Mark J Nieuwenhuijsen, Fifty shades of Green, Pathway to a healthy urban living

HUMAN TIMELINE

100000 BC

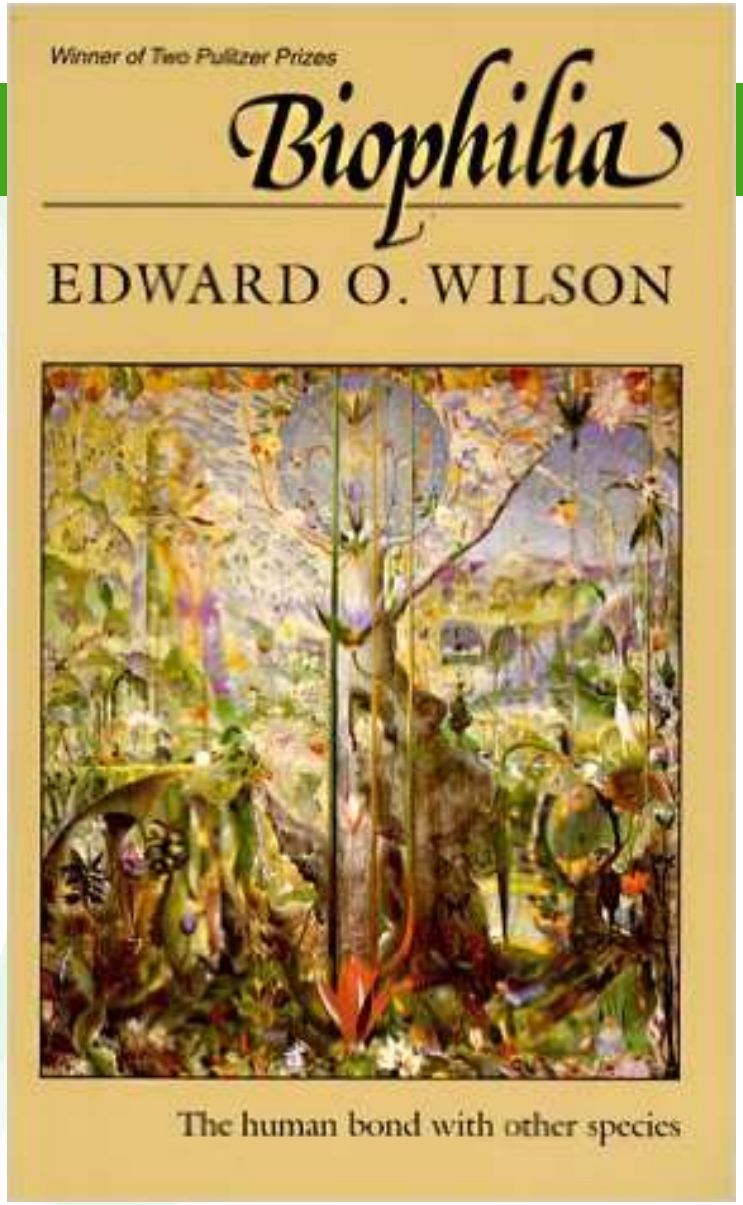
Hunter gatherers

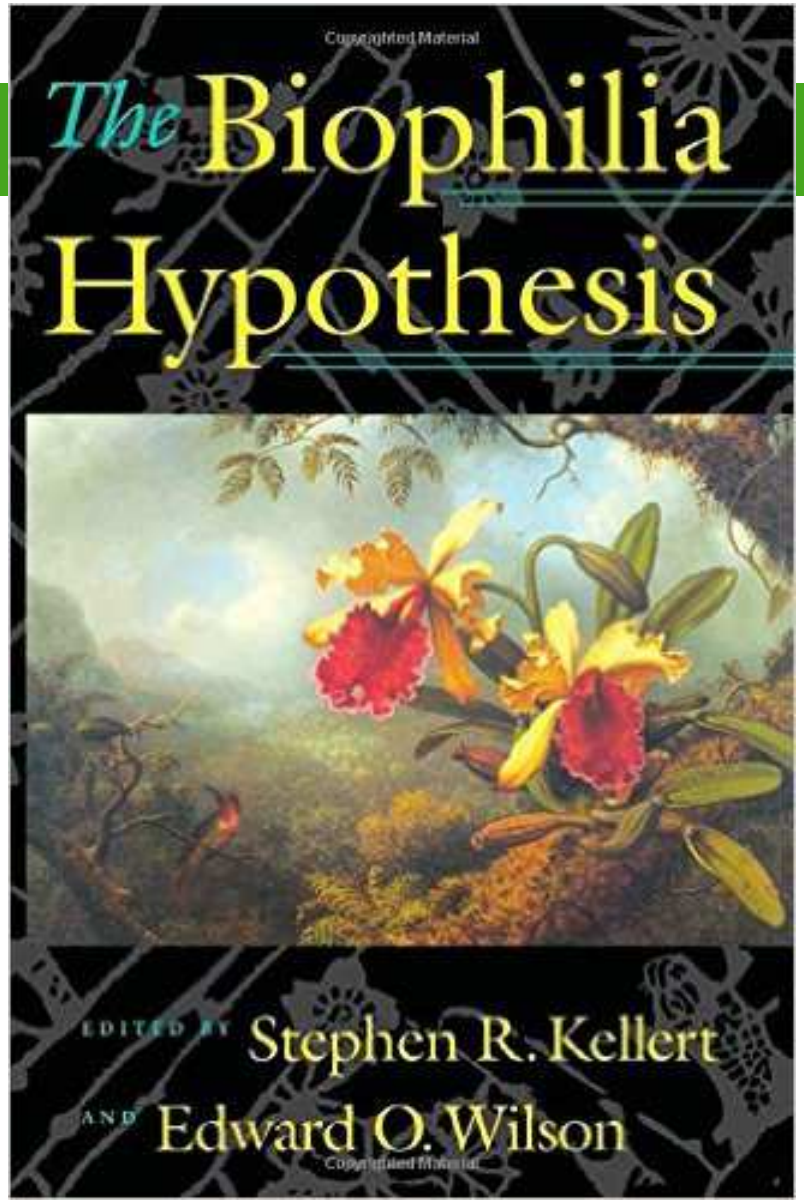
8000 BC

Agriculture

2000 AC

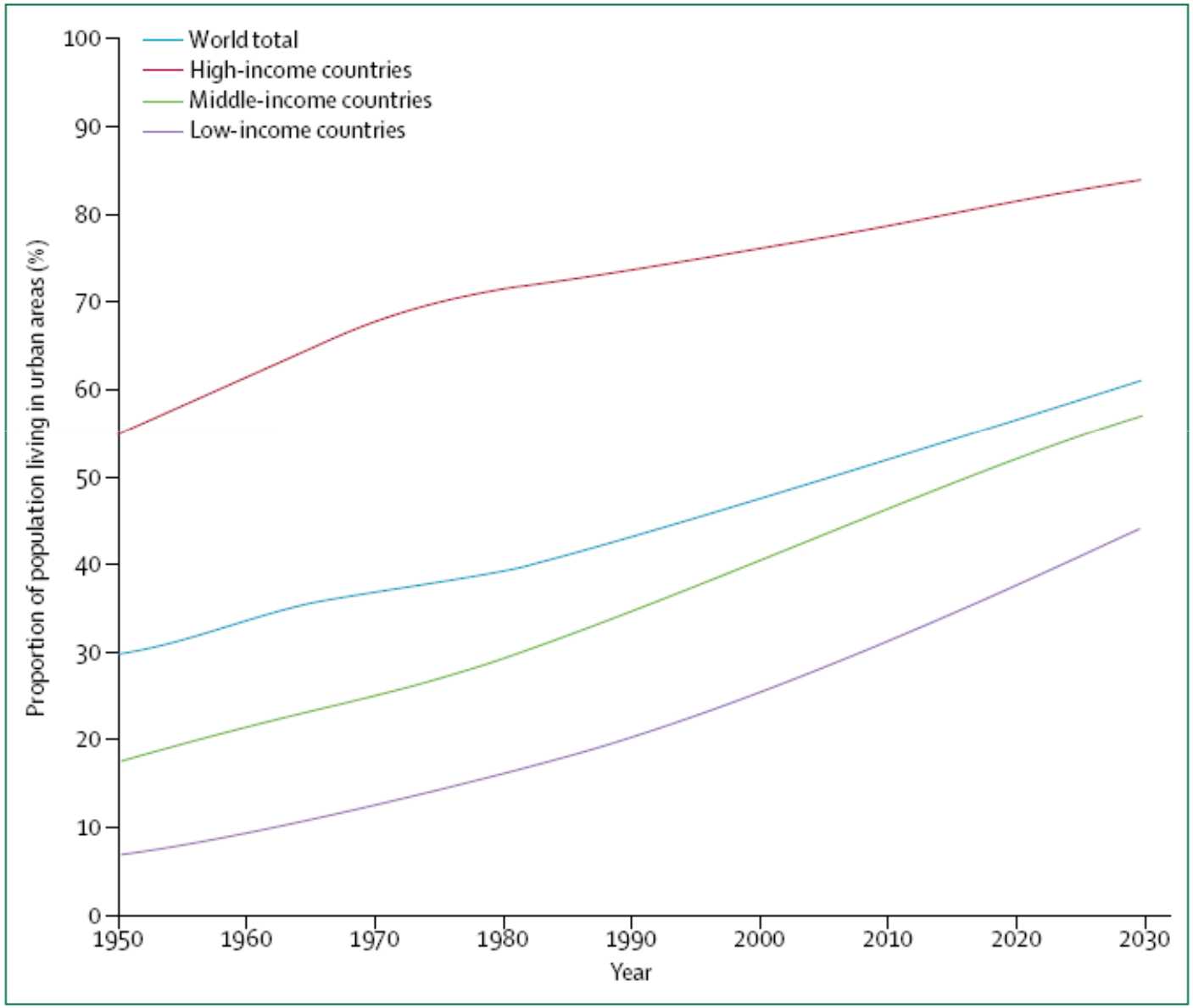
City dwellers





"Biophilia" is the term coined by Edward O. Wilson to describe what he believes is humanity's innate affinity for the natural world.

PROPORTION OF THE WORLD POPULATION LIVING IN URBAN AREAS



www.creal.cat

Rydin et al 2012

´´Cities have long been known to be society's predominant engine of innovation and wealth creation, yet they are also its main source of crime, pollution, and disease´´

Bettencourt et al 2007


SHENZHEN, CHINA

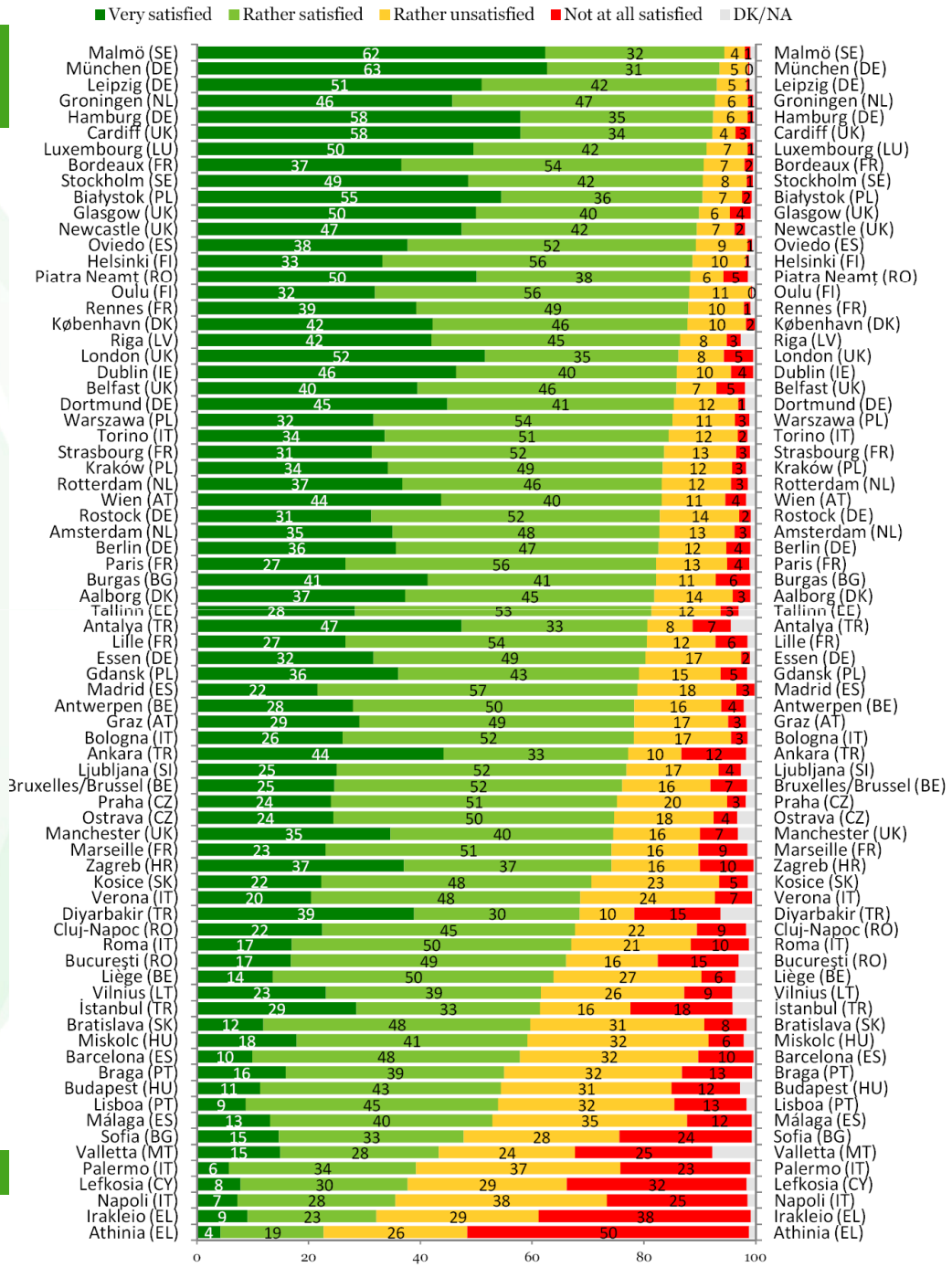

BEIRUT, LEBANON


BUENOS AIRES, ARGENTINA

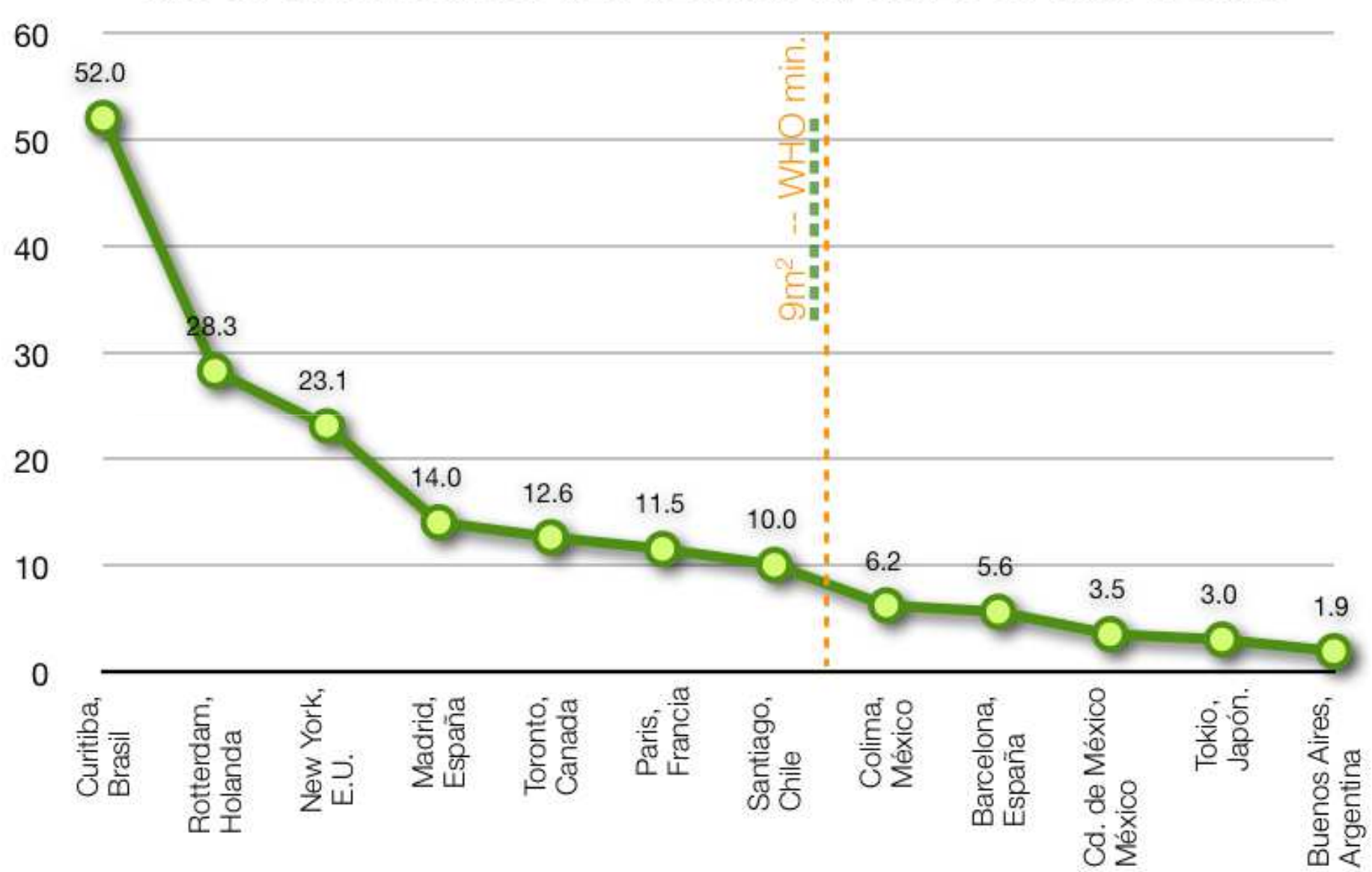

KUWAIT CITY, KUWAIT


ATHENS, GREECE

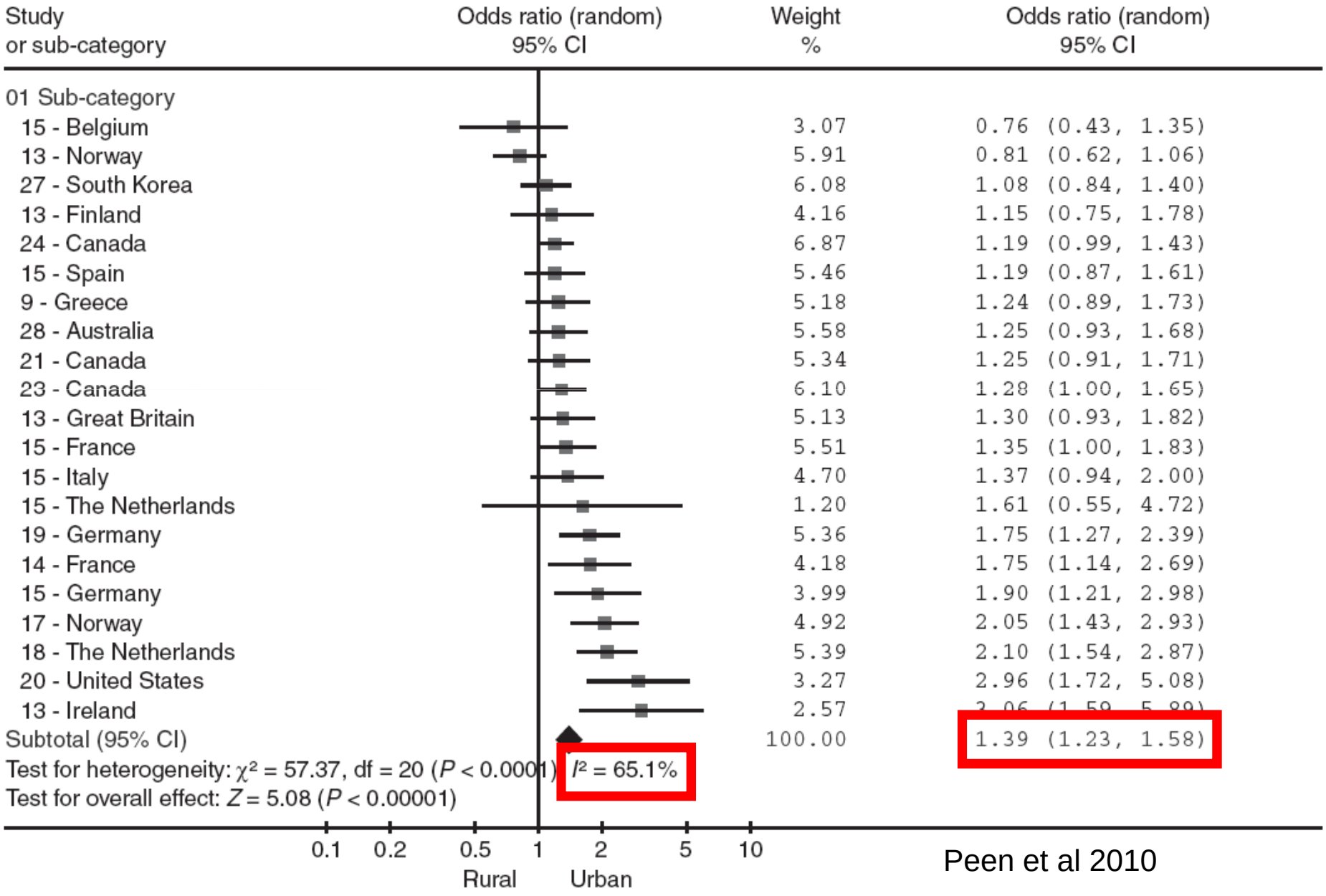
Satisfaction with green spaces (e.g. parks and gardens)



M^2 of green space per person of the world



MOOD DISORDERS RURAL VS URBAN



Peen et al 2010

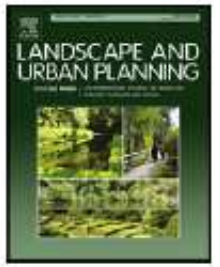
GREEN SPACE AND HOUSE PRICES

Landscape and Urban Planning 94 (2010) 77–83

Contents lists available at ScienceDirect

Landscape and Urban Planning

journal homepage: www.elsevier.com/locate/landurbplan



Trees in the city: Valuing street trees in Portland, Oregon

Geoffrey H. Donovan [a,*], David T. Butry [b]

[a] Pacific Northwest Research Station, Portland Forestry Sciences Laboratory, P.O. Box 3890, Portland, OR 97208, United States
[b] Building and Fire Research Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899, United States

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ABSTRACT

We use a hedonic price model to simultaneously estimate the effects of street trees on the sales price and the time on-market (TOM) of houses in Portland, Oregon. On average, street trees add $8870 to sales price and reduce TOM by 1.7 days. In addition, we found that the benefits of street trees spill over to neighboring houses. Because the provision and maintenance of street trees in Portland is the responsibility of adjacent property owners, our results suggest that if the provision of street trees is left solely to homeowners, then there will be too few street trees from a societal perspective.

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The Telegraph

Search - enhanced by OpenText

Monday 10 August 2015

London garden sells for £1.2 million

The 45ft long garden in north London, valued at £100,000, was the subject of a fierce bidding war

This Primrose Hill, back garden has sold for £1.25 million Photo: SWNS Group

By Agency

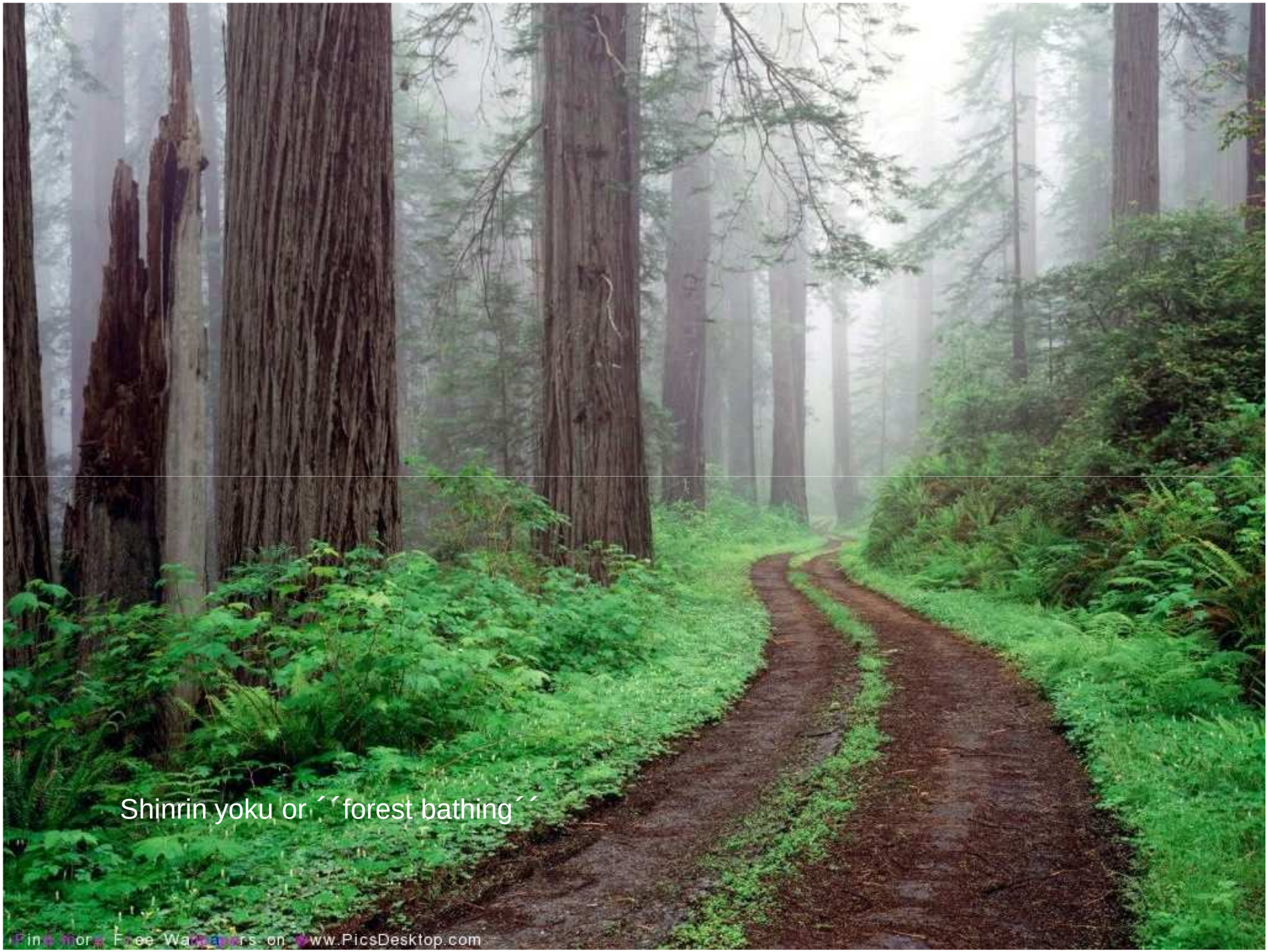
12:48AM BST 22 Jul 2015

The owner of a north London garden valued at around £100,000 has sold it for £1.25 million. Measuring just 45ft long, the grassy parcel of land has no planning permission and is surrounded by other properties.

But this didn't stop a fierce bidding war at auction - because the garden sits in Primrose Hill, one of the most **sought-after locations in London**.

The garden was at the rear of a house on Elsworthy Terrace, siding onto Elsworthy Road. Homes on these two streets will sell for between £1,800 and £2,000 per sq/ft - putting them amongst the most expensive roads in North London. The plot of land, measuring just 0.02 hectares and around 20 metres square, was offered by auction house Allsop Auctioneers with a guide price of £100,000 - £150,000.

It ended up selling for a staggering £1.25 million, with the buyer having to pay a further £68,750 in stamp duty - for a garden.
There were around 30 people in the auction room showing interest in the garden, and it became noticeably less busy after it had sold.


Shinrin yoku or ´´forest bathing´´
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GREEN CITIES, HEALTHY CITIES

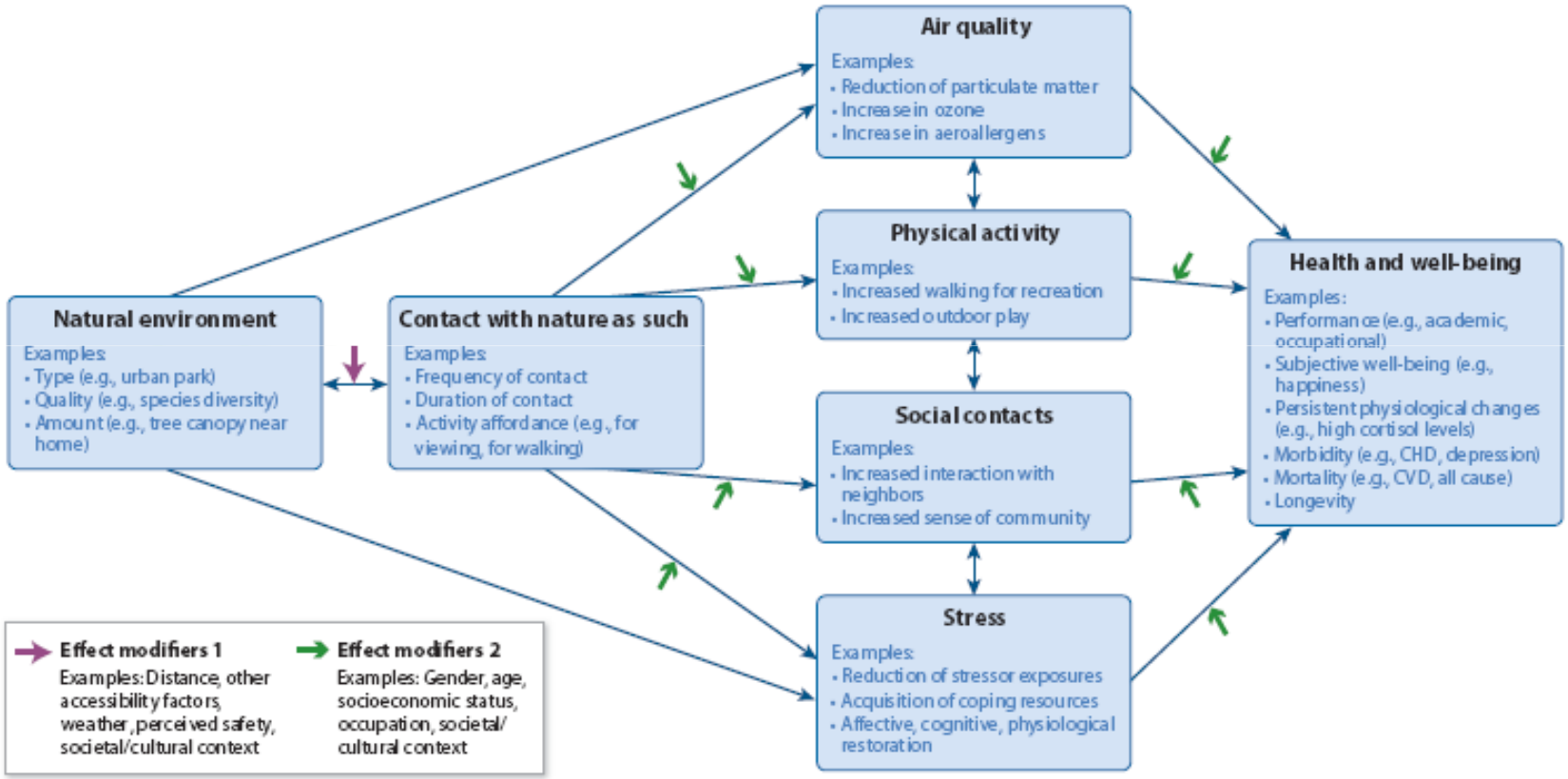
GREEN CITIES, HEALTHY CITIES

Lack of green space in (part of) many cities

Green space is necessary for healthy psychophysiological functioning and well being

Remaining questions in term where, how much, when etc

PATHWAYS THROUGH WHICH NATURE MAY AFFECT HEALTH



Hartig et al 2014

GREEN SPACE AND AIR POLLUTION

Regional modelling estimates in England determined that the tree canopy of the urban forest in the Greater London Area

- removed between 852 and 2121 tonnes of PM10 annually
- which equates to between 0.7 per cent and 1.4 per cent PM10 air-quality improvement.

Regional plans to increase tree cover from the current 20 per cent to 30 per cent are expected to

- remove 1.1 to 2.6 per cent by the year 2050.

Tallis et al., 2011

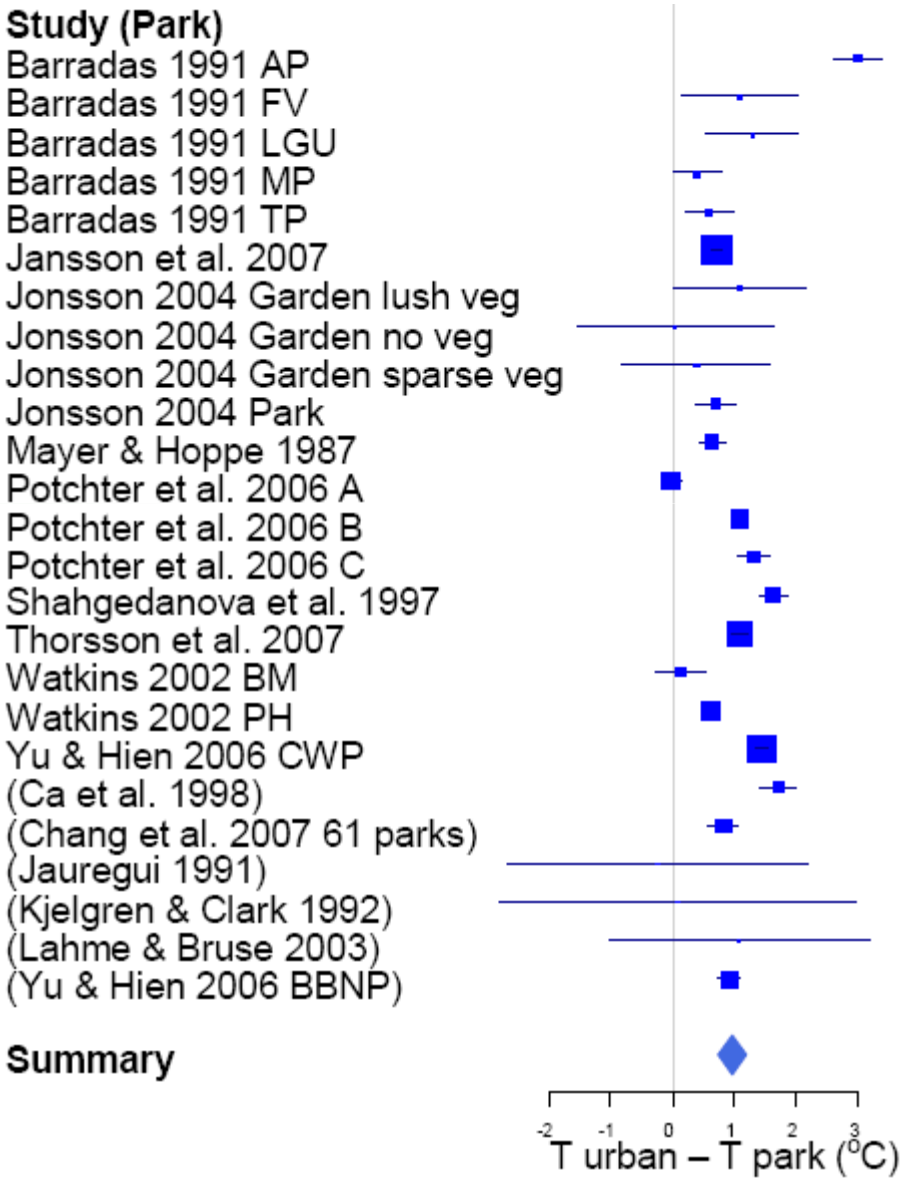
GREEN SPACE AND AIR POLLUTION

Measurements	100-m buffer	
	Regression coefficient (95% CI)	*p*-Value
Personal (adjusted)[b]		
$PM_{2.5}$	–5.9 (–10.0, –1.8)	< 0.01
NO_x	–5.1 (–18.6, 8.4)	0.45
Home-indoor[c]		
$PM_{2.5}$	–6.1 (–10.6, –1.6)	< 0.01
NO_x	–9.5 (–24.4, 5.3)	0.20
Home-outdoor[d]		
$PM_{2.5}$	–4.4 (–9.5, 0.7)	0.08
NO_x	–5.8 (–17.6, 6.0)	0.33

Regression coefficients for interquartile range increase NDVI for 100 m buffer

Dadvand et al 2012

GREEN SPACE AND TEMPERATURE



Bowler et al 2010

GREEN SPACE AND PHYSICAL ACTIVITY

Social Science & Medicine 138 (2015) 22–30

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

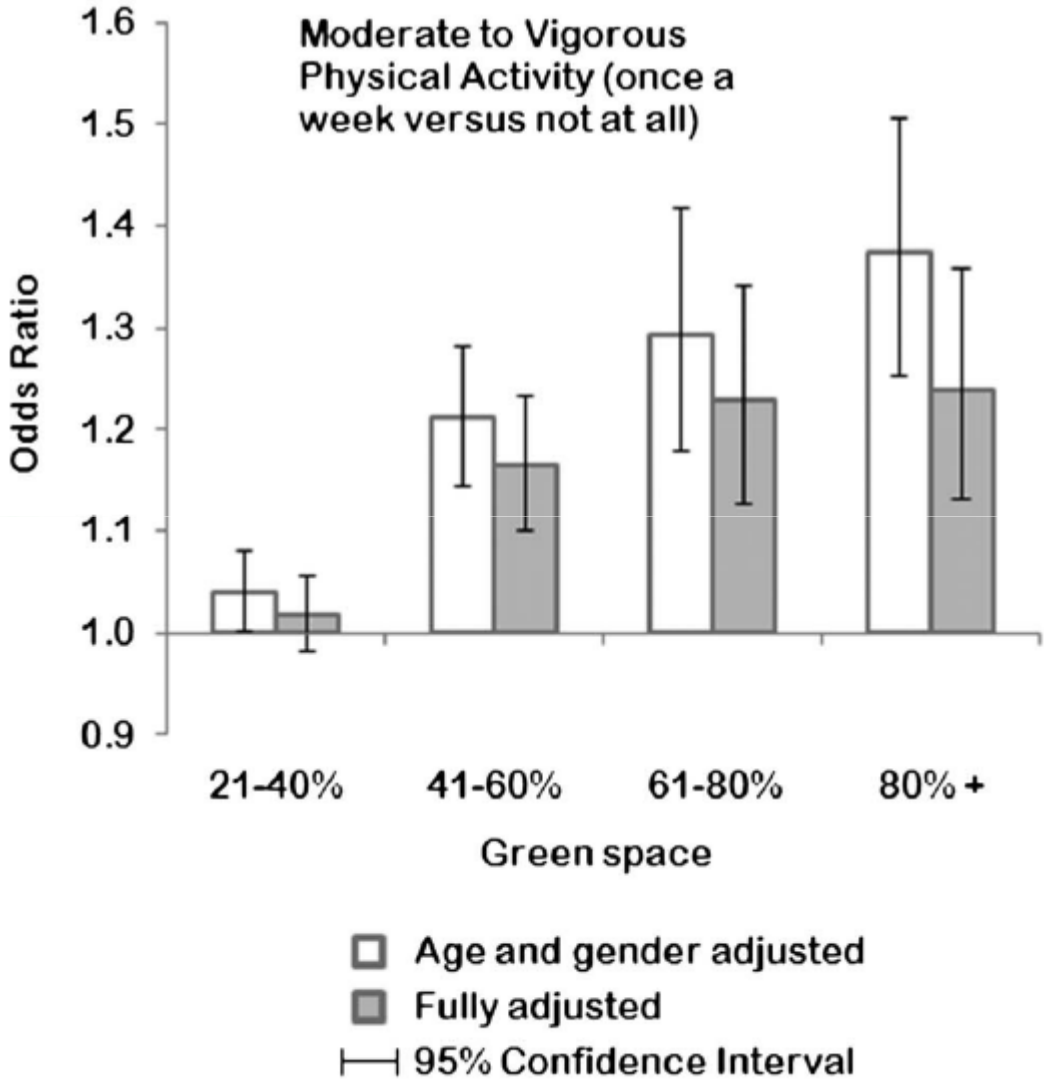
Review

Association of proximity and density of parks and objectively measured physical activity in the United States: A systematic review

Carolyn Bancroft [a, *], Spruha Joshi [a], Andrew Rundle [a], Malo Hutson [b], Catherine Chong [d], Christopher C. Weiss [c], Jeanine Genkinger [a], Kathryn Neckerman [d], Gina Lovasi [a]

20 articles met the inclusion criteria. Five articles reported a significant positive association between parks and physical activity. Nine studies found no association, and six studies had mixed findings. Our review found that even among studies with objectively measured physical activity, the association between access to parks and physical activity varied between studies, possibly due to heterogeneity of exposure measurement. Self-reported (vs. independently-measured) neighborhood park environment characteristics and smaller (vs. larger) buffer sizes were more predictive of physical activity.

GREEN SPACE AND PHYSICAL ACTIVITY



N=203883 adults

Astell-Burt et al 2014

GREEN SPACE AND SOCIAL CONTACTS

Sitting together for tea is what friends do," Jean-Jacques Sempé says of this week's "Under the Same Hat," his hundred-and-ninth *New Yorker* cover.

"Time spent with friends is one of the greatest pleasures of my life."

GREEN SPACE AND SOCIAL TIES

Table III. Multiple Regressions Using Apartment Greenness and Building Greenness to Predict Social Ties

		Subscales			
	Neighborhood social ties	Socializing at Taylor	Nearby neighbors	Local sense of community	General social ties
Model					
R^2	.15	.07	.10	.11	.02 (ns)
Apartment greenness					
β	.25	.22	.29	.25	.09
p	.0001	.01	.001	.0001	.28
Building greenness					
β	.12	.13	.14	.11	.10
p	.05	.14	.14	.12	.26

N=145 subjects Robert Taylor Homes, Chicago

Kuo et al 1998

Environmental biodiversity, human microbiota, and allergy are interrelated

Ilkka Hanski[a,1], Leena von Hertzen[b], Nanna Fyhrquist[c], Kaisa Koskinen[d], Kaisa Torppa[a], Tiina Laatikainen[e], Piia Karisola[c], Petri Auvinen[d], Lars Paulin[d], Mika J. Mäkelä[b], Erkki Vartiainen[e], Timo U. Kosunen[f], Harri Alenius[c], and Tari Haahtela[b,1]

[a]Department of Biosciences, University of Helsinki, FI-00014 Helsinki, Finland; [b]Skin and Allergy Hospital, Helsinki University Central Hospital, FI-00029 Helsinki, Finland; [c]Finnish Institute of Occupational Health, FI-00250 Helsinki, Finland; [d]Institute of Biotechnology, University of Helsinki, FI-00014 Helsinki, Finland; [e]National Institute for Health and Welfare, FI-00271 Helsinki, Finland; and [f]Department of Bacteriology and Immunology, Haartman Institute, University of Helsinki, FI-00014 Helsinki, Finland

Contributed by Ilkka Hanski, April 4, 2012 (sent for review March 14, 2012)

Rapidly declining biodiversity may be a contributing factor to another global megatrend—the rapidly increasing prevalence of allergies and other chronic inflammatory diseases among urban populations worldwide. According to the "biodiversity hypothesis," reduced contact of people with natural environmental features and biodiversity may adversely affect the human commensal microbiota and its immunomodulatory capacity. Analyzing atopic sensitization (i.e., allergic disposition) in a random sample of adolescents living in a heterogeneous region of 100 × 150 km, we show that environmental biodiversity in the surroundings of the study subjects' homes influenced the composition of the bacterial classes on their skin. Compared with healthy individuals, atopic individuals had lower environmental biodiversity in the surroundings of their homes and significantly lower generic diversity of gammaproteobacteria on their skin. The functional role of the Gram-negative

environmental biodiversity influences the composition of the commensal microbiota of the study subjects. Environmental biodiversity was characterized at two spatial scales, the vegetation cover of the yards and the major land use types within 3 km of the homes of the study subjects. Commensal microbiota sampling evaluated the skin bacterial flora, identified to the genus level from DNA samples obtained from the volar surface of the forearm. Second, we investigate whether atopy is related to environmental biodiversity in the surroundings of the study subjects' homes. Third, we examine whether atopy is related to the composition of the skin microbial community. Finally, we characterize the immune function of the study subjects by in vitro measurement of IL-10 expression in peripheral blood mononuclear cells (PBMCs) and relate it to the composition of the skin microbiota. IL-10 is one of the key anti-inflammatory cytokines in immunologic tolerance.

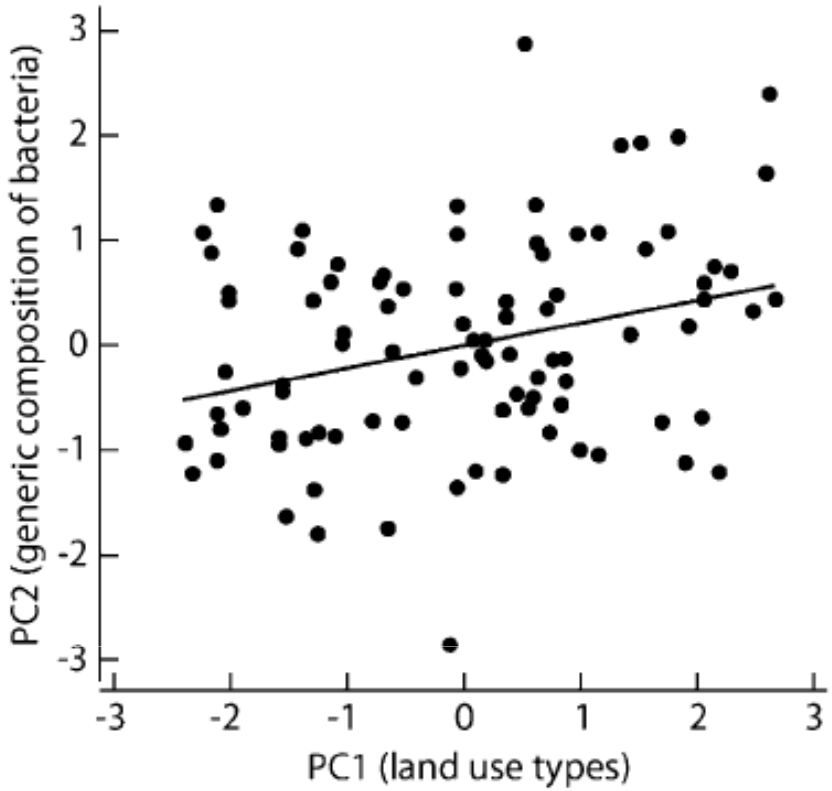


Fig. 1. Relationship between the generic composition of skin microbiota and land use types around the home. The vertical axis shows $PC2_{bac}$, which correlates positively with the generic diversity of proteobacteria and negatively with the diversity of all other bacterial classes (*SI Appendix*, Table S2). The horizontal axis shows $PC1_{env}$, which summarizes variation in land use types within a 3-km radius of the homes of the study subjects and is positively correlated with forests and agricultural land (*SI Appendix*, Table S1). Regression: $F = 9.12$, $df = 1.93$, $P = 0.0033$.

Hanski et al 2012

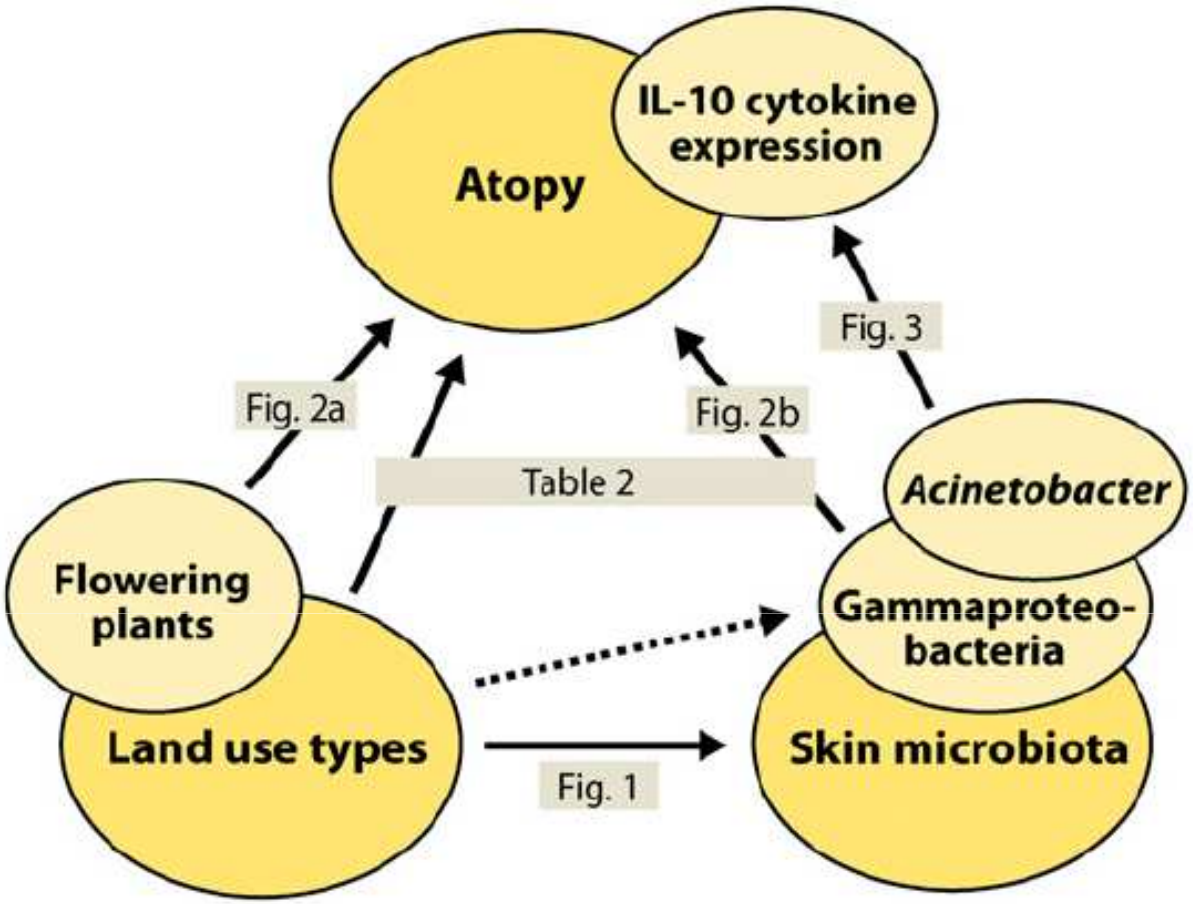


Fig. 4. Summary graph of the associations among environmental biodiversity, skin microbiota, and atopy. The solid arrows refer to the results in Figs. 1–3 and Table 2. The dashed-line arrow indicates a less significant effect of $PC1_{env}$ on the generic diversity of gammaproteobacteria ($t = 1.91$, $P = 0.059$, $n = 95$, with total number of bacterial genera as a covariate as in Fig. 2*B*).

Hanski et al 2012

STRESS REDUCTION AND RESTORATION

Stress Reduction Theory suggests natural environments promote recovery from stress and helps to lessen states of arousal and negative thoughts through psycho-physiological pathways.

Natural elements with characteristic such as a level of ground surface, spatial openness, curving sightlines and the presence of water, induce recovery of any form of stress, even mild short-term stress, via an unconscious and innate response (Ulrich 1984)

Attention Restoration Theory (ART) suggests that nature can replenish directed attention fatigue

Natural environments abound with "soft fascinations" which a person can reflect upon in "effortless attention", such as clouds moving across the sky, leaves rustling in a breeze or water bubbling over rocks in a stream. (The Kaplans 1980s)

GREEN VIEWS AND HOSPITAL RECOVERY

View Through a Window May Influence Recovery from Surgery

Abstract. *Records on recovery after cholecystectomy of patients in a suburban Pennsylvania hospital between 1972 and 1981 were examined to determine whether assignment to a room with a window view of a natural setting might have restorative influences. Twenty-three surgical patients assigned to rooms with windows looking out on a natural scene had shorter postoperative hospital stays, received fewer negative evaluative comments in nurses' notes, and took fewer potent analgesics than 23 matched patients in similar rooms with windows facing a brick building wall.*

ROGER S. ULRICH
Department of Geography,
University of Delaware, Newark 19716

Science. 1984 Apr 27;224(4647):420-1.

GREEN VIEWS AND HOSPITAL RECOVERY

Table 1. Comparison of analgesic doses per patient for wall-view and tree-view groups.

Analgesic strength	Number of doses					
	Days 0–1		Days 2–5		Days 6–7	
	Wall group	Tree group	Wall group	Tree group	Wall group	Tree group
Strong	2.56	2.40	2.48	0.96	0.22	0.17
Moderate	4.00	5.00	3.65	1.74	0.35	0.17
Weak	0.23	0.30	2.57	5.39	0.96	1.09

times were somewhat different. The records showed that patients with window views of the trees spent less time in the hospital than those with views of the brick wall: 7.96 days compared with 8.70 days per patient [Wilcoxon matched-pairs signed-ranks analysis, $T(17) = 35$, $z = 1.965$, $P = 0.025$].

spirits'' and ''moving well.'' More negative notes were made on patients with the brick wall view: 3.96 per patient compared to 1.13 per patient with the tree view [Wilcoxon matched-pairs signed-ranks analysis, $T(21) = 15$, $z = 3.49$, $P < 0.001$]. Although more

GREEN SPACE AND STRESS RECOVERY

R. S. Ulrich *et al.*

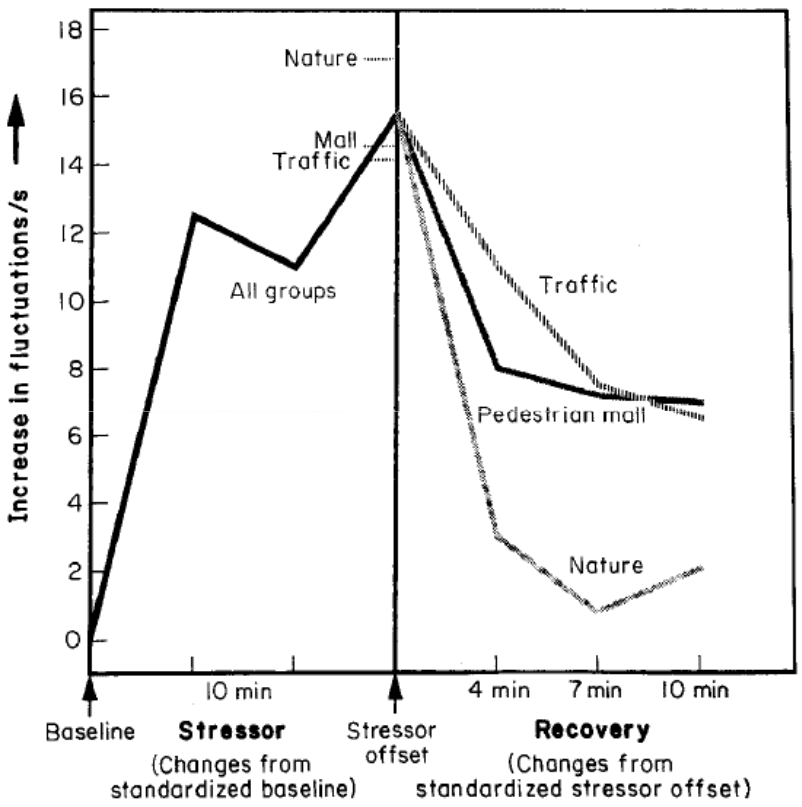


FIGURE 1. Changes in skin conductance (SCR) during stress and recovery.

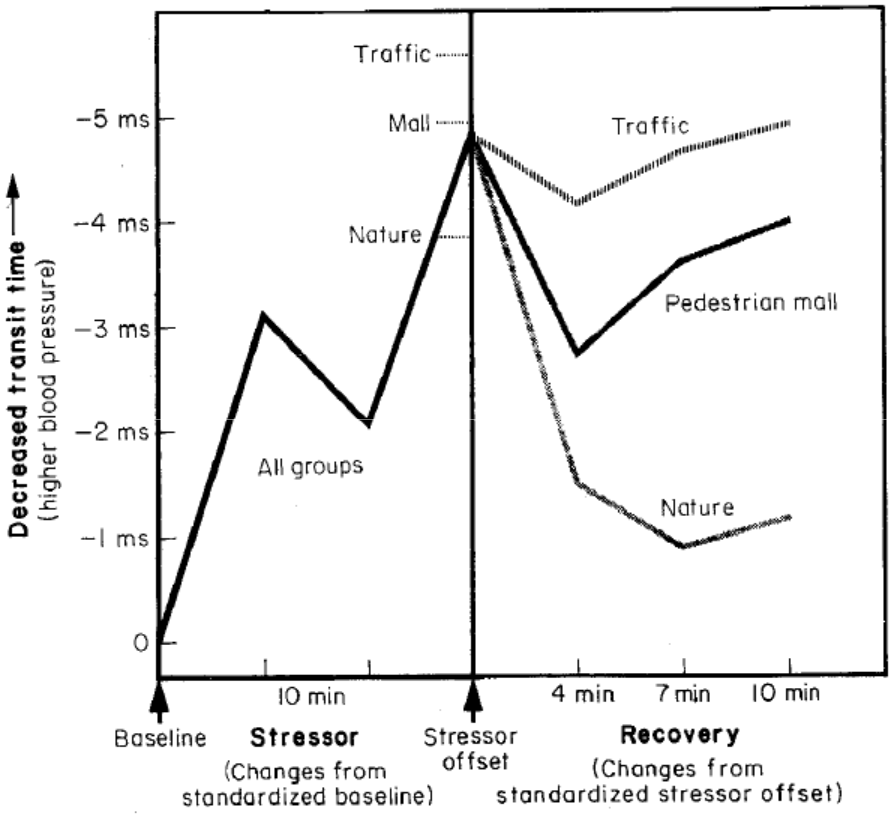


FIGURE 2. Changes in pulse transit time (PTT) during stress and recovery.

N=160

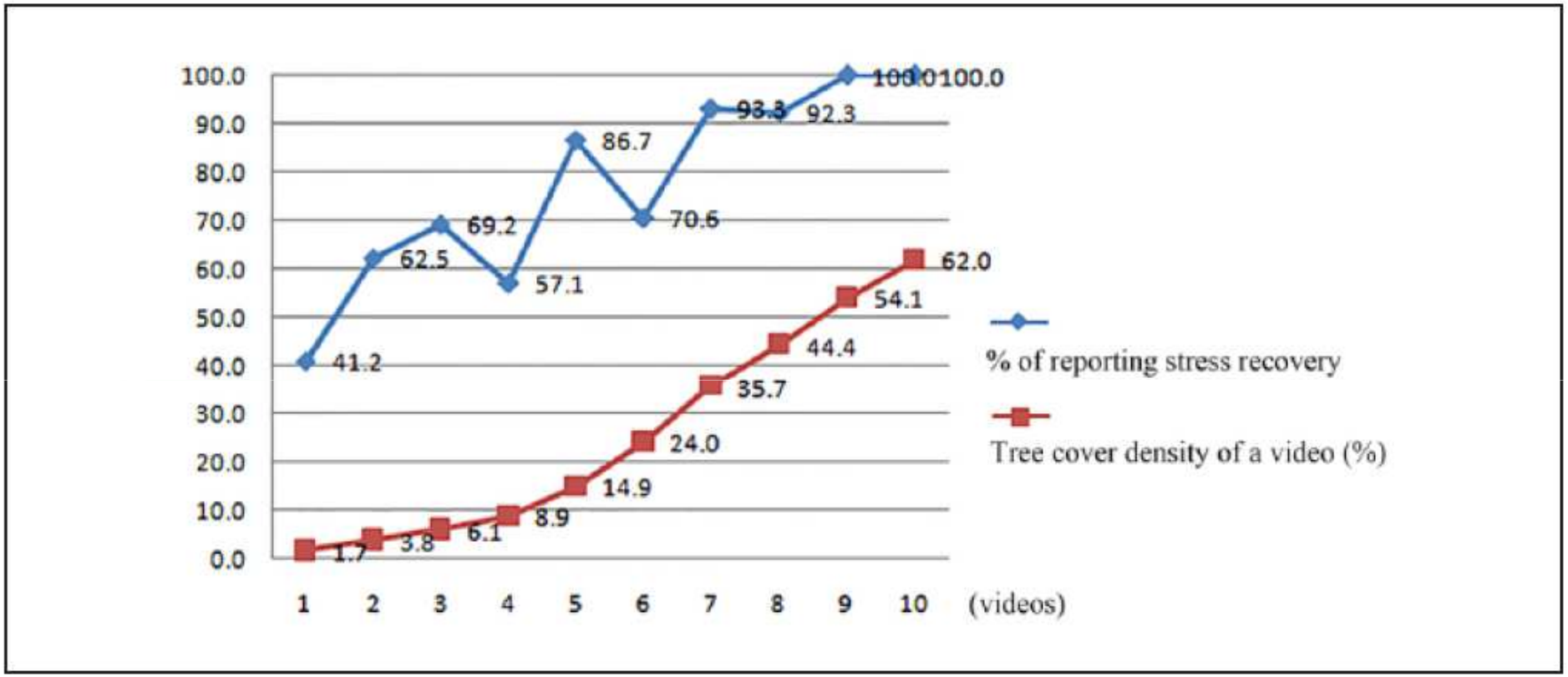
Ulrich et al 1991

TREE COVER AND STRESS RECOVERY

Figure 1. Panoramic photographs of two 3-D videos with a low (top, 2%) and a high (bottom, 61%) eye-level tree cover density.

Jiang et al 2014

TREE COVER AND STRESS RECOVERY



The relationship between tree cover density and percent of participants who reported the stress recovery effect for each of the 10 videos.

N=160

Jiang et al 2014

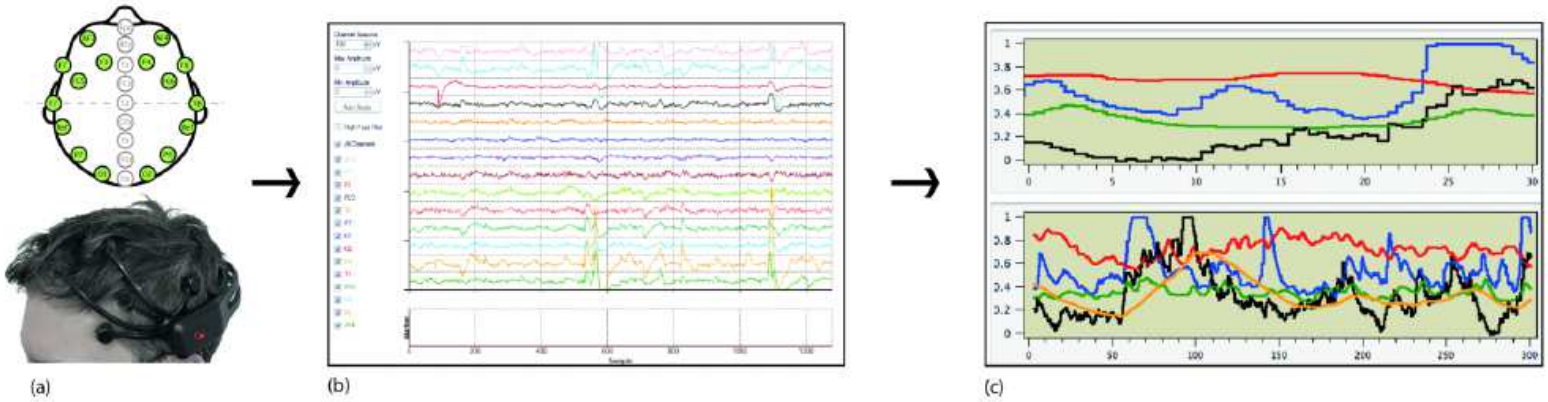


Figure 1 (A) Neural cap; (B) output from the Emotiv Testbench software: Emotiv EPOC records electroencephalography (EEG) signals from 14 sensor positions according to the 10–20 International System. Raw EEG signals are then 'translated' and classified in different emotional states and (C) output from the Emotiv Control Panel and 'Affectiv suite' (EEG data belong to the authors).

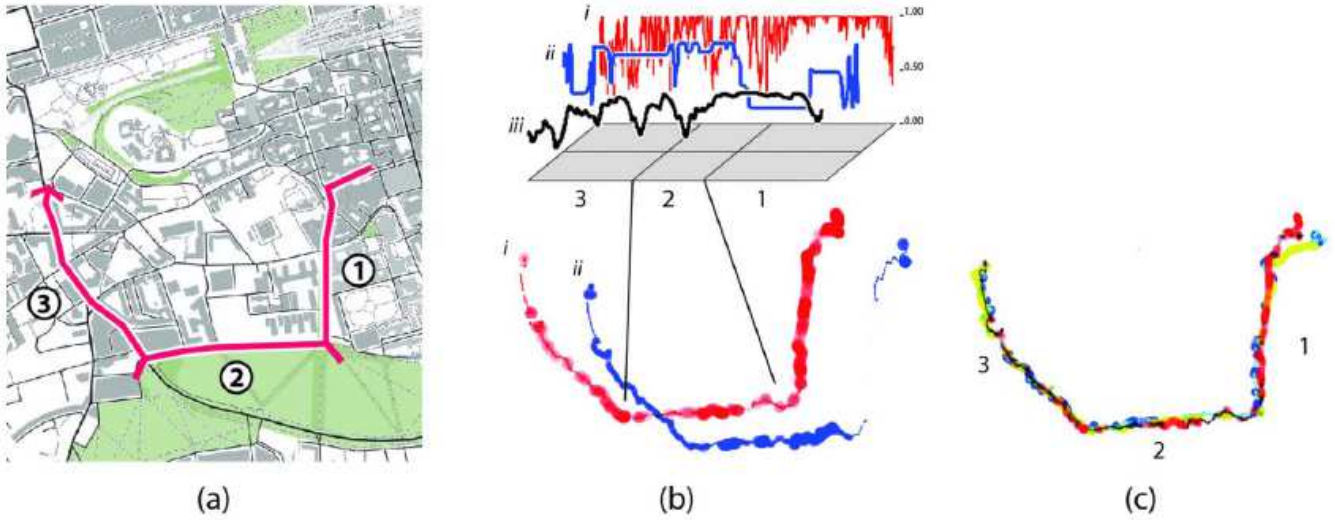


Figure 4 (A) Map of the route in central Edinburgh. (B) Emotional activity of one participant during the route, in charts (top of chart) and plot in space (bottom of chart). Red shows excitement; blue shows frustration. (C) Shows aggregate of excitement levels from the three participants. Peaks are in red, blue and yellow, respectively, for each participant.

N=12 students

Aspinall et al 2013

(a)

(b)

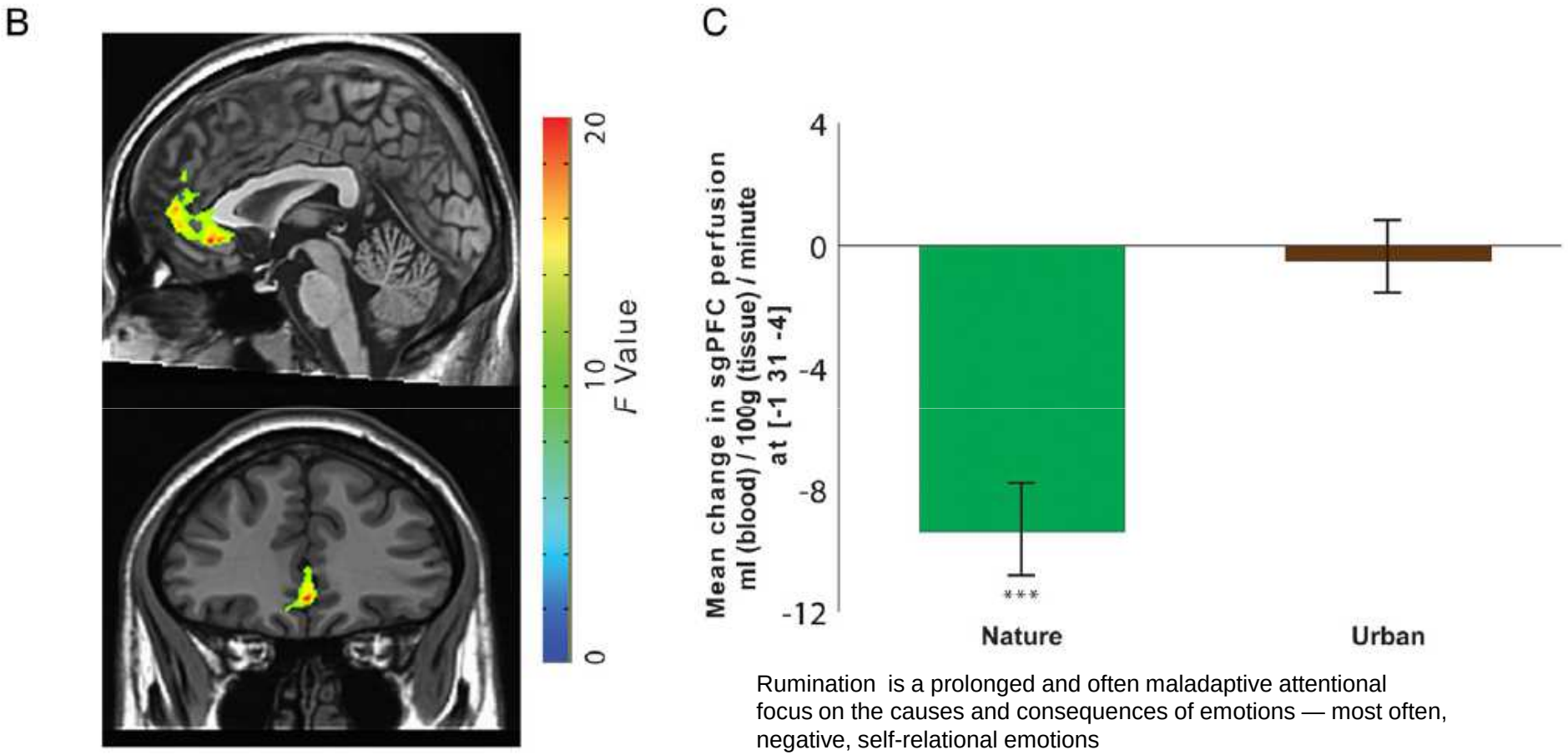
(c)

lower frustration, engagement and arousal, and higher meditation when moving into the green space zone

Figure 3 (A) Zone 1—urban shopping street; (B) zone 2—green space and (C) zone 3—busy commercial district.

Aspinall et al 2013

NATURE EXPERIENCE REDUCES RUMINATION AND SUBGENUAL PREFRONTAL CORTEX ACTIVATION



Rumination is a prolonged and often maladaptive attentional focus on the causes and consequences of emotions — most often, negative, self-relational emotions

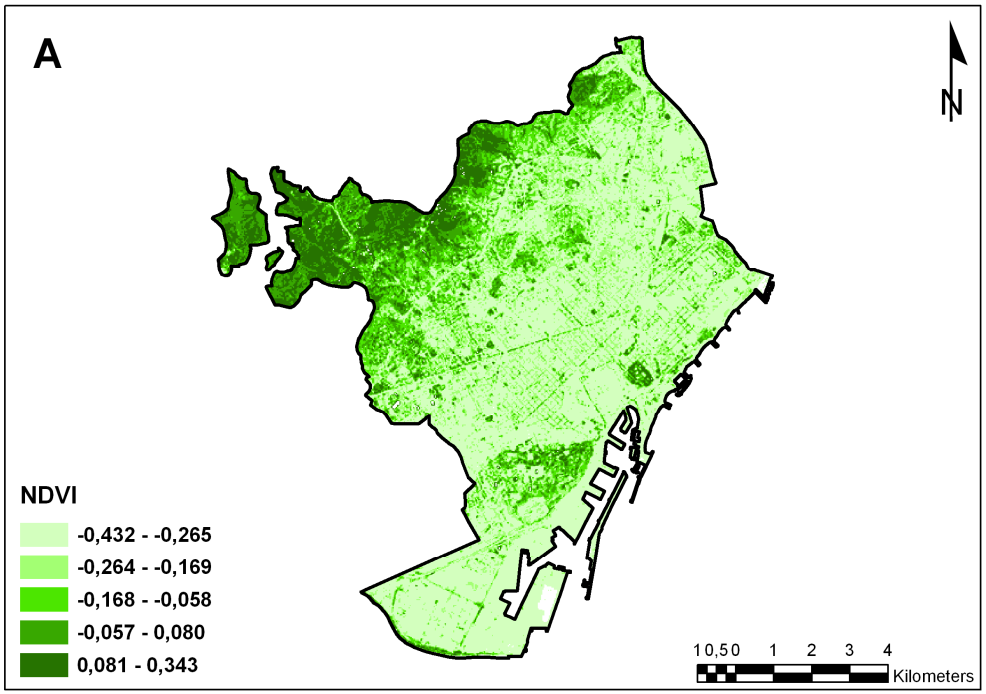
Fig. 1. The impact of nature experience on self-reported rumination and blood perfusion to the sgPFC. (*A*) Change in self-reported rumination (postwalk minus prewalk) for participants randomly assigned to take a 90-min walk either in a natural setting or in an urban setting. (*B*) A time-by-environment interaction in blood perfusion was evident in the sgPFC. *F* map of significant interactions at a threshold of $P < 0.05$, FWE corrected for multiple comparisons. (*C*) Change in blood perfusion (postwalk minus prewalk) for participants randomly assigned to take a 90-min walk either in a natural setting or in an urban setting. Error bars represent SE within subjects: $*P < 0.05$, $***P < 0.001$.

38 subjects, 90 min walk

Bratman et al 2015 PNAS

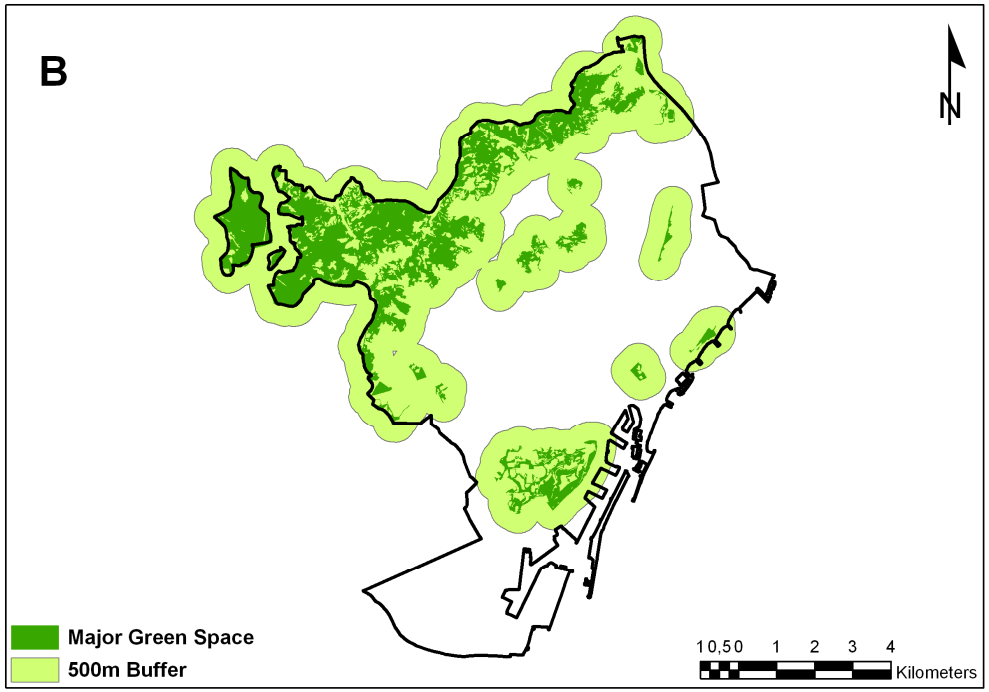
GREEN SPACE ASSESSMENT

- GIS maps (urban atlas, CORINE)
- Remote sensing
- Questionnaires (perception, use)
- Tracking devices (smartphone using apps for location, EMA and PA)
- Audits (quality assessment)



Surrounding greenness

NDVI = normalized difference vegetation index



Access to major green space

Living with X distance of green space

GREEN SPACE AND MENTAL HEALTH

Int. J. Environ. Res. Public Health **2015**, *12*, 4354-4379; doi:10.3390/ijerph120404354

OPEN ACCESS

International Journal of
Environmental Research and Public Health
ISSN 1660-4601
www.mdpi.com/journal/ijerph

Review

Mental Health Benefits of Long-Term Exposure to Residential Green and Blue Spaces: A Systematic Review

Mireia Gascon [1,2,3,4,*], Margarita Triguero-Mas [2,3], David Martínez [2,3], Payam Dadvand [2,3], Joan Forns [2,3,4], Antoni Plasència [1] and Mark J. Nieuwenhuijsen [2,3]

In total 28 studies were included in the systematic review. We found limited evidence for a causal relationship between surrounding greenness and mental health in adults. Limitation: cross sectional studies

GREEN SPACE AND GENERAL AND MENTAL HEALTH INDICATORS

20% reduction per IQR

	Surrounding greenness OR[§] (95% CI)	Access to green spaces OR[§] (95% CI)
Health indicators		
Less than good self-perceived general health	0.90 (0.83, 0.98)*	0.95 (0.83, 1.08)
Perceived risk of poor mental health	0.79 (0.71, 0.88)*	0.93 (0.79, 1.09)
Perceived depression and/or anxiety	0.81 (0.75, 0.88)*	0.86 (0.76, 0.98)*
Visits to mental health specialists	0.80 (0.69, 0.92)*	0.79 (0.63, 0.98)*
Intake of tranquilizers or sedatives	0.88 (0.79, 0.99)*	0.93 (0.78, 1.11)
Intake of antidepressants	0.80 (0.71, 0.91)*	0.87 (0.72, 1.05)
Intake of sleeping medication	0.89 (0.79, 0.99)*	1.03 (0.86, 1.24)

† Models adjusted for gender, age, education, marital status, socioeconomic status, percentage of population with university studies, health insurance, origin, and degree of urbanization.
§ Odds ratio (OR) reported for all the variables with the exception of social support, where incidence rate ratio is reported.
* p-value < 0.05.

n = 8793 adults

Triguero-Mas et al 2015

GREEN SPACE AND MENTAL HEALTH IN THE UK

Environmental Science & Technology

Article

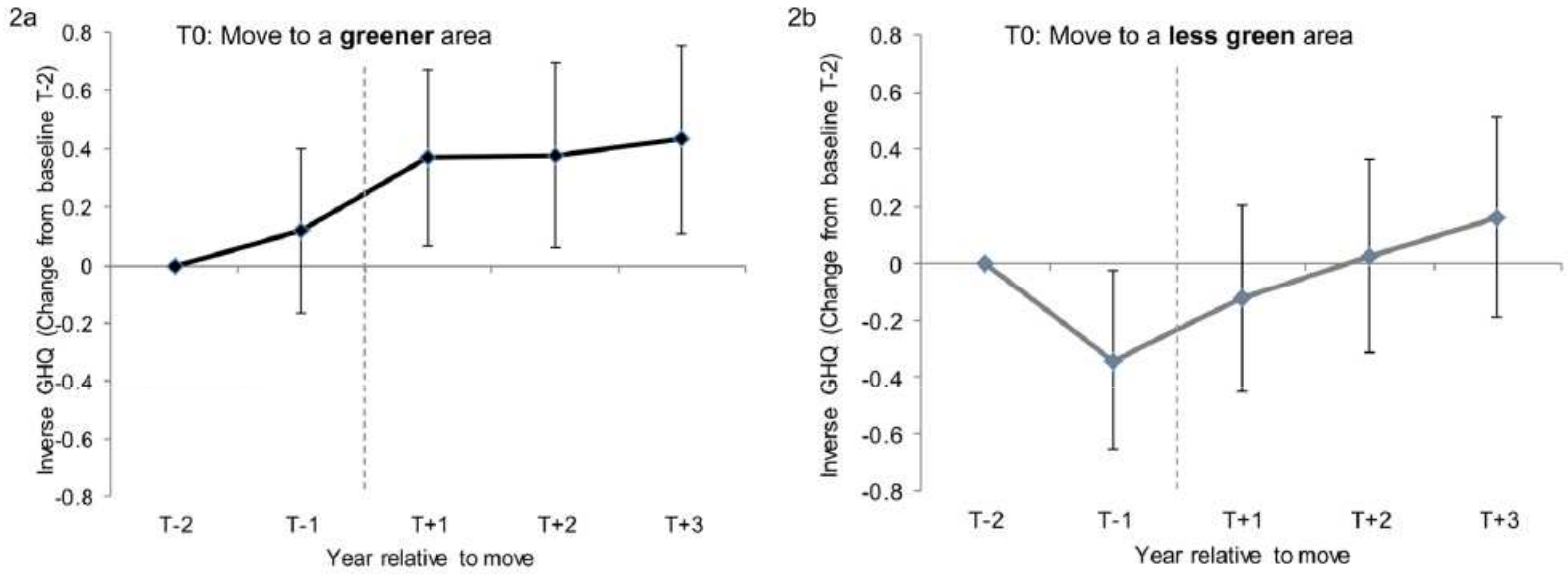


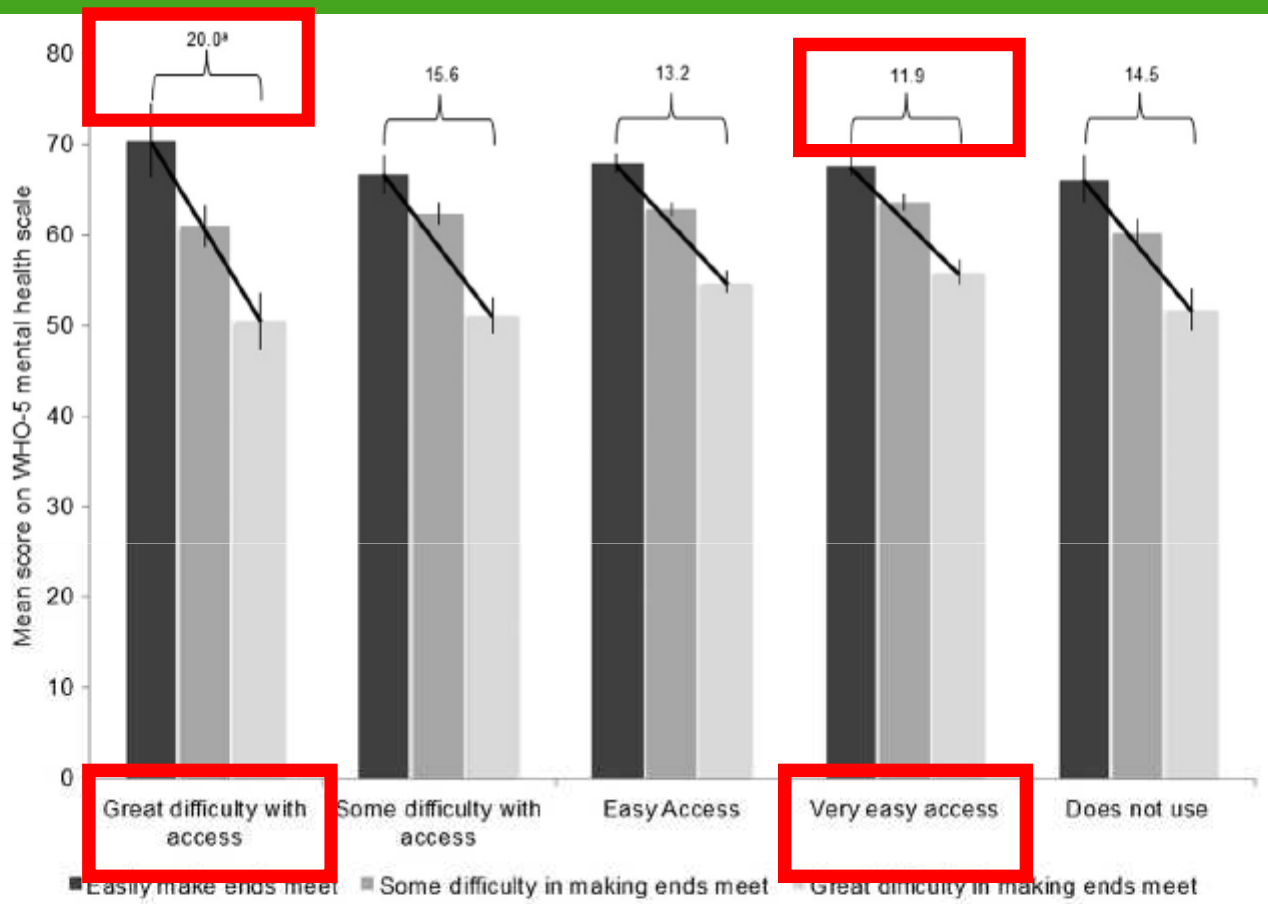
Figure 2. Changes in (inverse) GHQ scores compared to baseline (T−2) following relocations to (a) greener urban areas and (b) less green urban areas (error bars = 95% CIs). Note: T−1 and T+1 are annual data collection time points immediately prior to and succeeding the time of the move to a greener/less green area (T0). T−2 is the annual data collection time point preceding T−1, and T+2 and T+3 are the annual data collection time points succeeding T+1.

Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas

(n= 1064; observations = 5320)

Alcock et al 2014

GREEN SPACE, INEQUALITIES AND MENTAL WELL BEING



[a] denotes the difference in WHO-5 score between most and least financially strained. Solid sloped lines compare the gradient in mental well-being between reported levels of access to recreational / green areas.

Figure 1. Predicted mean mental well-being by perceived financial strain and ease of access to recreational/green areas

21,294 urban residents from 34 European nations Mitchell et al 2015

GREEN SPACE AND WORKING MEMORY

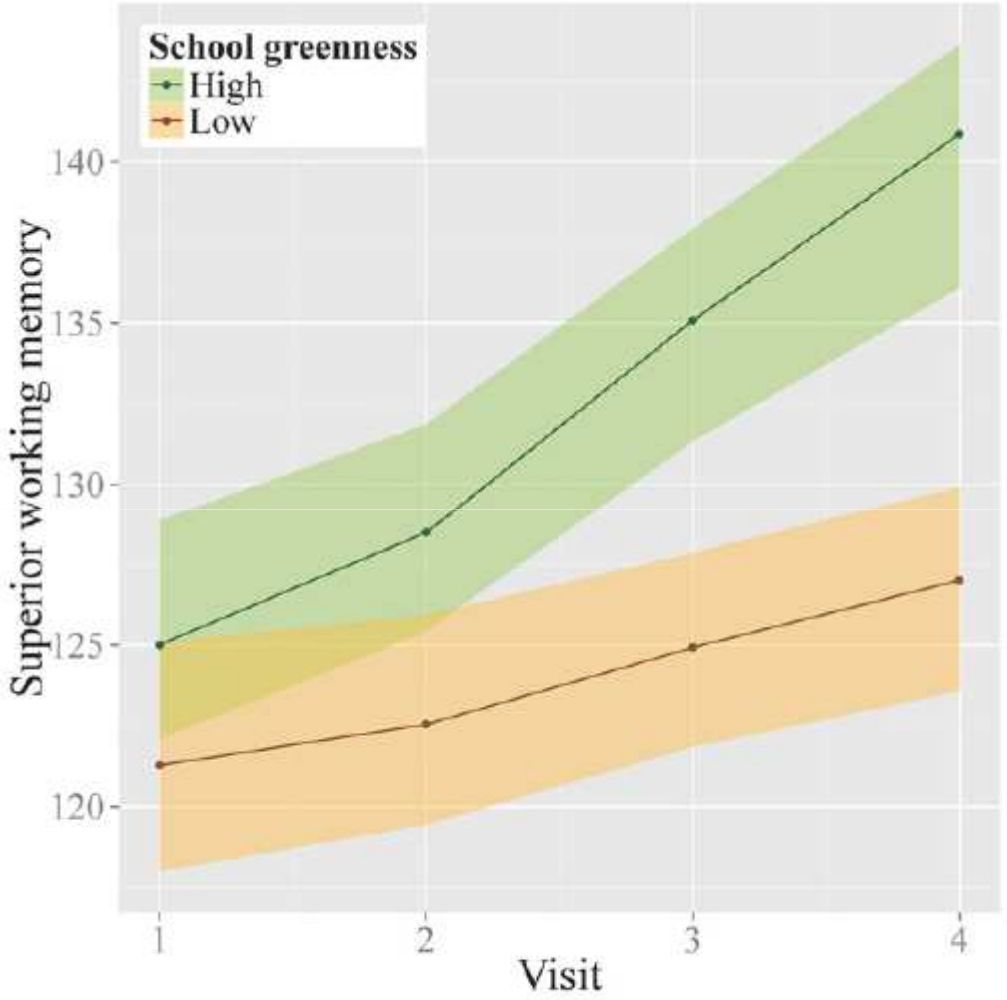


Fig. 1. Twelve-month progress (with 95% confidence bands) in superior working memory for participants with the first (low greenness) and third (high greenness) tertiles of greenness within the school boundaries.

Dadvand et al 2015
PNAS

N=2,593 children, 7-10 yrs

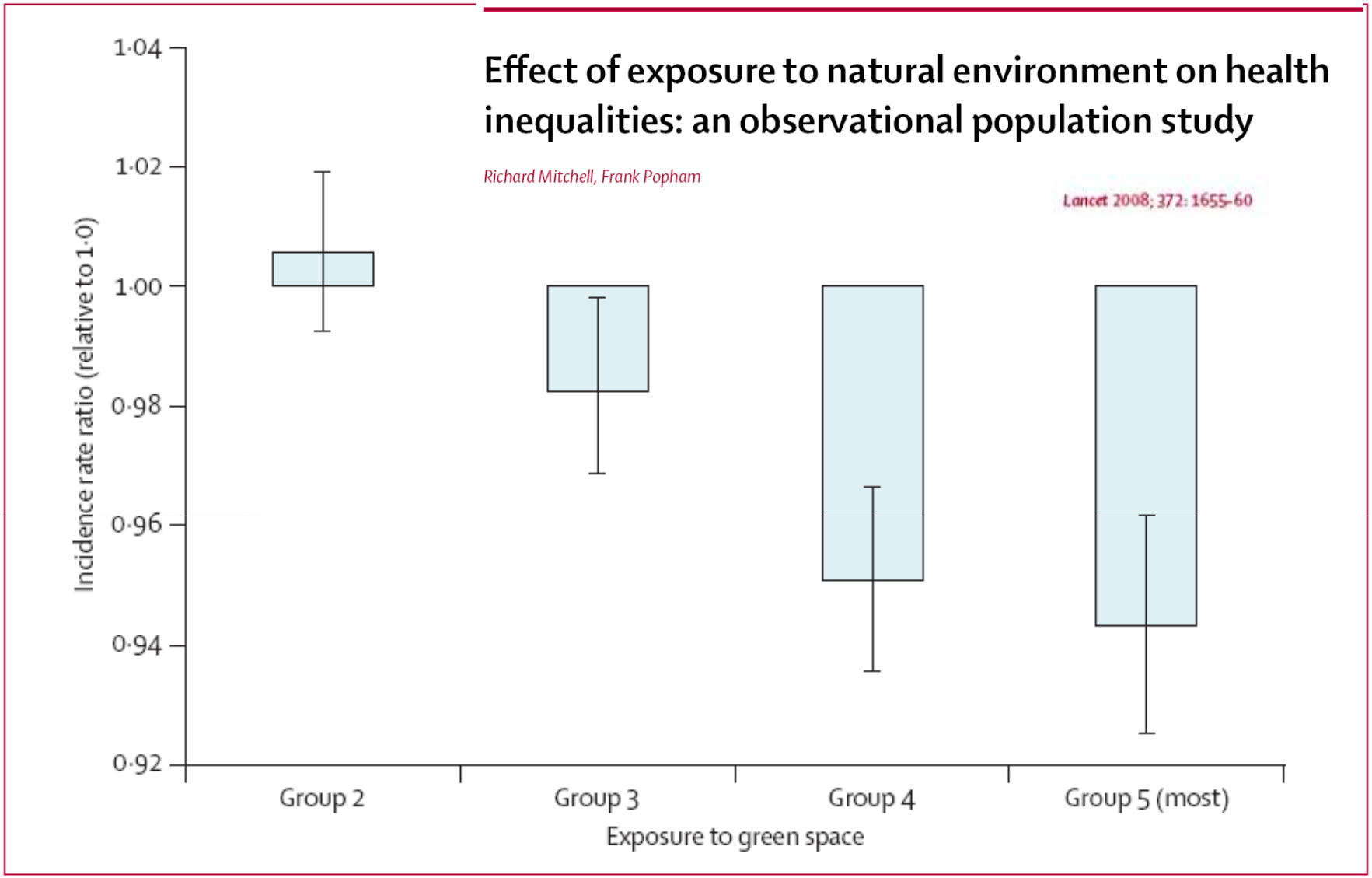


Figure 1: **Incidence rate ratios for all-cause mortality in groups of exposure to green space, relative to group 1 (least exposure to green space)**

N=40813236

Mitchell and Popham 2008 Lancet

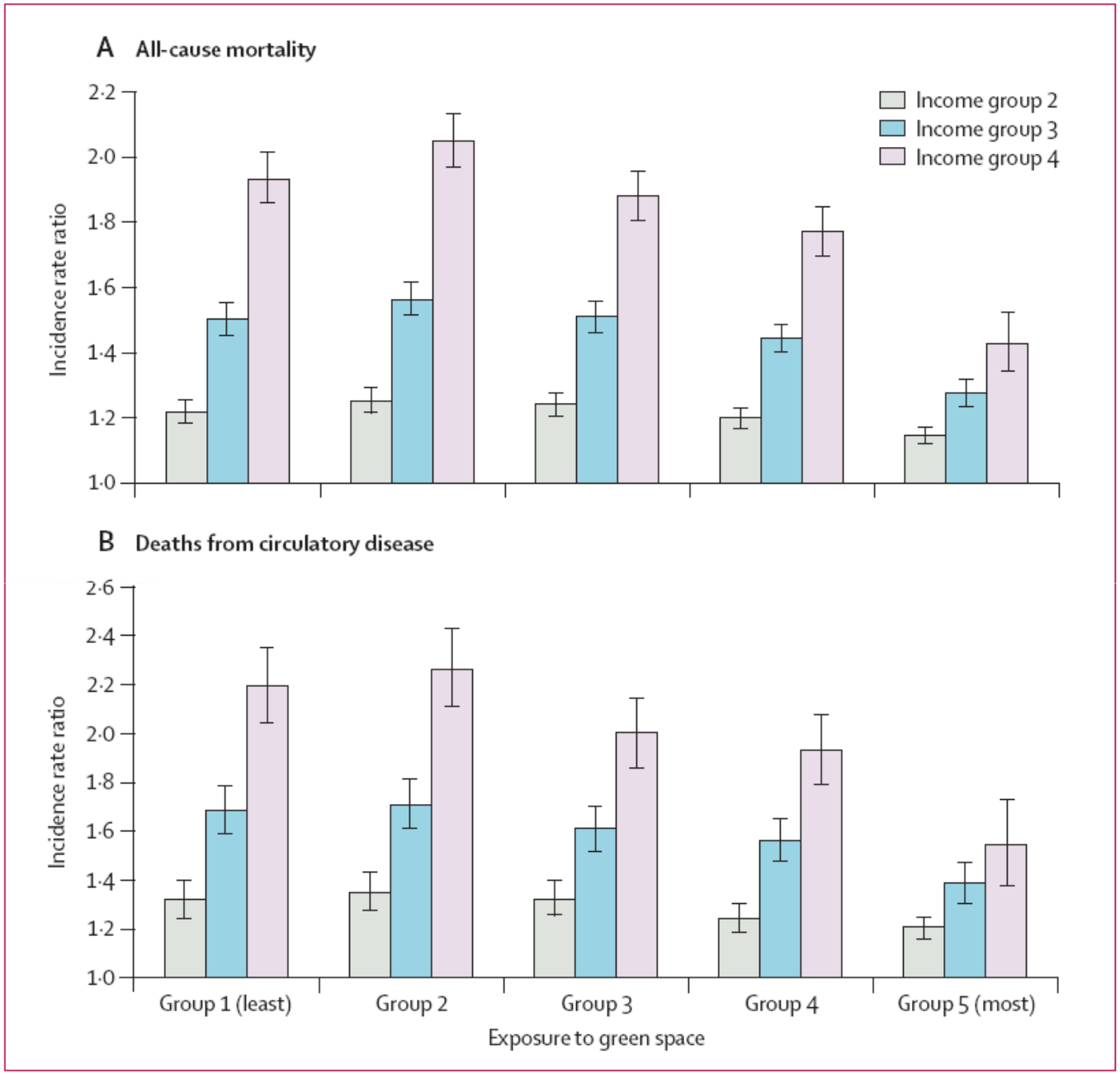


Figure 2: Incidence rate ratios for all-cause mortality (A) and deaths from circulatory disease (B) in income-deprivation quartiles 2–4, relative to income deprivation quartile 1 (least deprived), stratified by exposure to green space

Mitchell and Popham 2008

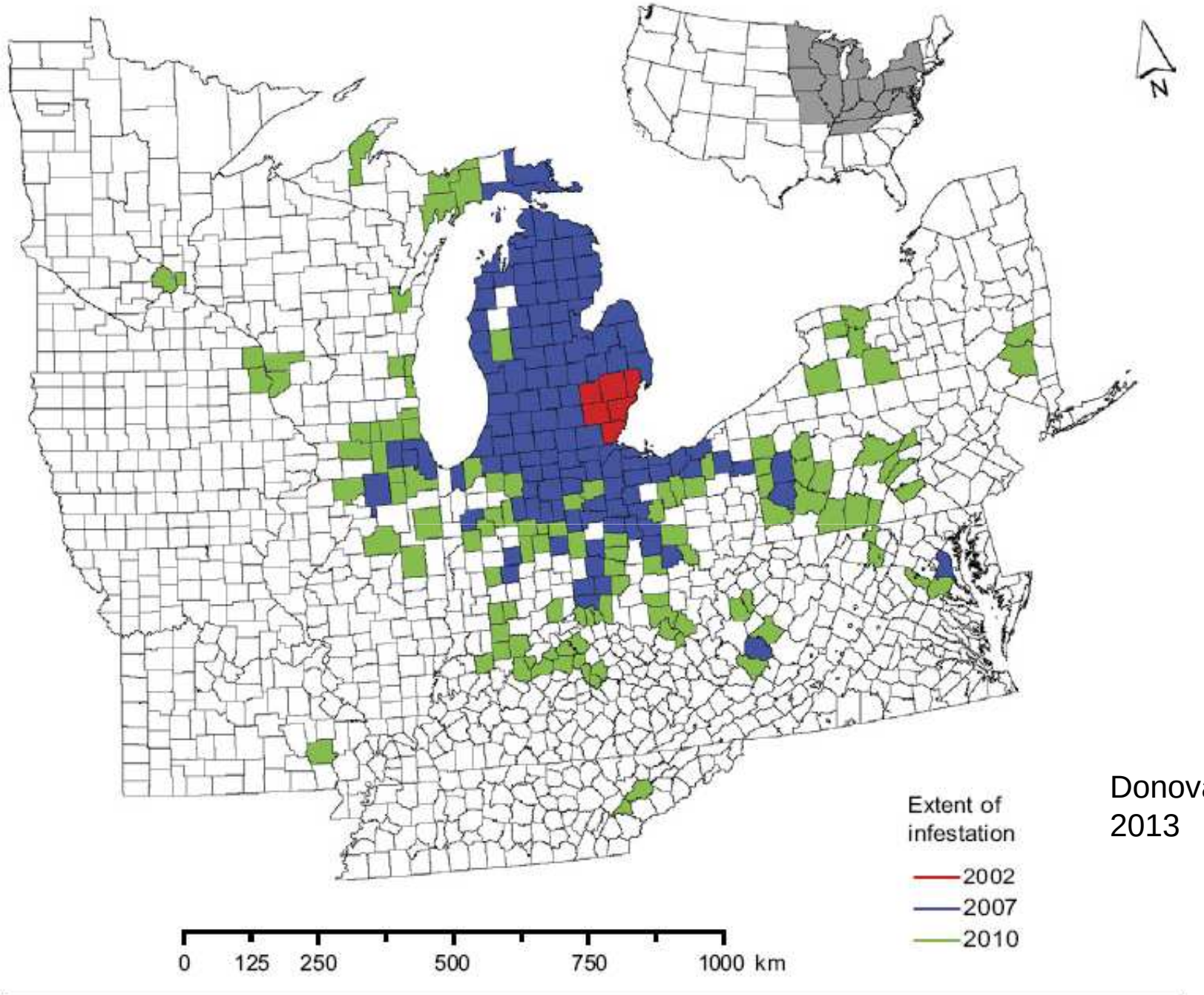
The Relationship Between Trees and Human Health

Evidence from the Spread of the Emerald Ash Borer

Geoffrey H. Donovan, PhD, David T. Butry, PhD, Yvonne L. Michael, ScD, Jeffrey P. Prestemon, PhD, Andrew M. Liebhold, PhD, Demetrios Gatziolis, PhD, Megan Y. Mao

Purpose: A natural experiment, which provides stronger evidence of causality, was used to test whether a major change to the natural environment—the loss of 100 million trees to the emerald ash borer, an invasive forest pest—has influenced mortality related to cardiovascular and lower-respiratory diseases.

Am J Prev Med 2013;44(2):139–145



Donovan et al 2013

Figure 1. Counties where the emerald ash borer had been detected in 2002, 2007, and 2010

TREES AND MORTALITY IN THE USA

Results: There was an increase in mortality related to cardiovascular and lower-respiratory-tract illness in counties infested with the emerald ash borer. The magnitude of this effect was greater as infestation progressed and in counties with above-average median household income. Across the 15 states in the study area, the borer was associated with an additional 6113 deaths related to illness of the lower respiratory system, and 15,080 cardiovascular-related deaths.

Table 1. Longitudinal regression model of adult lower-respiratory-tract disease–related mortality, adjusting for covariates, U.S., 1990–2007

Variable	Beta coefficient[a] (95% CI)	*p*-value
Time trend	−2.98 (−3.23, −2.72)	<0.001
1-year mortality-rate lag	0.31 (0.303, 0.310)	<0.001
Percentage non-Hispanic white	9.40 (6.40, 12.40)	<0.001
Percentage Native Hawaiian and other Pacific Islander	2.14 (0.32, 3.97)	0.022
High median income	13.95 (6.50, 21.39)	<0.001
Aged >25 years with no high school diploma, %	1.22 (0.92, 1.52)	<0.001
Aged >25 years with college degree, %	−0.33 (−0.70, 0.03)	0.077
Population below 100% of poverty line, %	2.24 (1.89, 2.58)	<0.001
Percentage of county covered by ash canopy	−5.22 (−7.79, −2.64)	<0.001
Emerald ash borer	−4.24 (−8.10, −0.39)	0.031
Emerald ash borer X high median income	6.23 (2.23, 10.22)	0.002
Years of infestation	1.44 (0.95, 1.92)	<0.001
Ash canopy X high median income	−0.85 (−1.30, −0.41)	<0.001
R^2		
Within counties	0.609	
Between counties	0.187	
Overall	0.352	

[a]Mortality rate per 100,000 adults

The presence of the borer in a county is associated with 6.8 additional deaths per year per 100,000 adults (95% CI4.8, 8.7).

Table 3. Longitudinal regression model of adult cardiovascular-related mortality adjusting for covariates in the U.S., 1990−2007

Variable	Beta coefficient[a] (95% CI)	*p*-value
Time trend	−6.49 (−7.45, −5.54)	<0.001
1-year mortality-rate lag	0.45 (0.43, 0.47)	<0.001
High median income	11.03 (5.71, 16.34)	<0.001
Native Hawaiian and other Pacific Islander, %	30.07 (2.44, 57.71)	0.033
Aged >25 years with no high school diploma, %	5.80 (4.67, 6.92)	<0.001
Aged >25 years with college degree, %	−1.92 (−3.26, −0.57)	0.005
Population below poverty line, %	−8.99 (−10.33, −7.64)	<0.001
Percentage of county covered by ash canopy	−1.80 (−9.51, 5.91)	0.648
Emerald ash borer	−13.51 (−25.38, −1.64)	0.026
Ash canopy X high median income	18.24 (5.45, 31.02)	0.0005
Years of infestation	2.77 (1.05, 4.48)	0.002
Emerald ash borer X high median income	−3.42 (−4.71, −2.13)	<0.001
R^2		
Within counties	0.753	
Between counties	0.298	
Overall	0.488	

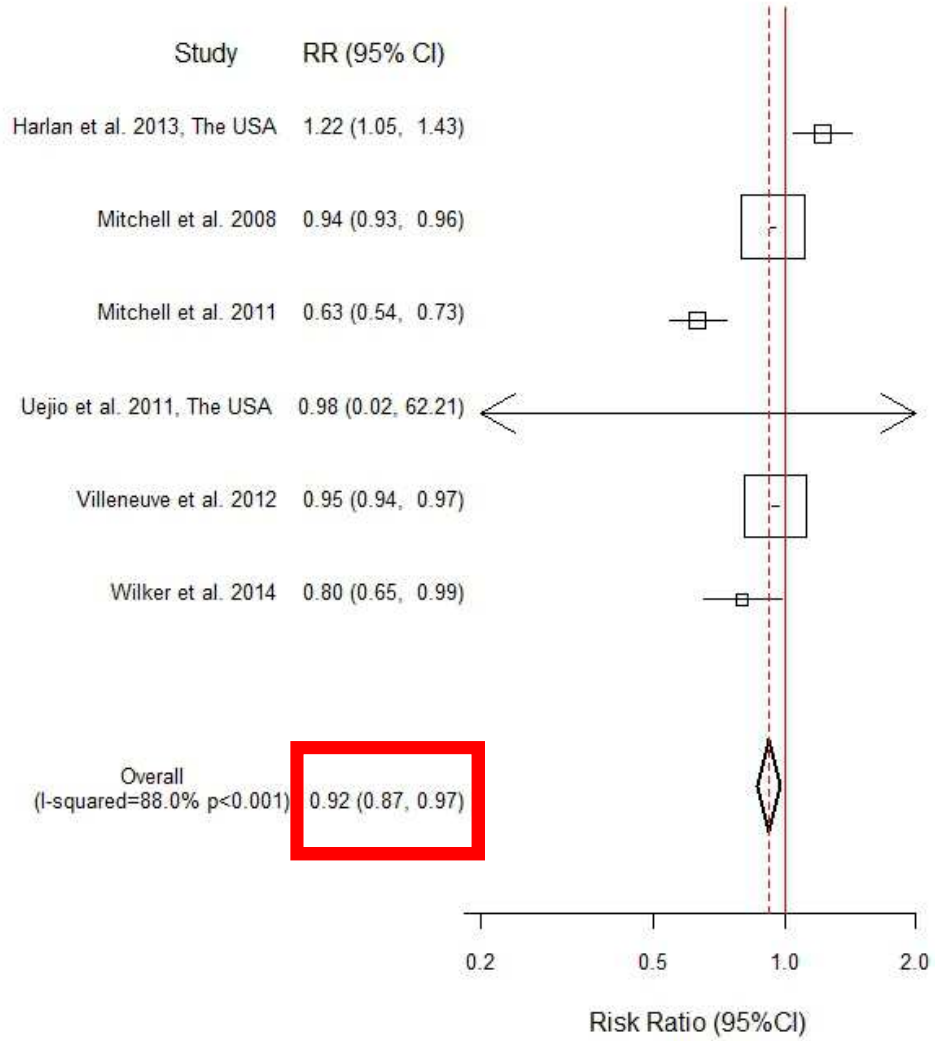
[a]Mortality rate per 100,000 adults

The presence of the borer on cardiovascular related mortality is 16.7 additional deaths per year per 100,000 adults (95% CI5.7, 27.7)

www.creal.cat

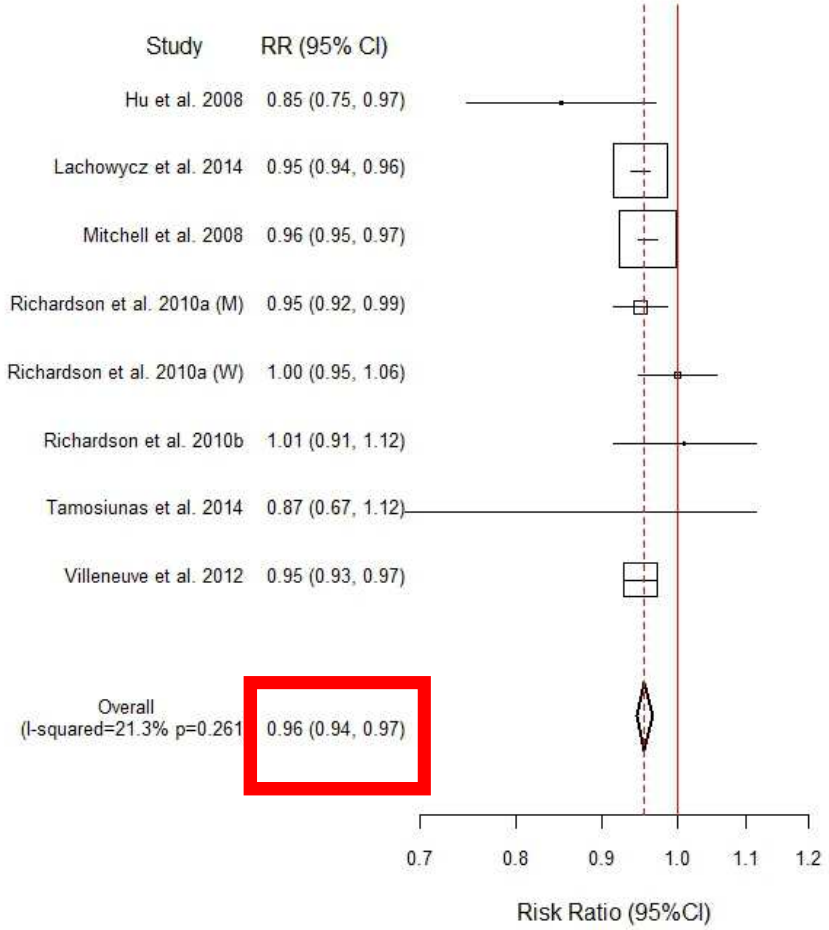
Donovan et al 2013

Meta-analysis All cause mortality



Gascon et al (under revision)

Meta-analysis Cardiovascular mortality



Gascon et al (under revision)

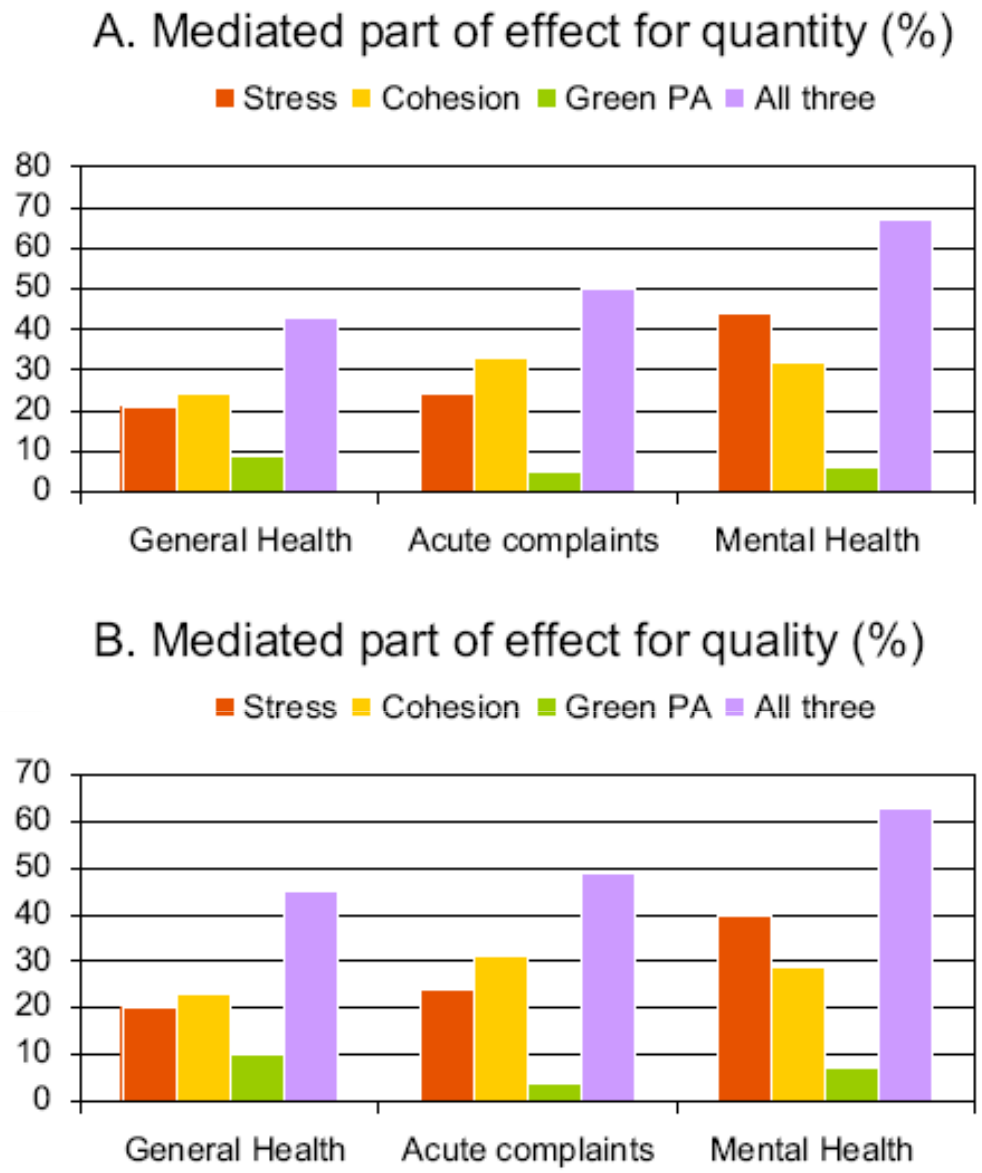


Fig. 1. Indirect effect on health indicators as percentage of total effect of quantity (A) and quality (B) of streetscape greenery respectively for the three mediators separately and combined.

De Vries el al 2013

N=1641

LYME DISEASE

OTHER OUTCOMES

Reduction in	Increase in
Crime	Skin cancer
Obesity	Allergies/asthma
	Birth weight


Montseny


M25-M23 UK


Parc Ciutadella

Rambla Poble Nou

Barceloneta

RESEARCH NEEDS

Longitudinal studies

Intervention studies

Contribution of various mechanisms

More on where, when, how much, what type

Quality assessents (e.g. audits)

Effectiveness in clinical practice (green prescribtions)


BEIRUTOPIA

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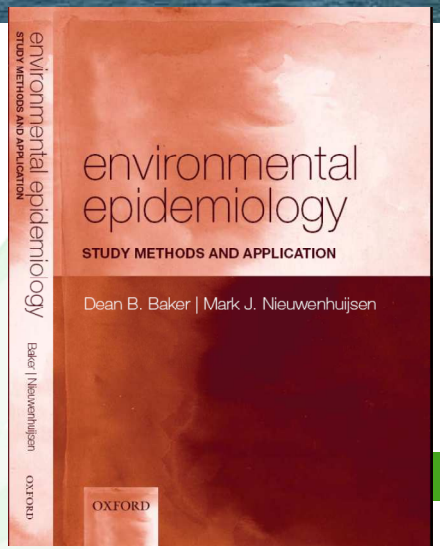
FARMÀCIA



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