



Urban nature, movement and health

Lecture at the Turku Summer University Seminar on Urban Nature
Turku/Åbo, Finland, Sept. 9, 2011

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Urban nature, movement and health

Part I: Is there a relation between greenery and health?

Part II. Does greenery stimulate to physical activity and thereby to health?

Part III. What can in such case the mechanisms be?
One example.

Greenery in the living environment and health are positively related

		Greenery in the living environment	
		People's perception	Objective measures
Health	People's perception	Grahn & Stigsdotter (2003) Nielsen & Hansen (2007; stress)	De Vries et al. (2003) Maas et al. (2006) Mitchell & Popham (2007)
	Objective measures	Takano et al. (2002) Nielsen & Hansen (2007; overweight)	Mitchell & Popham (2008) Maas et al. (2009)

Effect of exposure to natural environment on health inequalities: an observational population study

Richard Mitchell, Frank Popham

Lancet 372, 1955-1660, 2008

40.8 milj. British adult inhabitants

2001-2005

Proportion of green areas (10 m²) 4 km²

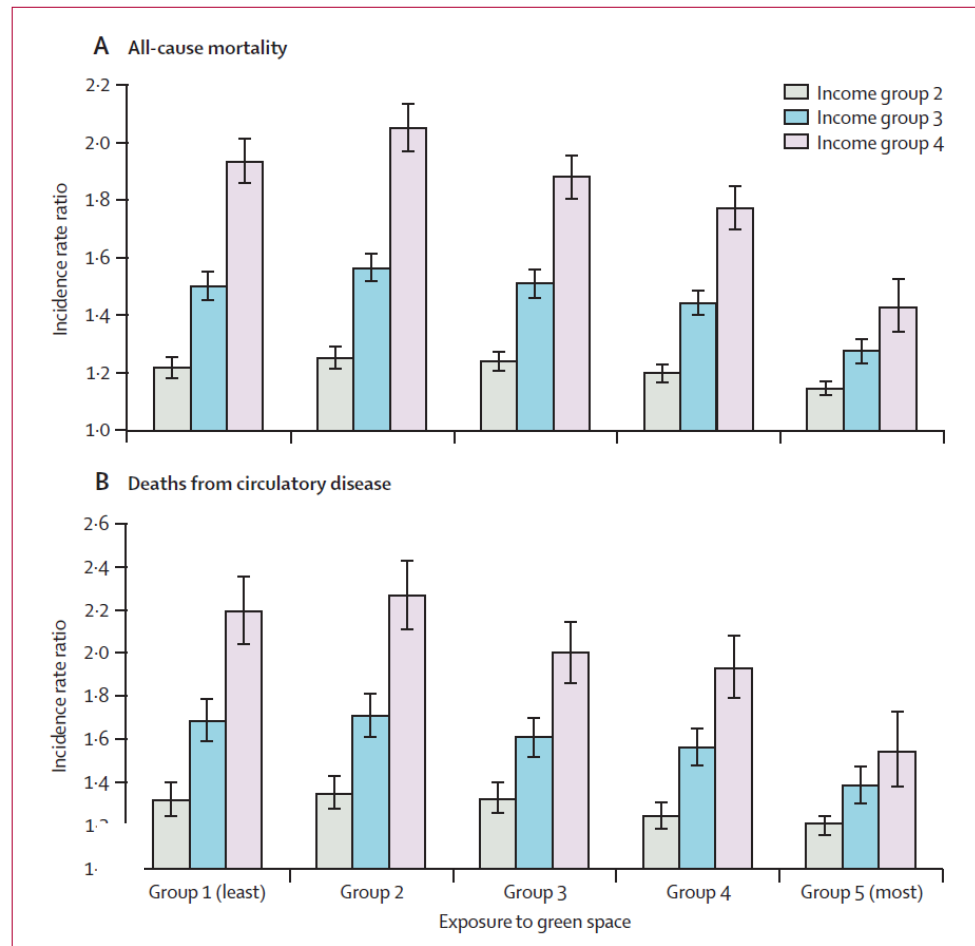
Mortality

- all causes
- circulatory diseases
- lung cancer
- self destructive behavior

Private economy

Effect of exposure to natural environment on health inequalities: an observational population study

Richard Mitchell, Frank Popham



Morbidity is related to a green living environment

J Maas,¹ R A Verheij,² S de Vries,³ P Spreeuwenberg,² F G Schellevis,^{1,2}
P P Groenewegen^{2,4}

0.35 milj. Dutch adult inhabitants

1 year

New diagnoses of diseases, classified by physicians

24 disease clusters

Proportion greenery 25 x 25 m 1 km radius around
the home adress

Socioeconomy

Morbidity is related to a green living environment

J Maas,¹ R A Verheij,² S de Vries,³ P Spreeuwenberg,² F G Schellevis,^{1,2}
P P Groenewegen^{2,4}

With higher proportion of greenery in the living environment, a lower degree of new diagnoses was noted in 15 of 24 disease clusters.

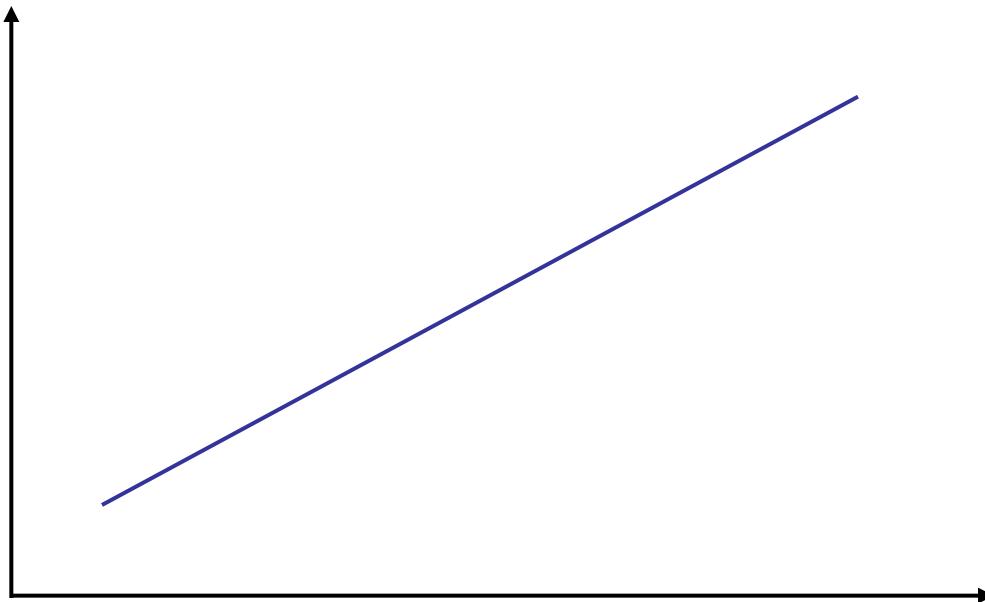
Related, but how?

Different plausible mechanisms of action

- **Possible non-causal mechanisms**
 - effects of composition, direct or indirect selection
- **Possible causal explanations**
 - enhance air quality and micro climate
 - restore attention & reduce stress
 - stimulate to physical activity
 - facilitate social contacts
 - enhance satisfaction with the living environment and sense of place

greenery → physical activity → health

physical activity



greenery

potential environmental influences on physical activity behaviours

inhibiting

neutral

stimulating



How to study these matters?



METHODOLOGY

Open Access

The active commuting route environment scale (ACRES): development and evaluation

Lina Wahlgren^{1,2}, Erik Stigell^{1,2} and Peter Schantz*^{1,3}

**overall perceptions of
route environments
for bicycle commuting**



**perceptions of different
route environment variables**

**overall perceptions of
route environments
for bicycle commuting**

Do you think that, on the whole,
the environment that you cycle in
simulates/hinders your commuting?



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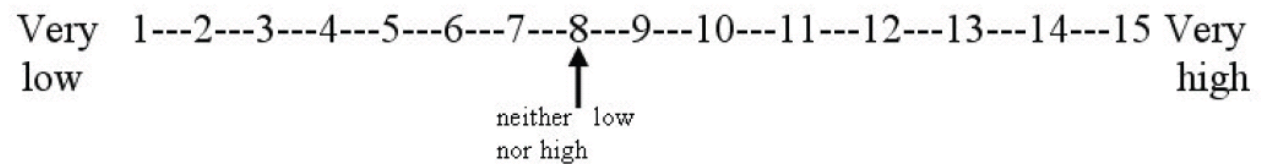
**stimulates
a lot**

**inhibits
a lot**

**perceptions of different
route environment variables**



How do you find the exhaust fume levels along your route?



**overall perceptions of
route environments
for bicycle commuting**

**stimulates
a lot**

**inhibits
a lot**



very low

very high

**perceptions of different
route environment variables**

route environment variables

physical environment

- paths/lanes/roads for bicyclists and apart from car traffic
- green elements (nature, parks, trees, plantings)
- aesthetics (ugly - beautiful)
- red lights
- hilliness
- directness of route

traffic environment

- exhaust fumes
- noise
- flow of motorized vehicles
- velocities of motorized vehicles
- velocities of other bicyclists
- congestion of all vehicles in non-separated traffic environments
- congestion of bicyclists in bicycle lanes/paths

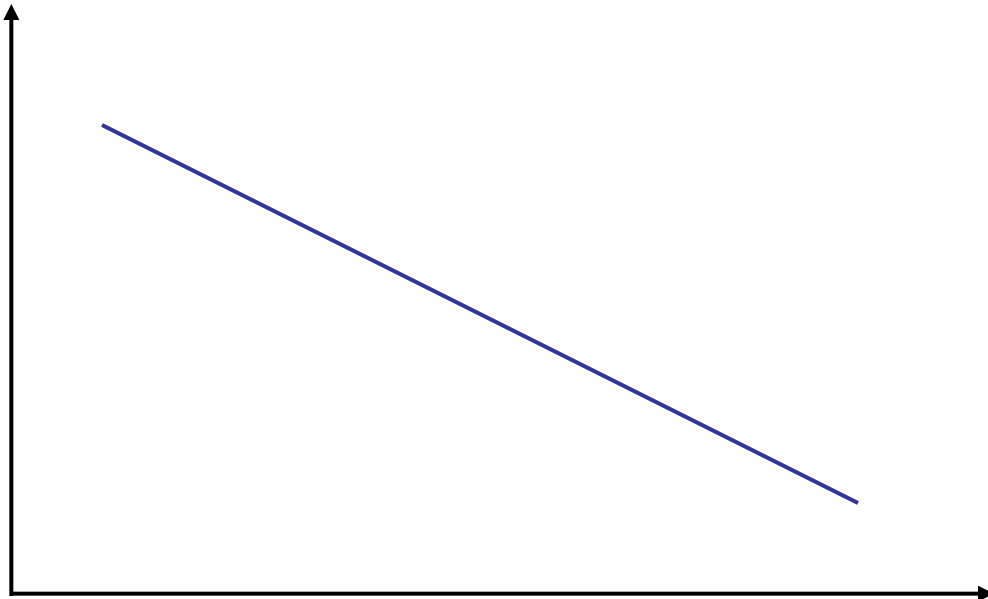
social environment

- conflicts between the individual and other road-users (including pedestrians)

greenery

**very
much**

**very
little**

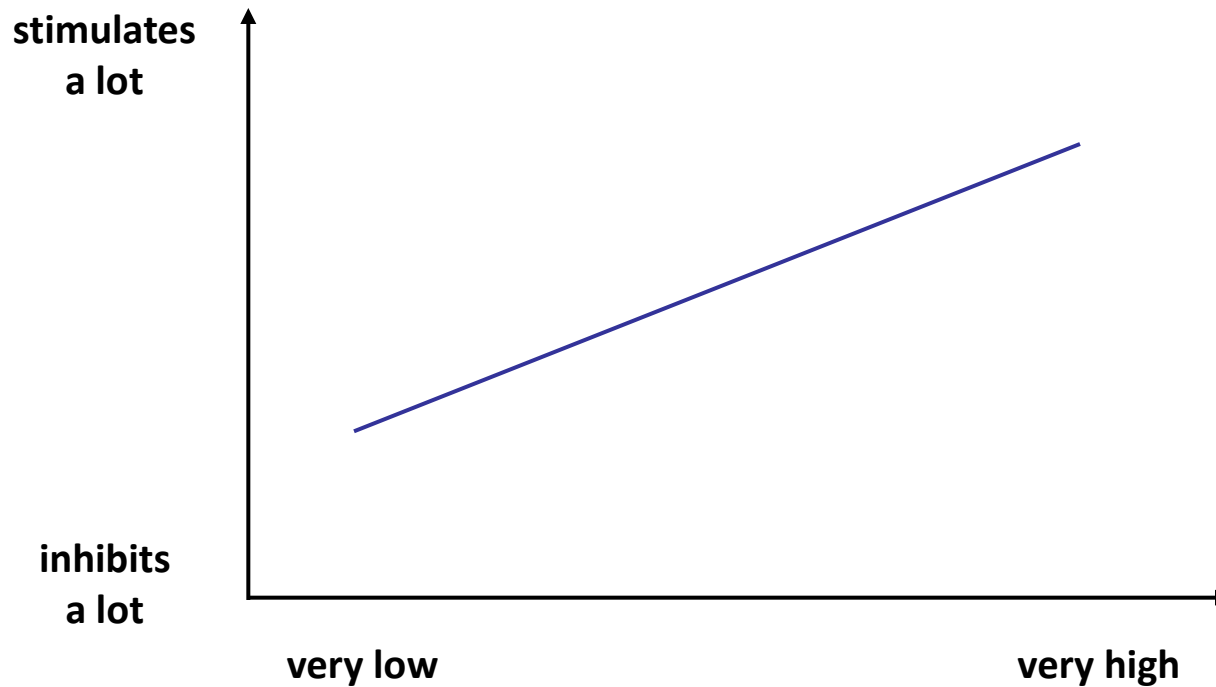


very low

very high

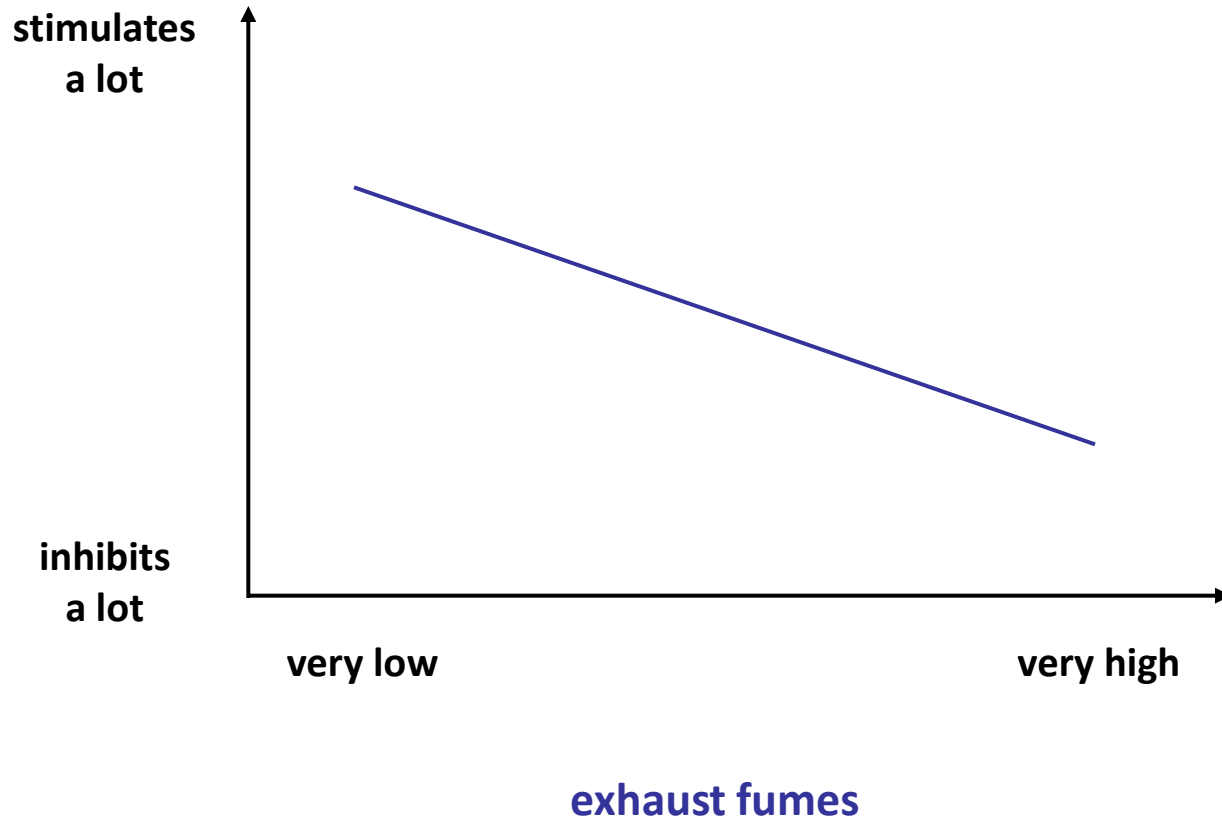
exhaust fumes

**overall perceptions of
route environments
for bicycle commuting**

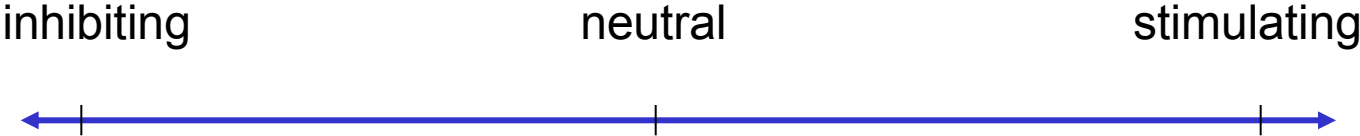


greenery along commuting routes

**overall perceptions of
route environments
for bicycle commuting**



potential environmental influences on physical activity behaviours



exhaust fumes

greenery

aesthetics



avoidance of an
inhibiting condition



attraction to a
stimulating condition

The Borg scale for rating perceived exertion

20	
19	very, very hard
18	
17	very hard
16	
15	hard
14	
13	somewhat hard
12	
11	fairly light
10	
9	very light
8	
7	very, very light
6	

Borg scale
RPE



individual

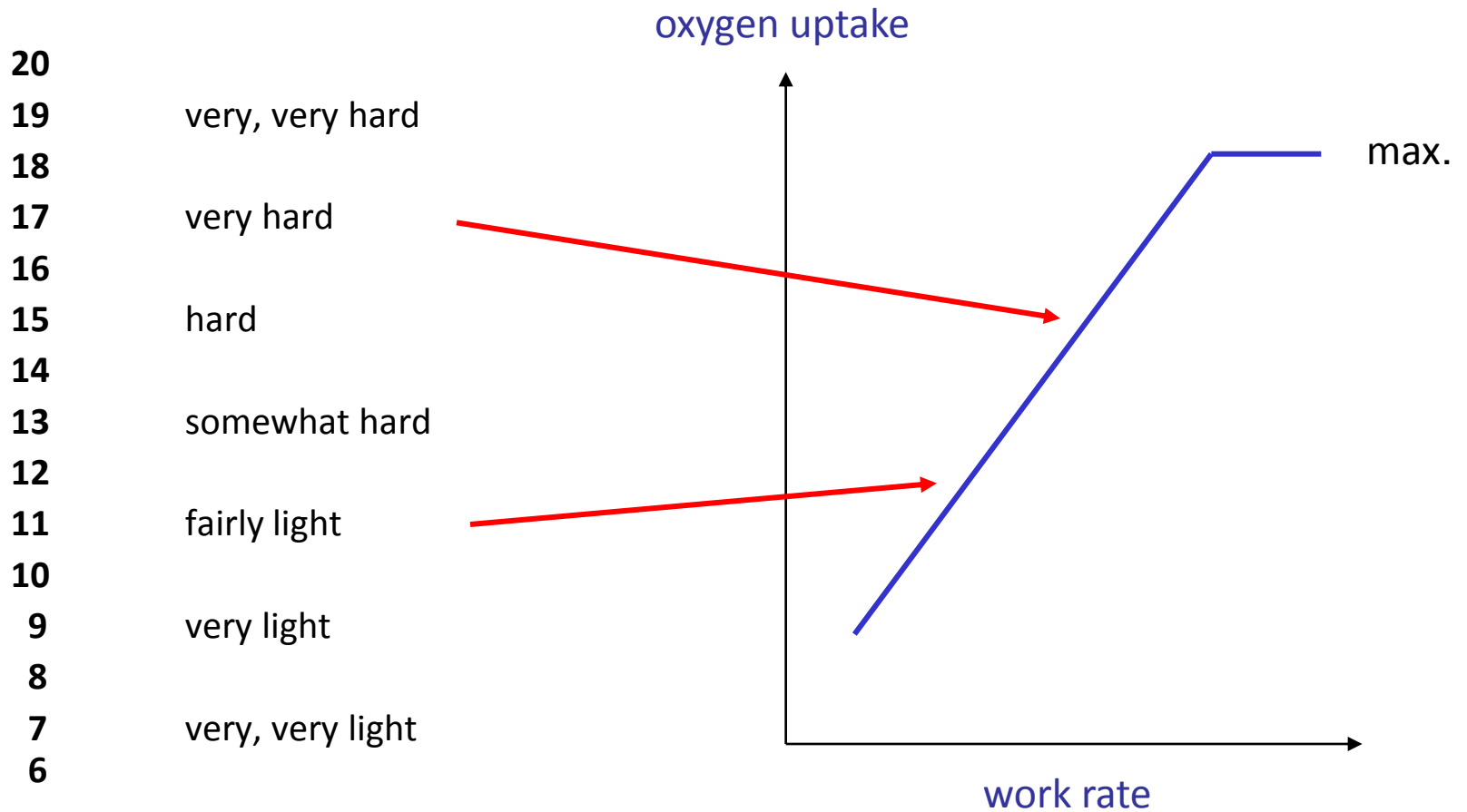


physical
activity

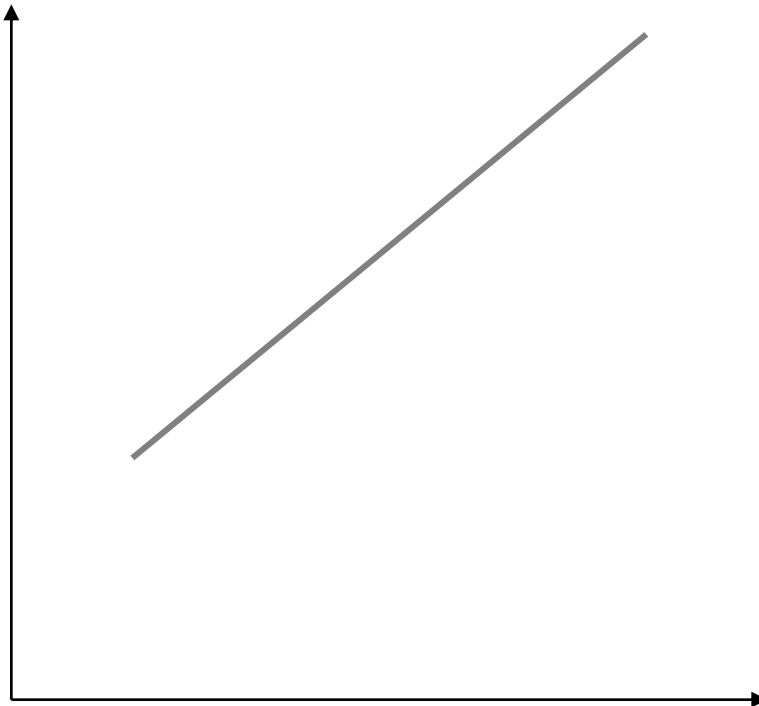


proprioception
ergoreceptors
ventilation
circulation
metabolism

The Borg scale for rating perceived exertion



perceived exertion

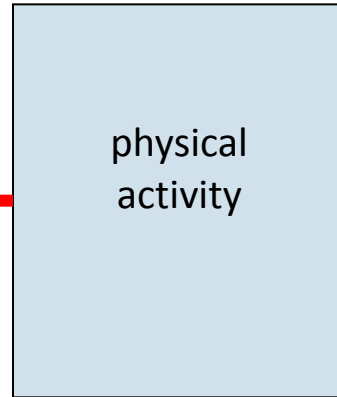
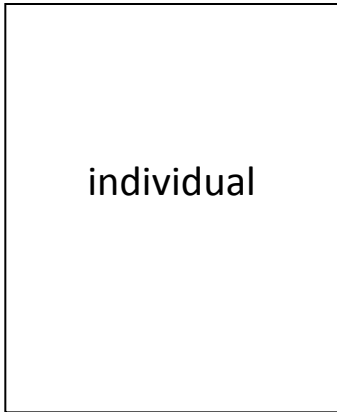
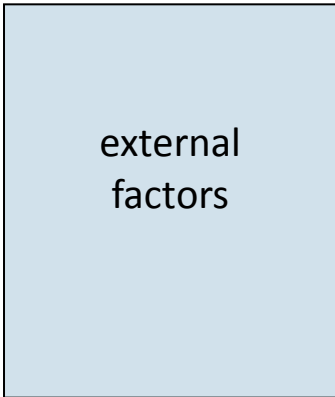


indoor laboratory
setting

outdoor
green setting

work rate

Borg scale
perceived exertion



- visual
- sound
- smell
- temperature
- touch

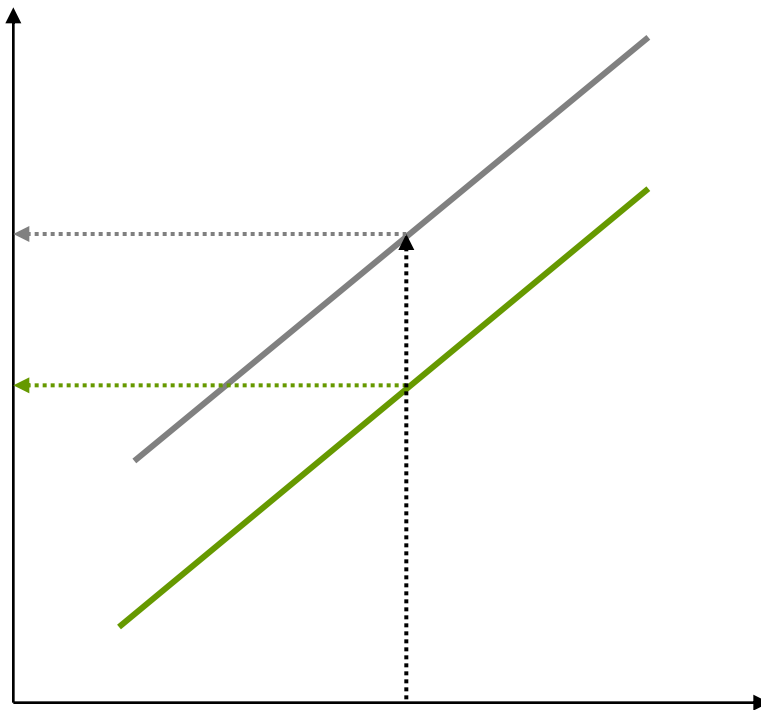
- proprioception
- ergoreceptors
- ventilation
- circulation
- metabolism

Environmental conditions

indoors: in a room in basement without windows, no people except for the person in charge of the experiment

outdoors: in a natural setting with water, snowless ground early spring or autumn (with or without leaves on the trees), no people except for the person in charge of the experiment

motivation
perceived exertion



indoor laboratory
setting

outdoor
green setting

work rate
heart rate
lactate

Summary

- Greenery in the living environment appears to prevent non-communicable diseases
- Greenery appears to stimulate to physical activity
- Greenery appears to lower the perceived exertion of physical activity
- Political actions leading to greener cities are more than welcome

References

- 1) Mitchell, R., Popham, F. 2008. Effect of exposure of green environment on health inequalities. An observational population study. *Lancet* 372, 1955-1960, 2008
- 2) Maas, J., Verheij, R.A, de Vries, S. Spreeuwenberg, P., Schellevis, F.G., Groenewegen, F.G. 2009. Morbidity is related to green living environment. *J Epidemiol Community Health* 63(12):967-73,
- 3) Wahlgren, L, Stigell, E, Schantz, P. 2010. The active commuting route environment scale: development and evaluation. *Journal of Behavioral Nutrition and Physical Activity* 7:58
- 4) Wahlgren, L. Schantz, P. 2011. Exploring bikeability in a metropolitan setting: stimulating and hindering factors in commuting route environments. Submitted for publication.
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Thanks for your attention

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