step rating scale for each descriptor: not at all (0), very little (1), rather little (2), neither little nor much (3), rather much (4), very much (5), and completely (6)
 - Background questions; Age, sex, environmental experiences and preferences (nature vs city)

Subjects and procedure.

- Subjects: 321 Norwegian undergraduate university students
- Filled in questionnaire after lecture
- Questionnaire: two pages of rating scales
 - one for nature environment
 - one for city environment
 - Data analysed for 238 subjects; 93 men and 145 women, mean age 22.9 yrs.

Study 1: Results and discussion

- The most important data analyses in the study are a series of factor analyses which on the overall yielded very clear and unambiguous factor solutions. A word on the rationale behind the choice of extraction and rotation methods would be preferable.

Study 2 (n =177)

- A further test of how well the constructed instrument differentiates between environments with varying degrees of restorativeness.
- Five videos were developed from forest, park, sea area, city, snowy mountain, all assumed to exhibit various degree of restorativeness.
- Critique: Little information on the reasons for the sampling of environments are given

Study 2: results

- The factors identified differentiated between the environments
- Two nature environments, forest and sea area, were rated reliably higher on all restorative components than the city environment.
- The city was rated higher than the park on extent, fascination and compatibility.
- The park was rated higher on escape and novelty (being away)
- The park chosen probably a suboptimal example of this type of natural environment.

Conclusions: Both studies

- Samples: Convenience sample; a population which is close at hand is chosen
 - Representativity for the general population is unknown
 - Generalisability of the results is not known.
 - A follow-up in a representative sample is recommended.

Important contribution to the advancement of psychological research on restorative environments

- Instrument development: a serious, well-founded and successful attempt at constructing a valid measure of restorativeness of environments'
- A contribution to the methodological development in the field.
- Empirical findings: '
 - Test of Kaplan & Kaplan's theory of restorative environments. Confirmed theoretical assumptions that the restorative components of environments can be described in terms of fascination, extent, compatibility and being away.
 - The nature of fascination may differ in nature and city surroundings.
 - At least two outcomes of restoration: relaxation and cognitive restoration.

Summary

- The article reports findings from two studies with the aim of developing a set of rating scale measures of restorative components of environments.
- Study 1 (n=238): Subjects imagined themselves to be either in a nature environment or a city environment while rating scales intended to describe how they experienced the environments
- Study 2 (n=177) subjects viewed videos of a forest, park, sea area, city, and a snowy mountain, rating the same scales

Summary

- Results confirmed Kaplan and Kaplan's (1989) theory
- Being away factor split into two factors: 1. being physically away and 2. being psychologically away.
- Natural environments scored higher than city environments on all measures
- Compatibility and fascination predicted preference
- Escape and compatibility predicted relaxation.

Article 3
Selective attention and heart rate responses to
natural and
urban environments

Karin Laumann, Tommy Garling,
Kjell Morten Stormark

Journal of Environmental Psychology 23 (2003) 125–134

Assumptions and purpose

- Assumes that natural environments have properties that attract involuntary attention, allowing recovery from mental fatigue resulting from directed attention.
- Aims at empirical tests of:
 - Kaplan's (1995) theoretical integration of the ART
 - Ulrich's psycho-evolutionary theory.
- Employs Posner et al.'s attention – orienting task as a measure of selective or directed attention.
- An important question is whether the Posner task in fact is a good measure of involuntary and directed attention.

Design

- Experimental study conducted with a small group (n=28) of voluntary participants, assigned randomly to either a nature or an urban environment group
- Innovative and elegant design.
- The procedure is very clearly described assuring replicability.

Design

- Environmental simulations (videos) developed on the basis of findings reported in Laumann et al 2001)
- Natural environment: Same waterfront environment as in the 2001 study because it scored particularly high on restorative components: Sounds from waves, birds, insects and boats passing by
- Urban environment recorded: Oslo, including a walk along a main pedestrian street ending up at a bus station. Sounds from cars, people talking, construction equipment, street musicians.

Results

- Subjects who had been exposed to nature exhibited
 - 1) significantly longer IBI (lower HR) compared to the baseline for this group.
 - 2) significantly longer IBI (lower HR) during the video than during the baseline phase.
- Subjects who had been exposed to urban video did not exhibit any significant change in IBI compared to baseline phase.

Results

- The IBI findings suggest that exposure to nature had an arousal reducing effect, thus confirming Ulrich's predictions.
- Confirming ART: HR deceleration is an indication of a state of sensory intake and involuntary attention.
- Increased HR during mentally loading tasks also indicate that this task triggers voluntary attention and environmental rejection (i.e. an inhibitory mechanism)

Results

- Reduced arousal effect of exposure to nature: Important step further in understanding why nature is experienced as restorative and in connecting ART with psychophysiological theory.

Discussion

- The hypothesis that exposure to nature would result in less mental fatigue and thus a greater capacity for directed attention was not confirmed: Should the theory be revised at this point?
- The task employed in this study may not be the most adequate test of ART: More appropriate to apply tests of a broad attentional focus?

One possible weakness

- This is an experimental study, but there is no control group (but what should the control condition be?)
 - Two experimental conditions: nature and urban
 - Urban environments may have some restorative effect, thus the manipulation is not between a positive and negative condition

Summary

- An attempt at empirically testing Kaplan's (1995) theoretical integration of the ART and Ulrich's psycho-evolutionary theory
- Experimental study (n=28)
- Results
 - Clear effect of mental load: reduced Interbeat interval (IBI, a measure of increased heart rate)
 - Video exposure: Significantly larger increase in IBI (a measure of reduced arousal) for nature group than for urban group
- Hypothesis that exposure to nature would result in less mental fatigue and thus a greater capacity for directed attention was not confirmed

Article 4

Housing and Mental Health: A review of the Evidence and a Methodological and Conceptual Critique

Evans, G.W, Wells, N.M., Moch, A.
(2003)

Journal of Social Issues

Main points

- Research on housing and mental health is remarkably underdeveloped
- Critical review of existing research on the immediate residential space focusing on three dimensions
 - Housing type
 - Floor level
 - Housing quality
- Discussion of methodological and conceptual shortcomings, in particular moderators and mediators
 - A theoretical framework for future research
 - Policy implications

The literature review

- Research on each category (ex: housing type) is summarized chronologically in tables
 - Housing variables are characterised
 - Mental health outcome measures are described
 - Whether reliability and validity data are available is indicated
 - Main and interactive effects are described
- Brief summaries of general findings/trends, explanatory mechanisms, methodological issues

Housing Type

- Main findings
 - Multi - dwelling housing is associated with adverse psychological health
 - High - rise: More mental health problems
 - Single - family detached homes: Best in terms of mental health
- Explanations
 - High-rise: Social isolation, no access to play spaces
 - Multi-dwelling: Possible stigmatization / fear of crime
- Methodological problems:
 - Lack of control for confounding variables

Floor level of Dwelling

- Poorer mental health at higher floor levels
- Explanations
 - Anxiety about accident and falls, less social networks
- Methodological problems:
 - Self-selection bias
 - Ignores within - floor heterogeneity

Children's well-being

- High – rise: More behavioural problems, restricted play opportunities
- Possible explanations
 - (Inadequate) Parent – child relations
 - Monitoring and supervision (difficult)
 - Lack of contact with the natural environment
 - Safety concerns
- Methodological problems:
 - Unclear direction of causality: Self-selection

Overall housing quality

- Operationalizations
 - Structural deficiencies
 - Cockroach and rodent infestations
 - Dampness
 - Mold
 - Housing dissatisfaction
 - Neighbourhood comparisons
 - Comparisons of difficult to rent versus low – vacancy housing
- Findings:
 - Housing quality is positively correlated with psychological well-being
 - Housing quality may influence psychosocial processes that affect mental health
 - Inconclusive due to methodological problems

Unsupportive environments: The case of Pruitt-Igoe housing project

- Yancey (1971): Pruitt-Igoe in St.Louis , Missouri
- 43 11-storey buildings housing more than 12000 people
- A shocking example of extreme atomisation of residents
 - High degrees of hostility
 - No social support
 - 1970: 27 of 43 buildings were totally vacant,
 - 1972: the entire project demolished
- Eplanations:
 - The design of public space: lacking appropriate public and semi-public spaces
 - No defensible space: areas that can be regularly used and controlled by residents
 - Illustrated by a situation due to maintenance of one building
 - A fence around the building restricted acces to residents: Crime rates fell dramatically
- http://www.youtube.com/watch?v=cd7VOz_Wstg

Conceptual issues: Moderation

- Moderating processes (interaction effects) not taken into account in housing research
 - Personal variables
 - Social and physical context: Income level, neighborhood quality, SES

Conceptual issues: Mediation –psychological processes that might account for linkages between housing and psychological well-being

- Identity – house as symbol of the self
- Insecurity
 - involuntary relocation: negative impacts on children
 - Instability – affects socioemotional development
 - Insecure housing and poor health
 - Hazards in high rise buildings
 - Low visual access
 - Vandalism

Conceptual issues: Mediation

- Social support
 - Women in high-rise: More loneliness, less social contact
 - Design may influence social support
 - Instrumental forms of social support : access to neighbours with useful knowledge
- Parenting
 - Inadequate housing and restrictive parenting
 - rigid control
 - Lack of outdoor playground associated with several problems
 - Parents' self-esteem and self-efficacy is affected by housing problems
- Control
 - Housing quality and learned helplessness
 - Self-efficacy may be influenced by inability to control and regulate access to space etc
 - Duration of residency and frequency of moves

Mediator variables

- When a predictor variable and an outcome variable have a significant relationship, which is, in turn, influenced by a third variable, the relationship is said to be mediated by the third variable.
- In this relationship the predictor variable influences the mediating variable in a causal manner.
- This mediating variable then leads to the outcome, creating the relationship between the predictor and outcome. It is only because of this mediating variable that a relationship between the predictor and outcome exists.

Example: relation between single-parent home and substance abuse

- Being raised in a single-parent home can lead to increased exposure to stress and that increased exposure to stress, not being raised in a single-parent home, leads to substance abuse or dependence

Moderator variables

- A variable indicating the conditions under which a specific effect occurs as well as how the direction or strength varies within a given relationship
- Indicates that an effect only occurs under specific conditions
- "a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable" (Baron and Kenny, 1986, p. 1174)

Moderator variables

- The impact of the predictor variable on the outcome is dependent on the value of the moderating variable
- No causal inferences can be drawn from a moderated relationship; relationships can only be described as correlated.

Policy Implications

- Efforts should be made to reduce the height and overall size of multiple-family dwellings
- Particular attention should be paid to spaces to support neighboring, informal contact and adequate play spaces for children
- Need for more attention on mental health of the elderly in relation to housing and neighborhood characteristics
- Research should be focused on more rigorous evaluations of housing improvements for low-income families

Methodological issues: the problem of selection

- Those with poorer mental health will often be selected or drift into the least desirable environments
- Early studies were unable to distinguish between causation (by the environment) and (social) selection
- Social selection remains a serious issue in any study of relationships between health and the environment

Methodological issues:
The problem of response bias

- The perception and reporting of environmental variables is strongly influenced by the subject's mental state
 - The environment may cause mental health problems, or
 - The environment may be *perceived* as causing mental health problems (bad mood phenomenon)

Methodological alternatives

- Requirement: Must be able to distinguish among the effects of social, psychological and environmental factors
- Ideal: RCT – studies (randomised controlled trials) – not possible in the present context
- In reality, those with more resources end up in the best environments

Situations in which the link between income and housing quality is broken

- State subsidised housing is weakening the link low income – low quality housing
- Canadian public housing: assigned separately from the determination of rent: the higher your income, the higher rent

Methodological alternatives

- Statistically control for effects of known corellates of mental health, and examine the residuals for the influence of the environment
- Problem: The partialling fallacy - the real effect of the environment on mental health could be removed when controlling for other variables
- Environmental variables should be gathered independently of mental health measures

Employ longitudinal design with same subjects but changing environments

- Isolate the effects of a specific environmental change or factor, such as a sudden increase in noise levels
- Make investigations before and after onset of environmental problem, and compare to area without noise problems

Article 5: Faber Taylor, A., Kuo, F. & Sullivan, W. C. (2001).

Coping with ADD: The Surprising Connection to Green Play Settings. *Environment & Behavior*, 33, 54-77.

A study conducted by

**Andrea Faber Taylor, Frances E. Kuo,
and William C. Sullivan**

(Power point slides provided by the authors)

The University of Illinois at Urbana-Champaign
Human-Environment Research Laboratory
1103 S. Dornier Drive, MC-636
Urbana IL 61801

**Attention Deficit
Hyperactivity Disorder
(AD/HD) is characterized by
severe difficulties with
inattention and impulsivity.**

AD/HD symptoms include

- restlessness
- outbursts
- trouble listening
- difficulty following directions
- problems focusing on tasks

Why should we focus on AD/HD?

- AD/HD is relatively common, occurring in roughly 7% of school-age children.
- AD/HD is linked to poor academic performance.
- AD/HD can have long-lasting effects on social development.

New treatment options are needed for AD/HD because

- Behavioral therapies help, but not much.
- stimulant medications are better, but have several problems

Problems with stimulant medication:

- They often have serious side effects.
- They help only 9 out of 10 children with AD/HD.
- There is no evidence they improve long-term social and academic outcomes.

According to *Attention Restoration Theory*

- Nature is engaging, so attracts our attention effortlessly.
- This allows deliberate attention to rest.
- Restored deliberate attention is then available when needed.

•Since the underlying problem in AD/HD seems to be one of attention...

- **Perhaps exposure to nature can improve AD/HD symptoms?**

The participants:

- 96 parents or guardians of children with AD/HD aged 7-12
- recruited through ads and flyers in the Midwest
- ratio of boys to girls in sample same as in AD/HD populations in general (3:1)

The survey asked parents to

- nominate activities that especially affected functioning – “best activities” and “worst activities”
- rate the aftereffects of activities, grouped by setting, on symptoms
- The relationship between greenness of activity settings and symptom severity was examined.

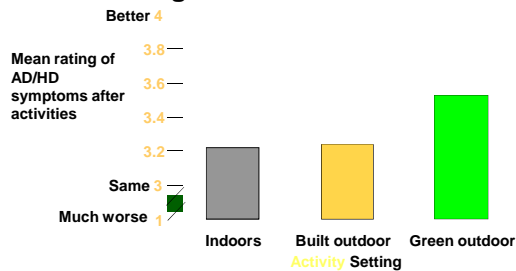
Was there a relationship between activities that most affect functioning and the greenness of their setting?

Likely settings of activities nominated as “Best” and “Worst” for AD/HD symptoms

Likely Setting	Best	Worst
Green (e.g., fishing, soccer)	85% (17) ↙	15% (3)
Ambiguous (rollerblading, playing outside)	56% (43)	44% (34)
Not Green (video games, TV)	43% (53)	57% (69) ↘

Was there a relationship between greenness of activity setting and ratings of post-activity symptoms?

Mean symptom ratings for activities in different greenness settings



Tips for parents, teachers, and caregivers:

- Encourage children to play outside in green yards or parks and advocate recess in green schoolyards.
- Observe which activities and settings improve children's symptoms.
- Value and care for trees.

Article 6: Faber Taylor, A., Kuo, F.E., Sullivan, W.C. (2002). Views of nature and self-discipline: Evidence from city children. *Journal of Environmental Psychology*, 22, 49-63.

(Power point slides provided by the authors)

Main message

Girls with a view of nature at home scored higher on tests of self-discipline

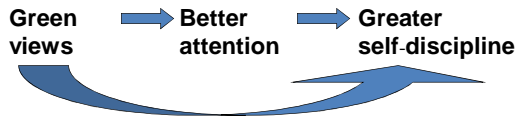
Inner-city girls are prone to risky behaviors:

- academic underachievement
 - juvenile delinquency
 - teenage pregnancy
 - substance abuse
 - To avoid these problem behaviors, girls need to have self-discipline
- Daily exposure to greenery may boost girls' self-discipline

Self-discipline exists in three forms:

- concentration
- impulse inhibition
- delay of gratification

The following study explored whether exposure to greenery does lead to greater self-discipline in children.



The Robert Taylor Homes (Chicago) were chosen as a research site because

- buildings are similar; only the quantity of nearby vegetation differs
- residents are randomly assigned to buildings
- residents have similar characteristics

The participants were

- recruited by door-to-door interviewers
- 169 mother or primary care-giver and child (7-12 year old) pairs
- from 12 buildings that represented the full range of amount of nature visible from home

Data collection

For each mother-child pair, the trained resident interviewer

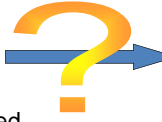
- asked the mother or care-giver to give both a “green” rating and a “built” rating of their apartment’s views.
- administered standardized tests of self-discipline to the child

Data collection

The standardized tests included tasks that measured the ability to

- concentrate
- inhibit impulses
- delay gratification

Green views

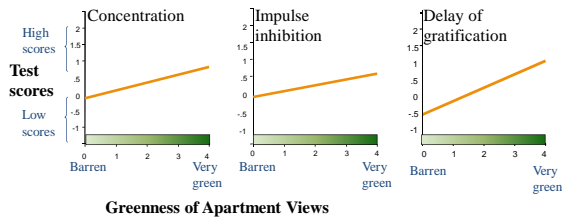


Greater self-discipline

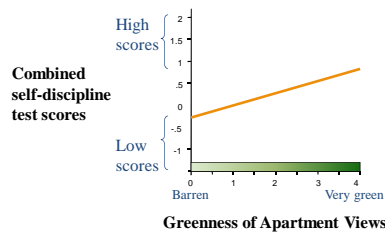
Adults asked, "How natural is your view?"

- concentration
- impulse inhibition
- delay of gratification

All forms of self-discipline were related to green views from home



Self-discipline increases as the greenness of the view increases



On average, the greener a girl's view from home:

- the better she concentrates
- the less she acts impulsively
- the longer she delays gratification
- ...in short, the better her self-discipline.

Two studies *have* shown that boys' attention is better after playing in greener places.

- Nature may affect boys just as much as girls
- But because boys spend less time at home than girls, *near-home* nature affects boys less.
- Future studies may find that boys' self-discipline is related to the amount of nature in their play area – wherever that is.

The importance of self-discipline

- | | |
|--|---|
| <ul style="list-style-type: none">• Lack of self-discipline may play a key role in:• teenage pregnancies• juvenile delinquencies• substance abuse• academic• underachievement | <ul style="list-style-type: none">• A self-disciplined girl will better handle<ul style="list-style-type: none">• peer pressure• sexual pressure• challenging situations• make more thoughtful choices• do better in school |
|--|---|

**Since greenery near home increases self-discipline in girls...
And greenery in usual play areas may eventually be shown to improve self-discipline in boys...
We should provide access to green views for all children.**

Ideas for parents, caregivers, and homeowners:

- Encourage girls to study or play in rooms with a view of nature
- Encourage children to play in green spaces and advocate recess in green school yards
- Plant, value, and care for trees at your residence and in your community
