The value of neighborhood greenspace for children using the life satisfaction approach

ESP EUROPE 2024: B10A - ASSESSING HEALTH AND WELL-BEING ECOSYSTEM SERVICE BENEFITS FROM NATURE-BASED SOLUTIONS ACROSS URBAN/PERI-URBAN LANDSCAPES

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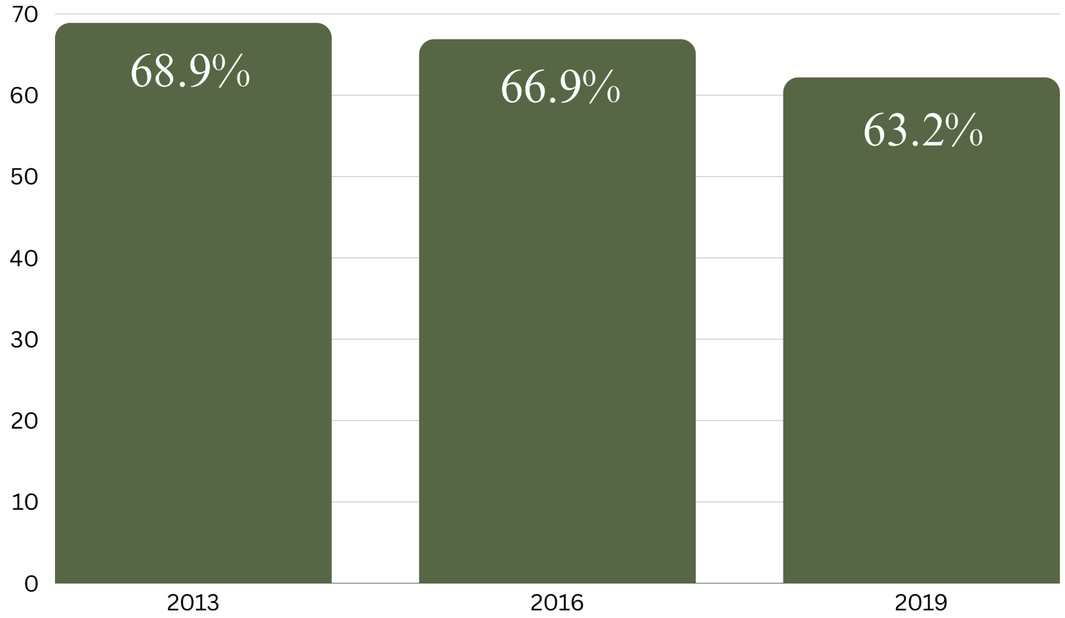
Neighborhood greenspace in Flanders

% of Flemisch population with 10 ha greenspace in a 800m radius



VITO, adapted by Statistiek Vlaanderen (2022)

⟶ concerning since exposure to nature enhances children's well-being

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The impact of greenspace on well-being: previous research

Overview of systematic reviews (Zare Sakhvidi et al., 2023)

- Based on 35 systematic reviews
- Greenspace is beneficial for children and adolescents' wellbeing
- Effect is diverse due to high heterogeneity assessment & population characteristics

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Research gap

Robust evidence is present, but no monetary valuation of benefits exists

↳ more difficult to include in policy decision-making

Goal: Put a monetary value on neighborhood greenspace for children for the 1st time

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How? Non-market valuation method

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How? Non-market valuation method
→ children do not have an income
→ children cannot asses monetary values
→ problem

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How? Non-market valuation method
→ children do not have an income
→ children cannot asses monetary values
} → problem

Solution: Life Satisfaction Approach (Frey et al., 2010; Welsch & Kuehling, 2009)

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Method

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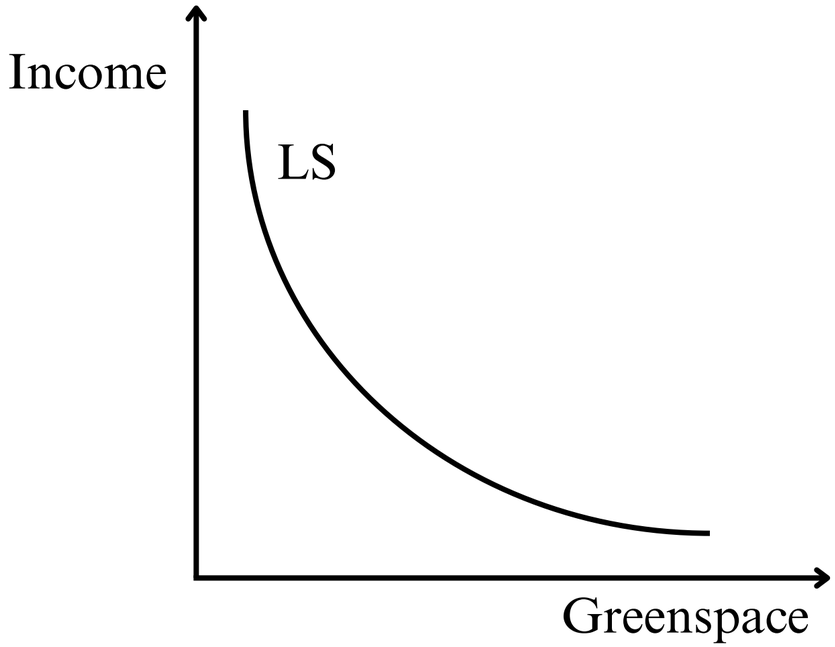
The Life Satisfaction Approach

- Every combination of income and greenspace yields a certain utility
- For every level of utility, multiple combinations are possible
- Life satisfaction is seen as a measure of utility



(Welsch & Kuehling, 2009)

The Life Satisfaction Approach

$$LS = f(x, y, \Theta' z)$$

(Frey et al., 2010; Welsch & Kuehling, 2009)

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The Life Satisfaction Approach

$$LS = f(x, y, \Theta'z)$$

LS = life satisfaction

x = neighborhood greenspace

y = income

$\Theta'z$ = other factors that affect life satisfaction

(Frey et al., 2010; Welsch & Kuehling, 2009)

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The Life Satisfaction Approach

$$LS = f(x, y, \Theta'z)$$

LS = life satisfaction

x = neighborhood greenspace

y = income

$\Theta'z$ = other factors that affect life satisfaction

$$MWTP = (\delta f / \delta x)/(\delta f/\delta y)$$

the trade-off between LS increase due to an increase in greenspace and LS decrease due to a decrease in income

(Frey et al., 2010; Welsch & Kuehling, 2009)

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Adjustment LSA for children

LSA for adults uses income ⟶ children do not have an income

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Alternatives:

1. Household income

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Alternatives:

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   ↳ Literature is ambiguous*

* (Cho, 2018; Knies, 2022; Qi & Wu, 2020)

Adjustment LSA for children

LSA for adults uses income ⟶ children do not have an income

Alternatives:

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- Literature is ambiguous*

1. Children might not care
2. Parents might shield their children from financial strain

* (Cho, 2018; Knies, 2022; Qi & Wu, 2020)

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Alternatives:

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Adjustment LSA for children

LSA for adults uses income ⟶ children do not have an income

Alternatives:

1. Household income
2. Time spent with parents

- Literature is ambiguous*
  ⟶ Results are age-dependent
  ⟶ Type of time matters

* (Fomby & Musick, 2018; Kutrovátz & Geszler, 2023; Li & Guo, 2023; Milkie et al., 2015; Offer, 2013)

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Adjustment LSA for children

LSA for adults uses income ⟶ children do not have an income

Alternatives:

1. Household income
2. Time spent with parents

   ⟶ valued using the opportunity cost or market replacement cost*

* (Sousa-Poza et al., 2001)

Data collection

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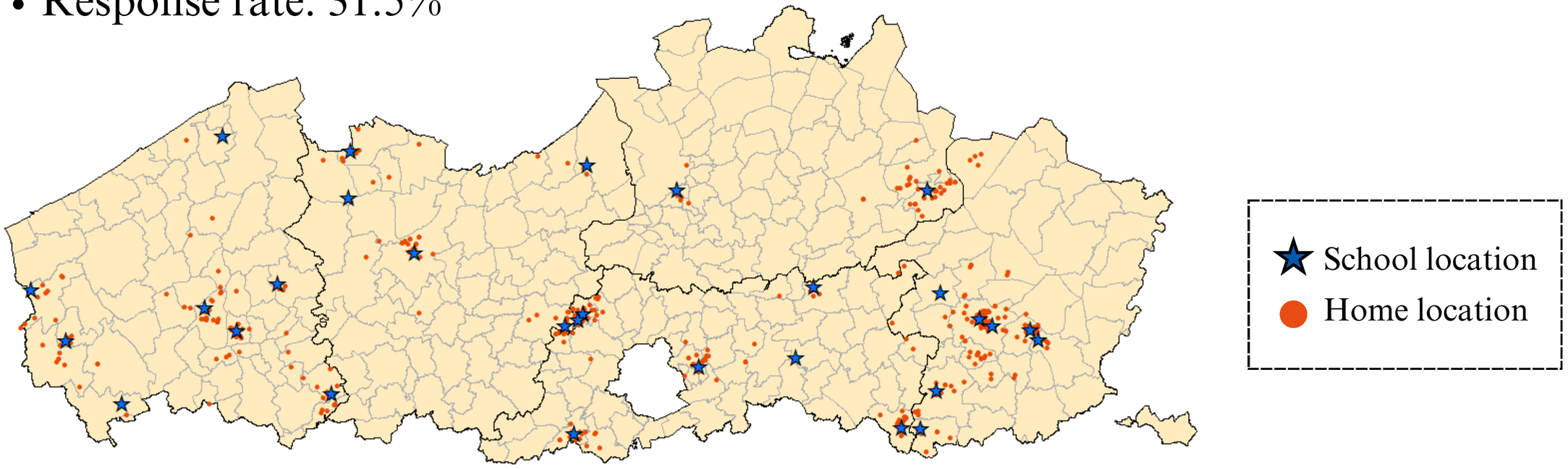
Data collection

- Data collection through 29 schools (Feb 2024 - June 2024)
- Data were collected from 475 child-parent pairs
- Response rate: 31.5%



Data collection

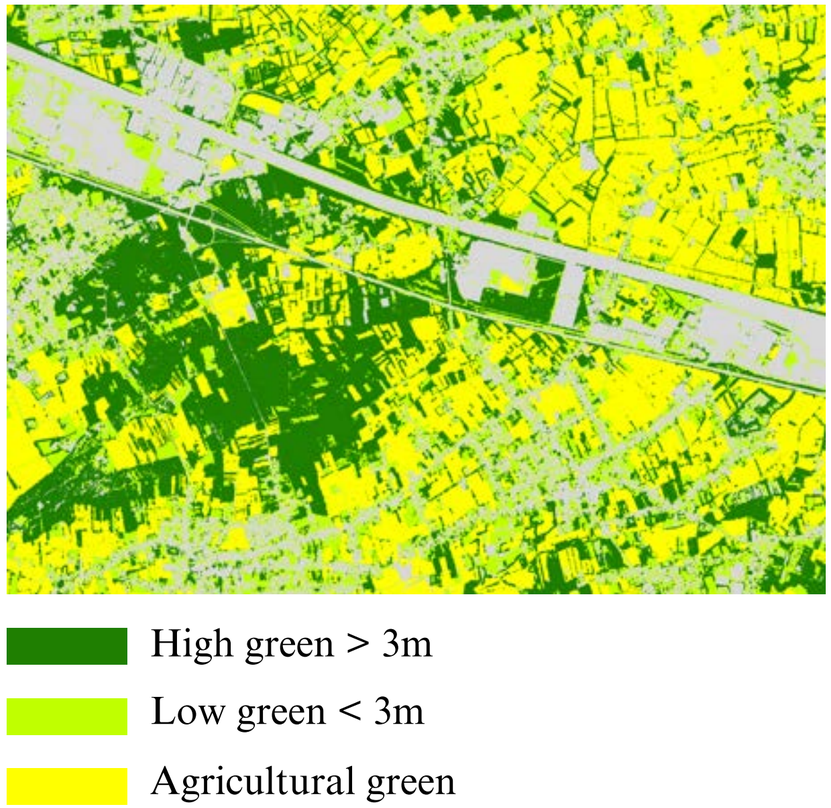
Life satisfaction

- SWLS-C (Gadermann et al., 2010)

Greenspace

- Buffers of 50, 100, 300, 500, 1000 and 2000m
- Green map of Flanders

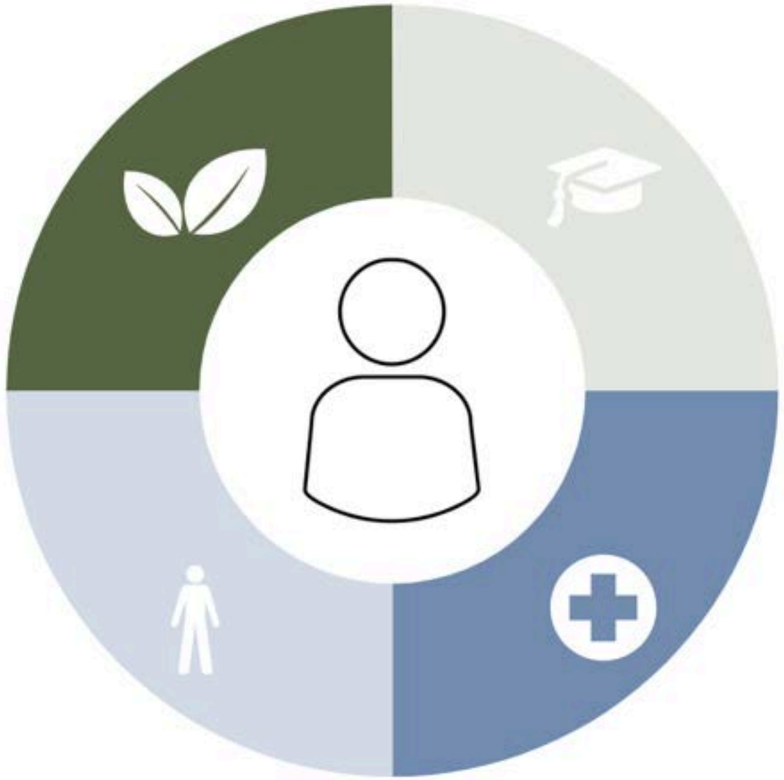
(Agentschap voor Natuur en Bos, 2012)



Sample

greenspace

- 35% live in urban area
- 96% have a garden



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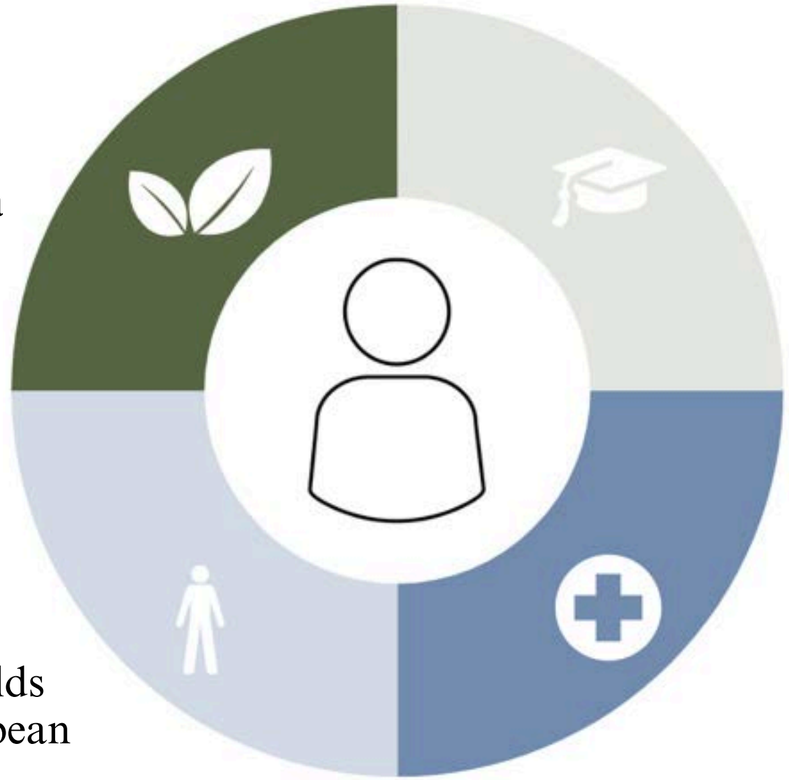

demographics

- 10.32 y mean age
- 55% girls
- 16% live in 2 households
- 89% is Western-European

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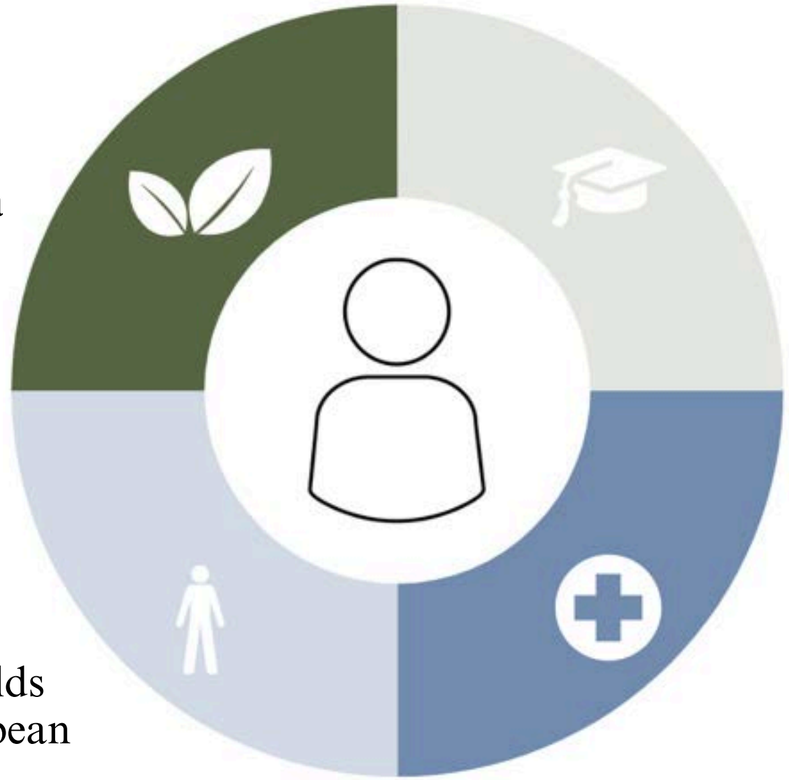

SES

- 93% are employed
- 68% are highly educated
- €5201 mean net household income

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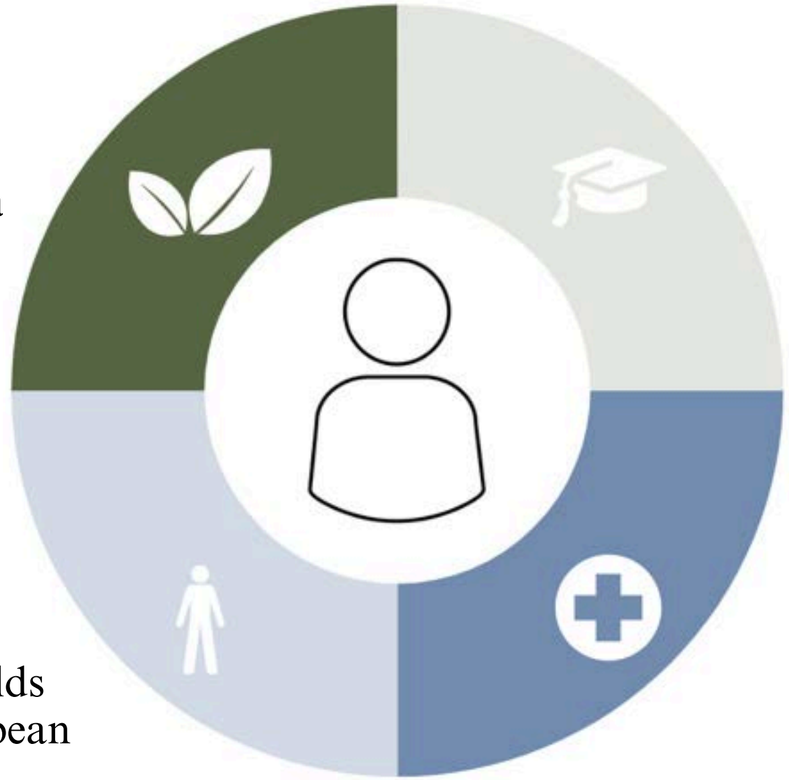

SES

- 93% are employed
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health

- 99% has good general health

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Results

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Valuation of well-being benefits: preliminary results

Preliminary results:

- Based on greenspace data of 2012
- Based on 383 instead of 475 observations

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Valuation of well-being benefits: preliminary results

	intercept	greenspace (log)	agri green (log)	time spent
50m	15.21***	0.9342***	-0.1007	0.0193***
100m	15.35***	0.8459*	-0.0004	0.0201***
300m	17.18***	0.3028	0.0523	0.0210***
500m	17.54***	0.1660	0.1006	0.0212***
1000m	15,09***	0.6798	0.3026	0.0209***
2000m	12.69***	1.0975*	0.5369	0.0215***

***1% sig. level; **5% sig. level; *10% sig. level

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Valuation of well-being benefits: preliminary results

LASSO: select variables (Tibshirani, 1996)

Variables for valuation:

- greenspace (only 50m & 100m)
- agricultural green (only 1000m)
- total hours spent

Other variables:

- relationship with the parents (only 100m)
- hours of organized activities out of school
- age
- the number of households
- total net income of the household

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Valuation of well-being benefits: preliminary results

Model after Lasso (only variables of intrest for eco analysis are displayed)

	greenspace (log)	agri green (log)	time spent
50m	0.7966*	X	0.0115
100m	0.0692	X	0.0116
300m	X	X	0.0123*
500m	X	X	0.0125*
1000m	X	0,0045	0.0123*
2000m	X	X	0.0125*

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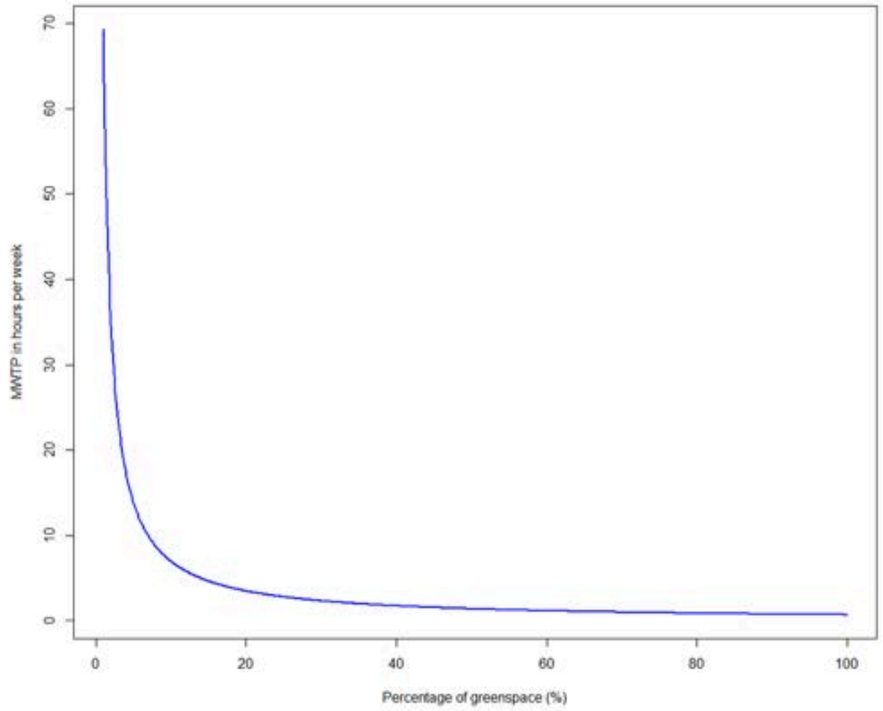
Valuation of well-being benefits: preliminary results

Economic valuation of 50m buffer



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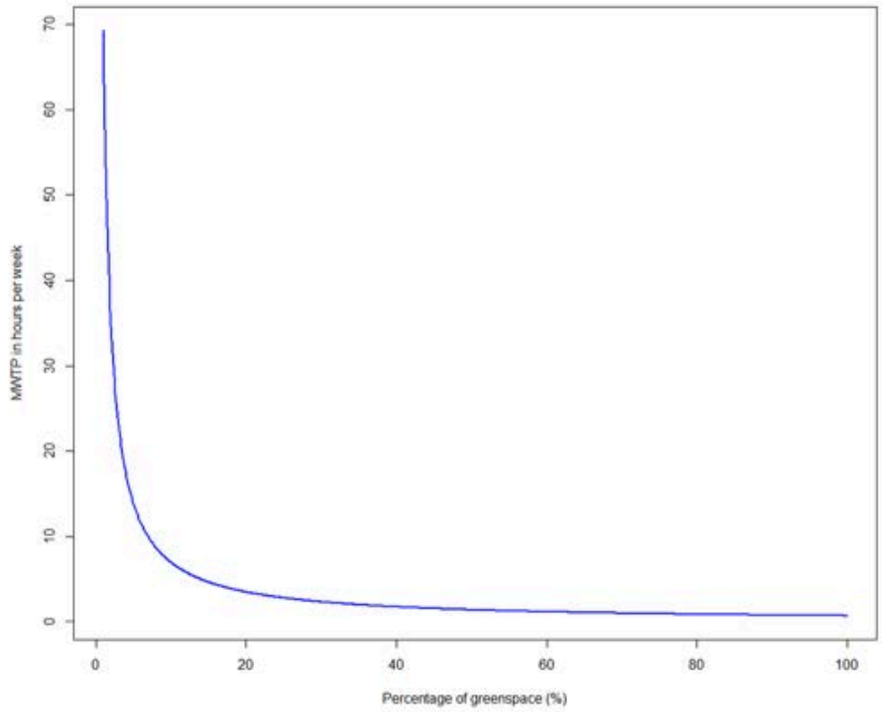

- 0% → 1%: value of +/- 69h per week
  ↳ unrealistic: min. 2.19%, median: 43%

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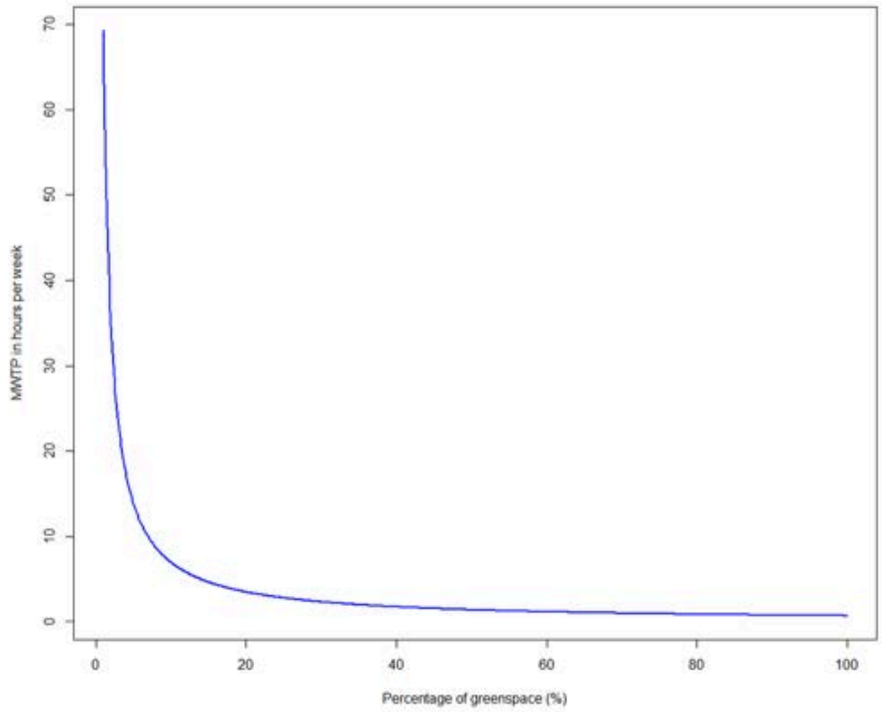

- 0% → 1%: value of +/- 69h per week
  - ↳ unrealistic: min. 2.19%, median: 43%

- For the average child: 43% → 44%
  - ↳
    - a value of 1.6 h per week
    - net income for 1h ≈ €18
    - 1.6 h ≈ €28.8/week

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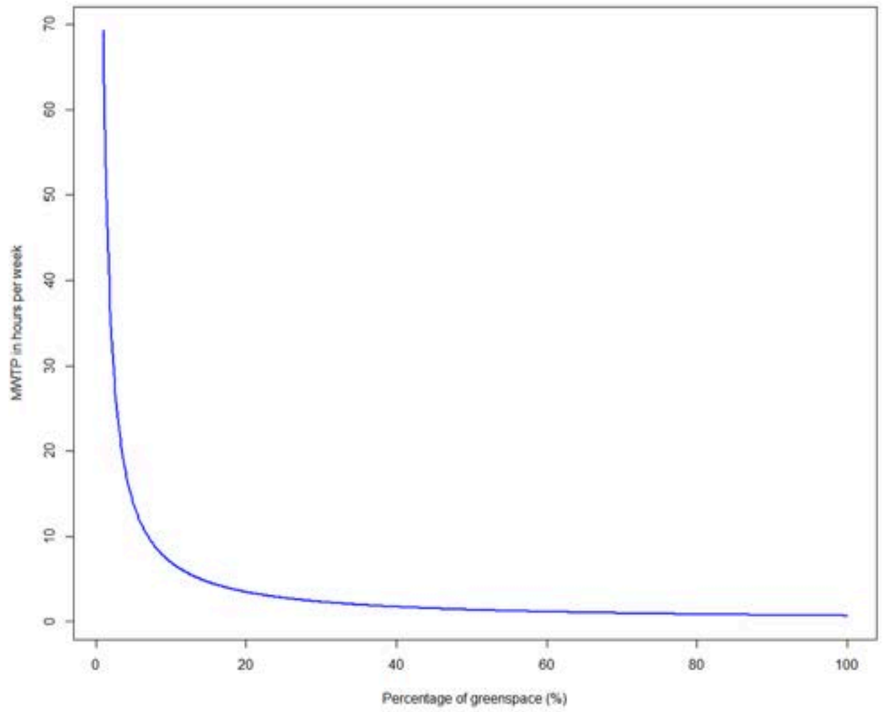

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    - a value of 1.6 h per week
    - net income for 1h ≈ €18
    - 1.6 h ≈ €28,8/week
      - ↳ 1.9% of total time spent (median)

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Valuation of well-being benefits: next steps

- 2021/2024 greenspace data
- Multiple imputation for missing data (Van Buuren, 2012)
- Use of double LASSO instead of LASSO (Urminsky, 2016)
- Adding personality to the model

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Thank you for your attention

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