



## Measures of the urban environment and physical activity

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## 2 parts

- Development of the European Alpha Environmental Questionnaire
- Results of the environment – walkability study (BEPAS)

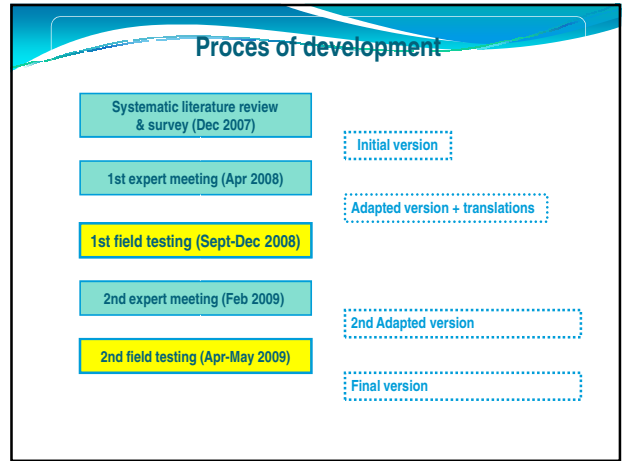
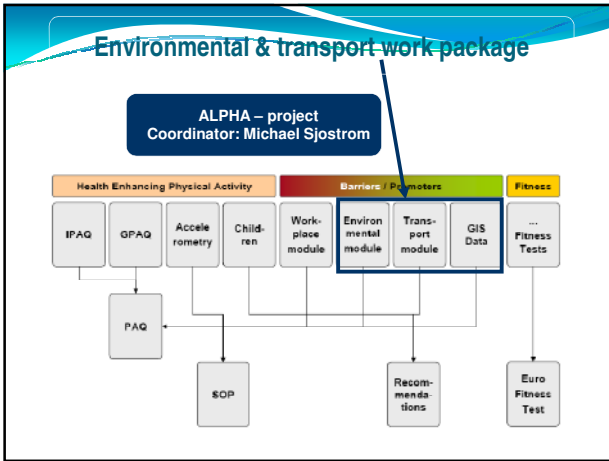


## Measuring built environment: Development of a European questionnaire

The Alpha Project

## ALPHA group environmental & transport work package

- France  Jean-Michel Oppert  
Julien Gloanec
- UK   
Harry Rutter  
  
Charlie Foster  
  
Christopher Gidlow
- Belgium   
Heleen Spittaels  
Maïté Verloigne  
Ilse De Bourdeaudhuij



### Systematic literature review & survey

**Systematic literature review**

- Published papers in Europe

**Survey**

- Survey of HEPA Network
- Survey among IPEN Network (European members)
- Ongoing studies

### Systematic literature review & survey (Dec 2007)

**REVIEW**  
Measures used in published studies

**SURVEY**  
Measures used in current or published studies

Neighborhood Environment Walkability Scale (NEWS) (ANEWS) (NQLS)	IPAQ environmental module (IPAQE)	Active 4 Life perceptions of environment and walking (A4L)
Cycling for Transport (C4T)	Perceptions of local environment (PLE)	Residential Environment and Coronary Disease (RECORD)

### Selecting themes & items

- Types of residences in your NH (3 items)
- Distance to local facilities (8 items)
- Walking or cycle infrastructure in your NH (4 items)
- Maintenance of infrastructure in your NH (3 items)
- NH safety (6 items)
- How pleasant is your NH (4 items)
- Cycling and walking network (4 items)
- Home environment (6 items)
- Workplace or study environment (10 items)

### First Alpha Environment Questionnaire + short version

⇒ Consensus: expertmeeting

- First Alpha Environment questionnaire: 49 items
- Short Alpha questionnaire: 11 items (4 point scale)

⇒Translations

### Published Manuscript

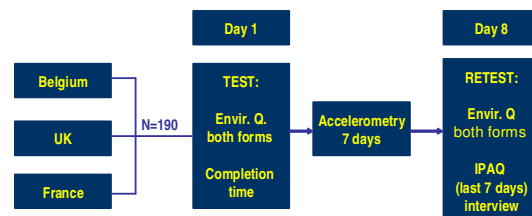
Heleen Spittaels, Charlie Foster, Jean-Michel Oppert, Harry Rutter, Pekka Oja, Michael Sjöström, Ilse De Bourdeaudhuij (2009).

Assessment of environmental correlates of physical activity: development of a European questionnaire

*International Journal of Behavioral Nutrition and Physical Activity*

OPEN ACCESS JOURNAL  
www.IJBNPA.org

### 1st field testing



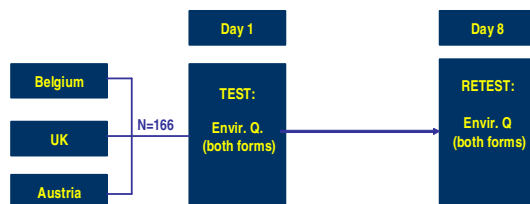
## 1st field testing : outcomes

- TEST-RETEST RELIABILITY
- PREDICTIVE VALIDITY
- FEASIBILITY

## Conclusions First field testing

- Alpa Q: reliability moderate to good  
validity contrasting results  
feasibility good: < 7 min
  - Short version: reliability moderate  
validity 0.21-0.34 with ipaq and acc  
feasibility good < 2 min
- ⇒ Rephrasing items for those with moderate results  
 ⇒ Consensus second expertmeeting  
 ⇒ Additional pilot testing

## 2nd field testing



TEST-RETEST RELIABILITY

## Conclusions

- The reliability scores improved from the 1st field testing (ICC from 0.66 to 0.86) to the 2nd field testing (ICC from 0.71 to 0.87).
- % agreement for short form also increased from the 1st field testing (range 50 - 83%) to the 2nd field testing (range 85 - 95%).
- Predictive validity: significant with self-reported minutes of transport-related walking, and objectively measured physical activity levels at low intensity, particularly in women.
- Feasibility: less than 7 minutes for the 49-item version and less than 2 minutes for the short version.

## Manuscript in preparation

Heleen Spittaels, Maïté Verloigne, Christopher Gidlow, Julien Gloanec, Sylvia Titze, Charlie Foster, Jean-Michel Oppert, Harry Rutter, Pekka Oja, Michael Sjöström, Ilse De Bourdeaudhuij

### Measuring physical activity-related environmental factors: reliability and predictive validity of the European environmental questionnaire ALPHA

#### 1. Types of residences in your neighbourhood

How common are the following types of residences in your immediate neighbourhood?

By your neighbourhood we mean ALL the area within approximately one kilometer or half a mile of your home or that you could walk to in 10-15 minutes.

Please put one check mark (✓) per answer that best applies to your view of your neighbourhood

	None	A few	Some	Most	All
a) Detached houses					
b) Semi-detached houses or terraced houses					
c) Apartment buildings or blocks of flats					

#### 1. Distance to local facilities

About how long would it take to get from your home to the nearest businesses or facilities listed below if you WALKED to them?

Please put one check mark (✓) for each business or facility.

The nearest...	1-5 min	6-10 min	11-20 min	21-30 min	More than 30 min
a) Local shop: grocery shop, bakery, butcher etc.					
b) Supermarket					
c) Local services such as a bank, post office or library, ...					
d) Restaurant, café, pub or bar					
e) Fast-food restaurant or takeaway					
f) Bus stop, tram, metro or train station					
g) Sport and leisure facility such as a swimming pool, sports field or fitness centre					
h) Open recreation area such as a park or other open space					

#### 1. Walking and cycling infrastructure in your neighbourhood

By your neighbourhood we mean ALL the area within approximately one kilometer or half a mile of your home or that you could walk to in 10-15 minutes.

Please circle one answer per statement

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
a) There are sidewalks in my neighbourhood	1	2	3	4
b) There are pedestrian zones or pedestrian trails in my neighbourhood	1	2	3	4
c) There are special lanes, routes or paths for cycling in my neighbourhood	1	2	3	4
d) There are cycle routes in my neighbourhood that are separated from traffic	1	2	3	4

**1. Maintenance of walking and cycling infrastructure in your neighbourhood**

By your neighbourhood we mean ALL the area within approximately one kilometer or half a mile of your home or that you could walk to in 10-15 minutes.

Please circle one answer per statement

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree	Not applicable
a) The sidewalks in my neighbourhood are well maintained	1	2	3	4	5
b) The cycle paths in my neighbourhood are well maintained	1	2	3	4	5
c) The play areas, playgrounds, parks or other open spaces in my neighbourhood are well maintained	1	2	3	4	5

**1. Neighbourhood safety**

By your neighbourhood we mean ALL the area within approximately one kilometer or half a mile of your home or that you could walk to in 10-15 minutes.

Please circle one answer per statement

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
a) It is dangerous to leave a bicycle locked in my neighbourhood	1	2	3	4
b) There are not enough safe places to cross busy streets in my neighbourhood	1	2	3	4
c) Walking is dangerous because of the traffic in my neighbourhood	1	2	3	4
d) Cycling is dangerous because of the traffic in my neighbourhood	1	2	3	4
e) It is dangerous in my neighbourhood during the day because of the level of crime	1	2	3	4
f) It is dangerous in my neighbourhood during the night because of the level of crime	1	2	3	4

**1. How pleasant is your neighbourhood for walking or cycling?**

By your neighbourhood we mean ALL the area within approximately one kilometer or half a mile of your home or that you could walk to in 10-15 minutes.

Please circle one answer per statement

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
a) My local neighbourhood is a pleasant environment for walking or cycling	1 None	2 A few	3 Some	4 Plenty
b) There is litter or graffiti in the streets of my neighbourhood	1	2	3	4
c) There are trees along the streets in my neighbourhood	1	2	3	4
d) In my neighbourhood there are badly maintained, unoccupied or ugly buildings	1	2	3	4

**1. Walking and cycling network**

By your neighbourhood we mean ALL the area within approximately one kilometer or half a mile of your home or that you could walk to in 10-15 minutes.

Please circle one answer per statement

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
a) There are many shortcuts for walking in my neighbourhood	1	2	3	4
b) Cycling is quicker than driving in my neighbourhood during the day	1	2	3	4
c) There are many road junctions in my neighbourhood	1	2	3	4
d) There are many different routes for walking or cycling from place to place in my neighbourhood so I don't have to go the same way every time	1	2	3	4

**8. Home Environment**

Please tick **Yes** or **No** [-]

	Yes	No
a) Do you have a bicycle for your personal use?		
b) Do you have a garden (including a yard, allotment or city garden)?		
c) Do you have small sports equipment such as a ball, racquets, ...for your personal use?		
d) Do you have exercise equipment such as weights, treadmill, stationary cycle, ...for your personal use?		
e) Do you have access to a car?		
f) Do you have a dog?		

**8. Workplace or study environment**

**A. How far do you have to travel to get to your usual place of work or study?**

I do not work or study? Please skip part B  
 I usually work at home or from home? Please skip part B  
 The distance to my work or place of study is .....miles/kilometres (circle as appropriate)

**B. At your work or place of study do you have....?**

Please tick one box only [-]

	Yes	No
a) ...escalators or lifts		
b) ...stairs		
c) ...fitness centre/equipment		
d) ...bicycles provided by employer or school		
e) ...a safe place to leave a bike		
f) ...enough car parking spaces		
g) ...showers and changing rooms		
h) ...exercise classes (e.g. aerobics classes)		
i) ...sports club / association (e.g. running club)		
j) ...employer/school subsidised public transport		

**Short measure of environmental perceptions: active travel and physical activity**

We would like to find out more information about the way that you think about your neighbourhood, home environment and workplace or study environment. Please put a check mark (✓) per answer that best applies to your view of your neighbourhood, home environment and workplace or study environment. By your neighbourhood we mean ALL the area within approximately one kilometer or half a mile of your home or that you could walk to in 10-15 minutes.

	Yes	No
a) Most of the houses in my neighbourhood are detached houses		
b) There are many shops within easy walking distance of my home		
c) There is a bus/tram station within easy walking distance of my home		
d) There is a park within easy walking distance of my home		
e) Walking is dangerous because of the traffic in my neighbourhood		
f) Walking is dangerous because of the level of crime in my neighbourhood		
g) There are trees along the streets in my neighbourhood		
h) At my home, I have small sports equipment such as a ball, racquets, ...for my personal use		
i) At my work or place of study, I have bicycles provided by employer or school		NA
j) At my work or place of study, I have employer/subsidised public transport/cycling		NA

**Recommendations**

**FOR MONITORING**

**We recommend to include the Alpha environmental questionnaire as a monitoring tool in ongoing health surveys in every European country.**

**The survey should measure key domains such as walking & cycling for transport and leisure time / work related physical activity**

**The Alpha Q lasts on average 6 minutes to be completed and is the recommended form. If this is not possible also the Alpha short form can be used (1 to 2 minutes).**

## Recommendations

### FOR RESEARCH

The Alpha environmental questionnaire is a valid and reliable instrument to measure the build environment for research purposes in Europe.

The Alpha Q is based on the NEWS but is much shorter and includes some specific EU items. For comparison purposes with US/AU the NEWS can also be used in EU preferably including also the specific items.

## Availability of the questionnaire

- Website
- Manual of operation
- Different languages:
  - English
  - Dutch
  - French
  - German
  - Spanish
  - Finnish

## International Expert group

Jim Sallis (US)	Maria Hagstromer (Sweden)
Neville Owen (Australia)	Patrick Bergmann (Sweden)
Klaus Gebel (Germany/Australia)	Kristina Sundquist (Sweden)
Fiona Bull (UK/Australia)	Rachel Davy (UK)
Pekka Oja (Finland)	David Ogilvie (UK)
Basile Chaix (France)	Melvin Hillsdon (UK)
Sylvia Titze (Austria)	Roger Macket (UK)
Frank Van Lenthe (Netherlands)	Andy Jones (UK)
	Andrea Backovic (Slovenia)
	Djomba Janet Klara (Slovenia)

## Neighbourhood walkability, neighbourhood SES, PA, sedentary behaviour and overweight in Belgian adults: Results of the Belgian Environmental Physical Activity Study (BEPAS)



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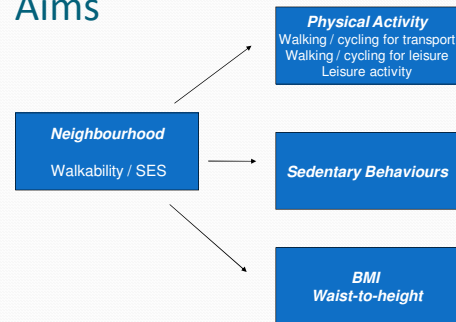
Delfien Van Dyck  
Ilse De Bourdeaudhuij  
Greet Cardon  
Benedicte Deforche



## Introduction

- Existing literature on physical environment and PA in adults: mainly US and Australian studies
- Strong need for European studies
  - Large differences in physical environments  
↔ US and Australia
  - Differences in PA behaviour: cycling in Europe
- Belgium : Belgian Environmental Physical Activity Study (BEPAS)
  - 1st large-scale European study on relation walkability – PA – sedentary behaviour – BMI in adults

## Aims

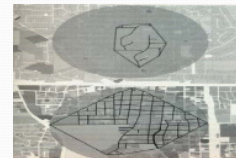


## Methods

- Ghent, Belgium: 24 neighbourhoods
  - 6 high walkable / high SES
  - 6 high walkable / low SES
  - 6 low walkable / high SES
  - 6 low walkable / low SES
- Neighbourhood selection:
  - SES: median annual household income
  - Walkability: GIS: connectivity, land use mix, residential density

## Methods: walkability

- High walkable neighbourhood:
  - (1) High residential density  
~ population density
  - (2) High connectivity
    - Many intersections, few dead-end streets,...



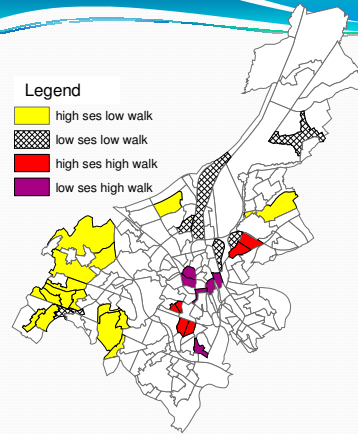
## Methods: walkability

(3) High land use mix: distribution of ≠ land uses in one neighbourhood: residential, commercial, institutional, recreational,....



### Legend

- high ses low walk
- low ses low walk
- high ses high walk
- low ses high walk



## Methods

- 1200 participants (20-65 years), 50 per neighbourhood
- 2 home visits, 1 week between visits
  - IPAQ interview
  - NEWS
  - 7 day accelerometer
  - demographic and psychosocial questionnaire
  - waist circumference

## Methods

- Analyses
  - Multilevel modeling MLwiN 2.02.
  - Two-level models
    - Level 1: individual-level variables
    - Level 2: neighbourhood-level variables
  - Multivariate regression analyses
  - All analyses: controlled for possible confounders: gender, age, education, working status
  - Logarithmic transformation of skewed variables
  - Statistical significance  $p < .05$

## Results: neighbourhood walkability - PA

	High walkability (mean (SD))	Low walkability (mean (SD))	$\beta$ (SE)
IPAQ (min/week)			
walking transport	117.3 (169.2)	37.6 (90.1)	0.764 (0.157)***
cycling transport	82.3 (126.7)	43.9 (95.2)	0.447 (0.105)***
motor transport	309.2 (295.3)	344.8 (315.7)	-0.125 (0.067)*
walking recreation	85.3 (137.2)	67.6 (128.4)	0.334 (0.111)**
Activity monitor (min/day)			
MVPA	38.6 (23.8)	31.8 (23.1)	0.095 (0.030)***

\* p<0.05; \*\* p<0.01; \*\*\* p<0.001

## Results: walkability – sedentary behaviour – BMI – waist circumference

	High walkability (mean (SD))	Low walkability (mean (SD))	$\beta$ (SE)
Sedentary behaviour IPAQ (min/day)			
sitting time weekday	472.2 (193.5)	418.1 (195.4)	0.035 (0.017)*
sitting time WE day	358.7 (160.2)	366.7 (190.2)	0.010 (0.026)
daily sitting time	439.8 (156.3)	403.4 (385.7)	0.023 (0.013)*
Actigraph (min/day) physical inactivity	1081.6 (93.3)	1060.8 (110.5)	12.920 (6.182)*
BMI (kg/m <sup>2</sup> )			
men	25.0 (3.8)	25.6 (3.6)	-0.788 (0.320)**
women	23.0 (3.7)	23.9 (4.0)	-0.924 (0.440)*
Waist circumfer. (cm)			
men	92.5 (11.7)	92.5 (11.7)	1.120 (0.962)
women	90.8 (10.6)	81.2 (12.2)	1.049 (1.182)

## Results:

### INTERACTIONS

- neighbourhood walkability x neighbourhood SES
  - on PA
  - on sedentary behaviour
- No significant results were found ( $\beta$  (SE))

## Discussion & conclusions

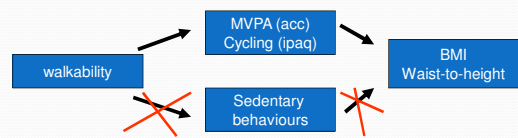
- Living in high walkable neighbourhoods:
  - 80 min/week more walking for transport
  - 40 min/week more cycling for transport
  - 20 min/week more walking for recreation
  - 35 min/week less motor transport
  - 50 min/week more MVPA (accelerometer)
  - Lower BMI, in men and women
  - BUT ALSO
    - 35 min/day more sitting time
    - 20 min/day more inactivity (accelerometer)

## Discussion & conclusions

- Results ~ Australian and US studies
- Clear relationship between walkability and PA in adults
  - Walking AND **cycling**
  - For transportation AND **recreation**
  - Possibilities for future interventions: ≠ PA behaviours can be influenced

## Discussion & conclusions

- Positive association with PA,
- BUT negative association with sedentary behaviour
  - Still: lower BMI in high walkable neighbourhoods
  - Mediating effect of PA and sedentary behaviour?



## Discussion & conclusions

- Interactions walkability – SES
  - No significant results
  - Interesting finding
    - Robust effects of walkability independent of SES
    - Future interventions: both high and low SES neighbourhoods can profit

Thank you!

Questions?