

The research centre for inclusive
access to outdoor environments



Recent findings on urban green space & health

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Theories on landscape preference

Appleton's (1975) work on prospect and refuge, and that of Wilson (1984) and Bourassa (1991) propose a biological basis for human preference for certain types of environments and the psychological benefits they bestow.

The Biophilia hypothesis (Kellert and Wilson 1993) suggests that people's desire for contact with nature has an underlying cause based on genetic fitness and competitive advantage:

the natural environment is a resource vital to human wellbeing, physical and mental.

What might this mean for an urbanised society?

The artificial conditions of the town produce “a harmful effect, first on (a man’s) entire mental and nervous system and ultimately on his entire constitutional organisation” – the antidote is pleasing, rural scenery. *F L Olmsted 1886*



Central Park – The Bridge, Currier and Ives, U.S. Library of Congress

Prospect Park, Brooklyn, Olmsted & Vaux, 1866



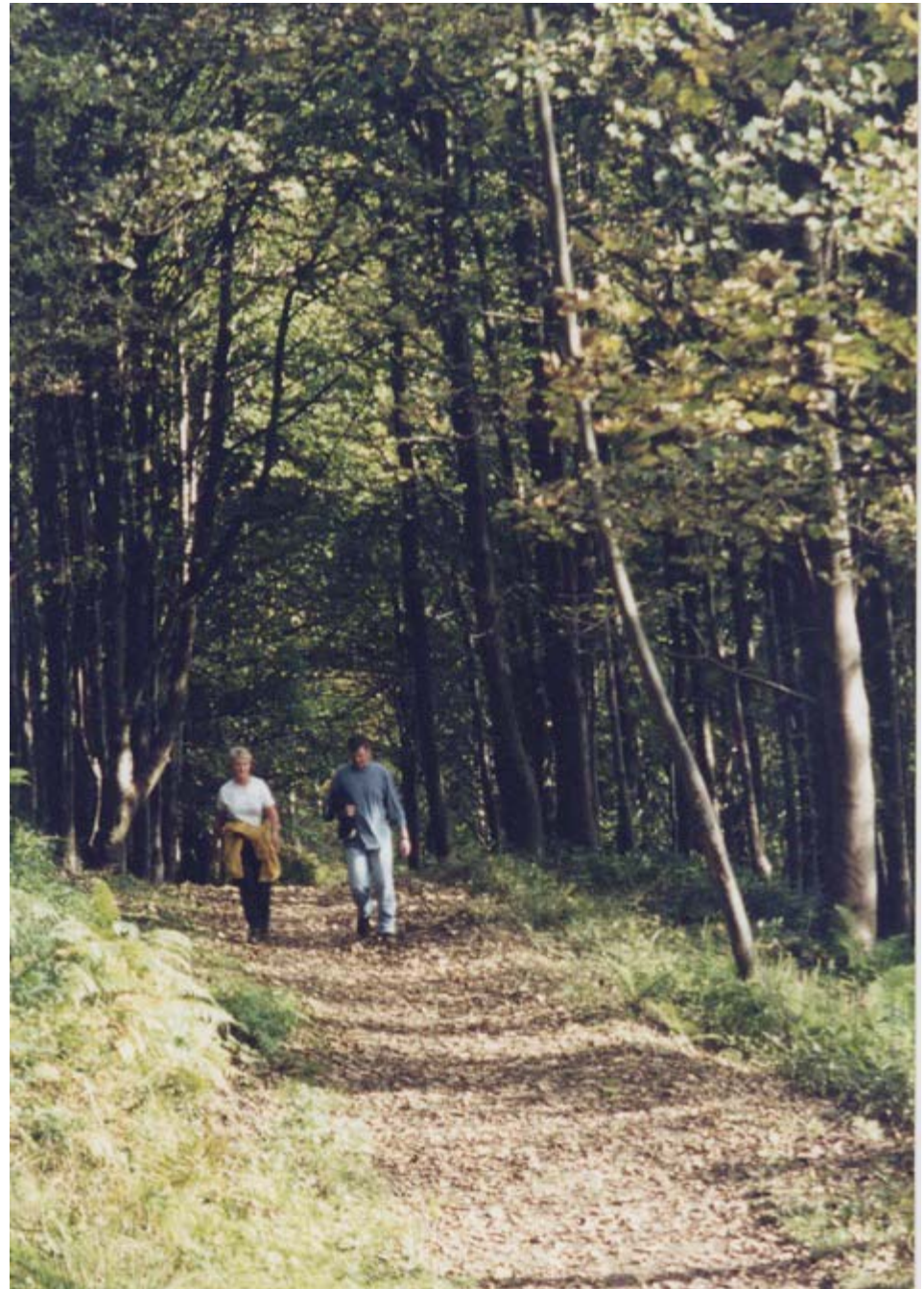
Ward Thompson, C. 2011. Linking Landscape and Health: the Recurring Theme, *Landscape and Urban Planning*, 99(3), 187-195

Understanding use of woods near urban areas:

“You can just go away by yourself. You can just disappear and nobody can see you...you can’t do that in the city, you can’t just keep walking, walking, walking”

*“I find it’s quiet, it gets you away from everyday life. You just go away and be in a world of your own sometimes... **if you’re angry at anything, just go away and get yourself all calmed down.**”*

Unemployed men and women from urban areas in Central Scotland



Open Space and Social Inclusion: Local Woodland Use in Central Scotland, Edinburgh: Forestry Commission, 2004

Experiential learning in childhood

In addition to being important for *healthy physical, mental, cognitive, emotional and social development*, childhood play in natural settings appears to have a long-term and positive effect on attitudes, well-being and behaviour

Ward Thompson, C, Aspinall, P and Montarzino, A. 2008. The Childhood Factor: Adult Visits to Green Places and the Significance of Childhood Experience. *Environment and Behavior*. 40 (1) 111-143



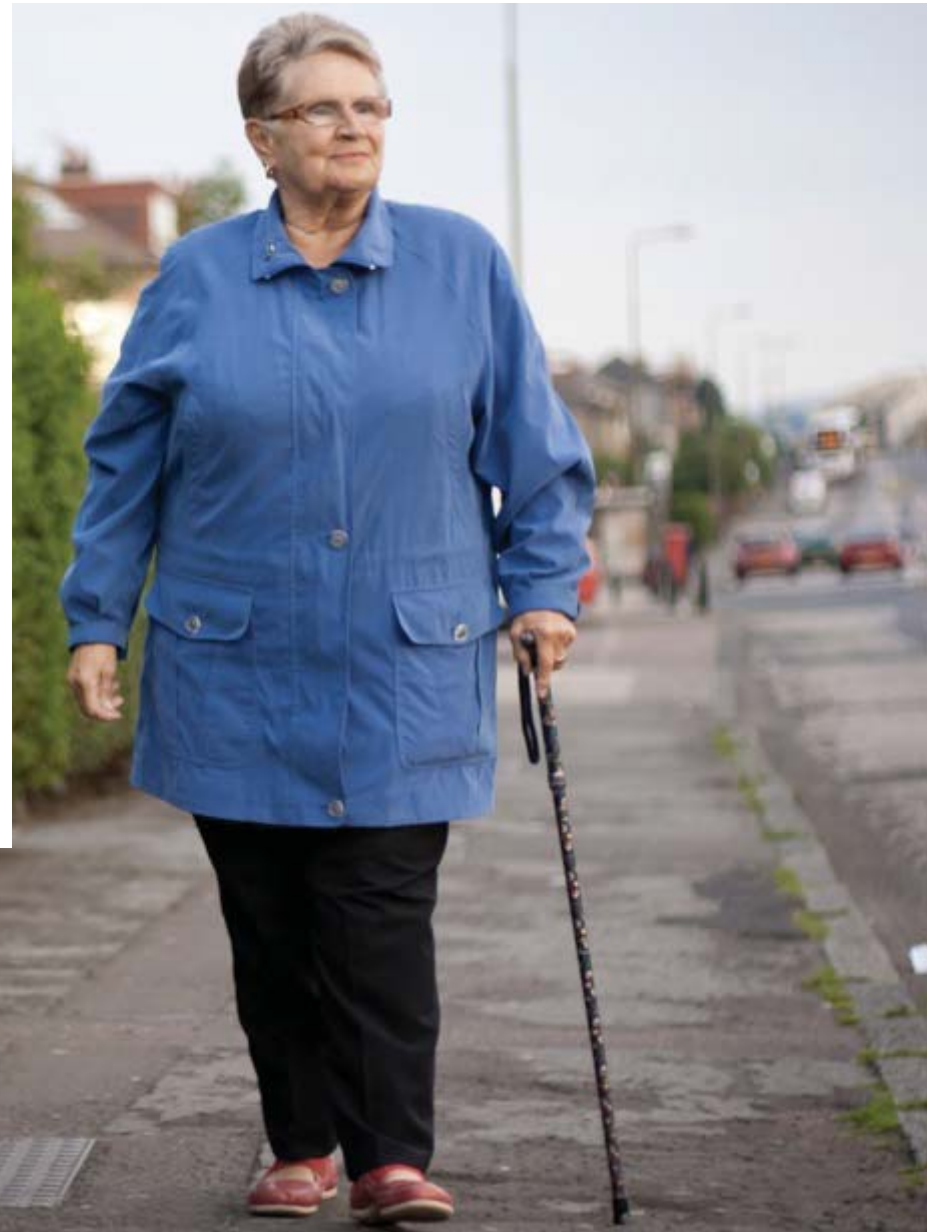
Natural England 2010 *Free-Range Teenagers: Wild Adventure Space its role in teenagers' lives*. NECR025

Our research with older people shows the importance of getting outside

“It's a psychological thing about escaping the flat ... a load comes off my mind when I go out”.

“I have a different feeling about myself when I get home after being out”

“I enjoy the seasons and elements of change. I like trees, wildlife and the atmosphere – it's all stimulating for thought”



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Does closeness of green/blue space make a difference?



Do you live within 10 minutes' walk of a local open space?

In a British study, older people (65+) who lived within 10 minutes' walk of a local open space were **twice as likely to achieve the recommended levels of healthy walking** (2.5 hours/week) compared with those whose local open space is further away.

Older people (65+) living within 10 minutes' walk of a local open space were **more than twice as likely to be satisfied with life** compared with those whose local open space is further away.



Potential mechanisms linking landscape and health: Physical Activity



Many people walk when in natural landscapes – physical activity has positive effects on physical health, mood and stress

Potential mechanisms linking landscape and health: Social Engagement



Social contact when in natural environments – relieves social isolation (a health risk) and may enhance activity or mood

Potential mechanisms linking landscape and health: Attention Restoration



Psychological response to perceiving natural environments
Attention Restoration Theory (Kaplan & Kaplan)

Potential mechanisms linking landscape and health: Independent Physiological Responses



Independent physiological response: psychoneuroendocrine mechanisms (Ulrich et al., Hartig et al, Ottoson & Grahn, Park et al)

Shinrin-yoku – ‘forest bathing’ - and psychoneuroendocrine mechanisms



(a) Walking in the Forest Area



(b) Watching the Landscape in the Forest Area



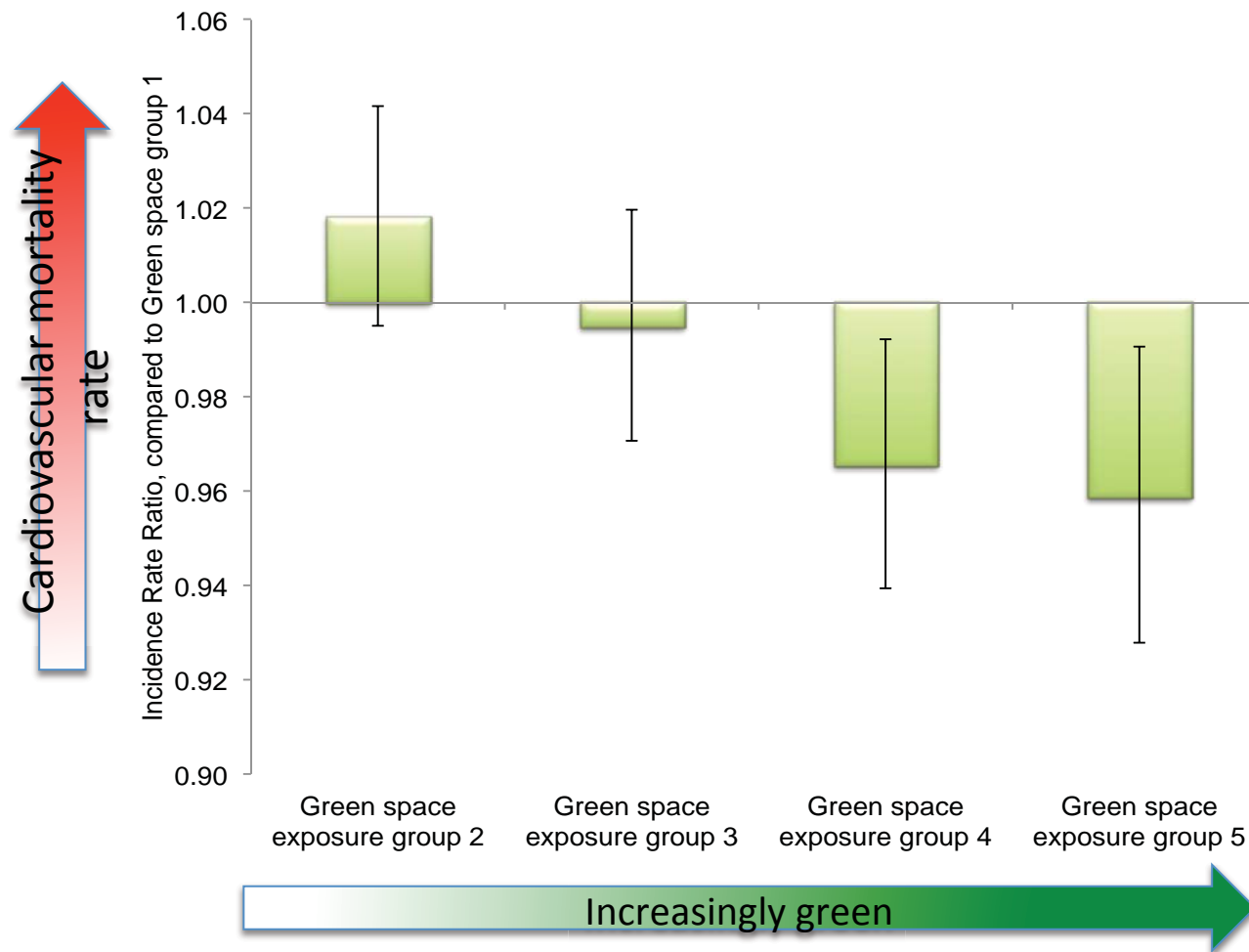
(c) Walking in the City Area



(d) Watching the Landscape in the City Area

Park et al., 2007. Physiological effects of Shinrin-yoku (taking in the atmosphere of the forest) - using salivary cortisol and cerebral activity as indicators. *Journal of Physiological Anthropology*. 26(2), 123-8

A clear association between access to green space and health in England (similar pattern in Wales but not in Scotland or New Zealand)



Mitchell R, Popham F. Effect of exposure to natural environment on health inequalities: an observational population study. *The Lancet* 2008; 372(9650):1655-1660

Richardson, E., J. Pearce, et al. "The association between green space and cause-specific mortality in urban New Zealand: an ecological analysis of green space utility." *BMC Public Health* 2010 10(1): 240



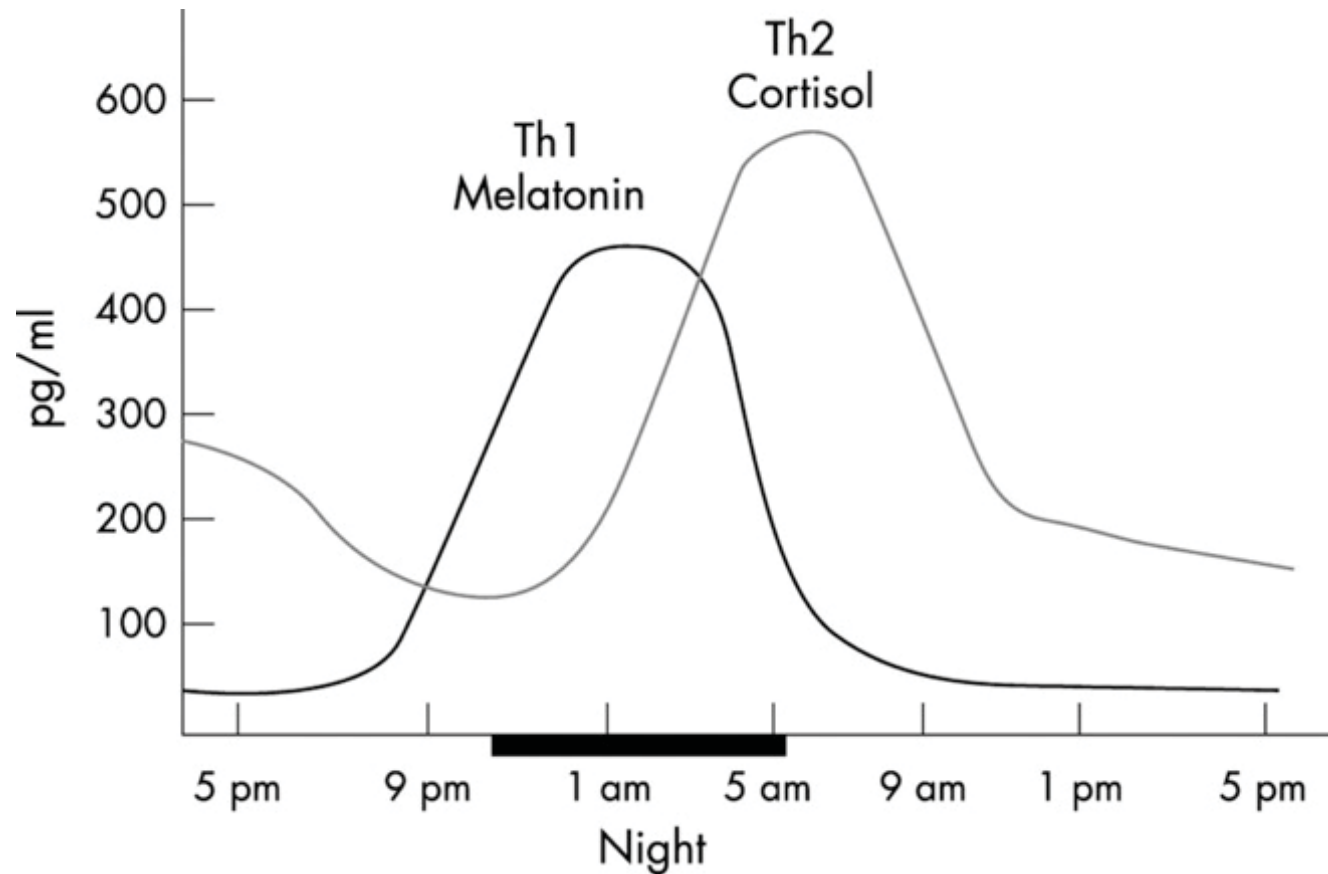
In the Netherlands, researchers have shown significant relationships between the amount of green space near home and a number of self-reported and objectively measured indicators of physical and mental health – they call this effect ‘**Vitamin G**’. The relationship is particularly strong for children and lower socioeconomic groups. (Maas et al., 2008; 2009)



Maas, J. et al., 2009. Morbidity is related to a green living environment. *J. Epidemiol. Commun. H* 63, 967–973

What might lie behind some of the beneficial effects of getting outdoors?

Circadian rhythms



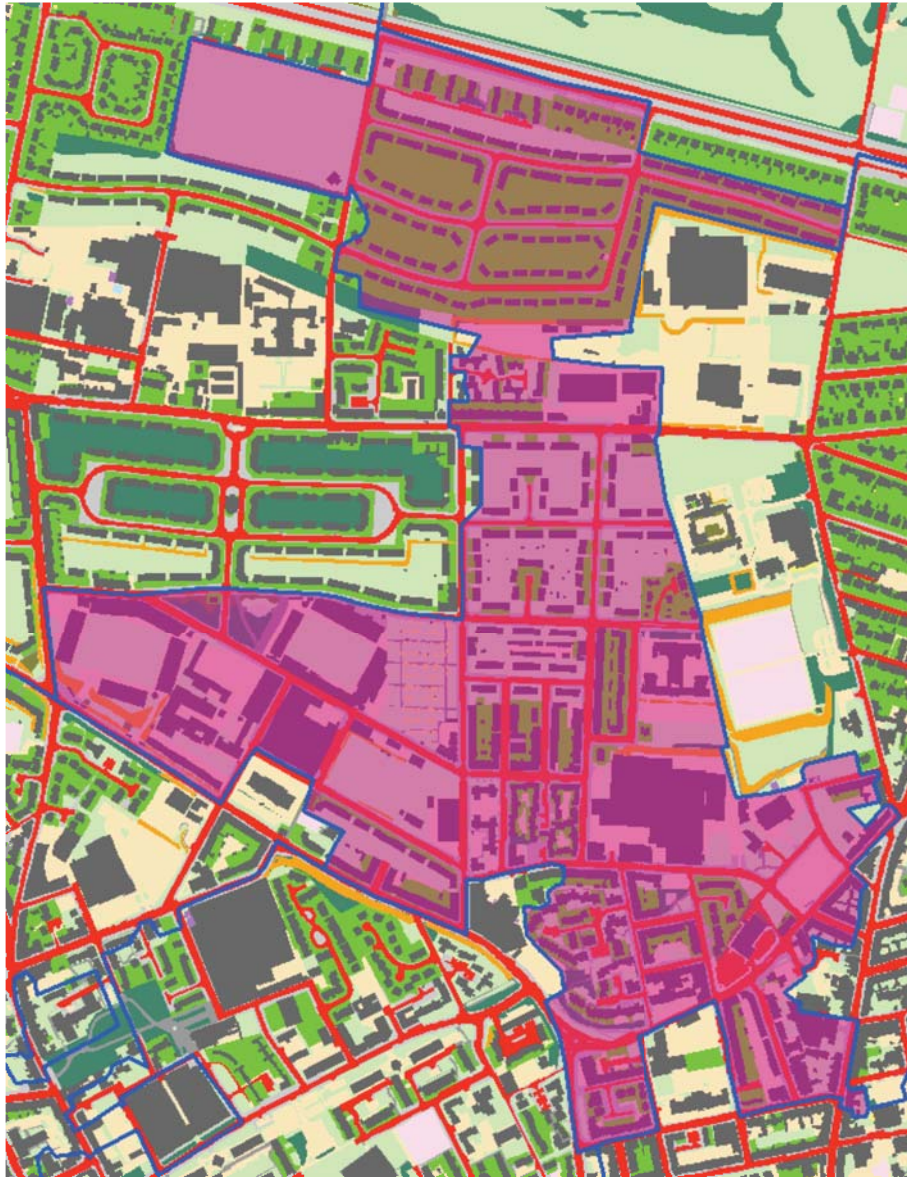
GreenHealth: relationships between green space and health and wellbeing for residents of deprived urban areas

A study for the Scottish Government



Catharine Ward Thompson, Jenny Roe, Lynette Robertson, Peter Aspinall, Mark Brewer, Betty Duff, Richard Mitchell, Angela Clow, David Miller:
Universities of Edinburgh, Heriot-Watt, Glasgow & Westminster; James Hutton Institute & Biomathematics & Statistics Scotland.

Green space measured using Census Area Statistics Wards - includes parks, woodlands, scrub and other natural environments, but not private gardens



Low green space



High green space

People not in work, living in parts of Dundee with more or less green space

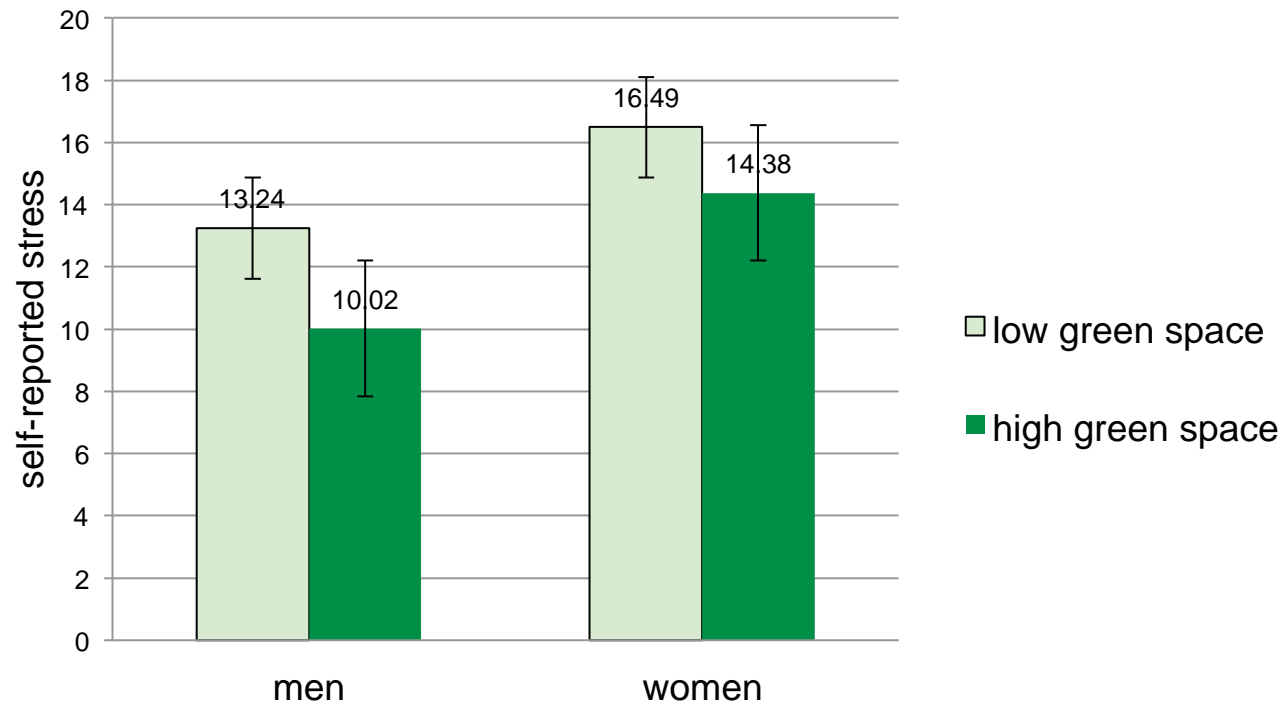
Study design: cross-sectional survey in highly deprived neighbourhoods with varying levels of green space (mean 34%, excluding private gardens).

Sample: people not in work for any reason, aged 35-55 (mean 45 yrs); 50% Male:Female

Primary outcome measure: salivary cortisol (collected 4 times per day), perceived stress (PSS).

Secondary outcome measures: perceived mental wellbeing (SWMWBS), levels of physical activity.

Levels of green space and perceived stress (PSS) (n=103)



Mean levels of self-reported stress in areas of low ($\leq 43\%$) and high ($>43\%$) urban green space

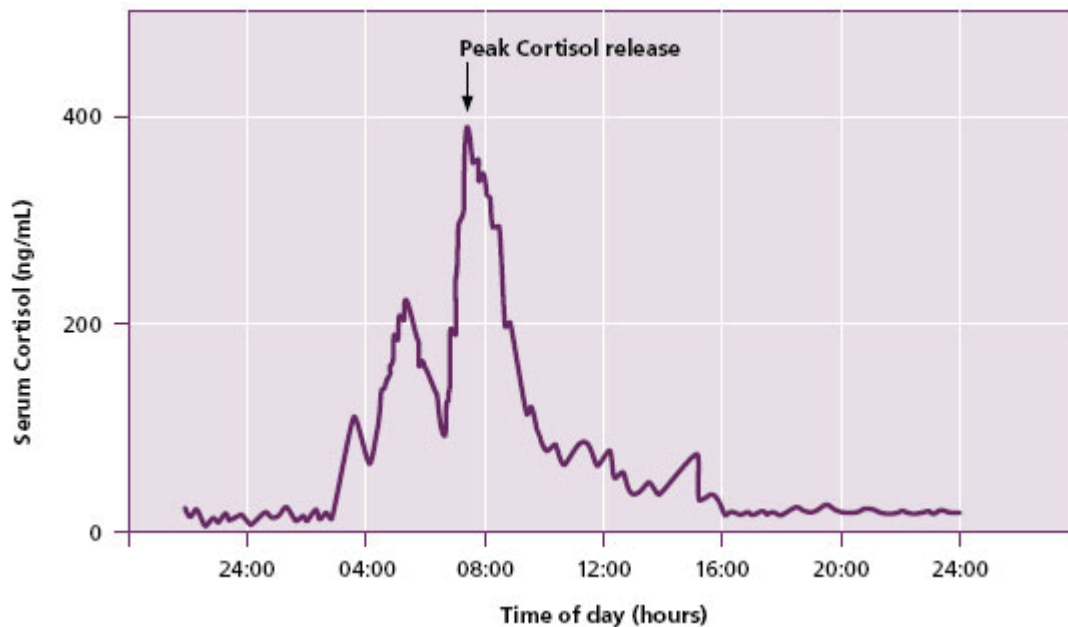
Measuring stress using salivary cortisol

Cortisol – vital for orchestrating healthy body functioning around the 24 hour cycle

Its diurnal pattern reflects functioning of the hypothalamic pituitary adrenal (HPA) axis



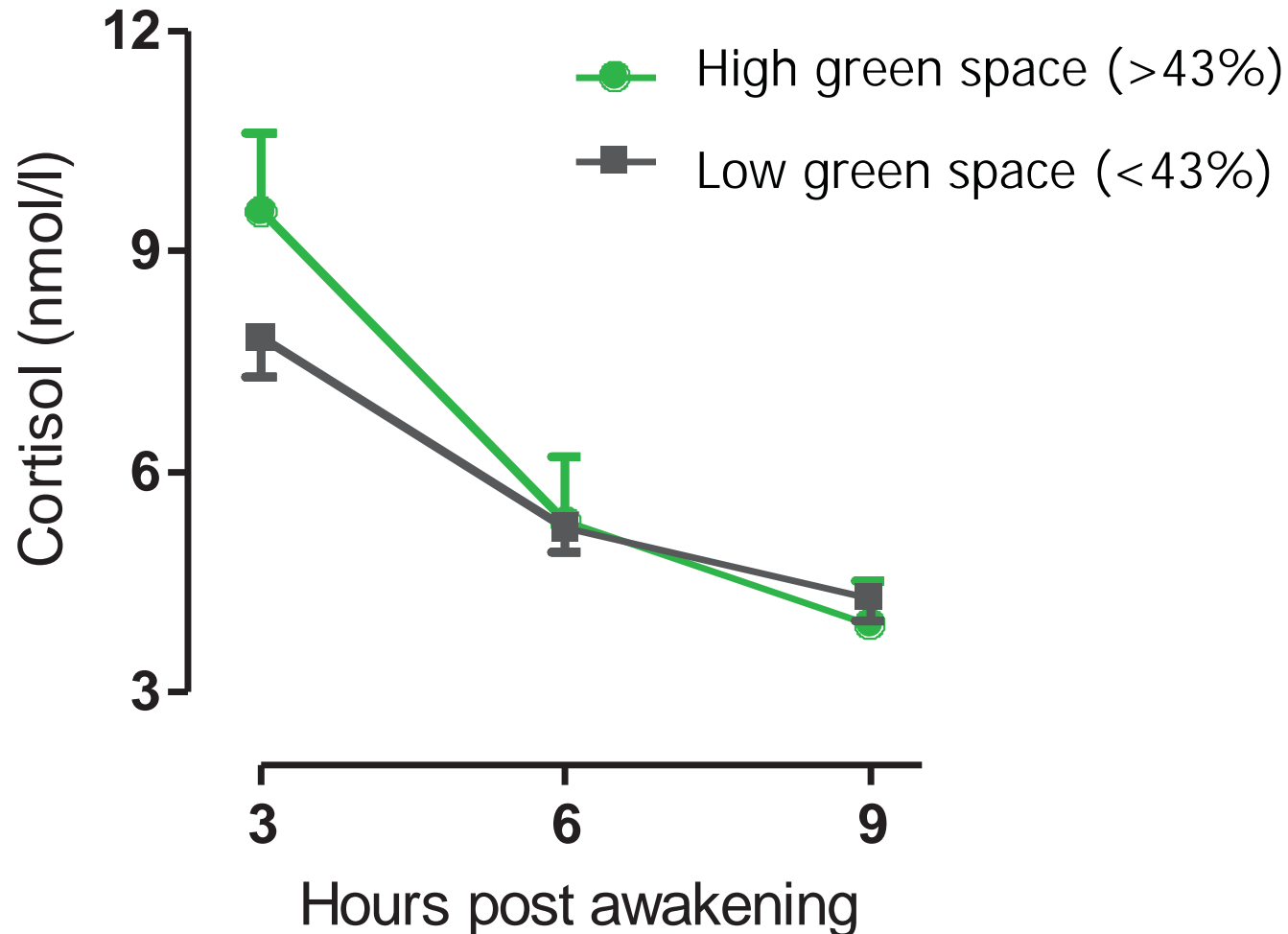
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- Non-invasive method
- Cortisol plays a key role in responding to acute stress
- A biomarker responding to everyday life of participants in their usual surroundings

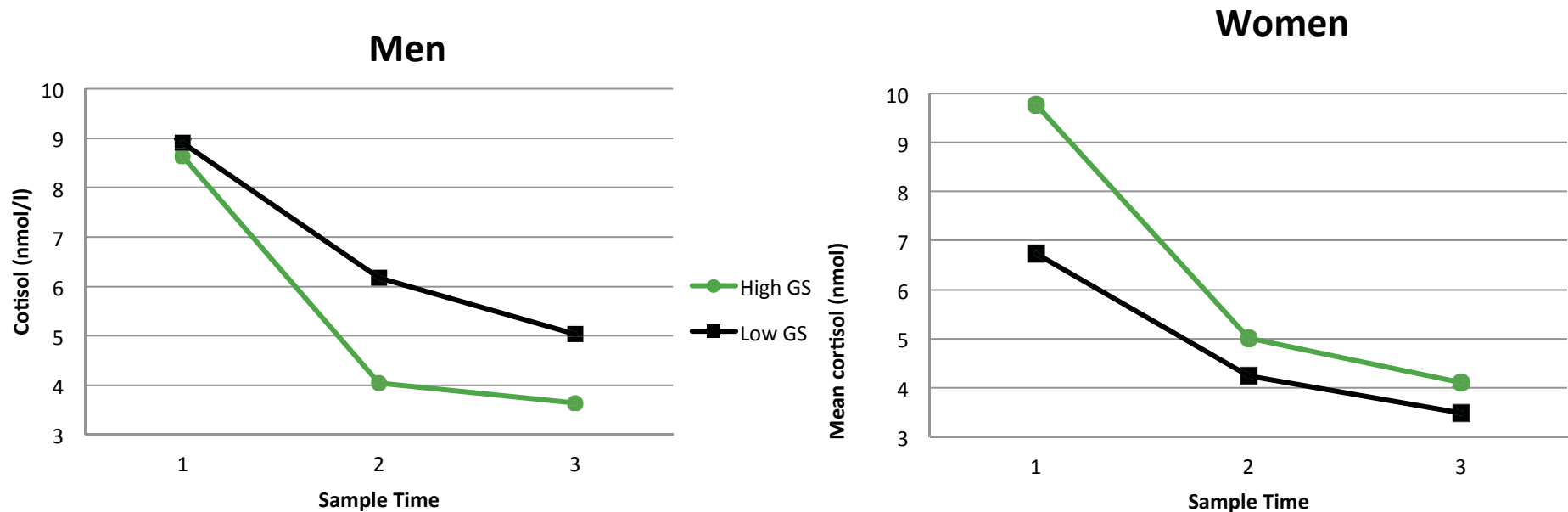
Relationship of cortisol slope to % green space (n=88)



Ward Thompson, C. Roe, J., Aspinnall, P., Mitchell, R., Clow, A. & Miller, D. 2012. More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landscape and Urban Planning* 105, pp. 221–229

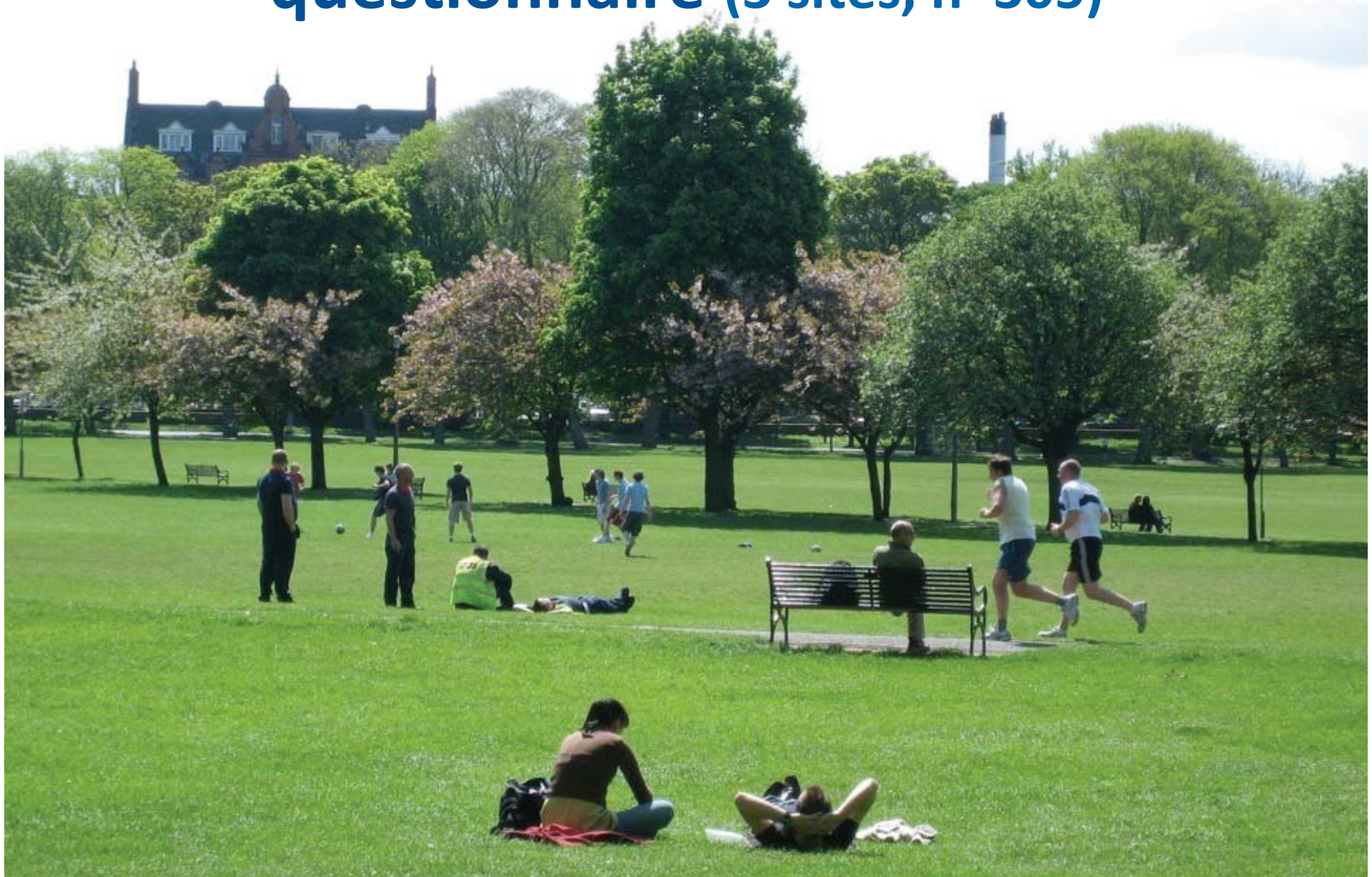
Roe, J.J., Ward Thompson, C., Aspinnall, P.A., Brewer, M.J., Duff, E.I., Miller, D., Mitchell, R., Clow, A. Green Space and Stress: Evidence from Cortisol Measures in Deprived Urban Communities. *Int. J. Environ. Res. Public Health* 2013, 10, 4086-4103

Differences between men's and women's cortisol slope in relation to % green space

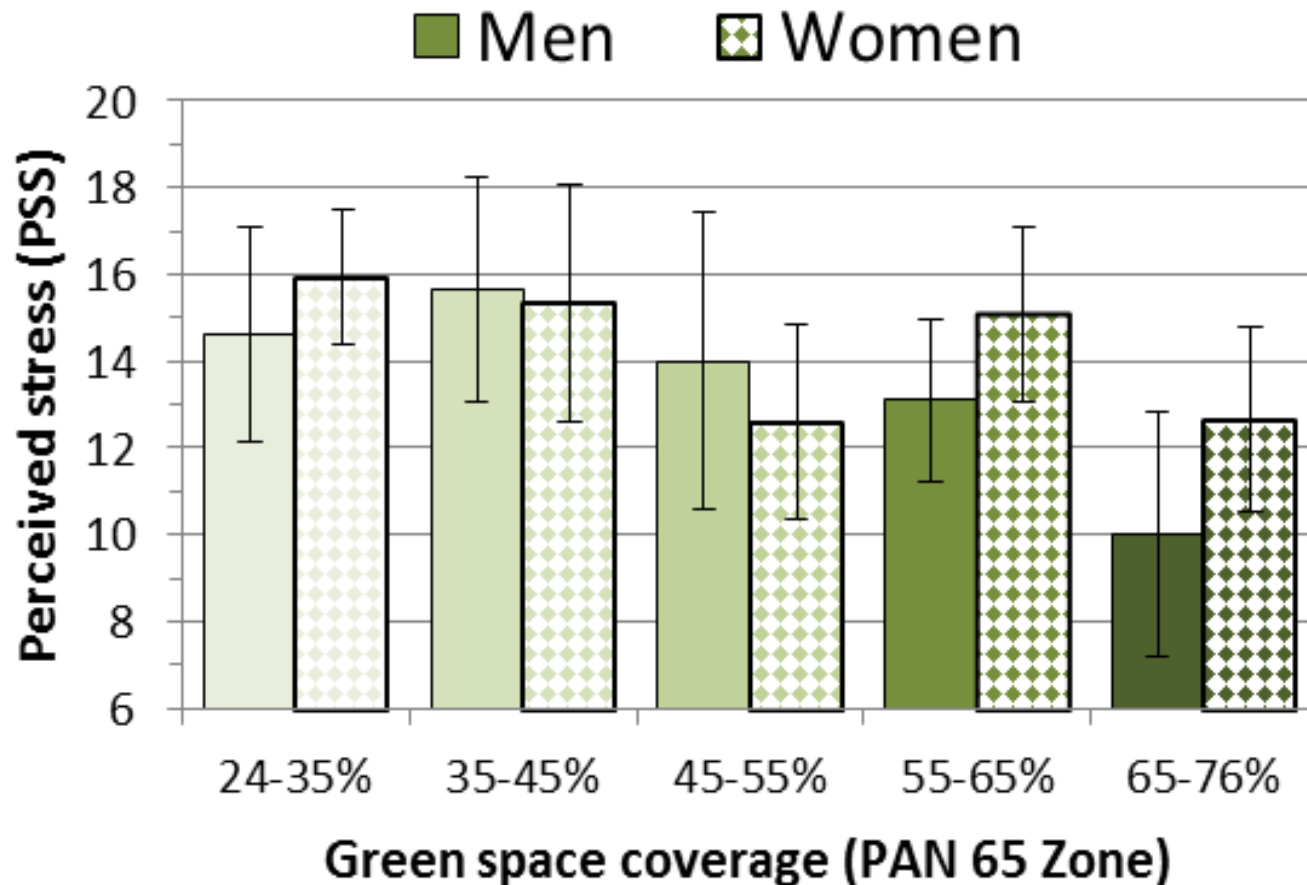


Men and women have similar patterns and levels of cortisol in high green space (green line) *but* different in low green space (black line): men are classically stressed, females are more exhausted.

Results from the main household questionnaire (3 sites, n=305)



More green space is associated with less stress for both men and women (but only significant for men)



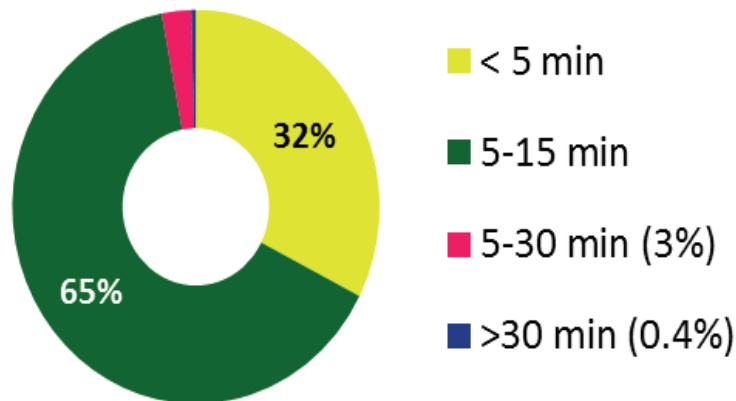
Variables controlled for in the analysis: age, income, and deprivation

What did survey participants tell us about their use of green space?

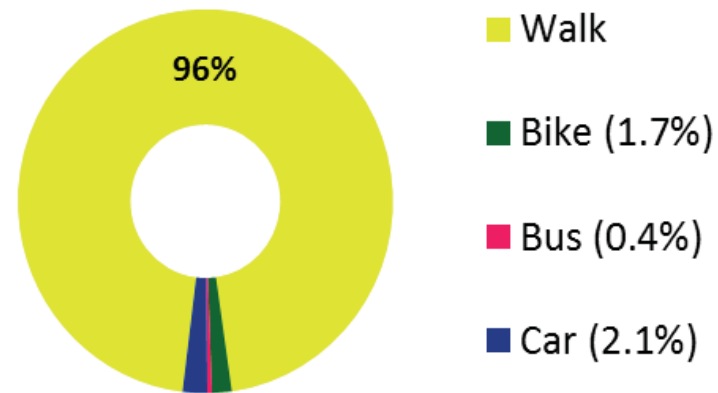
80% used their local green space at least once/year.

25% used their local green space daily.

No significant difference in overall usage between men and women.

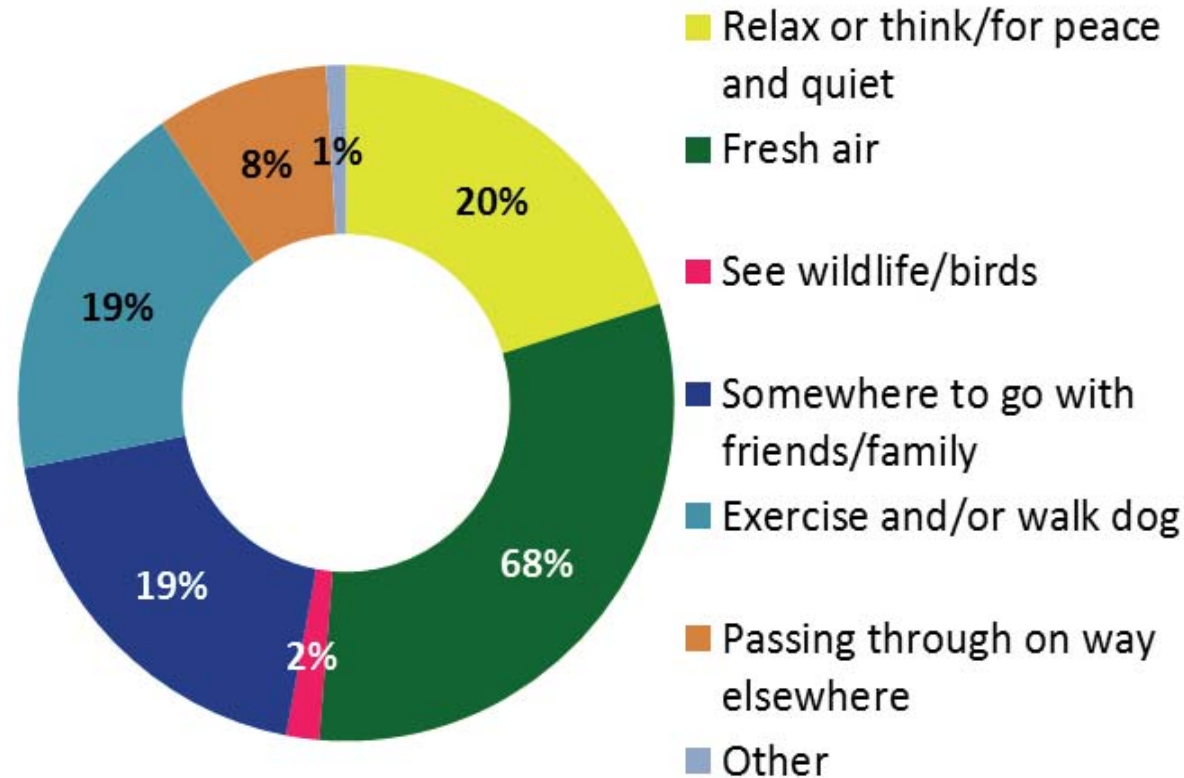


Perceived walking distance to the nearest green space (n=234)



Mode of travel to the nearest green space (n=234)

Why do participants visit green space?



Based on identifying the two main reasons for visiting (n=153)

Visiting green space **with other people** was associated with **lower levels of perceived stress for men and women**, and (for men only) higher levels of mental wellbeing and general health

A group of hikers, including several older adults, are walking along a dirt path in a lush, green forest. The hikers are wearing various jackets and backpacks, suggesting they are on a hike. The path is surrounded by dense foliage and trees, creating a natural environment.

Where you exercise may affect benefits to mental health

Using natural environments for physical activity at least once a week was associated with about half the risk of poor mental health among those who don't visit

Each additional use of *any* natural environment per week was associated with about a 6% lower risk of poor mental health

Mitchell R. Is physical activity in natural environments better for mental health than physical activity in other environments? Social science & medicine. 2012 May 8. <http://dx.doi.org/10.1016/j.socscimed.2012.04.012>

What impact do urban woodland improvements for deprived communities have on people's activities and wellbeing?

Two sites in Glasgow matched on urban deprivation and distance to green space, one with Forestry Commission Scotland physical improvements and social interventions to encourage use

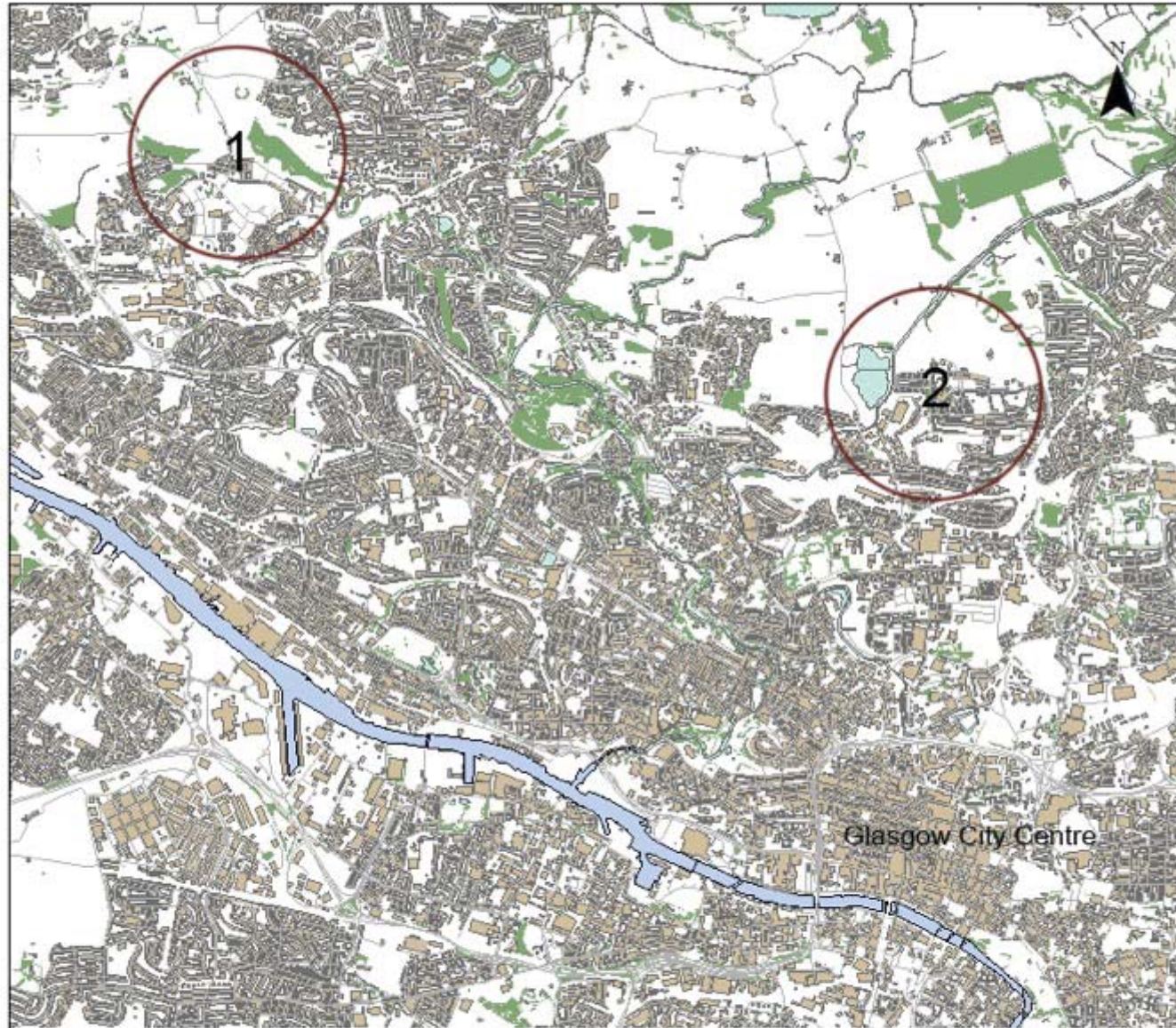
A repeat, cross-sectional survey (2006 n=215, 2009 n=216)



Drumchapel post-Intervention, 2009



Milton, Possil canalside, 2006



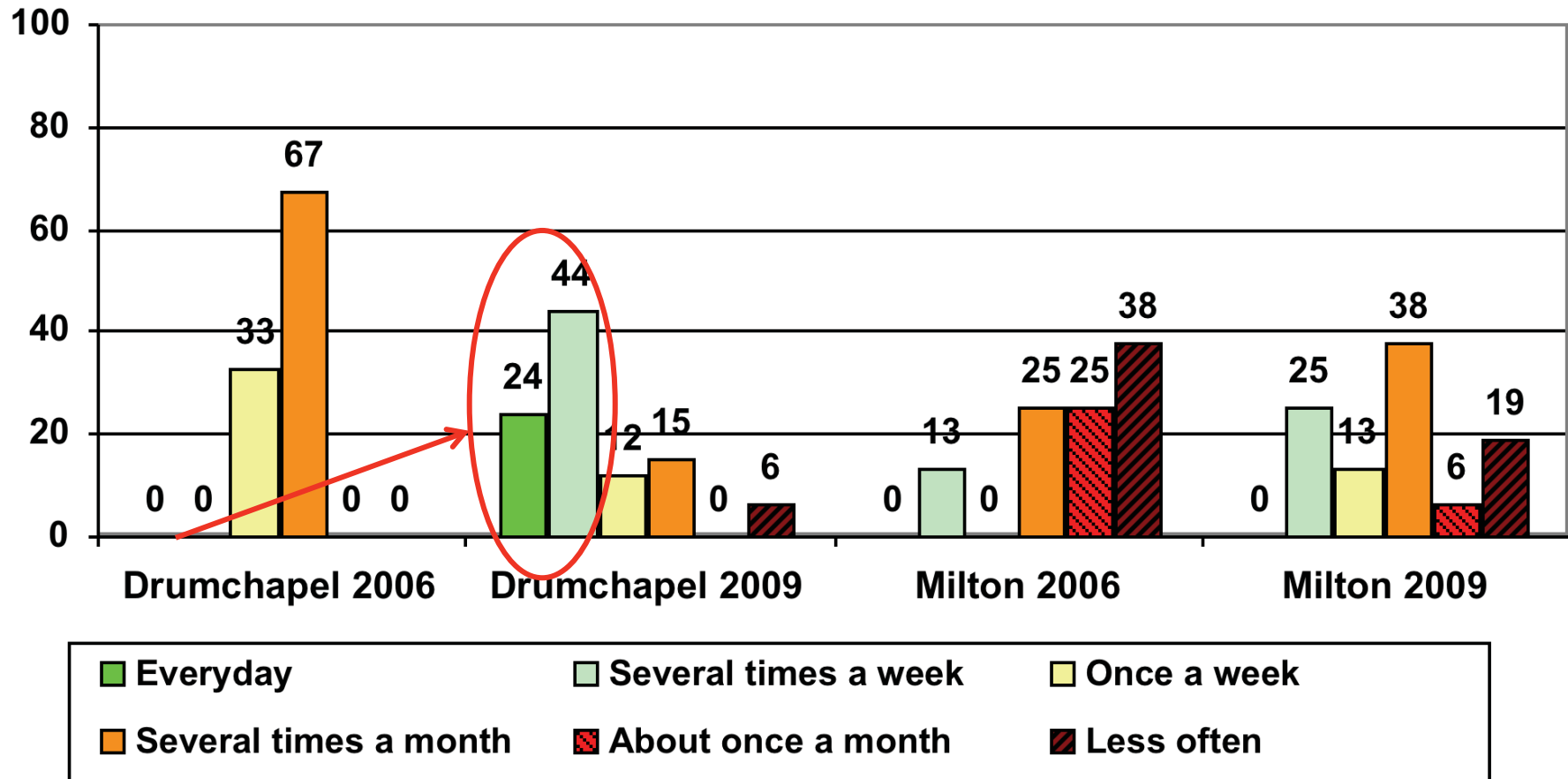
© Crown Copyright/database right 2012. An Ordnance Survey/EDINA supplied service



1 Drumchapel: 2 - Milton

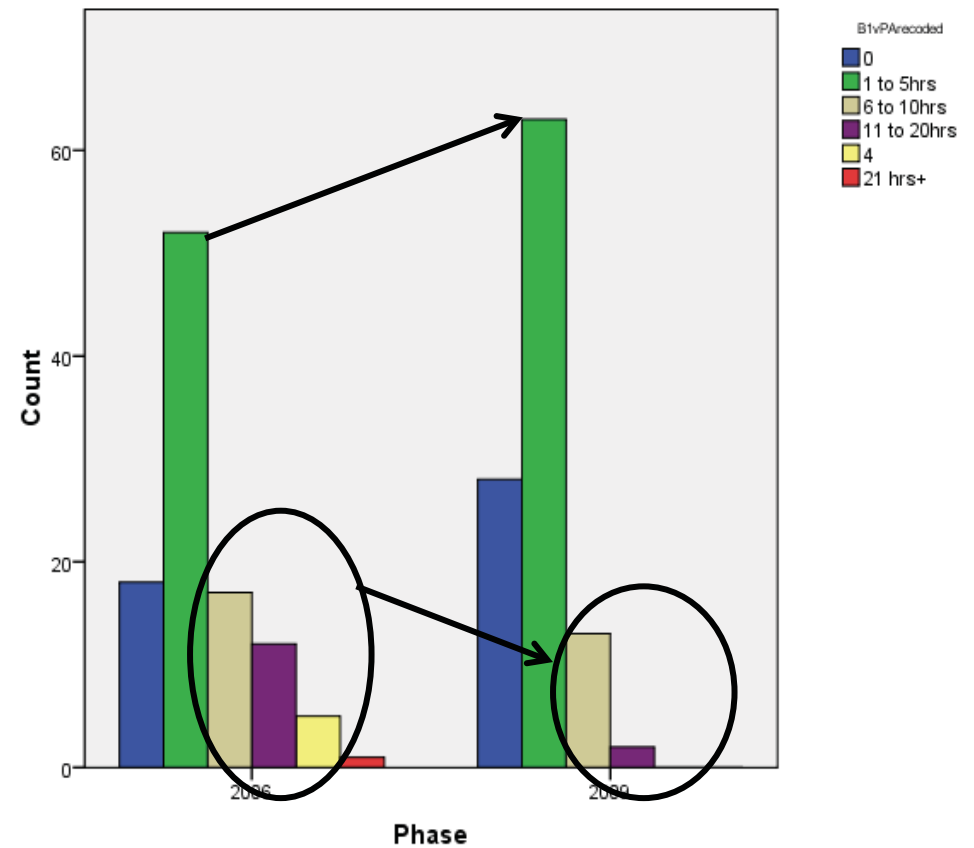
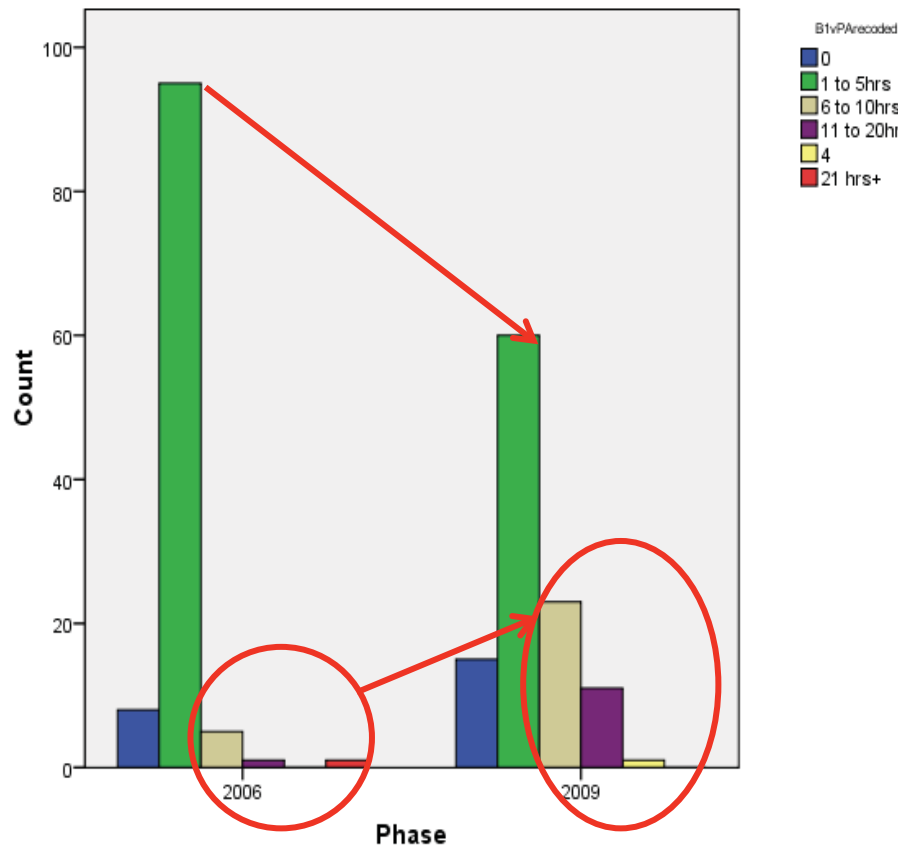
Frequency of visits to woodlands between April and September: differences over time (2006 n=22, 2009 n= 50)

% of respondents



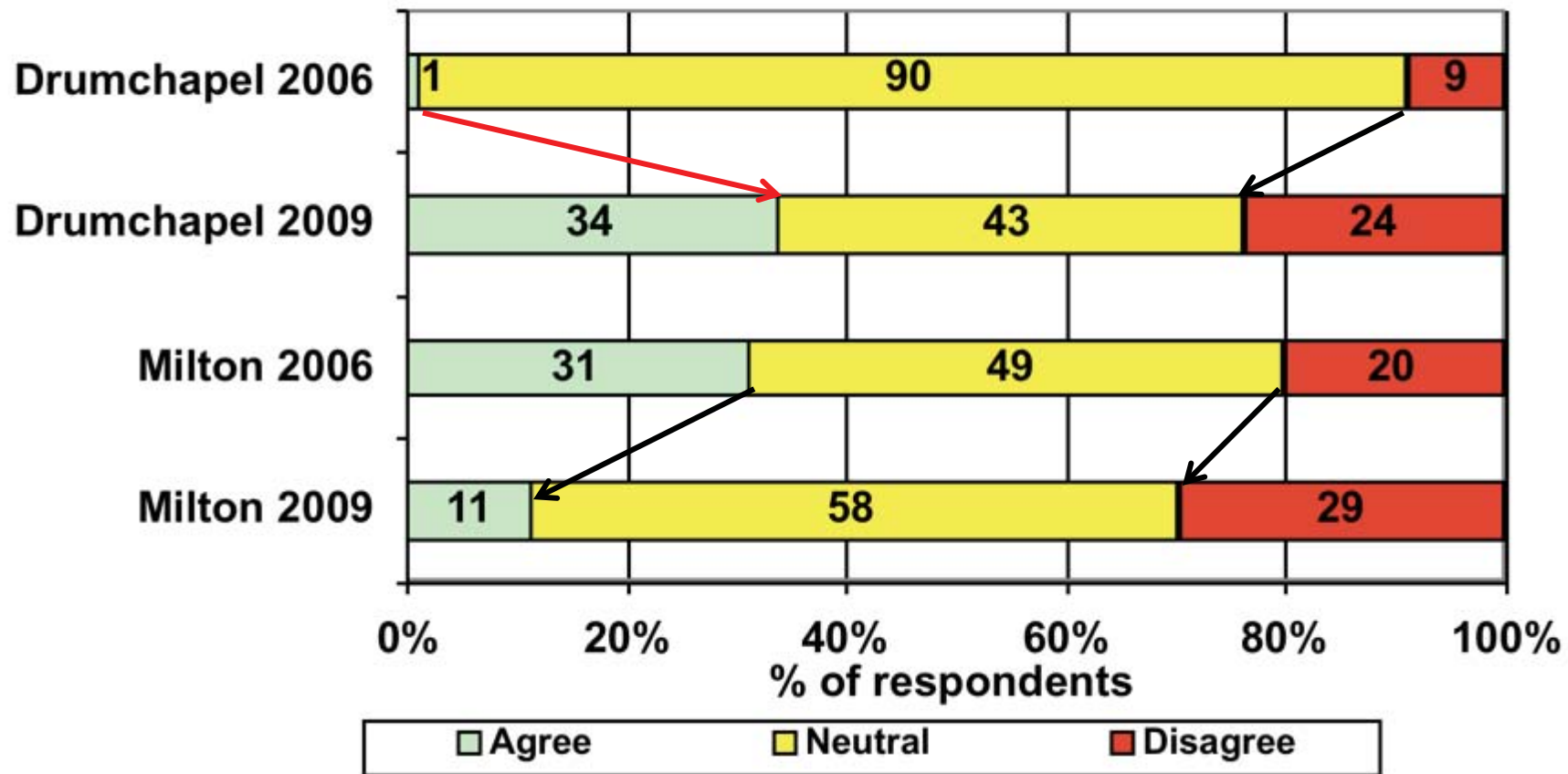
A significant ($p = 0.021$) difference over time in the intervention site, ns in comparison

Differences in physical activity (hours/week) over time



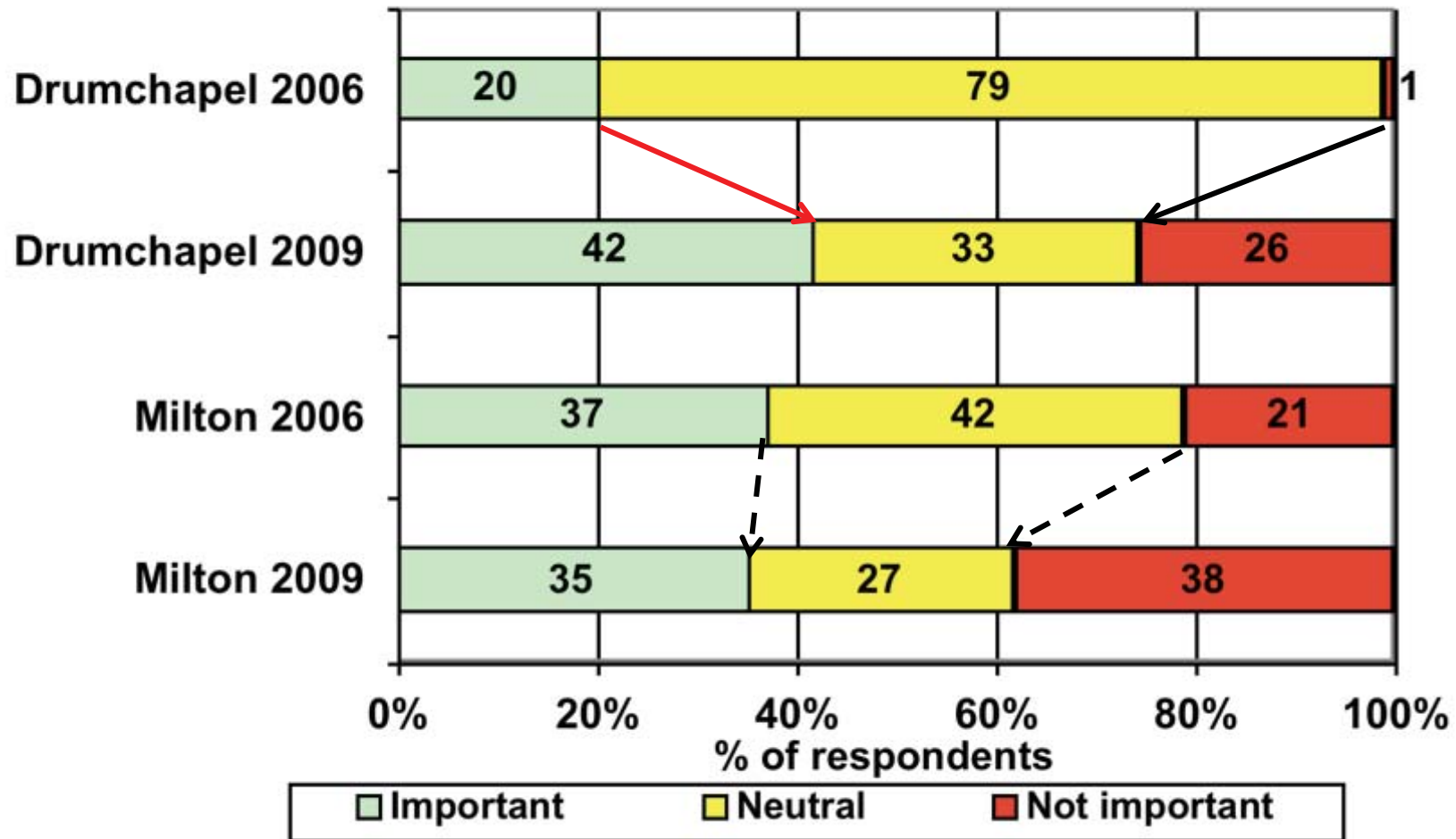
A significant ($p < 0.001$) difference over time in intervention and ($p=0.002$) in comparison sites

Perceptions of woodlands as a place to visit with family and friends: differences over time



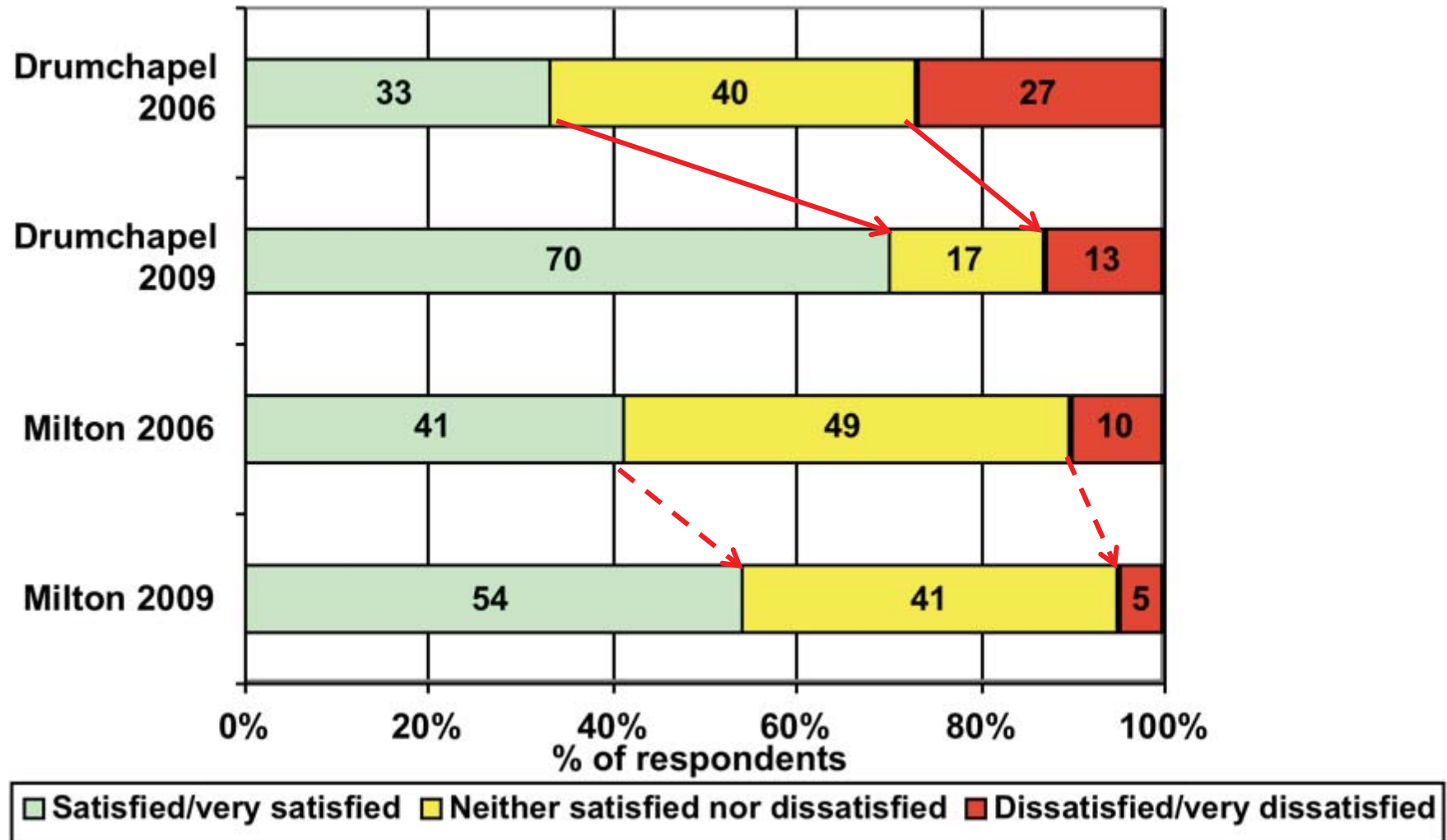
A significant ($p=0.003$) difference over time in the intervention site, and ($p=0.002$) in comparison

Perceptions of the importance of local woodlands in making a difference to quality of life: differences over time



A significant ($p = 0.002$) difference over time in the intervention site, ns in comparison

Satisfaction with physical environment in the neighbourhood: differences over time



A significant ($p < 0.001$) difference over time in the intervention site, ns in comparison

“There is just something about going into the forest which makes me feel so good.”

Drumchapel resident

WOODS IN AND AROUND TOWNS PHASE III WHAT IS THIS ABOUT?

Woods In and Around Towns (WIAT) is one of the most significant initiatives ever undertaken by Forestry Commission Scotland (FCS). In summary it aims to improve the quality of life of people living and working in Scotland's towns and cities. Since the launch of WIAT in 2005, FCS has made a major investment of over £50 million in this programme. For this – the third phase (2011–2014) – FCS will continue to treat WIAT as a priority initiative.

From <http://www.forestry.gov.uk/wiat>



A new NIHR funded study: the impact of urban woodland improvements for deprived communities in terms of their mental health and wellbeing

Three WIAT intervention sites and three matched 'control' sites

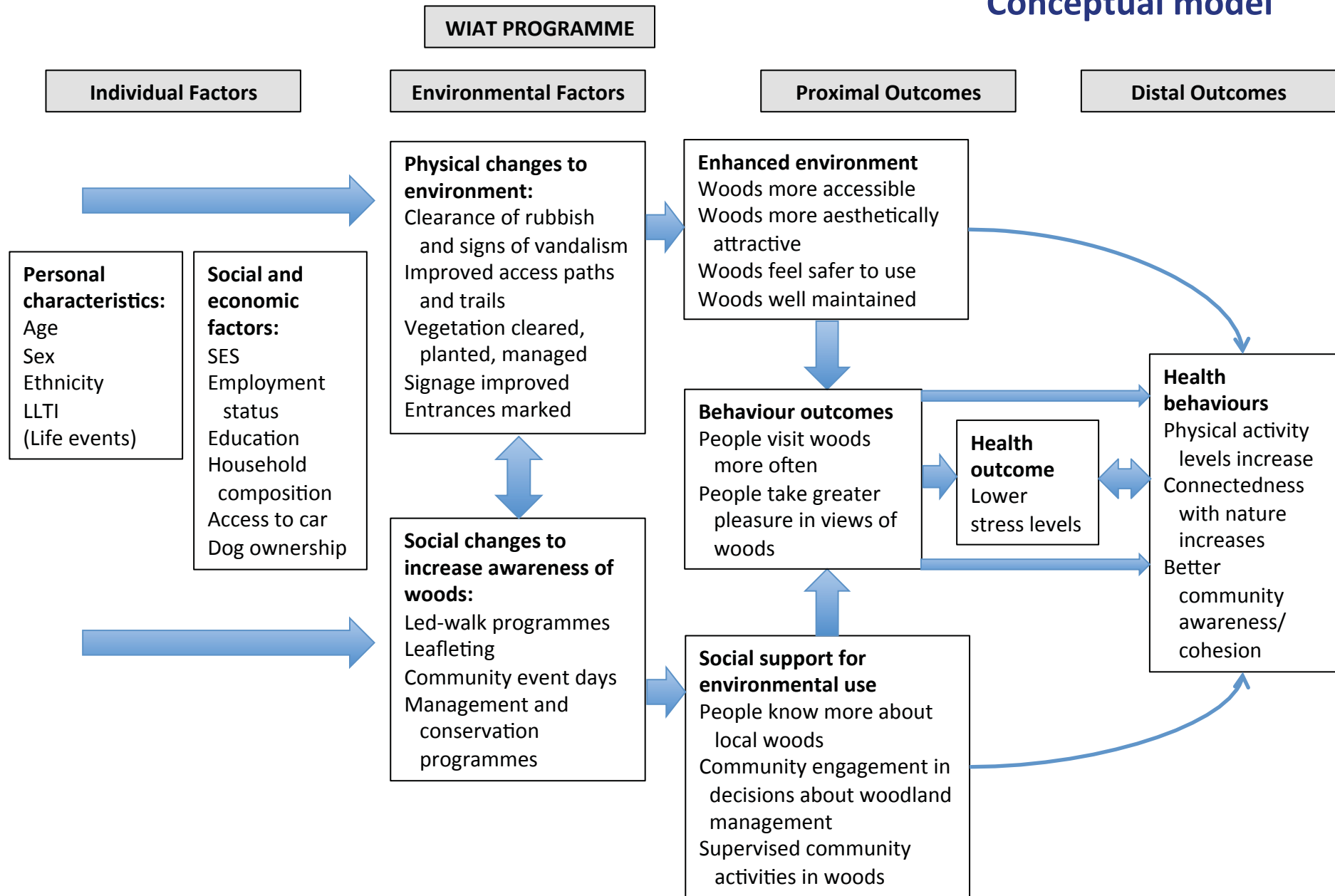
1. Physical woodland improvements (management of vegetation and litter, new paths and surfacing, benches, etc.)
2. Increased promotion in the community (led-walks, event days, forest school initiatives).



Silveirinha de Oliveira, E. et al., 2013. How effective is the Forestry Commission Scotland's woodland improvement programme —'Woods In and Around Towns' (WIAT)—at improving psychological well-being in deprived urban communities? A quasi-experimental study. *BMJ Open* 2013;3:e003648-e003648

New longitudinal study using 3 intervention and 3 matched comparator sites

Conceptual model



Evaluating a government pilot study on children, looking at:

- obesity;
- unintentional injuries;
- asthma;
- mental health and wellbeing.

Good Places Better Health for Scotland's Children

Prepared by the Evaluation Group
of Good Places Better Health

4.0 OUR VISION

A Scotland where

Homes are warm and dry with good quality space for children to play indoors and outdoors

Children play, explore and relax outdoors in streets, parks, green places, open spaces and have contact with nature in their everyday lives

The presence of children outdoors is welcomed, supported and valued by parents and the wider community

Neighbourhoods are well maintained, safe, appealing, support healthy food choices and have a strong sense of community



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Our latest research project ...

Mobility, Mood and Place (MMP) explores how places can be designed collaboratively to make mobility easy, enjoyable and meaningful for older people.



Mobility, Mood and Place is funded by Lifelong Health and Wellbeing, a cross-council initiative addressing the challenges and opportunities of an ageing population.



www.mobilitymoodplace.ac.uk

Using innovative mobile neural imaging methods to explore real-time emotional responses to place.



Mobility, Mood and Place is funded by Lifelong Health and Wellbeing, a cross-council initiative addressing the challenges and opportunities of an ageing population.



www.mobilitymoodplace.ac.uk

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