Psychological & Social Benefits of Trees, Nature & Plants

Review of Scientific Studies

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Global Urbanization
America’s wildlands - places to get away from it all

Muir
Thoreau
Leopold
urban plants & nature - benefits & values?
Portland Classical Chinese Garden

Most cherished in this mundane world is a place without traffic; truly in the midst of a city there can be mountain and forest.

Wen Zhengming (1470-1559)
Outline

Community Economics
Mental Functioning
Health & Well-Being

urban forests, landscapes & interiors
Maia says: science rocks!
Interiorscapes

Plants in Buildings:
www.plants-in-buildings.com

Plants for People:
www.plants-for-people.org

Plants for Life:
www.plantsforlife.info
Trees and Property Values

- data from > 800 home sales, large front yard tree
  increase in sales price of home
  (0.88% or $1K per $115K home value) Anderson & Cordell, 1988

- various studies, buyers willing to pay 3-7% more for residential properties with ample trees
Parks and Property Values

- proximate principle

- assessed value of properties - 10 to 20% higher

- conditions for higher value: forested, passive use, good visibility, well maintained
Landscape and Office Bldg Rents
Landscape and Office Bldg Rents

- Building and landscape variations
  - 85 office buildings
  - landscape quantity, functionality, quality

- Positive Influences
  - quality landscape aesthetic
  - building shade

- Outcomes
  - 7% boost in rental rates
  - plants as visual screens reduce rates 7.5%
Trust for Public Lands

Economic Benefits of Parks and Open Space

The Economic Benefits of Parks and Open Space: How Land Conservation Helps Communities Grow Smart and Protect the Bottom Line. Communities around the country are learning that open space conservation is not an expense but an investment that produces important economic benefits. TPL's entire report on the economic benefits of open space is available in portable document format (pdf) or in text format by chapter.
How cities use parks for...

Economic Development

Executive Summary

Parks provide intrinsic environmental, aesthetic, and recreation benefits to our cities. They are also a source of positive economic benefits. They enhance property values, increase municipal revenue, bring in homebuyers and workers, and attract retirees.

At the bottom line, parks are a good financial investment for a community. Understanding the economic impacts of parks can help decision makers better evaluate the creation and maintenance of urban parks.

Key Point #1
Real property values are positively affected.

Key Point #2
Municipal revenues are increased.

Key Point #3
Affluent retirees are attracted and retained.

Key Point #4
Knowledge workers and talent are attracted to live and work.

Key Point #5
Homebuyers are attracted to purchase homes.
- Inner City Business Districts
- Small Town Business Districts
- Freeway Roadside Commerce
- Athens GA Case Study

4 national studies

National Urban and Community Forestry Advisory Council
USDA Forest Service
local community partners
Research Question:
What is the response of consumers/shoppers to trees in CBD streetscapes?

Measures:
Visual preference
Place perceptions
Patronage behavior
Product pricing
Trees in Business Districts

District visitors prefer (large) trees
Merchant interactions & product quality judged to be better
Shoppers willing to pay 9-12% more for products
Results: Visual Preference

Small cities - all U.S.A.
Image Categories (sorted by ratings)

Pocket Parks
mean 3.72
(highest)

Full Canopy
mean 3.63

Scale: 1 = not at all, 5 = like very much, 26 images
No Trees
mean 1.65
(lowest)

(high - 3.72)
Results:
Product Pricing

Large cities - all U.S.A.
Product Pricing

• comparing CBD with and without trees
• contingent valuation method
• willingness to pay more for all types of goods with trees

* up to 12% in large cities, 9% in small cities)
List of Goods & Stated Prices

### Table 3. Product pricing by scenarios.

<table>
<thead>
<tr>
<th>Index and items</th>
<th>Scenario</th>
<th>Scenario</th>
<th>Scenario</th>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No trees</td>
<td>Trad. trees</td>
<td>Mixed veg.</td>
<td>F = 49.91</td>
</tr>
<tr>
<td><strong>Convenience Goods</strong></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
<td>p &lt; .000, 2 df (2, 3 no sig. $\Delta^*$)</td>
</tr>
<tr>
<td>Ice cream cone, dinner, flower bouquet, lunch sandwich, appointment book</td>
<td>8.98</td>
<td>13.44</td>
<td>13.78</td>
<td>p &lt; .000, 2 df (2, 3 no sig. $\Delta^*$)</td>
</tr>
<tr>
<td></td>
<td>2.74 SD</td>
<td>5.20 SD</td>
<td>5.00 SD</td>
<td></td>
</tr>
<tr>
<td><strong>Shopping Goods</strong></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
<td>F = 31.11</td>
</tr>
<tr>
<td>Sports shoes, watch, light jacket, pots and pans, gallon of paint</td>
<td>33.52</td>
<td>46.43</td>
<td>47.36</td>
<td>p &lt; .000, 2 df (2, 3 no sig. $\Delta^*$)</td>
</tr>
<tr>
<td></td>
<td>11.49 SD</td>
<td>16.72 SD</td>
<td>18.54 SD</td>
<td></td>
</tr>
<tr>
<td><strong>Specialty Goods</strong></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
<td>F = 23.64</td>
</tr>
<tr>
<td>Gift for spouse/partner, new glasses, art print, motel room</td>
<td>51.88</td>
<td>69.79</td>
<td>73.24</td>
<td>p &lt; .000, 2 df (2, 3 no sig. $\Delta^*$)</td>
</tr>
<tr>
<td></td>
<td>18.30 SD</td>
<td>30.41 SD</td>
<td>30.79 SD</td>
<td></td>
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</tbody>
</table>
Product Pricing

<table>
<thead>
<tr>
<th>Goods Categories</th>
<th>Mean Stated Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>convenience goods</td>
<td>- 50% -</td>
</tr>
<tr>
<td>shopping goods</td>
<td>- 39% -</td>
</tr>
<tr>
<td>specialty goods</td>
<td>- 35% -</td>
</tr>
</tbody>
</table>

- 50% - 39% - 35%
Outline

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Nature & Learning Potential

- Lecture Halls - plants
  - 34 students
  - academic year
  - lecture halls - with & w/o plants

- Positive Affects
  - less inattentive behavior (70% fewer signals)
  - 100% lecture return rate with plants, 86% without

Amanda Read, Royal College of Agriculture, UK
Workplace Nature Views

- **Well-being**
  - desk workers without view of nature reported 23% more ailments in prior 6 months

- **Job Satisfaction**
  - less frustrated and more patient
  - higher overall job satisfaction and enthusiasm

Plants in Workplace

- **Productivity**
  - 12% quicker reaction on computer tasks
  - reports of being more attentive

- **Less Stress**
  - lower systolic blood pressure

Lohr et al. 1996. J. of Environmental Horticulture
employee health & the corner office:

indirect $$ benefits
Green Roof - Chicago City Hall

high-rise nature, preferred views
Directed Attention Fatigue

mental tasks requiring high focus
and high effort
active screening of other stimulus
and distractions
depletion - short term & cumulative
America’s wildlands - getting away from it all!
Characteristics of Restorative Environments

Being Away
Fascination
Extent
Compatibility

recovery from directed attention fatigue

Rachel & Stephen Kaplan - University of Michigan
Restorative Affects of Nearby Nature
- small spaces
- enclosure
- sequence of experience
- rich detailing
Americans travel 2.3 billion miles per day on urban freeways & highways
Roadside Landscape & Traffic Stress Response

- **Roadside Features - Driving Simulations**
  - Forest, golf course, strip mall

- **Physiological Response**
  - E.g. heart beat, blood pressure

- **Results**
  - Nature scenes - return to baseline faster, less response to new stressors
  - Immunization effect

Stress and Body Response

- impaired immune system
- sleep interruption
- heightened ailments (acne, ulcers)
- more likely to have accidents
- inhibited memory

Ulrich-views of nature reduce stress response
Chicago Public Housing with & without green spaces

Wm. Sullivan & F. Kuo
University of Illinois
lower levels of fear
less violent & aggressive behavior
fewer reported crimes
more self-discipline for girls
reduced ADHD symptoms
better neighbor relationships
better coping with life’s challenges
Outline

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Plants & Office Conditions

- **Dust Levels**
  - particulates reduced 20%
  - respiratory effects?

- **Relative Humidity**
  - recommended range for human comfort 30-60%
  - plants boost relative humidity significantly, but not excessively (5-10%)
Wellness & Healing

- **Surgery Recovery**
  - shorter post-operative stays
  - less use of potent pain drugs, better attitude

- **Lifestyle Recovery**
  - attentional fatigue restored
  - relationships and career coping


Roger Ulrich. Texas A &M. Studies on nature and medical recovery
Healing Gardens
- institutional design -
U of WA Hospitals Surgery Pavilion
USFS & Centers for Disease Control

Americans, physical activity & obesity
Reported Leisure Activity - U.S.
Physical Inactivity & Obesity

- majority of Americans not active enough
- goal-30 minutes per day of moderate activity
- risk factor for chronic diseases (heart, cancer, diabetes)
- significant costs to national health services
Obesity Trends* Among U.S. Adults

BRFSS, 1985

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)

Obesity Trends* Among U.S. Adults

BRFSS, 1990

(*BMI ≥30, or ~30 lbs overweight for 5’4” woman)

Obesity Trends* Among U.S. Adults
BRFSS, 1991

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)

Obesity Trends* Among U.S. Adults
BRFSS, 1992

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)

Obesity Trends* Among U.S. Adults

BRFSS, 1993

(*BMI ≥30, or ∼ 30 lbs overweight for 5’4” woman)

Obesity Trends* Among U.S. Adults

BRFSS, 1994

(*BMI ≥30, or ∼ 30 lbs overweight for 5′4″ woman)

Obesity Trends* Among U.S. Adults
BRFSS, 1995

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BRFSS, 2000

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)

Obesity Trends* Among U.S. Adults

BRFSS, 2001

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)

parks, open spaces & trails
walkable city places
make room for pedestrians
Value of Plants and Nature in Cities?

Economic Development Values
Environmental Functions/Services
Improved Human Health/Functioning

City/Metro Scale
Properties and Neighborhoods

Building Interiors?
Plants are very important for our quality of life, our mood and our emotional, psychological and physical health.

Get Your Greens!

where we live, work & learn & play