UNIVERSITEIT GENT

FACULTY OF MEDICINE AND HEALTH SCIENCES

Creating cycling-friendly environments: An experimental study using manipulated photographs

Results from studies among children, parents and adults

Ariane Ghekiere and Lieze Mertens

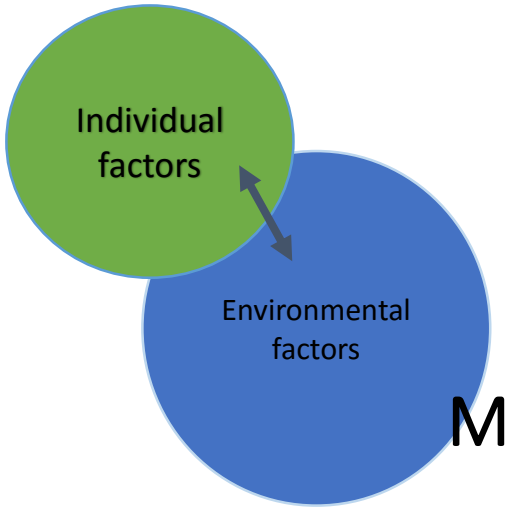
Supervised by
dr. Jelle Van Cauwenberg, Prof. dr. Benedicte Deforche, Prof. dr. Ilse De Bourdeaudhuij

Cycling for transport → health benefits (Oja, 2011)

- Physical activity levels (Wanner, 2012; Davison, 2006)
- Body composition (Lubans, 2011)
- Physical fitness (Andersen, 2009)
- BMI (Bere, 2011; Ostergaard, 2012)
- Cardiovascular health (Andersen, 2011; Ostergaard, 2012)
- All cause mortality, cancer mortality and cancer morbidity (Oja, 2011)

- Mental health

→ *Everyone cycles?*
Car use short distances
37% children, 54% adults



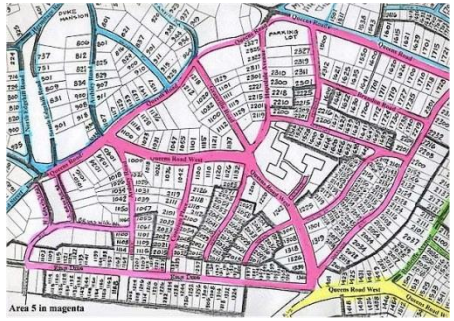
Environmental factors

Macro-scale factors

- Distance to destination
- Connectivity
- Residential density
- Land-use
- …

Micro-scale factors

- Type of cycling infrastructure
- Vegetation
- Speed limitations
- …



Need for experimental research → causality

→Panoramic manipulated photographs

Pilot-tested among adults and seniors

→ Limited in number of environmental factors due to the ranking

→ Limited within one general street setting

Mertens et al 2014, IJBNPA; Van Cauwenberg et al 2014, Plos One

Research aim

Study 1

Is the effect of micro-scale environmental factors equal across different street settings?

Sample 1: 305 children (10-12 yrs) and their parents across 12 primary schools

Sample 2: 389 mid-aged adults (40-65 years old)

Panoramic manipulated photographs:

- 3 **micro-scale** factors:
  * evenness of cycle path: very uneven, moderately uneven, even
  * speed limits: 70 km/h, 50 km/h, 30 km/h
  * degree of separation: no separation, curb, hedge

- 1 **macro-scale** factor: general street setting: enclosed, half-open, open


70


50


30

Online questionnaire: choice-based conjoint task (Sawtooth Software, SSI Web)

→ Marketing research tool

→ Examining the preference/importance of specific atributes of a product (=street)

Difference parents-adults

Analysis

Hierarchical Bayes analyses in Sawtooth Software
→ outcome = preference scores (utilities)

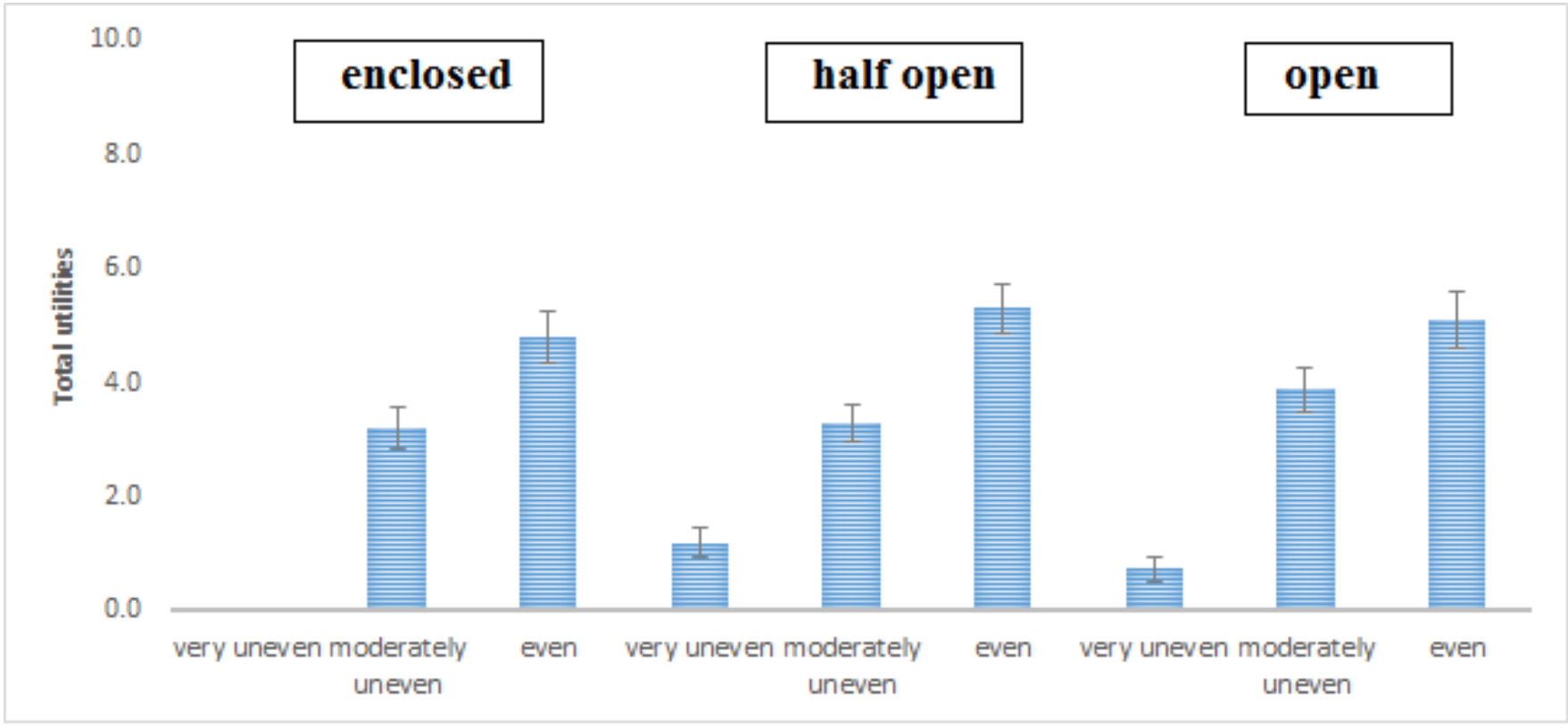

I WANT YOU
TO CHOOSE!
memegenerator.net

Route option 1 : hands on your head

Route option 2: both hands in the air

Route option 1 : hands on your head

Route option 2: both hands in the air


enclosed
half open
open
Total utilities
10.0
8.0
6.0
4.0
2.0
0.0
very uneven
moderately uneven
even
very uneven
moderately uneven
even
very uneven
moderately uneven
even

Changing micro-scale factors have similar effect on the supportiveness for transportation cycling across street settings

Ghekiere A, Van Cauwenberg J, Mertens L, Clarys P, de Geus B, Cardon G, Nasar J, Salmon J, De Bourdeaudhuij I, Deforche B: **Assessing cycling-friendly environments for children: are micro-environmental factors equally important across different street settings?** *International Journal of Behavioral Nutrition and Physical Activity* 2015, **12:**54.

Mertens L, Van Cauwenberg J, Ghekiere A, Van Holle V, De Bourdeaudhuij I, Deforche B, Nasar J, Van de Weghe N, Van Dyck D: **Does the Effect of Micro-Environmental Factors on a Street's Appeal for Adults' Bicycle Transport Vary across Different Macro-Environments? An Experimental Study.** *Plos One* 2015, **10:**e0136715.

Study 2

Research aim

Which micro-scale environmental factors are most important to create **more supportive environments** for transportation cycling?

Sample 1: 1232 children (10-12 yrs) and their parents across 45 primary schools

Sample 2: 1950 mid-aged adults (40-65 yrs)

Online questionnaire: choice-based conjoint tasks (Sawtooth Software, SSI Web)

Panoramic photographs manipulated in 7 environmental factors:

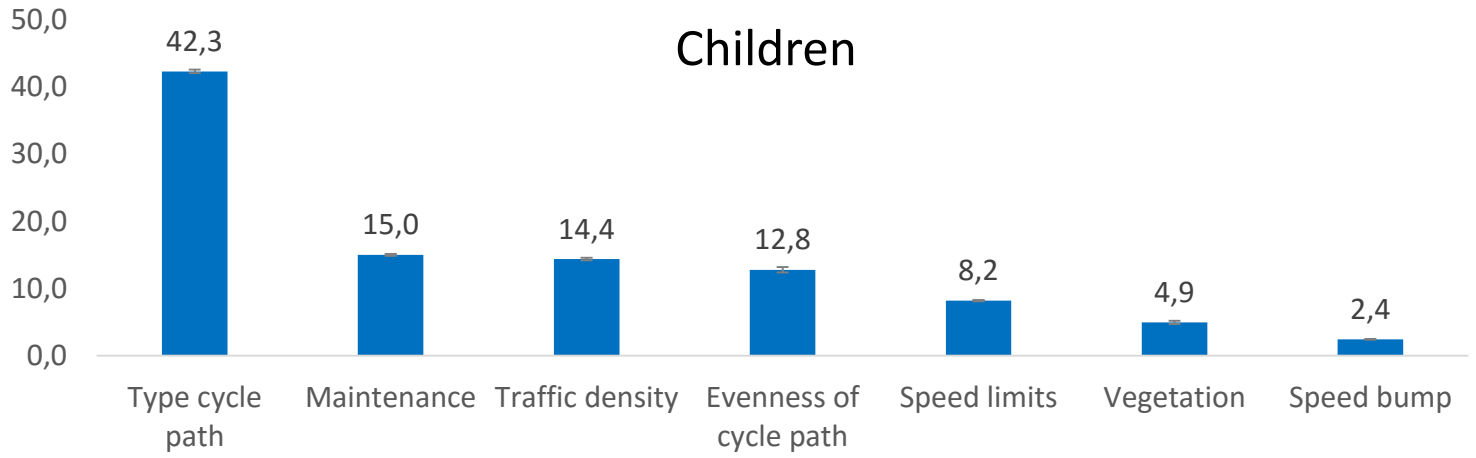
- Type of cycle path (6 levels)
- Evenness of cycle path (3 levels)
- Speed limitation (2 levels)
- Speed bump (2 levels)
- Maintenance (3 levels)
- Vegetation (3 levels)
- Traffic density (3 levels)

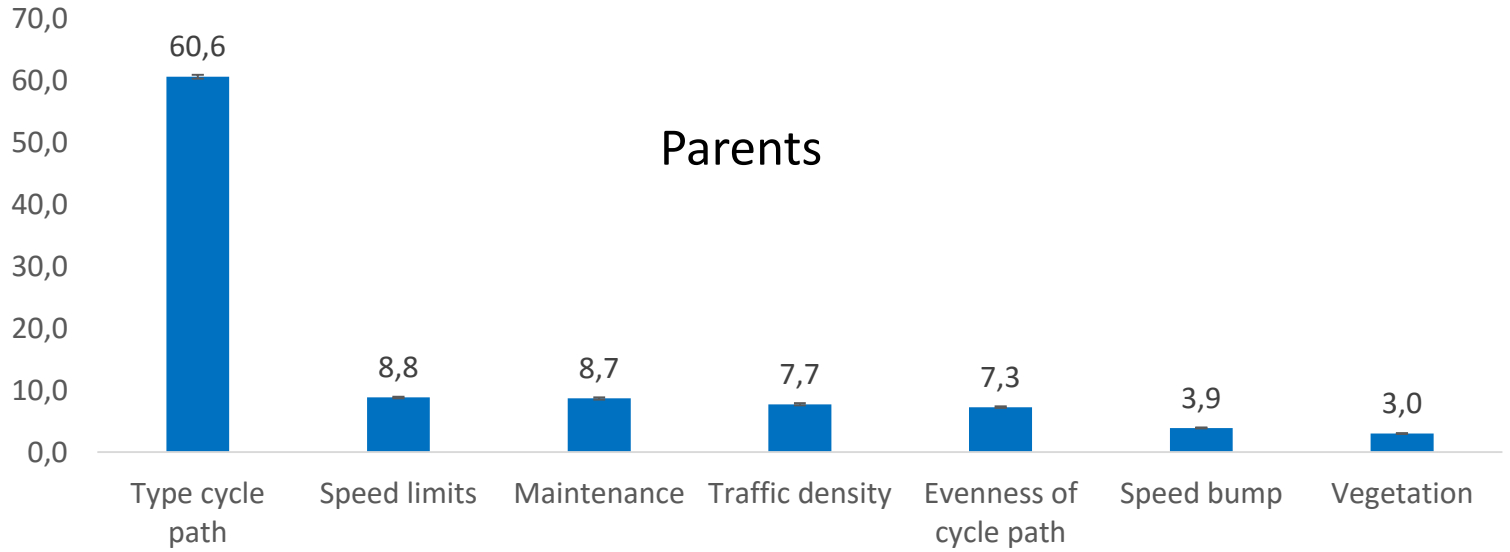

50

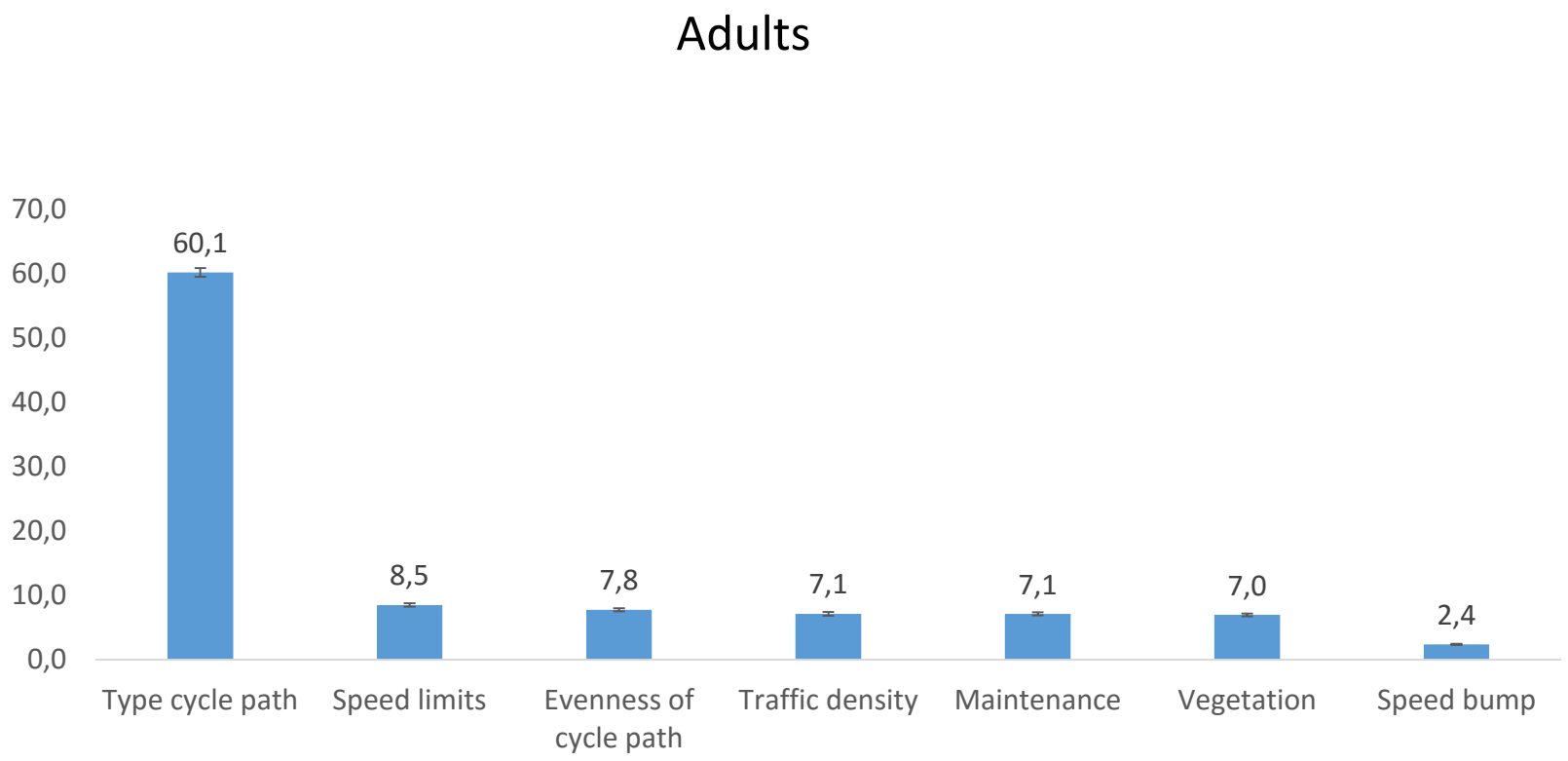

30


30

Which route do you prefer to cycle to your friend?


Children
50,0
40,0
30,0
20,0
10,0
0,0
42,3
15,0
14,4
12,8
8,2
4,9
2,4
Type cycle path
Maintenance
Traffic density
Evenness of cycle path
Speed limits
Vegetation
Speed bump


Parents
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,0
60,6
8,8
8,7
7,7
7,3
3,9
3,0
Type cycle path
Speed limits
Maintenance
Traffic density
Evenness of cycle path
Speed bump
Vegetation


Adults
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,0
60,1
8,5
7,8
7,1
7,1
7,0
2,4
Type cycle path
Speed limits
Evenness of cycle path
Traffic density
Maintenance
Vegetation
Speed bump

Type 1

Type 2

Type 3

Type 4

Type 5

Type 6

- Type of cycle path (separation) is most important factor
  → Any investment is beneficial

- Experimental onsite research needed: effect on behavior?

- Future studies:
  - Interaction between micro-scale environmental factors
  - Does subgroups exist with specific preferences?
  - Different age groups (adolescence and older adults)
  - Interaction with distance and social aspect
  - Cost-effectiveness of interventions

Acknowledgements

Supervisors: Benedicte Deforche & Ilse De Bourdeaudhuij (UGent)

Important contributors:
Lieze Mertens (UGent)
Jelle Van Cauwenberg (UGent)
Greet Cardon (UGent)
Nico Van de Weghe (UGent)
Bas de Geus (Vrije Universiteit Brussel)
Peter Clarys (Vrije Universiteit Brussel)
Jack Nasar (Ohio State University, US)
Jo Salmon (Deakin University, Australia)

UNIVERSITEIT GENT

Vrije Universiteit Brussel

fwo Research Foundation Flanders
Opening new horizons

Thank you!

Ariane.Ghekiere@UGent.be Lieze.Mertens@UGent.be
Benedicte.Deforche@UGent.be