



UNIwersytet im. Adama Mickiewicza w Poznaniu

HOW CAN SOCIALLY JUST AND ECOLOGICALLY RESPONSIBLE MOBILITY BE MEASURED? A CASE FROM POLAND

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SOCIALLY JUST AND ECOLOGICALLY RESPONSIBLE

Transport equity / poverty vs. **sustainable mobility**

How to provide access to opportunities, access to mobility, satisfying human needs, and reduce cost & harm

How to reduce environmental footprints and resource use
In a just and equitable manner?

SOME SYNERGIES

MANY TENSIONS & CONTRADICTIONS

SOCIALLY JUST AND ECOLOGICALLY RESPONSIBLE

Transport equity / poverty vs. **sustainable mobility**

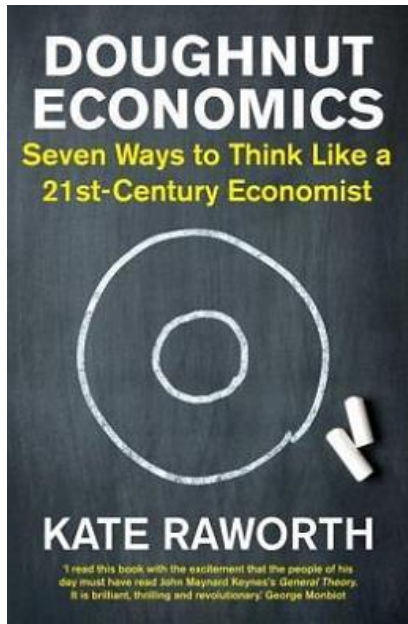
How to provide access to opportunities, access to mobility, satisfying human needs, and reducing cost & harm

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In a just and equitable manner?



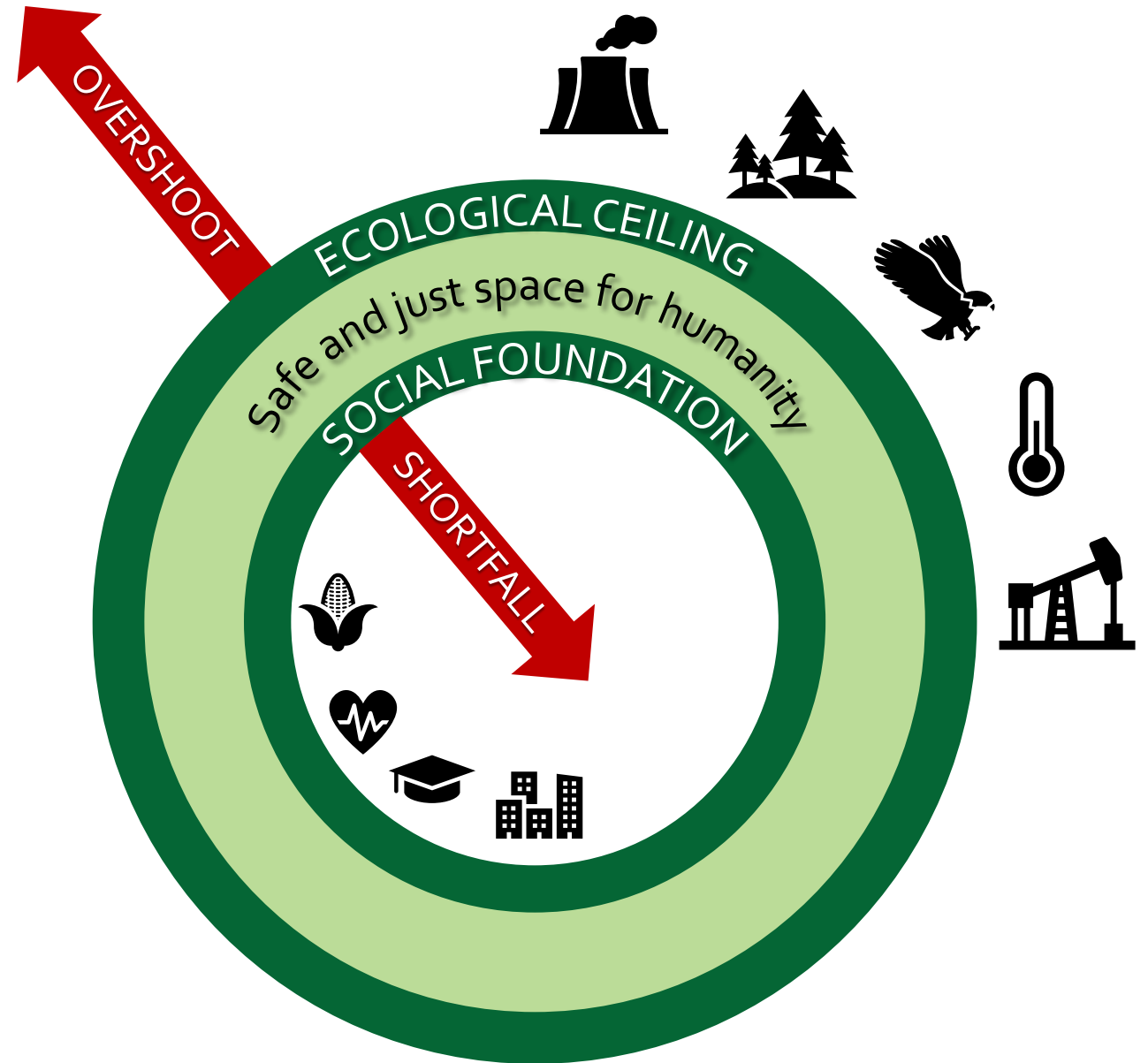
DOUGHNUT ECONOMICS



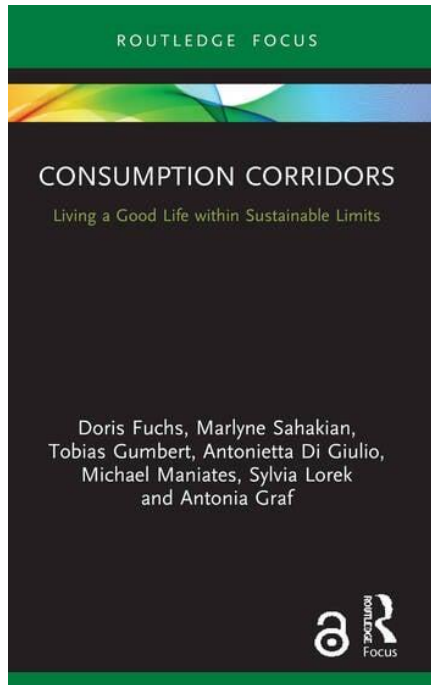
Raworth, K. (2018). *Doughnut economics: Seven ways to think like a 21. century economist*. Random House Business Books.



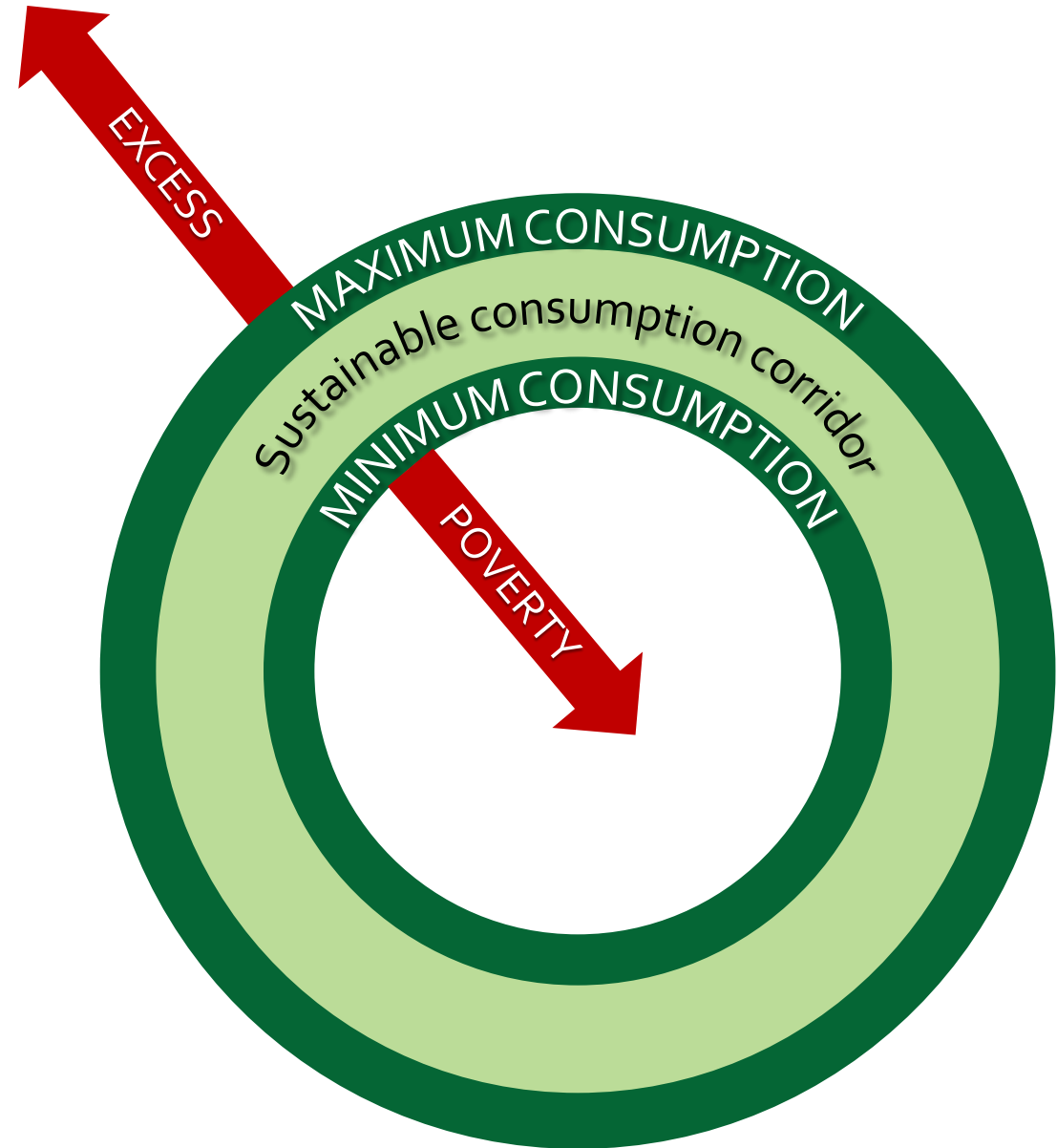
Kate Raworth by Arbeid & Milieu at Flickr and Wikipedia.org (CC BY 2.0)



SUSTAINABLE CONSUMPTION CORRIDORS



ENERGISE project
(CC BY-NC-ND 4.0)



Fuchs, D., Sahakian, M., Gumbert, T., Di Giulio, A., Maniates, M., Lorek, S., & Graf, A. (2021). *Consumption corridors: Living a good life within sustainable limits*. Routledge (CC BY-NC-ND)

SOCIAL-ECOLOGICAL MATRIX

Goldemberg's
Corner

An indicator of social achievement
or well-being



An indicator of ecological pressure or resource use

AIMS OF THIS STUDY

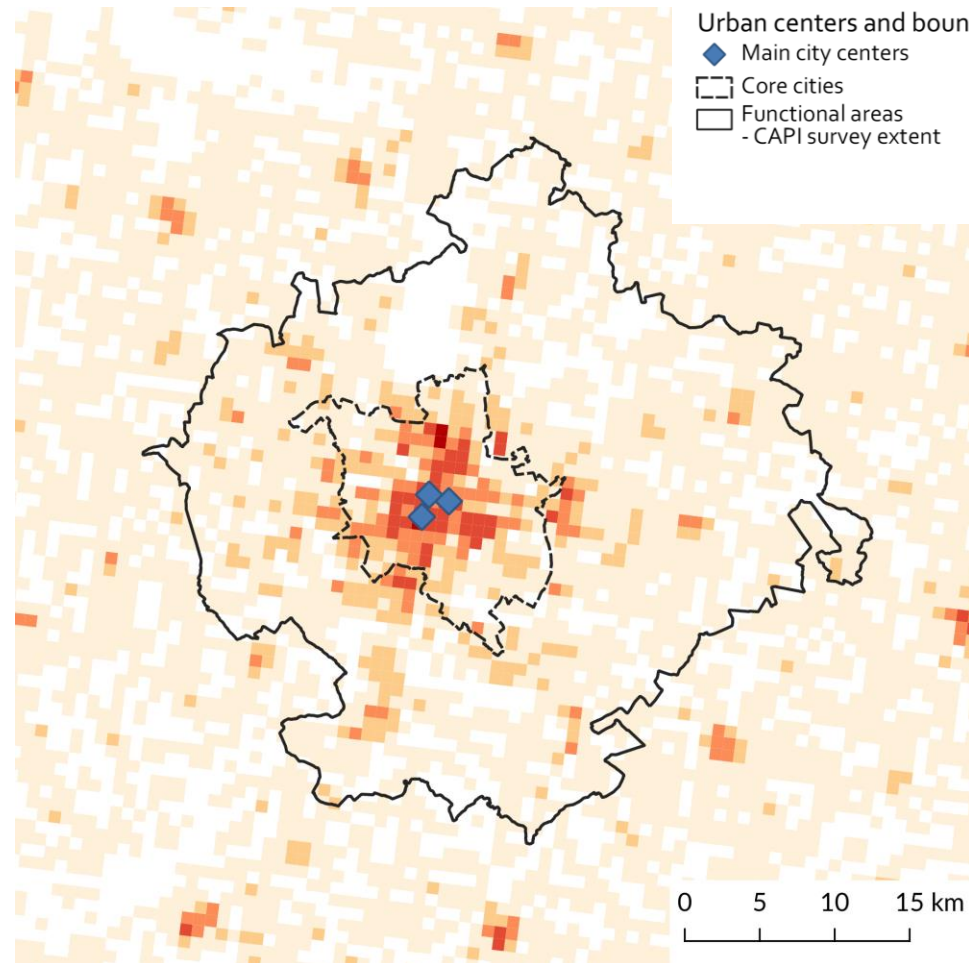
- **Apply the social-ecological approach to mobility at an urban scale**
- **Assess the social-ecological performance of urban areas**
- **Develop indicators and their thresholds**
- **Identify the conditions of good social-ecological performance**

THE PROJECT

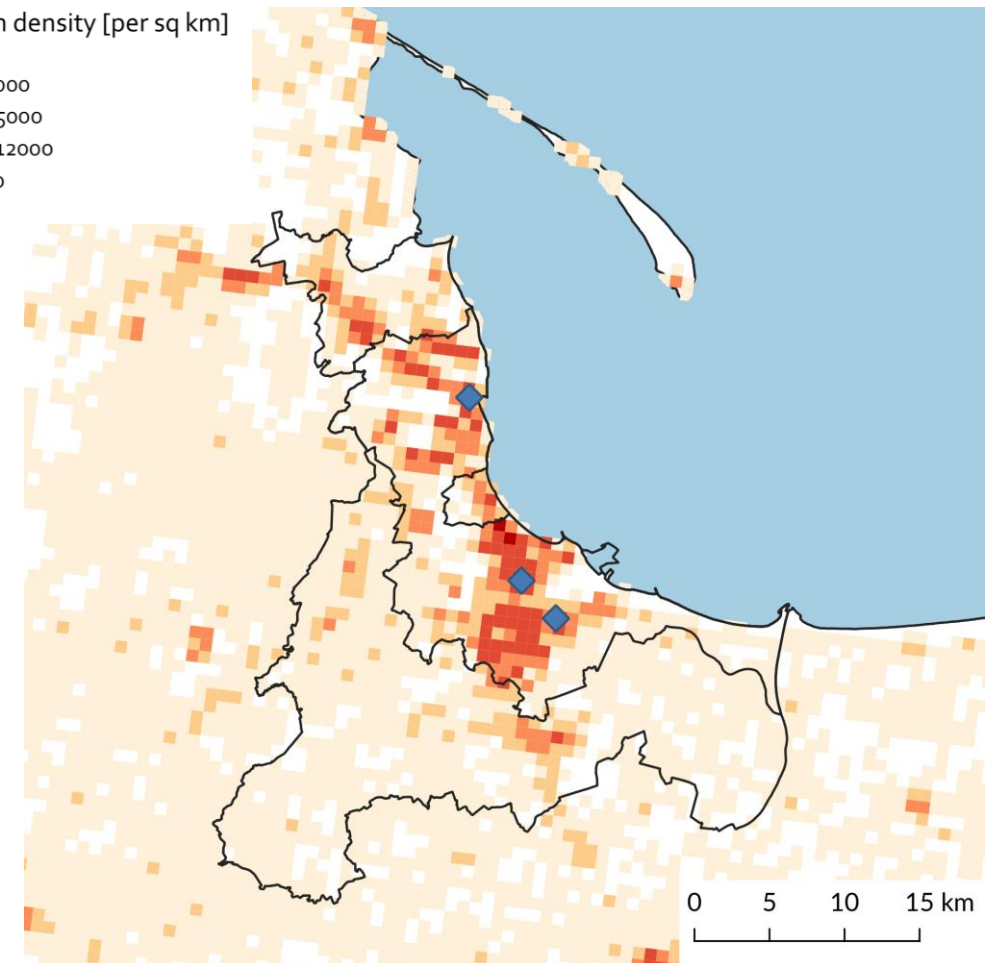
- **Travel behaviour in Polish cities: causality, behavioral changes, and climate impacts** (2020/37/B/HS4/03931), financed by the National Science Center in Poland
- **Mixed-methods:** quantitative survey, GIS, in-depth interviews
- **CAPI & CAWI** survey
- **Two study areas:** Poznań FUA and Tri-city FUA
- **Multiple mobility-related topics**



POZNAN AREA



TRI-CITY AREA



~1M Inhabitants (540k in the core city)

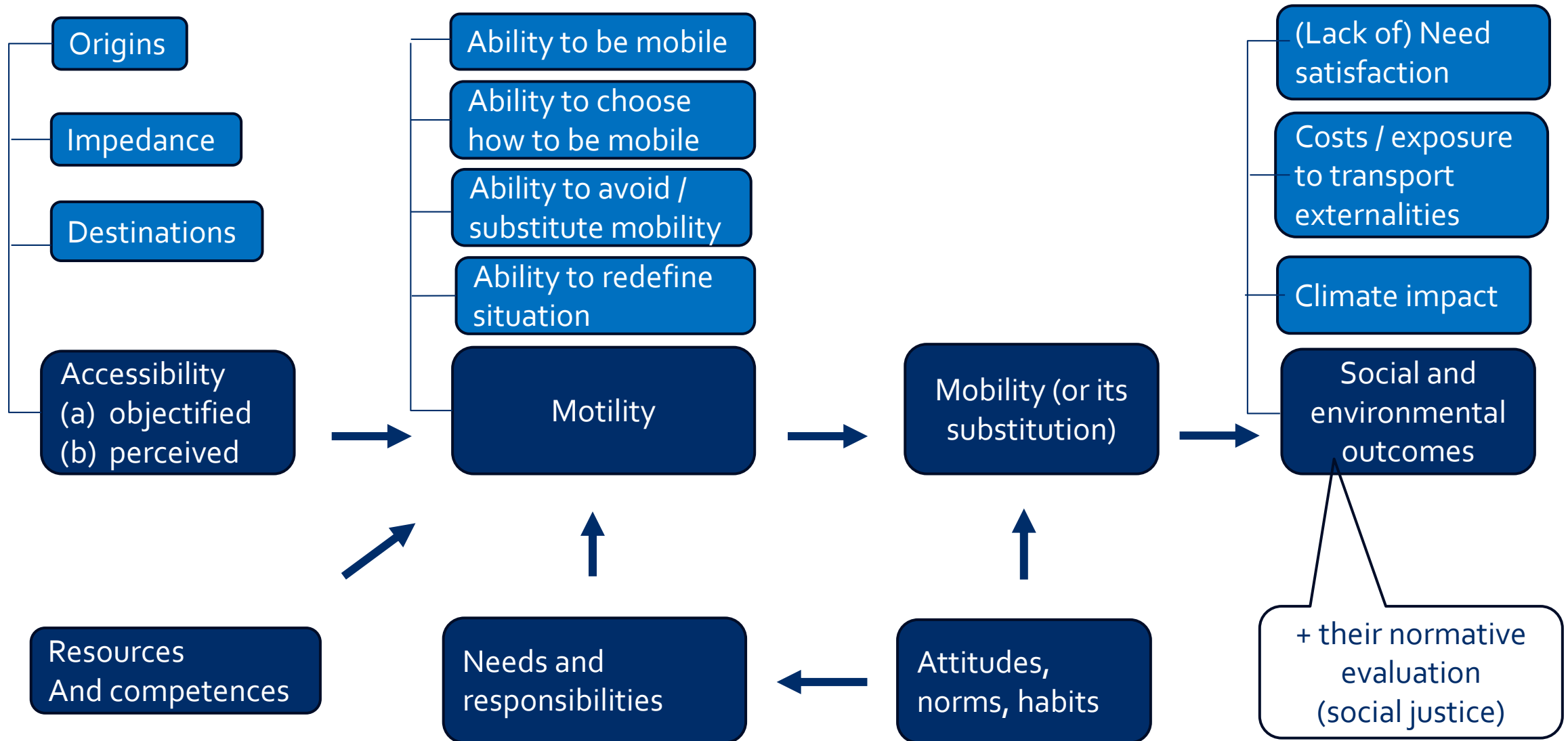
More concentric and monocentric

Centres delineated based on density of jobs, services by Hanna Obracht-Prondzyńska

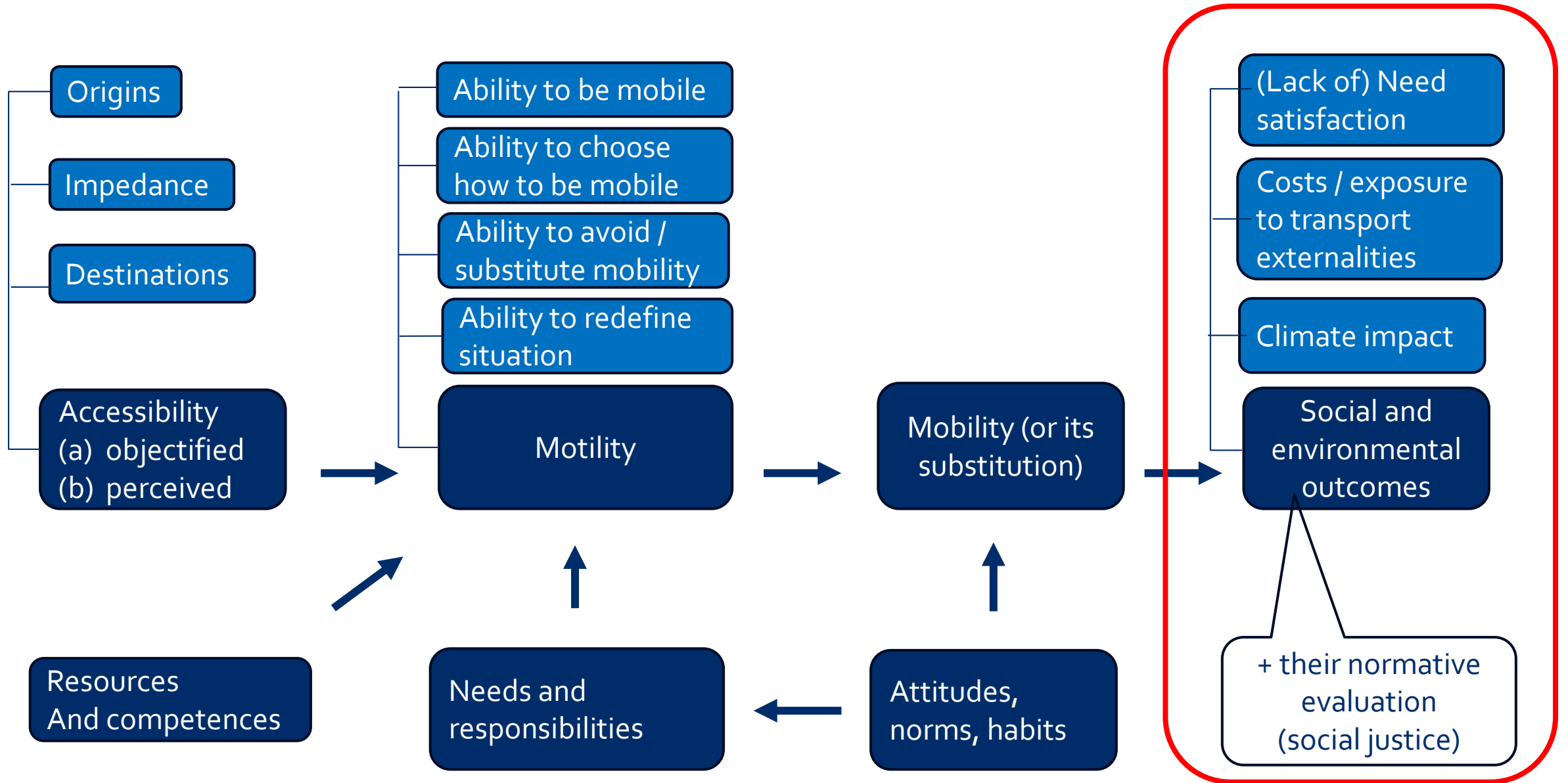
~1 M Inhabitants (590 k in core cities)

More linear and polycentric

CONCEPTUAL MODEL



OUR FOCUS TODAY



SOCIAL INDICATORS

Accessibility poverty

Mobility poverty

(Lack of) need satisfaction

**Costs of mobility:
time, money, exhaustion**

**Exposure to: noise, air pollution,
accidents**

ECOLOGICAL INDICATORS

GHG Emissions

Material footprint

Land fragmentation

Energy use

Ecological footprint

CHALLENGES:

choosing indicators, establishing thresholds

ECOLOGICAL INDICATOR: CO₂ EMISSIONS

2.5 t CO₂e / cap / year

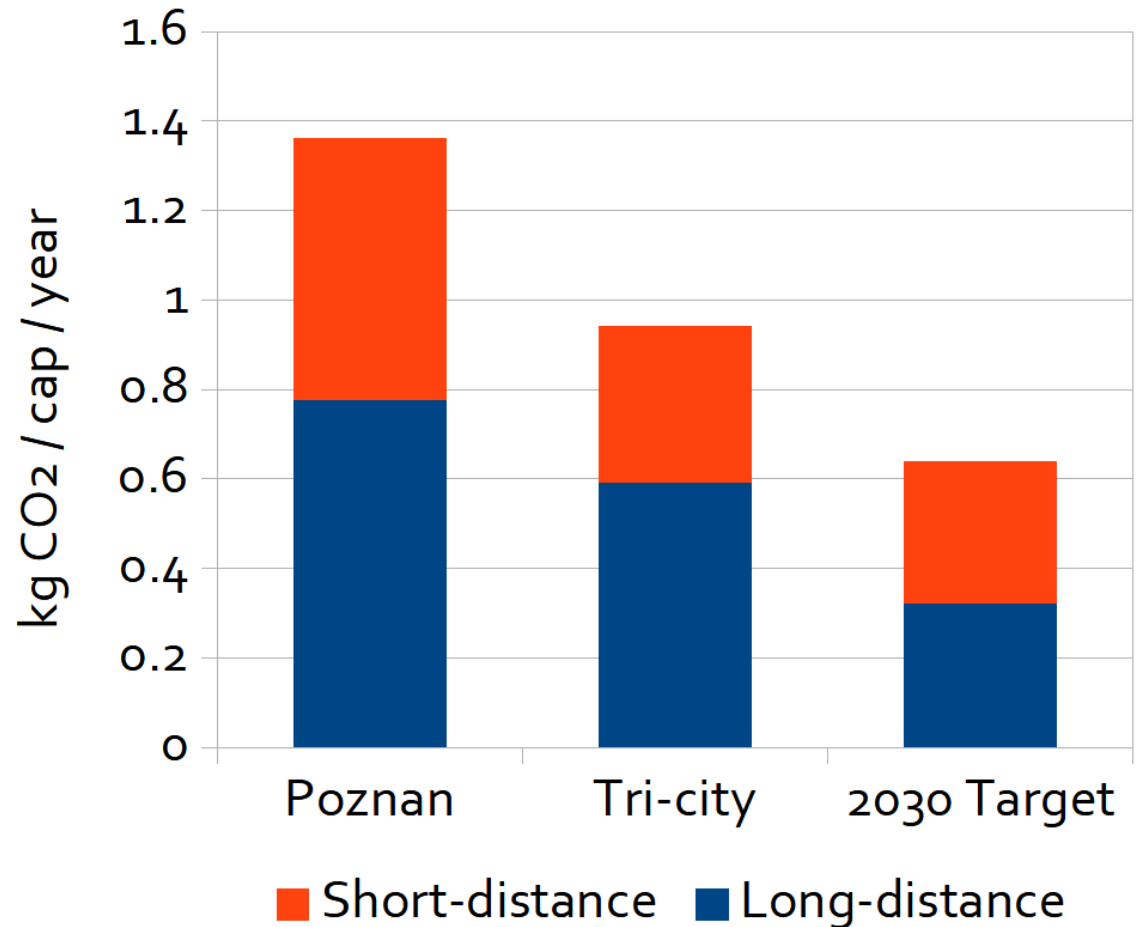
1.5 degree lifestyle emissions 2030 target
(Akenji et al. 2019)

0.45–0.83 t CO₂e / cap / year

1.5. degree mobility emissions 2030 target
(Akenji et al. 2019; Dillman et al. 2023)

0.64 t CO₂e / cap / year

A working 2030 target for this analysis
Fifty-fifty per short- and long-distance
travel



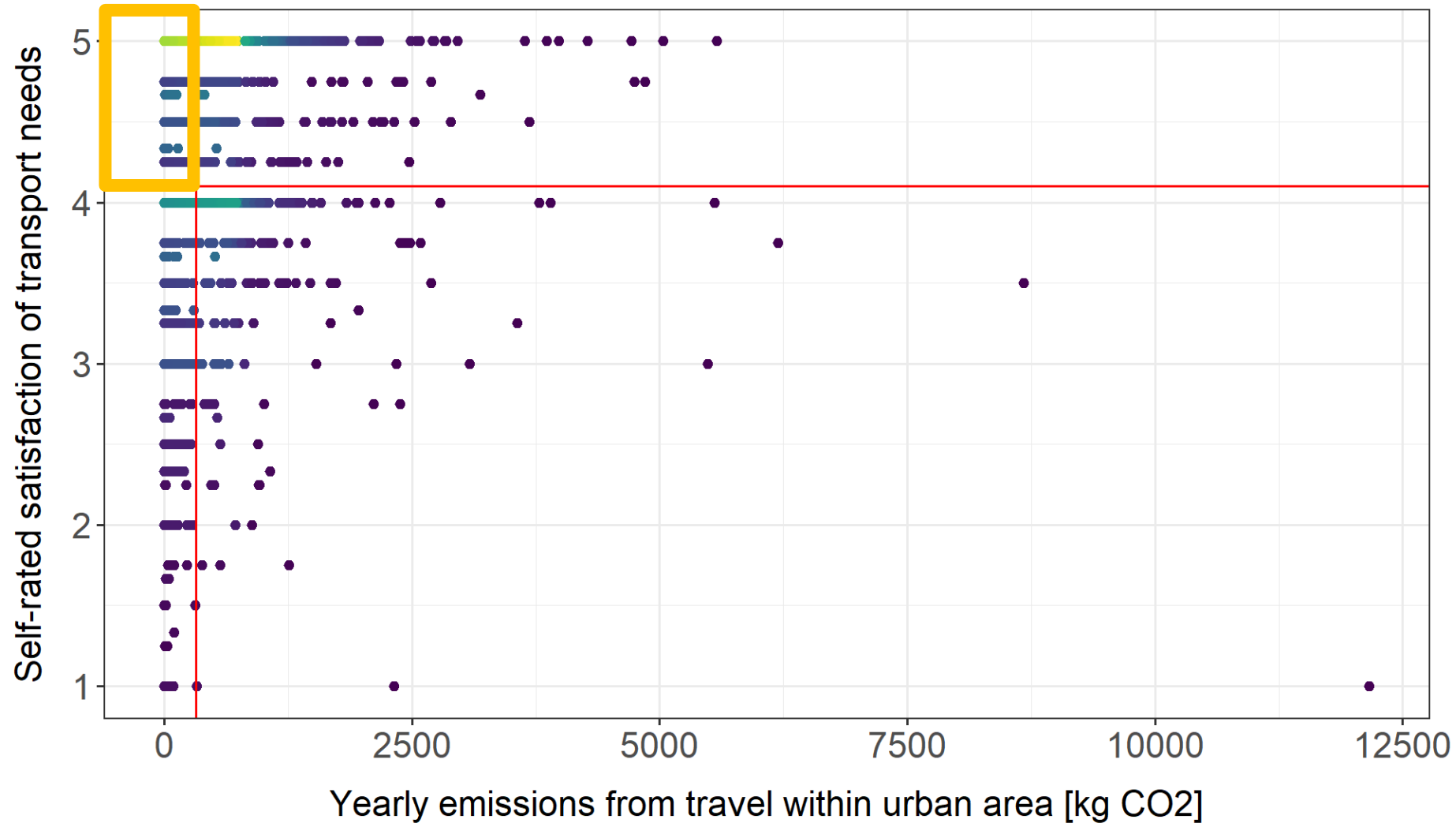
SOCIAL INDICATORS

Three indices used in this example:

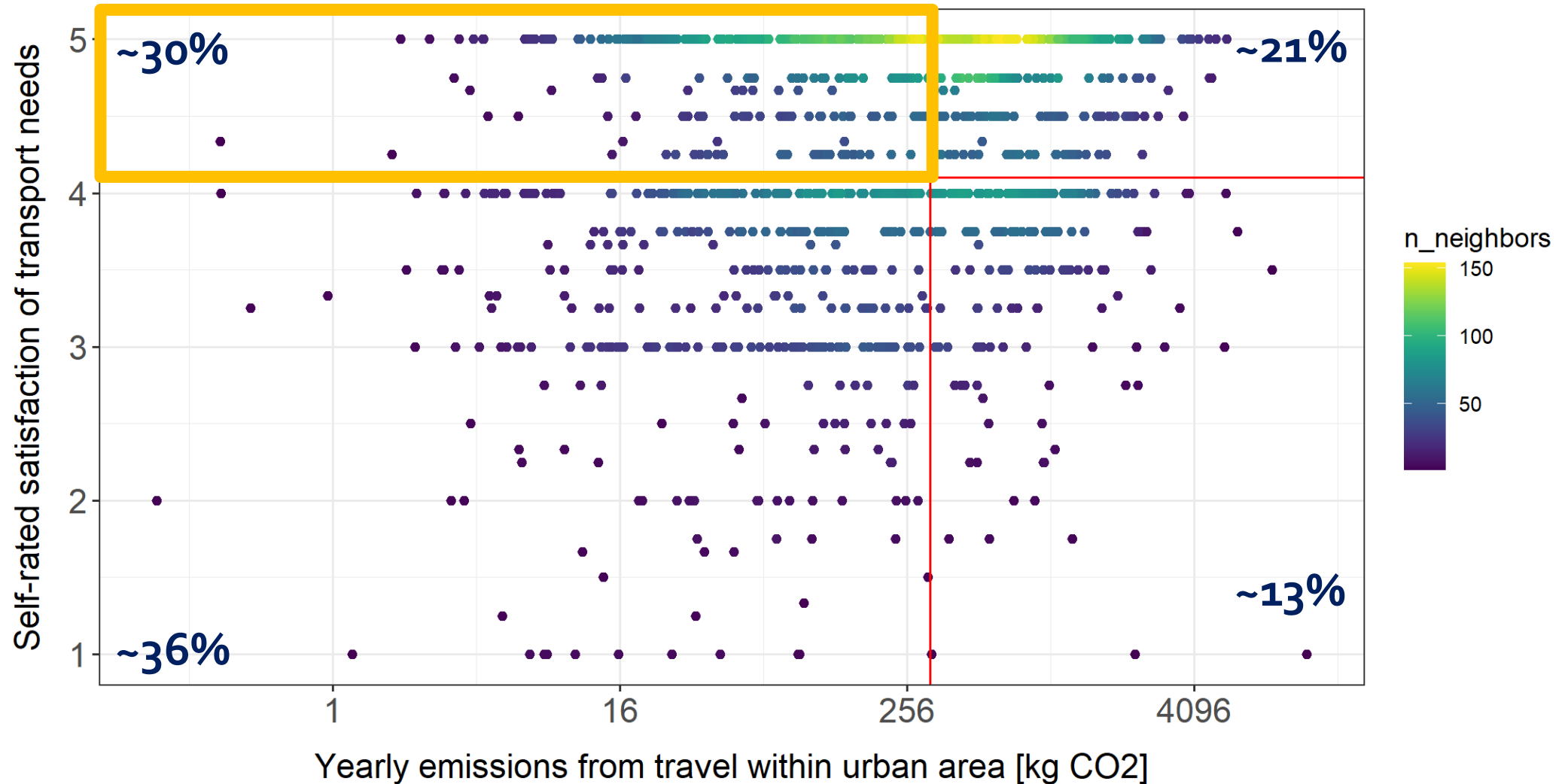
1. **Self-rated satisfaction of local transport needs:**
rated on a 1-5 scale, six items by purpose: work or study, leisure, healthcare, shopping large items, daily shopping, visiting people
2. **Self-rated annoyance with transport noise at home:**
two items on 1-5 scale of frequency and intensity
3. **Feeling of being stressed or tired with local travel**
three items on 1-5 scale of frequency

+ Many more in the survey

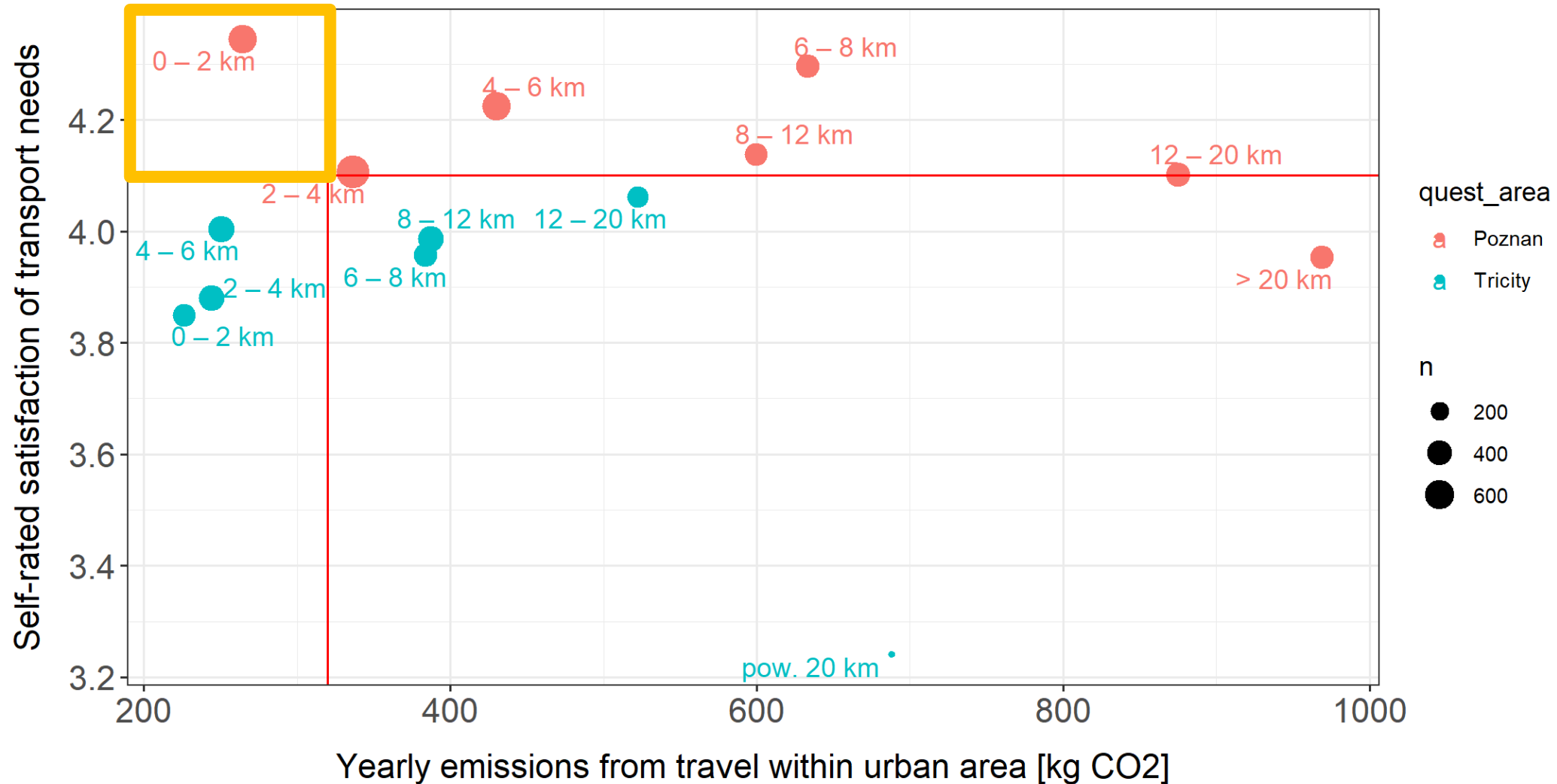
(Dis)satisfaction of needs vs. CO₂ emissions



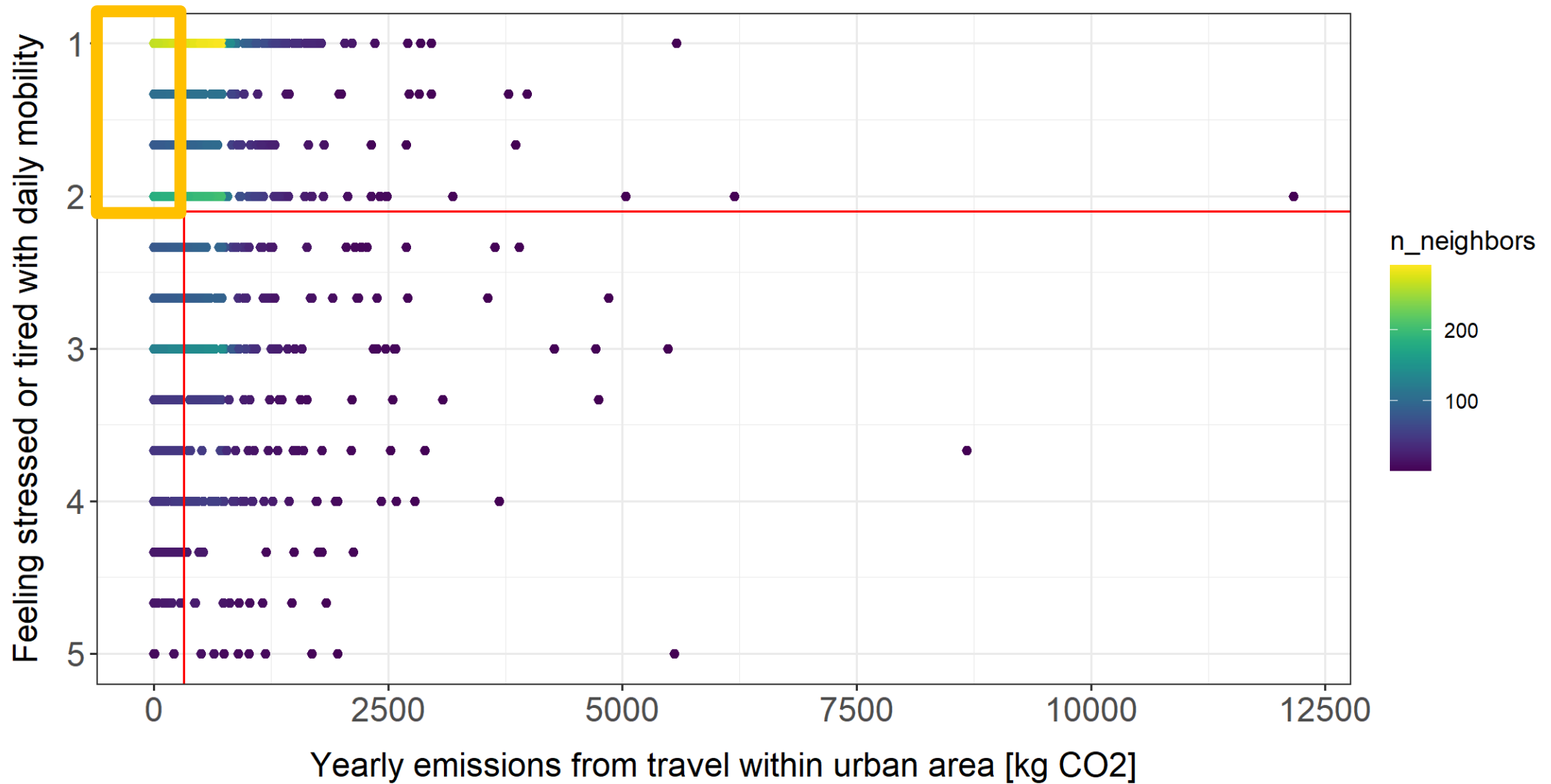
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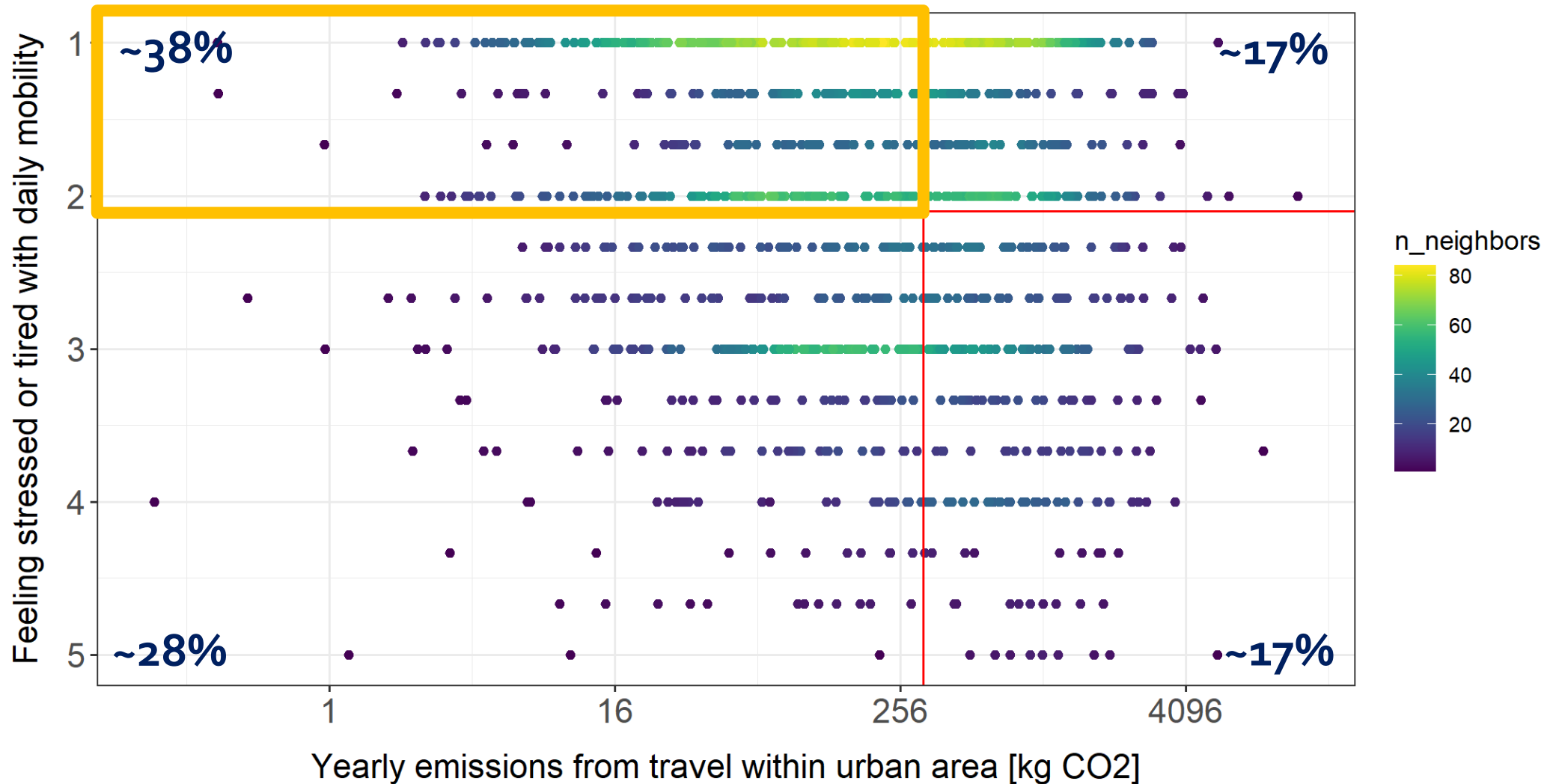
(Dis)satisfaction of needs vs. CO₂ emissions



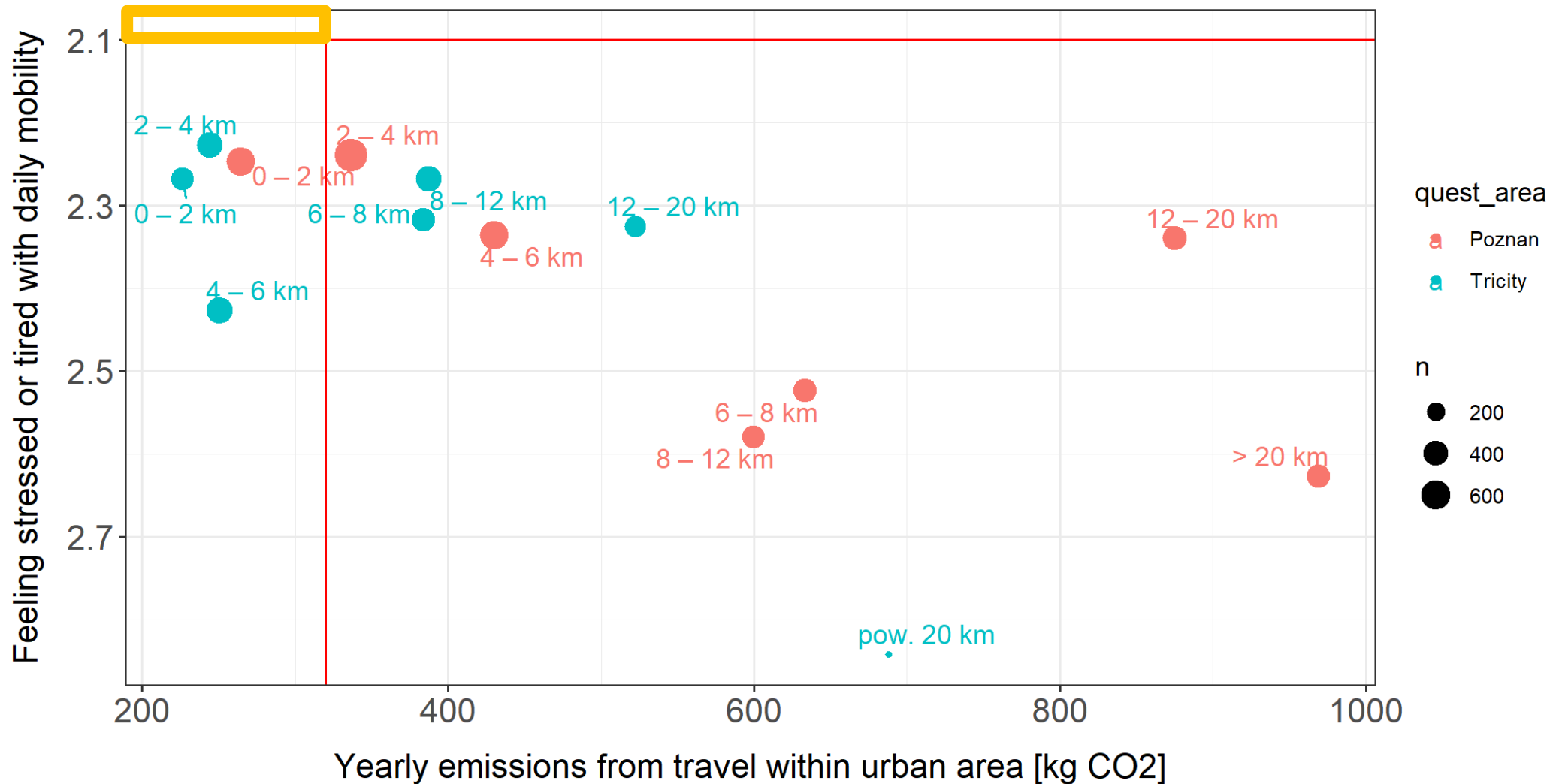
Feeling stressed or tired with daily mobility vs. CO₂ emissions



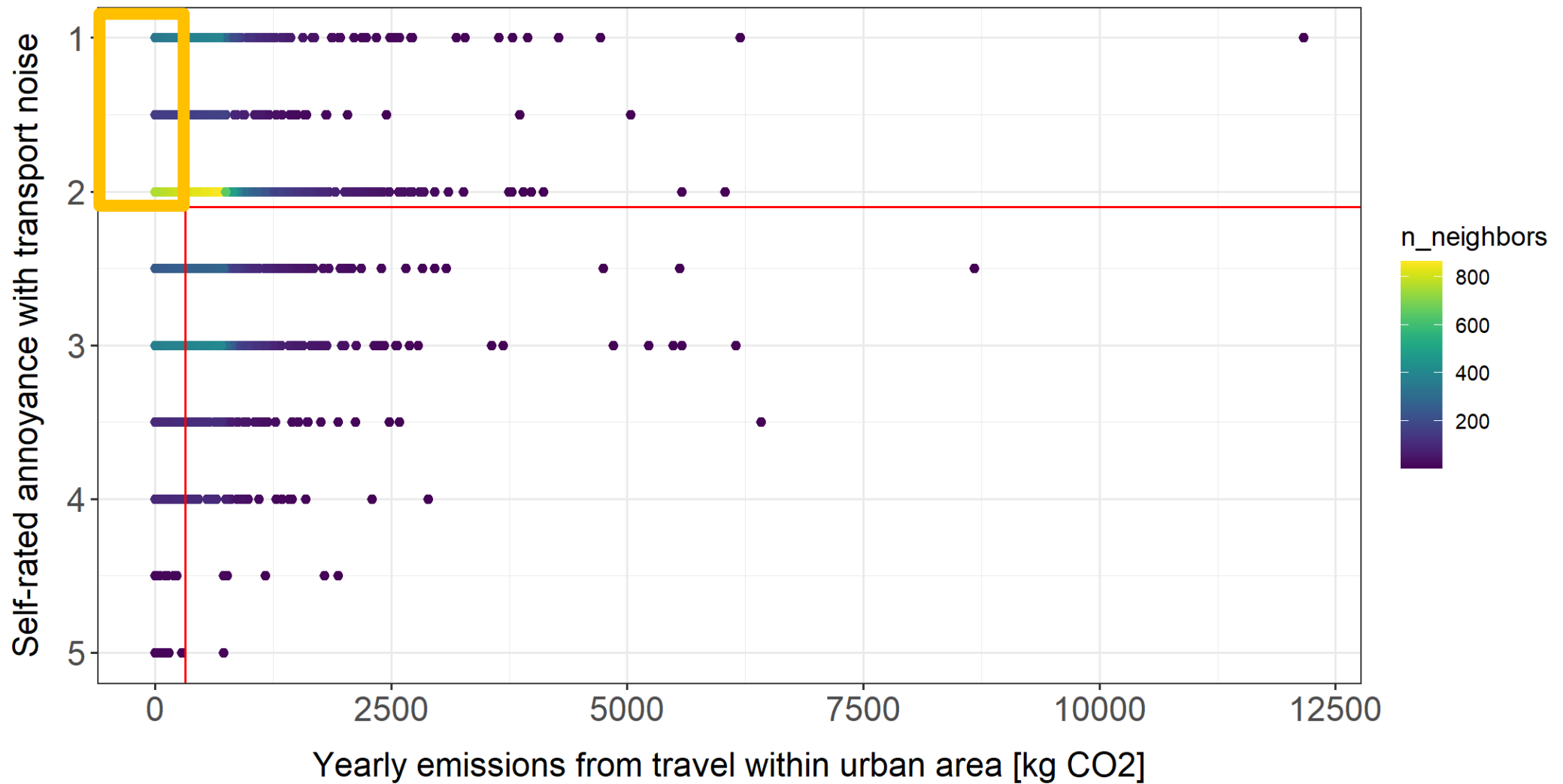
Feeling stressed or tired with daily mobility vs. CO₂ emissions



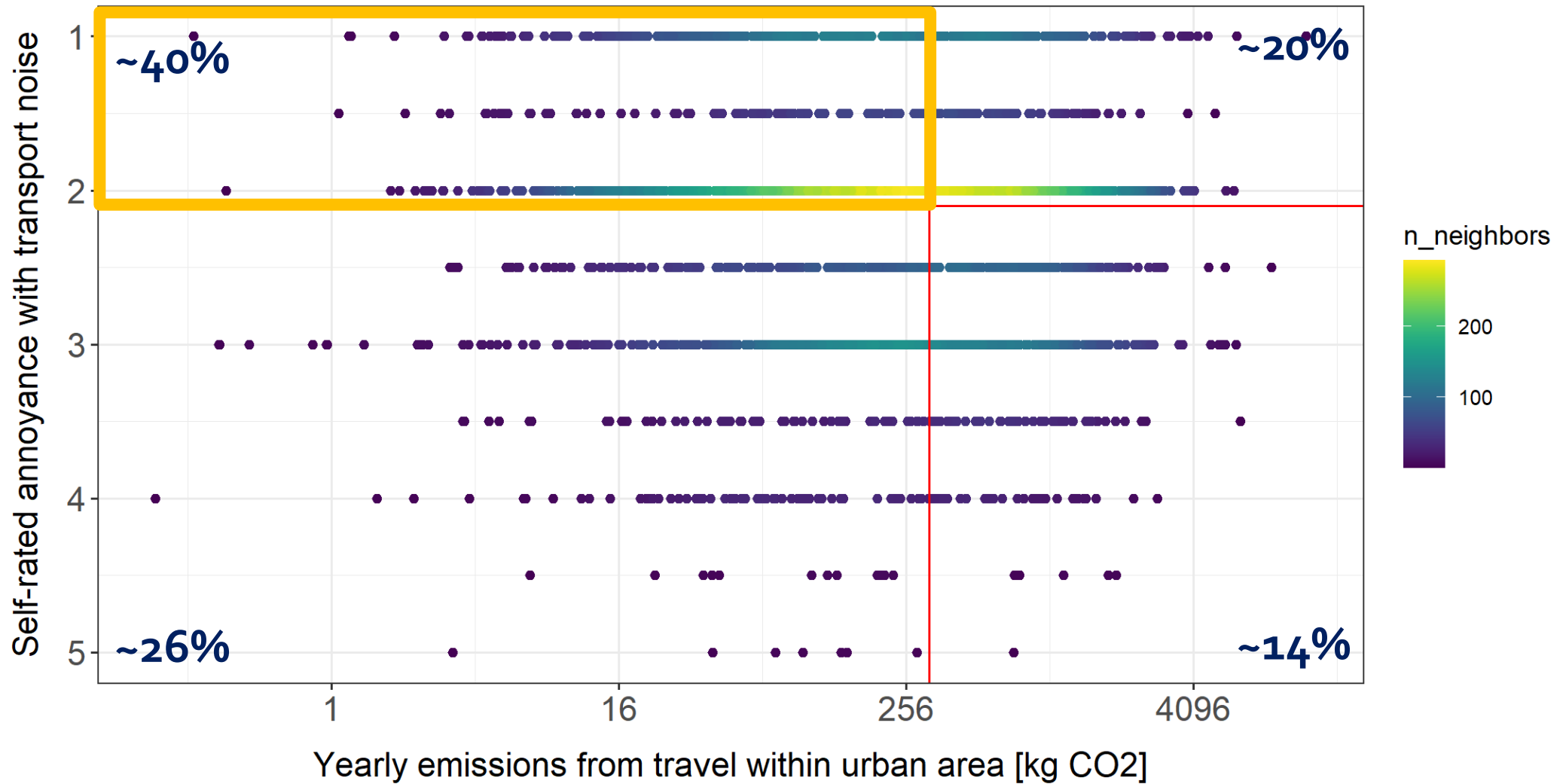
Feeling stressed or tired with daily mobility vs. CO2 emissions



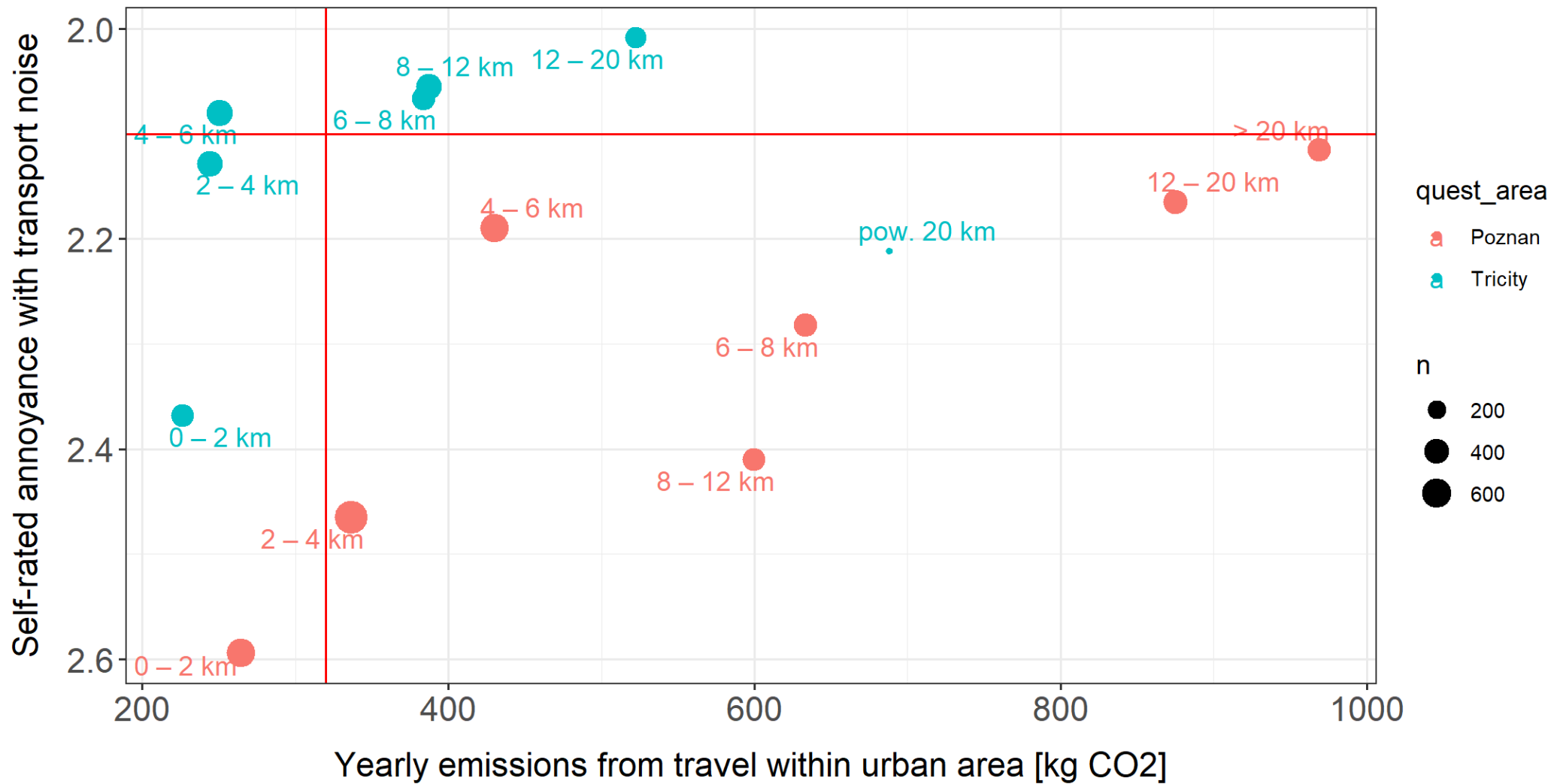
Transport noise annoyance vs. CO₂ emissions



Transport noise annoyance vs. CO₂ emissions



Transport noise annoyance vs. CO₂ emissions



WHO LIVES WITHIN THE MOBILITY DOUGHNUT?

Low emissions & high need sat.: ~30%

Low emissions & low stress: ~38%

Low emissions & low noise: ~40%

In general:

- Shorter distance to centers
- Somewhat older
- Lower education level
- Low or medium economic status
- More commonly walking
- Less commonly driving cars

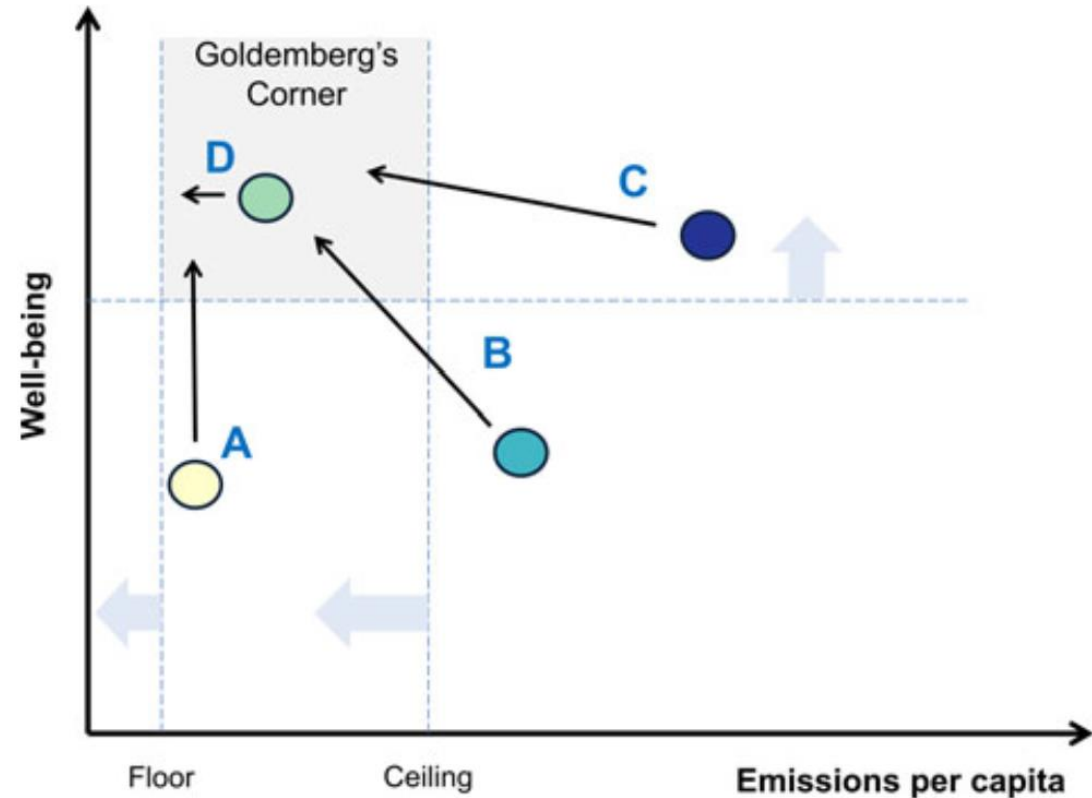
PRELIMINARY RESULTS!



Vecteezy.com

POLICY OUTLOOK

- Support for compact city development
- Explicitly measure social-ecological performance in SUMP, etc.
- Collectively develop indicators and threshold
- Different policies for different quadrants?



Roberts, J. T., Steinberger, J. K., Dietz, T., Lamb, W. F., York, R., Jorgenson, A. K., Givens, J. E., Baer, P., & Schor, J. B. (2020). Four agendas for research and policy on emissions mitigation and well-being. *Global Sustainability*, 3, e3. <https://doi.org/10.1017/sus.2019.25>

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THANK YOU!

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Marta Olejniczak, Cezary Brudka

