



Norwegian University of
Science and Technology

**Exploring the relationship between pedestrian
preferences and revealed route choices:
A case study of Trondheim's city center**

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Background

- **Why** pedestrians **choose certain routes** and take **detours**
- Supports **evidence-based** pedestrian infrastructure planning
- From **GPS data** → **flow prediction**, but **not necessarily why they choose**

→ **Planning decisions** may **overlook** qualities that pedestrians **actually value**

Research questions

- 1.) What factors are **important for pedestrians** when choosing their routes?
- 2.) How do **perceived preferences align** with the **existing environment**?
- 3.) To what extent are these **stated preferences reflected** in **revealed route choices**?

Method:

1. Identify valued route characteristics

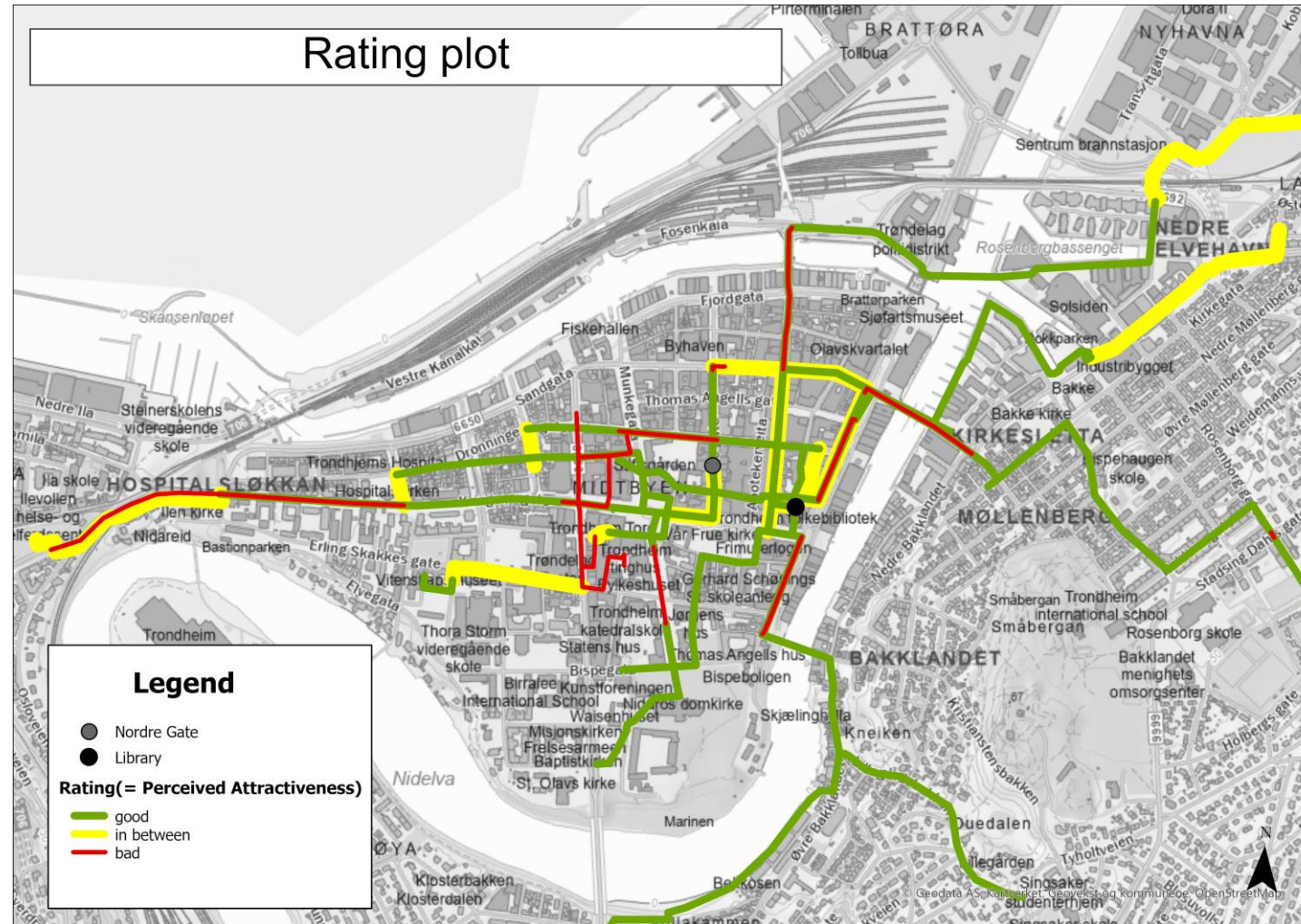
Setting: 2 sunny Saturdays in June 2024 at Nordre Gate & City Library in Trondheim's city center

Sample: N=25 participants
(75% leisure, 25% errands)



Method:

1. Identify valued route characteristics



Method:

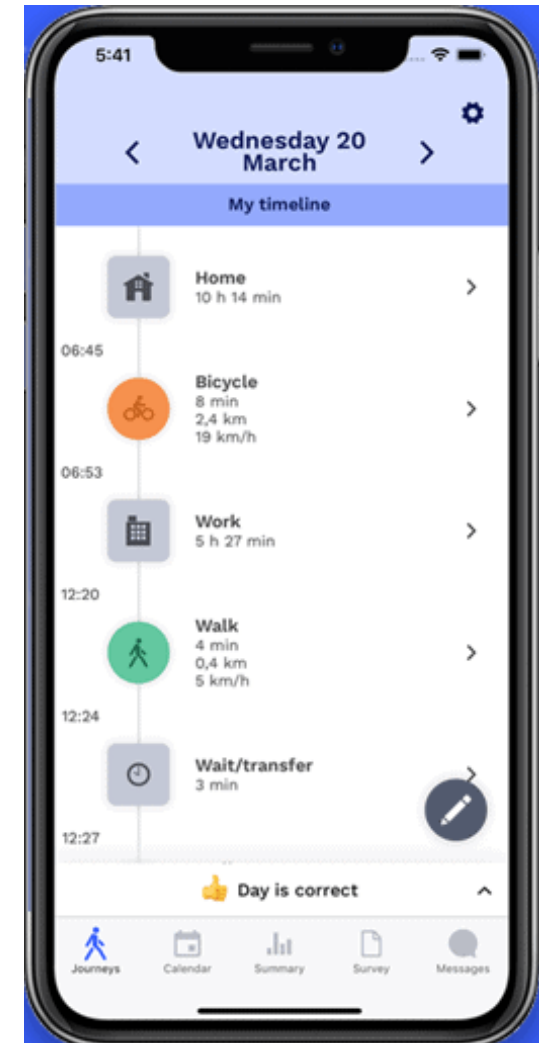
2. Translated preferences into geospatial variable

Dimensions	Subjective preferences	Objective built environment variables	Measurement scale
Social and Activity Atmosphere	Perceived crowding	Crowding level [average pedestrian volumes per day]	None (0), Few >2000 (1), A lot >7000 (2)
	Recreational facilities	Recreational land use on ground floor	No (0), Yes (1)
	Shopping facilities	Commercial presence on ground floor	No (0), Yes (1)
Aesthetic and Spatial Quality	Nice architecture	Historic buildings or institutional land use along the route	No (0), Yes (1)
	Quiet area	Residential land use	No (0), Yes (1)
Mobility and Accessibility	Ease of walking	Sidewalk width [m]	<1m (1), 1–2m (2), >2–3m (3), >3m (4)
	Crosswalks	Presence of signalized crosswalks on the segment	None (0), Yes (1)
	Perceived shortest route	Route equals shortest-path	No (0), Yes (1)
	Perceived traffic intensity	Traffic level [average daily vehicle volume]	No (0), Low <2000 (1), Mid 2000–4000 (2), High >4000 (3)
Natural and Scenic Elements	Green view	Green space within 5 m buffer along the segment	No (0), Yes (1)
	River view	River within 100 m buffer along the segment	No (0), Yes (1)

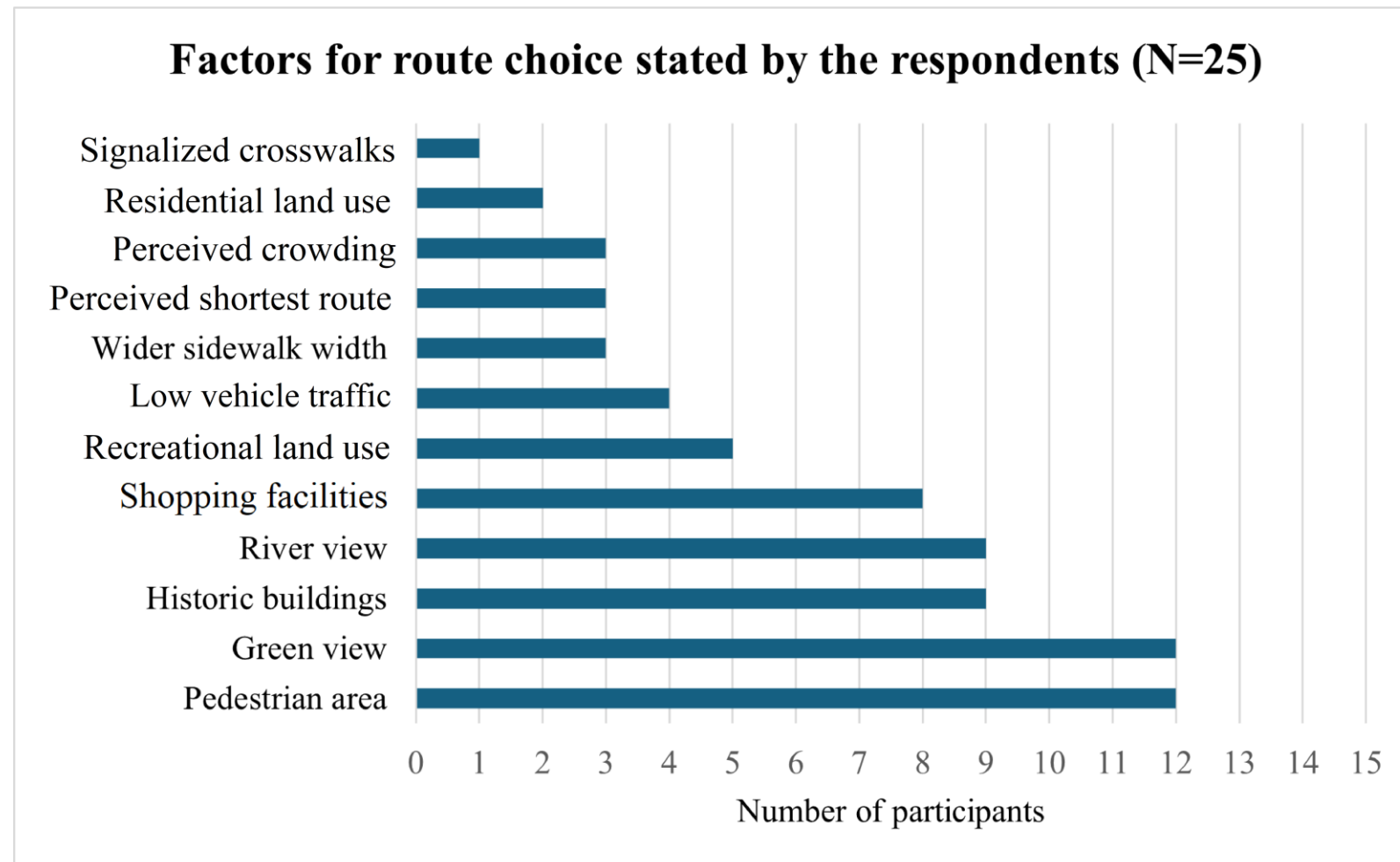
Method:

3. Test against revealed choices

- GPS travel survey data by TravelVU app (Oct-Nov 2019)
- Sample: N=280 participants, 800 routes (77% weekday, 23% weekend).
- Choice Set: Trip-level binary choice set comparing observed GPS route against network shortest path.
- Models: Conditional logit with Path Size overlap factor & weekday/weekend interaction



What factors influence pedestrians' route choices?



How do perceived preferences align with the existing environment?

67%

Average Percent Agreement

High agreement:

network shortest-path,
residential land use,
institutional land use and high
crowding.

Poor agreement:

green views, historic buildings,
signalized crosswalks, and low
crowding
segments

21.8%

Objective Oversupply
(Present on route, but unnoticed)

Signalized crosswalks
Green view

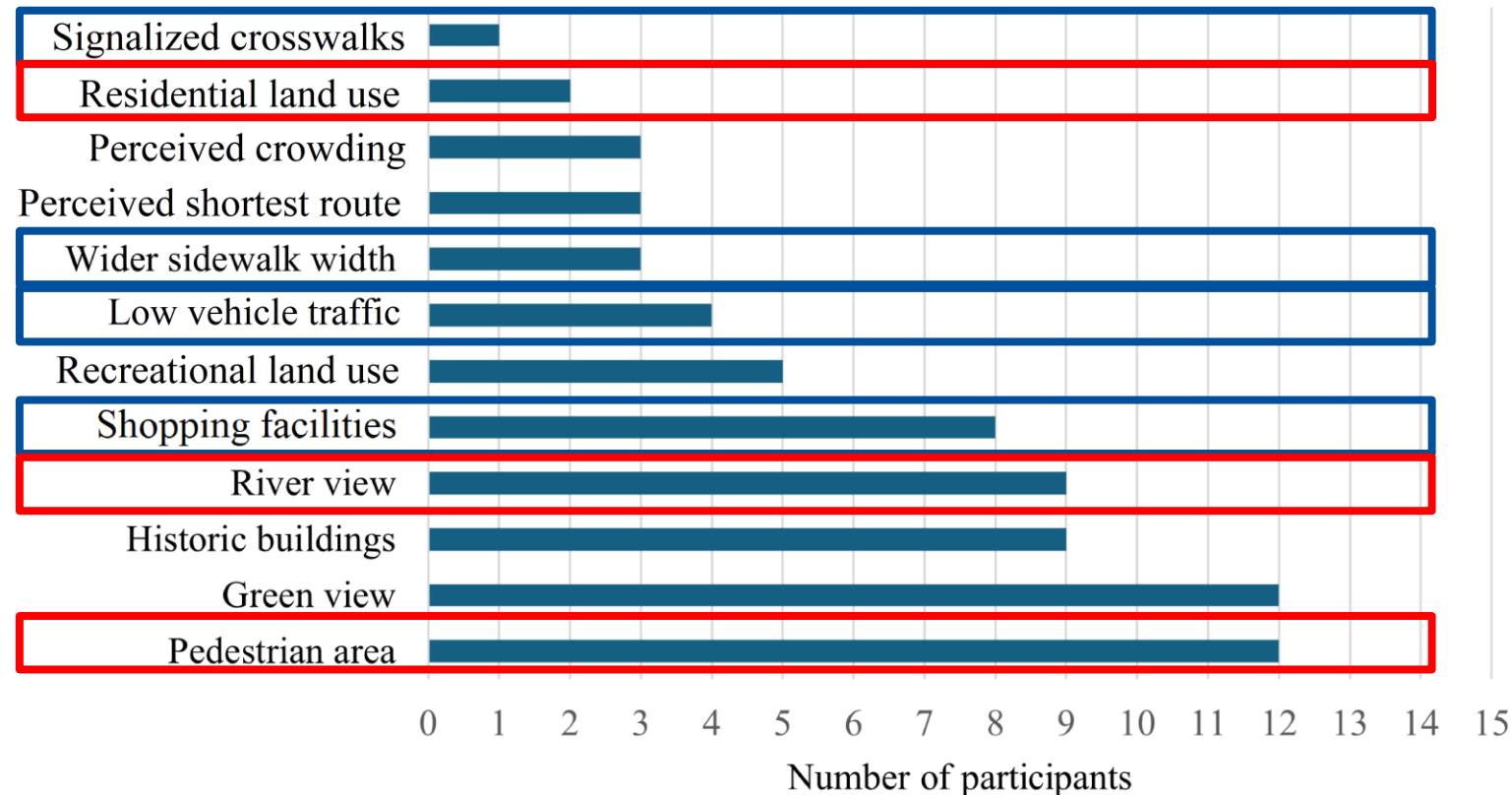
13.7%

Subjective Overestimation
(Perceived as key, but absent)

Recreational facilities
Shopping facilities

Are Stated Preferences Reflected in Revealed Routes?

Factors for route choice stated by the respondents (N=25)



Planning recommendations

- First step that **combines links and routes in a more systematic way** to evaluate infrastructure improvements
 - Includes parts that are **not often part of traditional evaluations**
 - It goes **beyond gut feeling**

Planning recommendations

GPS data becomes more accessible:

- It can be used to **evaluate routes and infrastructure interventions** in a **transparent and systematic way**, revealing trade-offs that are difficult to identify through **traditional travel surveys**
- GPS data **reflects the conditions under which it was collected** and **does not capture** all aspects of the pedestrian experience
- **Average-behavior models** may **overlook** context-specific preferences and micro-scale environmental qualities
- Pedestrian experiences extend **beyond measurable environmental attributes**
- **Combining** GPS-based analyses with stated-preference approaches can provide a **more complete picture** of what pedestrians value and how they make route choice

Thank you!

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Let's connect!

