



Economics of City Trees & Forests

what does science tell us?

Kathleen Wolf, Ph.D.

Research Social Scientist

University of Washington (Seattle)

School of Environmental and Forest Sciences

City of Trees Annual Briefing 2016

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English Garden Landscapes



Blenheim Palace Park – Capability Brown

English Garden Landscapes



horticultural introductions

English Garden Landscapes



horticultural emphasis with urbanization

English Garden Landscapes



**Butchart Gardens – Victoria B.C., Canada
international destinations**



importance of nearby nature & trees

credit: American Planning Association



credit: American Planning Association



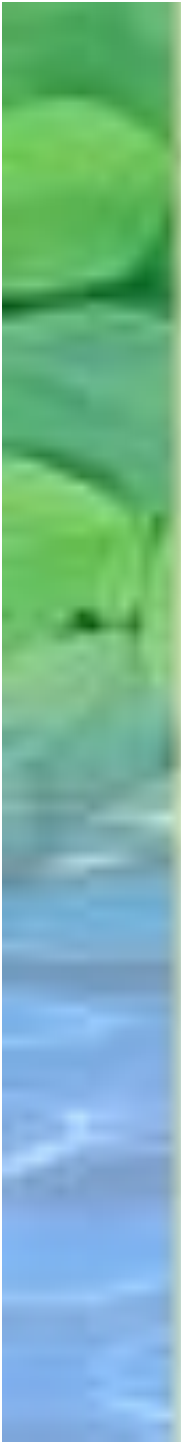
Landscape



Community



Garden



urban forestry and urban greening
'metro nature'

economic values to communities



Yard & Street Trees

Value

Increase

Condition

2%	mature yard trees (greater than 9-inch dbh)
3%	larger street trees (up to 100' away)
3-5%	trees in front yard landscaping
6-9%	good tree cover in a neighborhood
10-15%	mature trees in high-income neighborhoods

multiple studies:

Green Cities: Good Health > Local Economics



Local Government Benefits

***Civic Investment – Public Goods
like schools, emergency response, roads***

- street trees average positive effect on house values
- added up across Portland, Oregon
- yields a total value of \$1.35 billion
- potentially increasing annual property tax revenues \$15.3 million

Donovan & Butry. 2010
Landscape and Urban Planning

Trees & Retail Environments Research



Wolf, K.L. 2005. Business District Streetscapes, Trees, and Consumer Response. *Journal of Forestry* 103, 8: 396-400.

1. Place Perceptions

- Place Character
- Interaction with Merchants
- Quality of Products

2. Patronage Behavior

- travel time, travel distance
- duration & frequency of visits
- willingness to pay for parking

3. Product Pricing

- higher willingness to pay for all types of goods
- higher in districts with trees – 9-12%

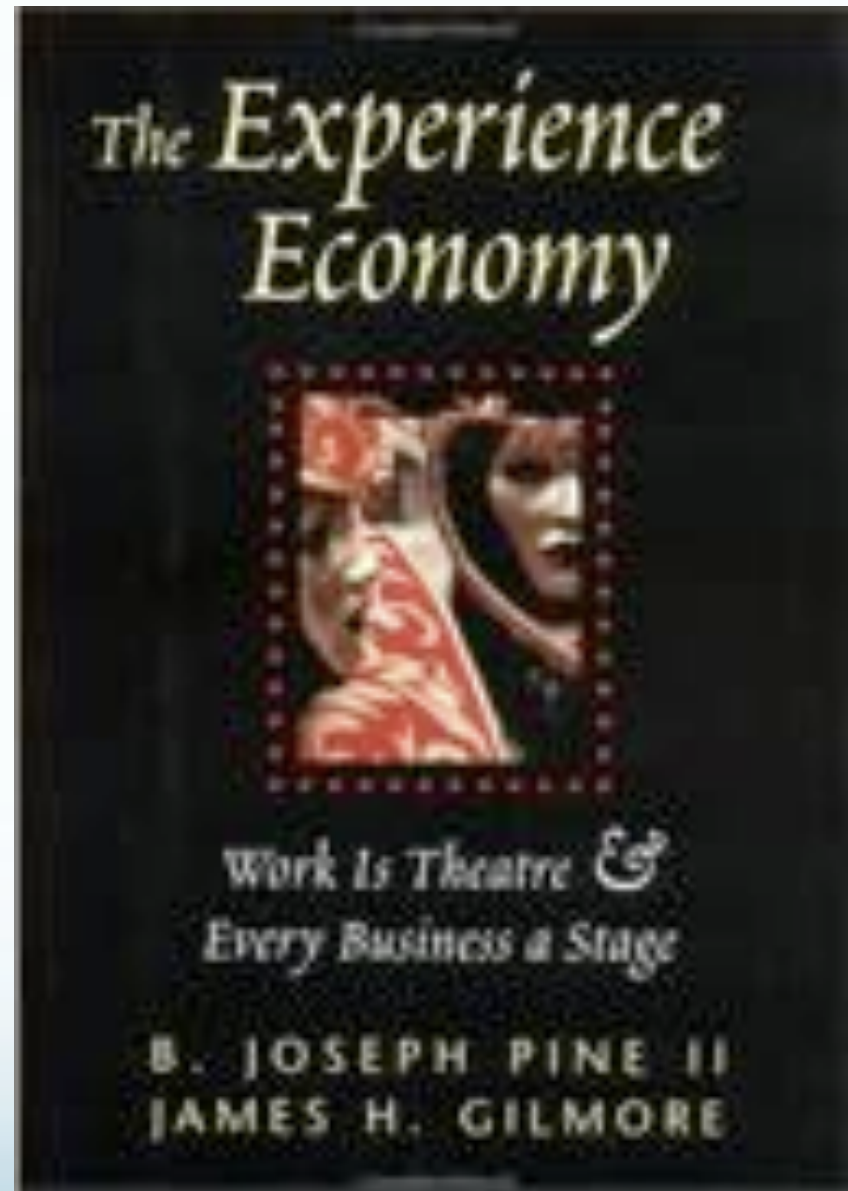


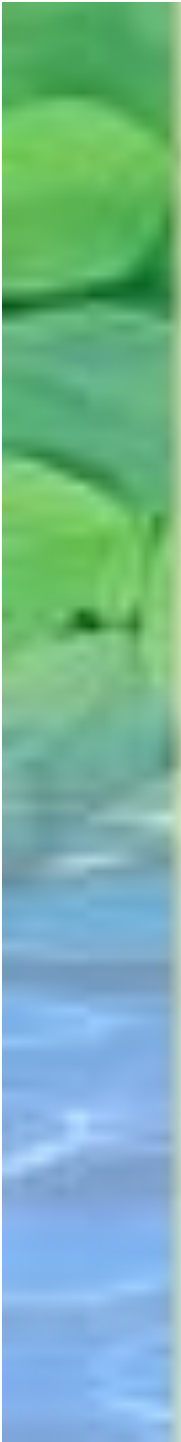
Place Marketing

**Relationship
Marketing**

retail & place
marketing

“Companies stage
an experience when
they engage
customers in a
memorable way.”





urban forestry and urban greening
'metro nature'

human health & wellness benefits

WHO health definition

*a state of complete
physical, mental, and social well-being
and not merely the absence
of disease or infirmity (1946)*

science & evidence re: environment
role of 'metro nature'?
not a panacea, but important!



Determinants of Health

canopy of a city = human health benefits



evidence about human wellness & 'nearby nature'



Green Cities: Good Health

www.greenhealth.washington.edu



Sponsors:
USDA Forest Service, U&CF Program
University of Washington
NGO partners

thanks!
to U of WA students:
Katrina Flora
Mary Ann Rozance
Sarah Krueger



research review & summaries



Community Building

Local Economics **▼**

Place Attachment & Feeling

Crime & Fear **▼**

Cold Streets **▼**

Active Living **▼**

Reduced Fire

Wildlife & Photography

Heating & Energy

Mental Health & Function **▼**

Work & Learning

Culture & Equity

Lifestyle & Gender

Local Economics

Trees in cities are not grown and managed for products that can be bought and sold on markets, but they do provide many intangible services and functions. This article serves two purposes. First, it introduces valuation methods that are used to convert intangible benefits to dollar sums.^{1,2} Then, it shows how nonmarket valuations can support local decision-making.

Fast Facts

- The presence of larger trees in yards and as street trees can add from 3% to 10% to home values throughout neighborhoods.
- Averaging the market effect of street trees on 44 house values across Portland, Oregon yields a total value of \$1.26 billion, potentially increasing annual property tax revenues \$15.2 million.³
- A study found 7% higher rental rates for commercial offices having high quality landscapes.⁴
- Shoppers claim that they will spend 6% to 12% more for goods and services in central business districts having high quality tree canopy.⁵
- Shoppers indicate that they will travel greater distance and a longer time to visit a district having high quality trees, and spend more time there when they arrive.⁶

15,444 trees 12,400 trees



Street trees have market value of houses, providing tax revenue for communities.



urban nature & health benefits across the life cycle



Urban Forests and Newborns

the urban natural environment and
pregnancy outcomes . . .



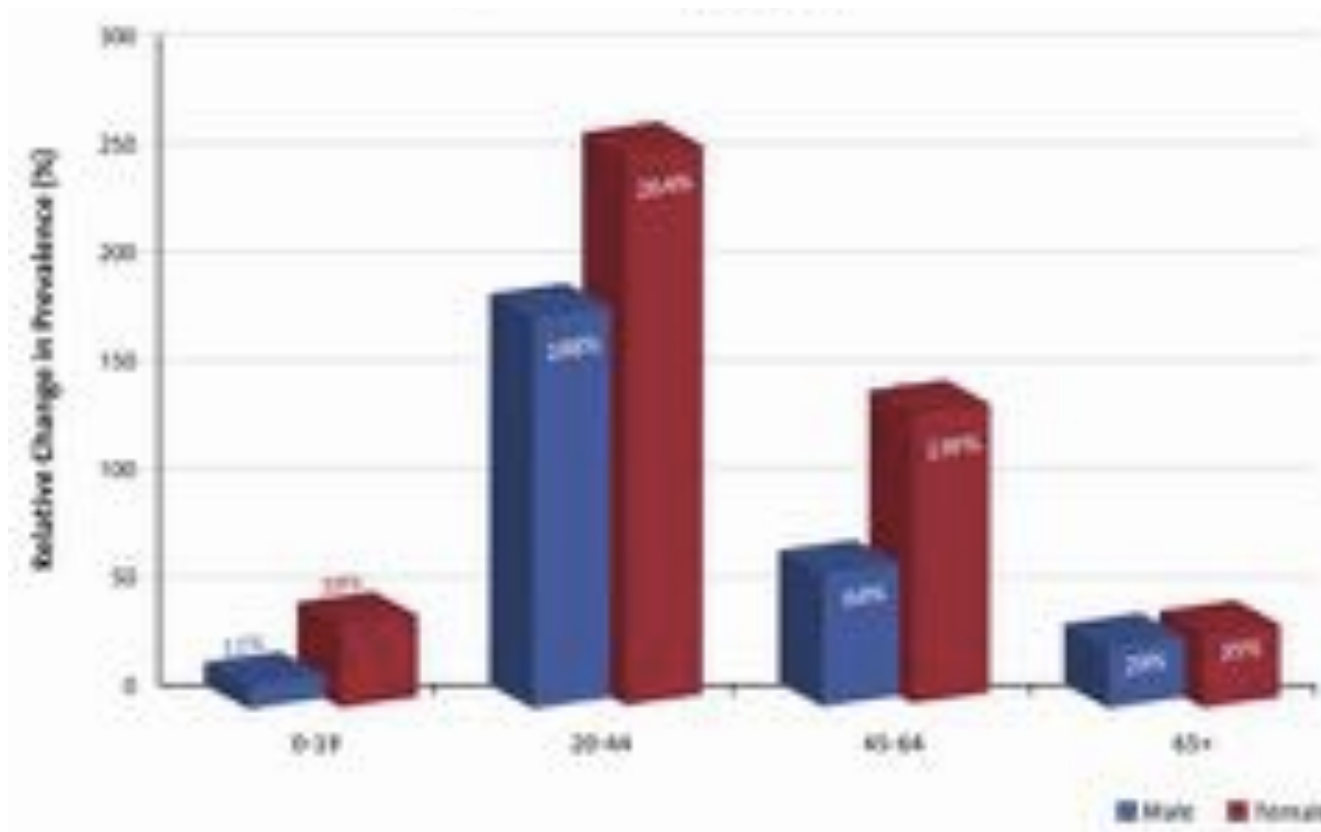
10% increase in tree-canopy cover
within 50m of a house

= lower number of low weight births
(1.42 per 1000 births)

*Donovan et al., Health & Place, 2011; similar studies in
Lithuania, Vancouver B.C., Munich, Tel Aviv Israel, Spain*



Change in % Population on ADHD Treatments 2001 - 2010



America's State of Mind, Medco Health Solutions, Inc

ADHD and nature contact

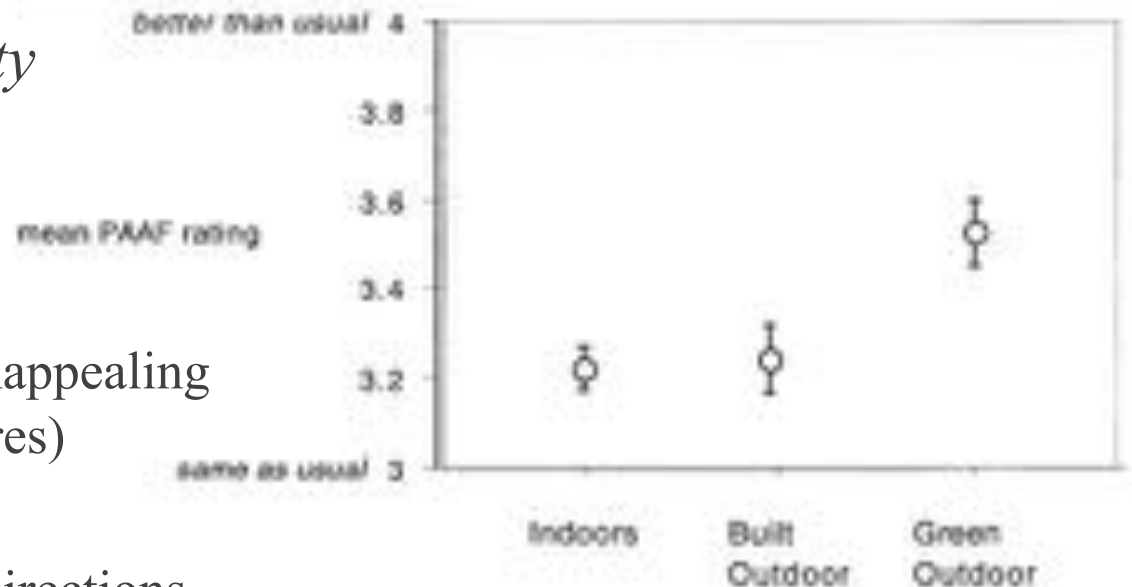


- 96 children aged 7-12 diagnosed ADD or ADHD

- Parents gave *postactivity attentional functioning ratings* (PAAF) –

4 measures:

- Can't stay focused on unappealing tasks (homework or chores)
- Can't complete tasks
- Can't listen and follow directions
- Easily distracted



Faber Taylor. 2001. *Environment & Behavior*

Li & Sullivan. 2016. Landscape & Urban Planning

Classroom Views & Stress



School No. 1



School No. 4



attention
scores

Classroom Views & Stress

high school
student response

stress
scores

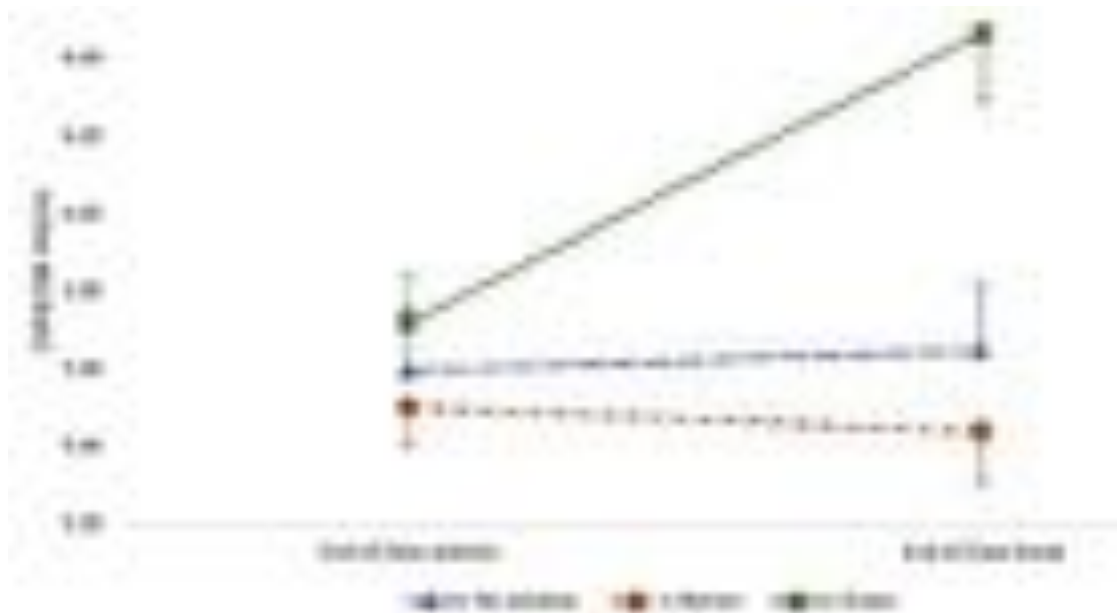


Fig. 2. Attention scores at the end of class activity and break (Stress and AT).

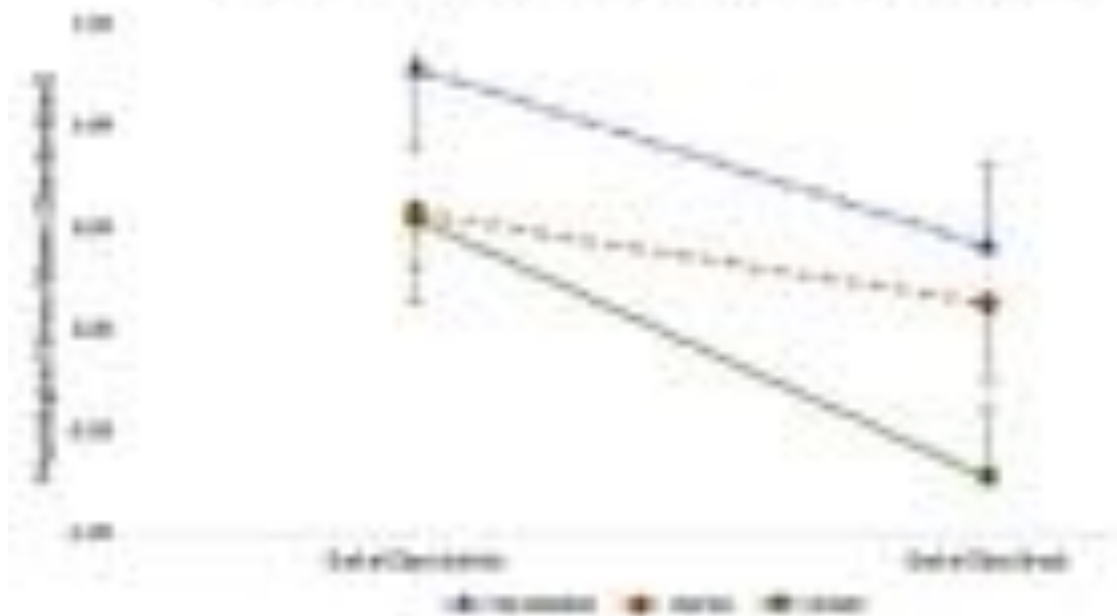


Fig. 3. Physiological stress at the end of class activity and break (Stress and AT).



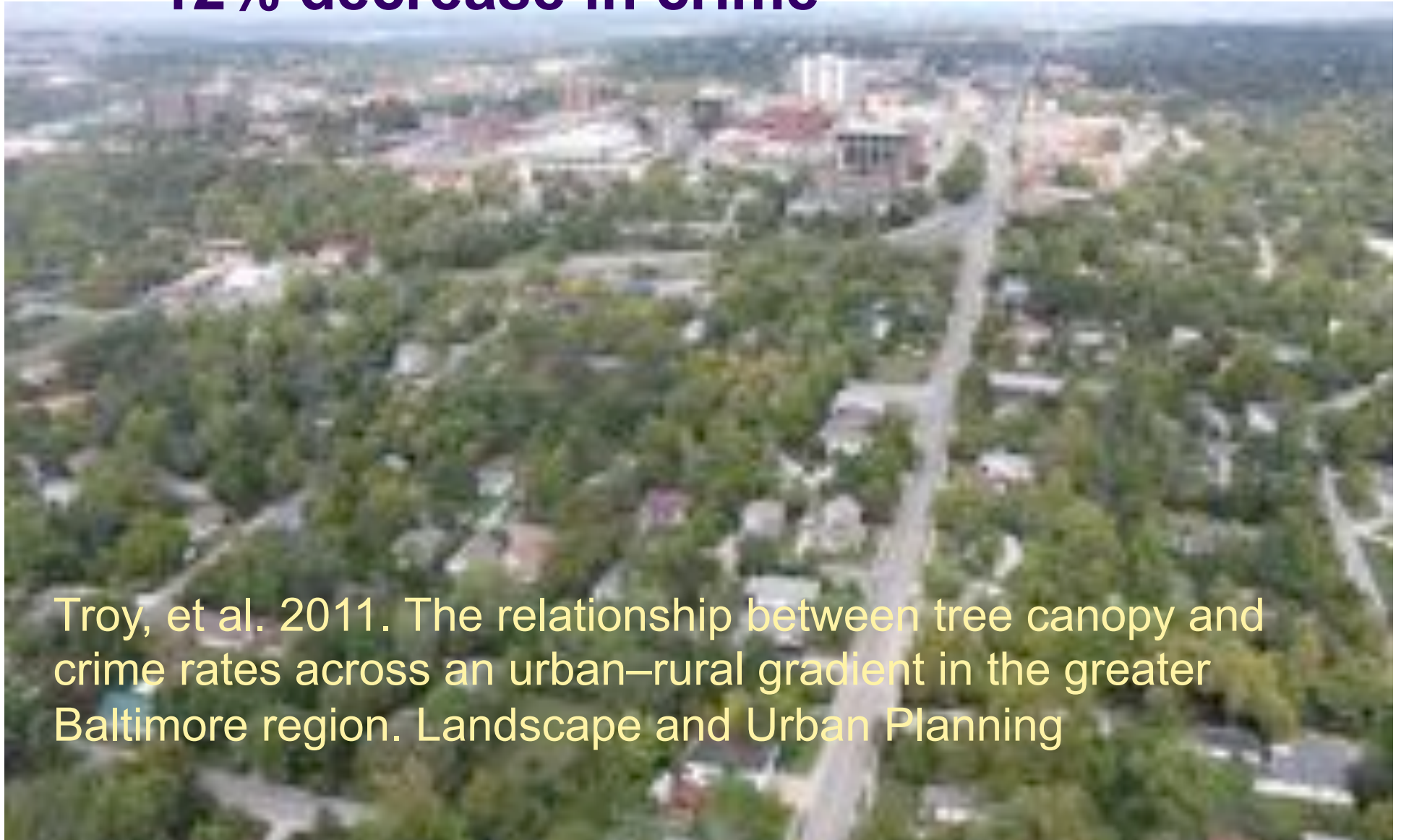
Trees & Crime Reduction

- trees in the public right of way are associated with lower crime rates
 - smaller, view-obstructing trees are associated with increased crime
 - larger trees are associated with reduced crime

Donovan & Prestemon. 2012.
Environment and Behavior



**10% increase in tree canopy
~ 12% decrease in crime**



Troy, et al. 2011. The relationship between tree canopy and crime rates across an urban–rural gradient in the greater Baltimore region. *Landscape and Urban Planning*

Improving Depression

20 adults with major depression
walk in a park setting and an urban setting

- 50-minute walks one week apart
- before-after testing:
 - Mood: Positive and Negative Affect (PANAS)
 - Cognition: Backward Digit Span (BDS)

cognitive and affective
improvements after
walking in a
nature setting



Shinrin-yoku Forest Bathing

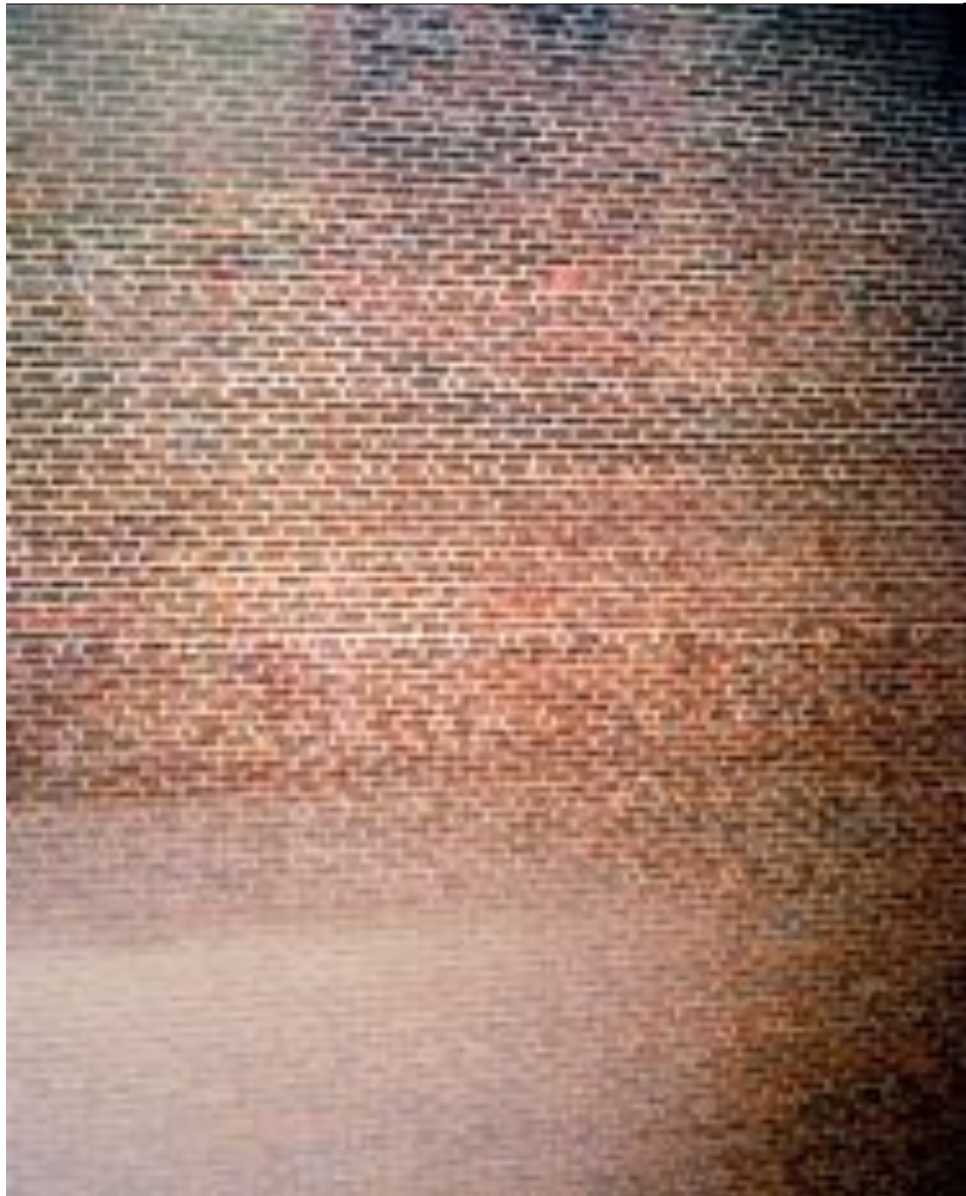


- extended forest walks
 - reduced ‘fight or flight’ response
 - lower cortisol – a stress indicator
 - increased immune function
 - lower pulse rate & blood pressure



Tsunetsugu, Park, Miyazaki. 2010. Environmental Health and Preventive Medicine

Effects of nature window view on recovery from surgery (Roger Ulrich, 1984)



- Shorter stays
- Less pain
- Fewer minor complications
- Better emotional well-being



hospital healing gardens

health care \$\$ savings
patient preference & return



Ulfelder Healing Garden,
Massachusetts General Hospital

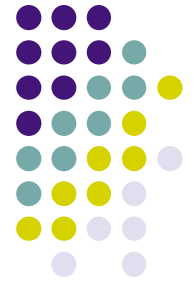


Scripps Encinitas Hospital

Massachusetts General Hospital



credit: Frank Oudeman

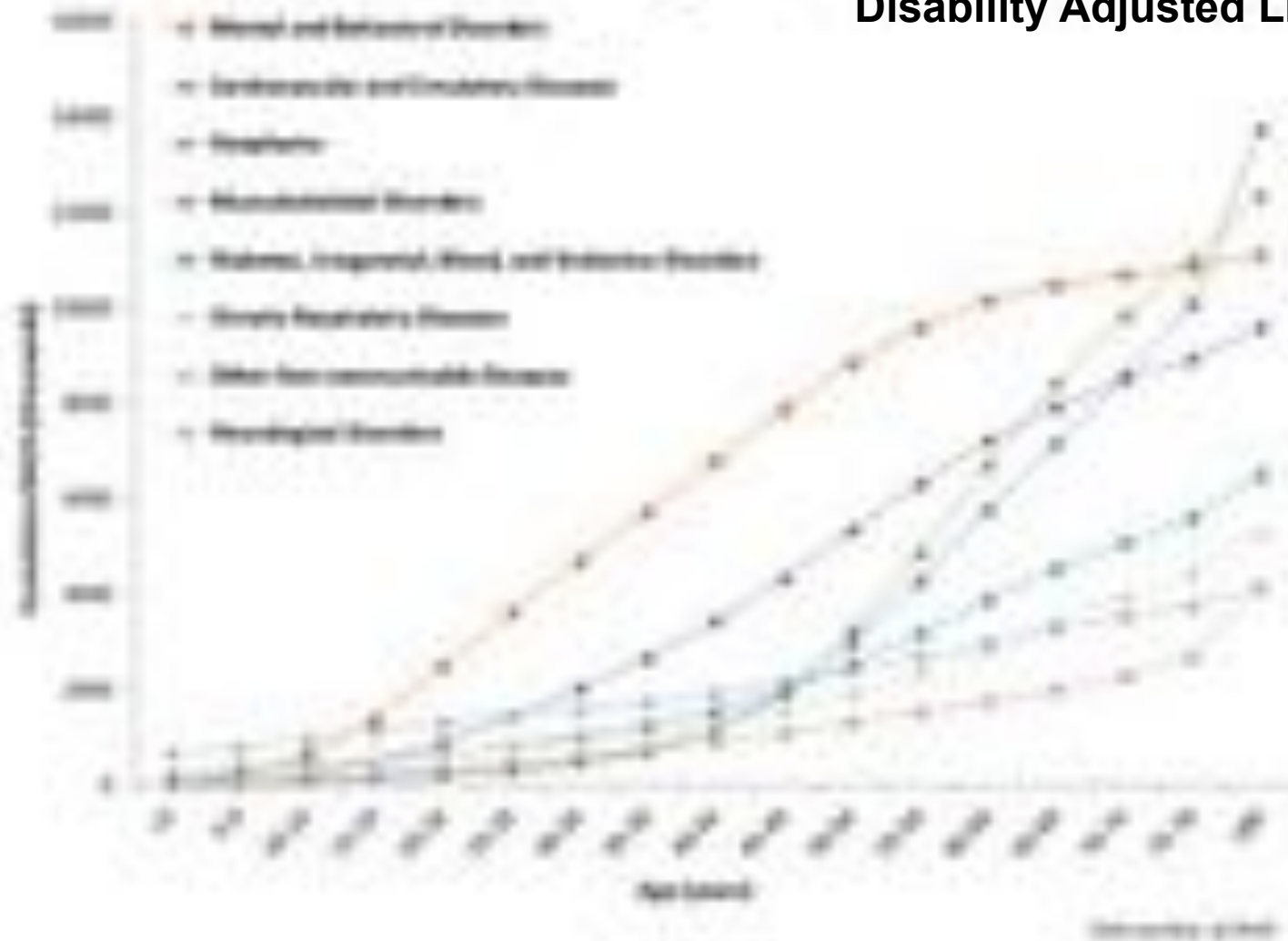


Lifecycle :: disease & illness

economic costs to nation and community

Cumulative U.S. DALYs for the Leading Disease/Disorder Categories by Age (2000)

Disability Adjusted Life Year





Conclusions

- Nearby trees & nature in cities & towns is essential!
- Economic benefits – property value & retail behavior
- Nature supports disease prevention & health promotion for people of all ages
- Evidence? Green Cities: Good Health
- Many more studies underway

www.naturewithin.info



College of the Environment University of Washington

Human Dimensions of Urban Forestry and Urban Greening

Integrating research on people, environments and behavior regarding nature in cities

Urban Forestry
Human health is well-being research

Project Director
Kathleen L. Wolf, Ph.D.



Nature and Consumer Environments
Research about how the urban forest influences business district activity

Green and Transportation
Studies on the value of having quality environments in urban corridors

Civic Ecology
Studies of human behaviors and benefits when people are active in the environment

Policy and Planning
Integrating urban greening research with community change

Urban Forestry and Human Benefits
Work-recreation, studies and more

