Beyond Technology: Exploring Public Awareness and Sentiment Towards Smart City Applications

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School of Social Sciences

VolkswagenStiftung

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Cities' Role in the Environmental Crisis

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Source: Federal Ministry for Economic Cooperation and Development (https://www.bmz.de/en/issues/climate-change-and-development/cities-and-climate)

Source: New York (Photo: Andreas Wulff) (https://www.flickr.com/photos/andreaswulff/21957951499/in/album-72157659321208472/)

Smart solutions for sustainable cities

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Created with OpenArt

Smart solutions for sustainable cities

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O'Dwyer et al. 2019
Thornbush and Golubchikov 2021

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Smart solutions for sustainable cities

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Smart solutions for sustainable cities

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Arena et al. 2020

Created with OpenArt

Laufs et al. 2020
Ismagilova et al. 2019

The flip side of smart cities

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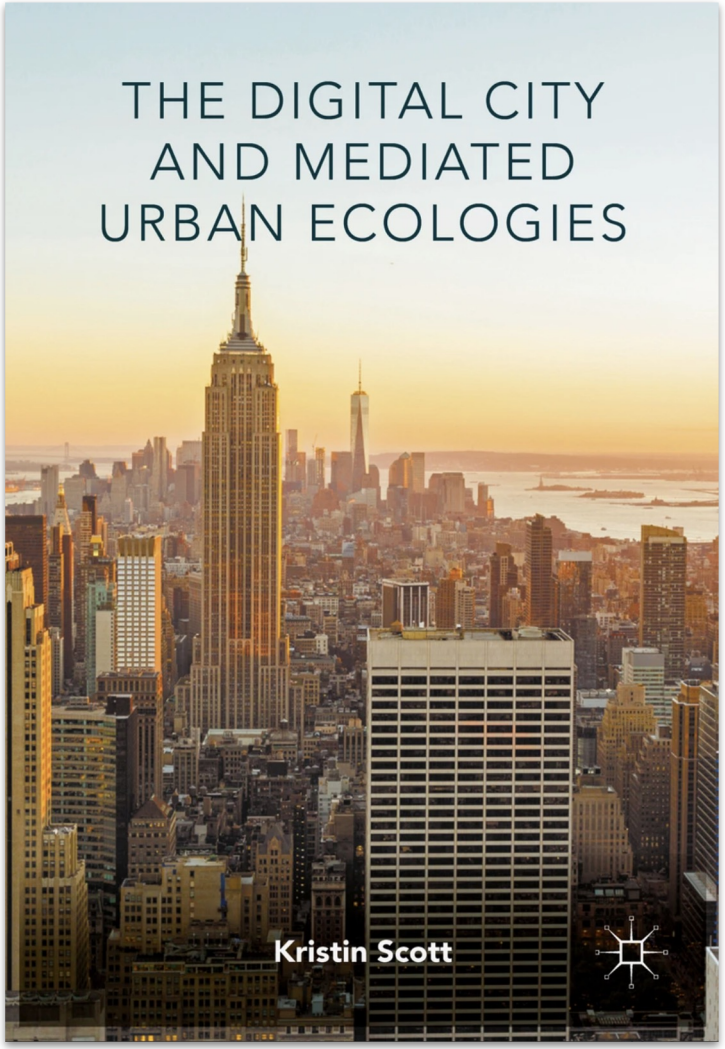

Source: Springer Link
(https://link.springer.com/book/10.1007/978-3-319-39173-1)

- Three case studies: NYC, San Antonio, and Seattle
- Promises of smart cities ↯ Actual outcomes

Previous literature on citizens' perspective

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- Most studies...
  - are case studies focused on individual applications (Dirsehan and van Zoonen 2022)
  - apply qualitative methods (van Twist et al. 2023)
  - are based on small and/or selective samples (Wirtz et al. 2022; Echebarria et al. 2020)

Research question

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To what extent are the axes of inequality reflected in the attitudes towards smart city applications?

Data

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- Forsa Omninet: probability-based online panel from Germany
  - Representative of the German online-population aged 14 and above
  - Offline recruitment via telephone
- Data collection: May 3, 2023 – May 23, 2023
- N = 2,021

Survey

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- Various topics covered
  - Attitudes towards public transport
  - Environmental attitudes
  - **Desirability of and familiarity with different smart city applications**

Smart city applications

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Mobility	Social inclusion	Public safety	Environment
• Smart bikes • Smart cars • Smart buses • Parking sensors	• Navigation sensors • Mobility sensors	• Traffic cameras • Lighting sensors • Security cameras	• Smart grid • Pollution sensors

Smart city applications

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Mobility	Social inclusion	Public safety	Environment
• Smart bikes • Smart cars • Smart buses • Parking sensors	• Navigation sensors • Mobility sensors	• Traffic cameras • Lighting sensors • Security cameras	• Smart grid • Pollution sensors

„Smart buses that dynamically adapt their route to the needs of passengers."

Desirability of smart city applications

„To what extent would you like to see this technology implemented in your residential area?“

- Range from „1 – I would not like it at all“ to „6 – I would like it very much“

Familiarity with smart city applications

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„Have you ever heard or read about this technology before?“

- „Yes.“
- „No.“

How desirable are the applications?

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How desirable are the applications?

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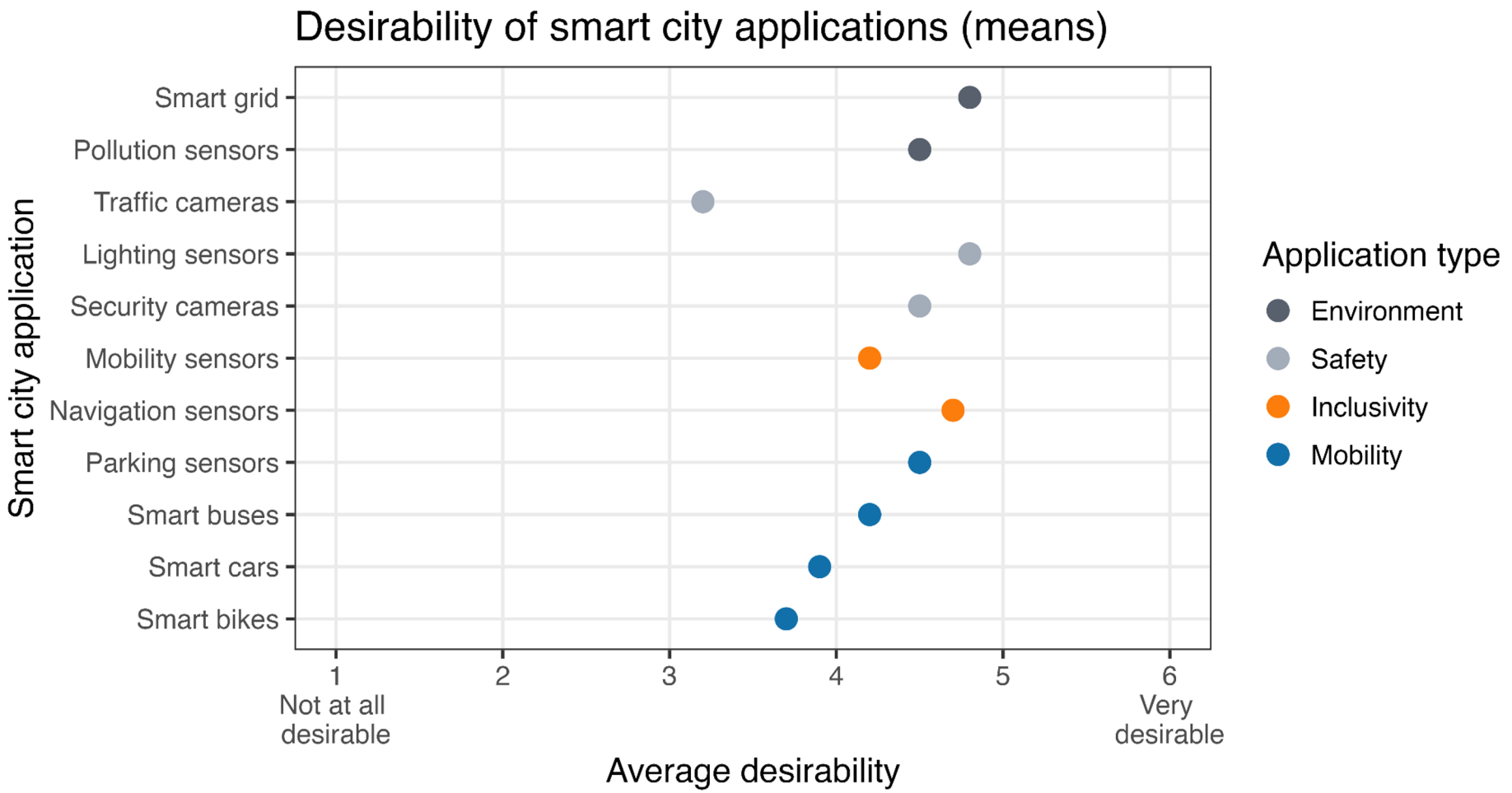

Does desirability vary by …?

Does desirability vary by ...?

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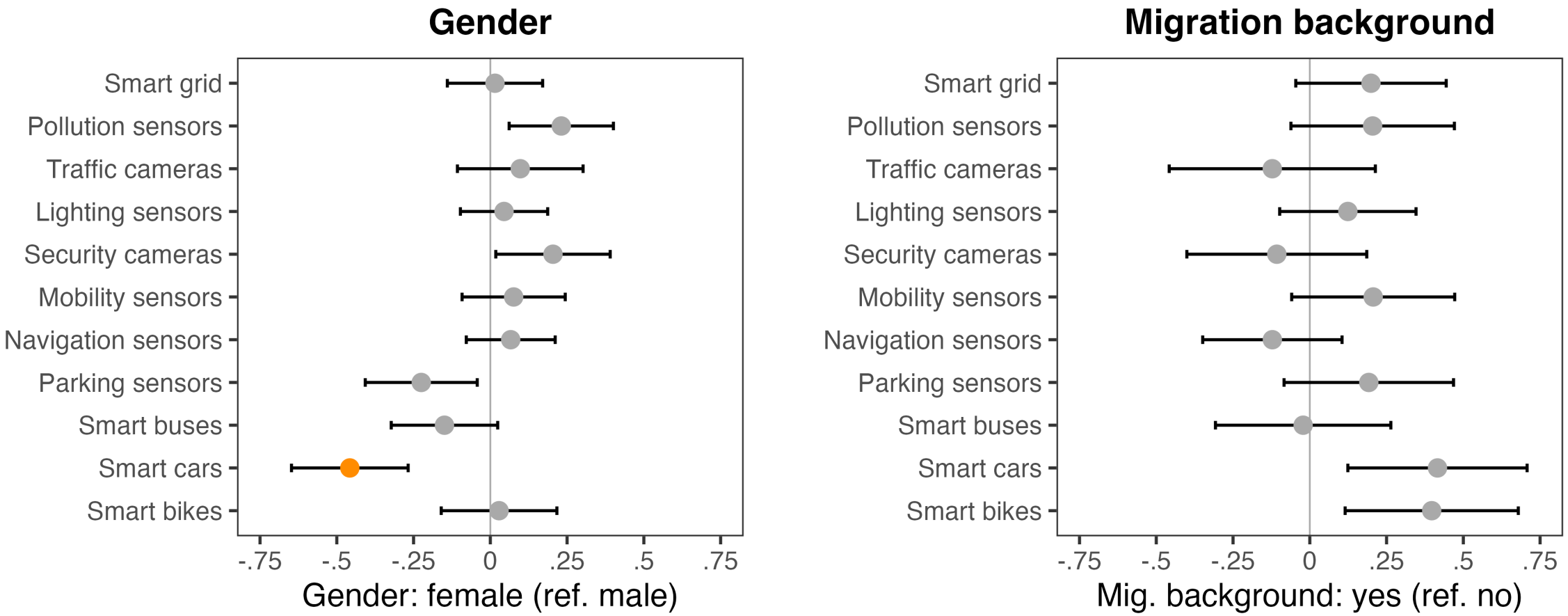

Note: p-values adjusted for multiple testing; orange points represent significant results

Does desirability vary by ...?

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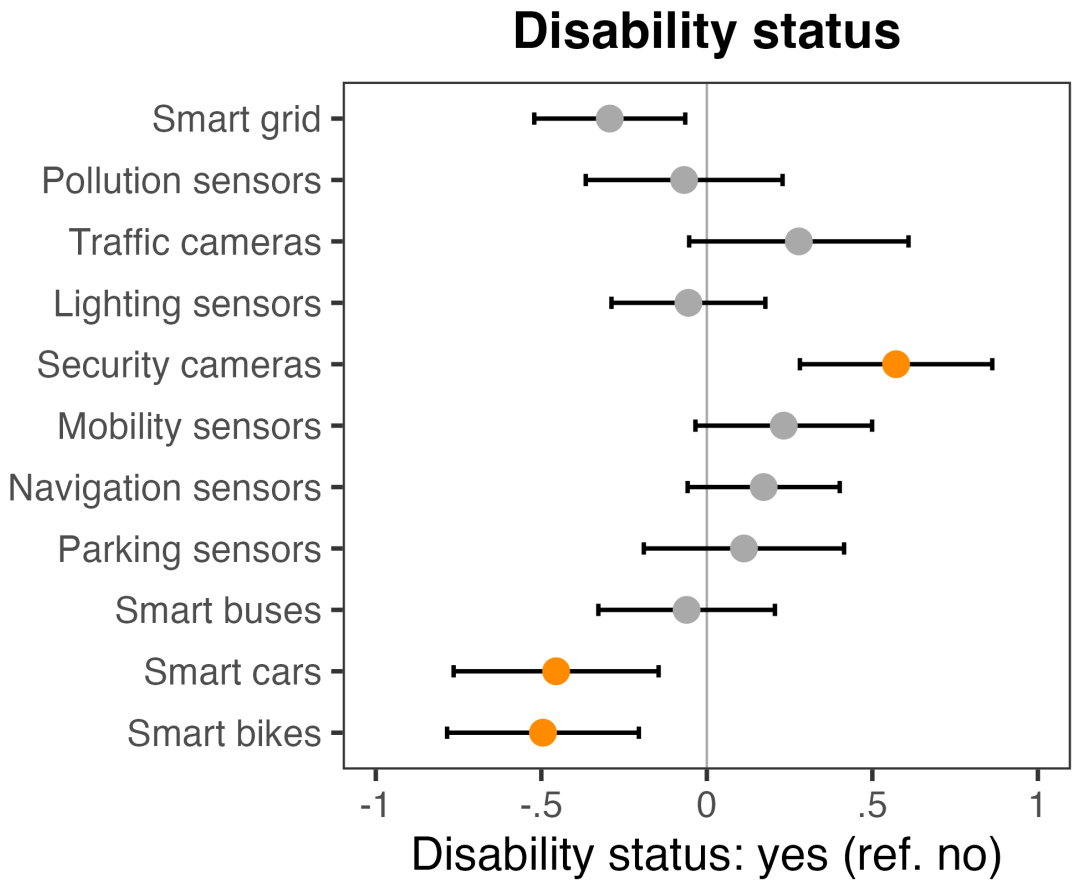

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Does desirability vary by ...?

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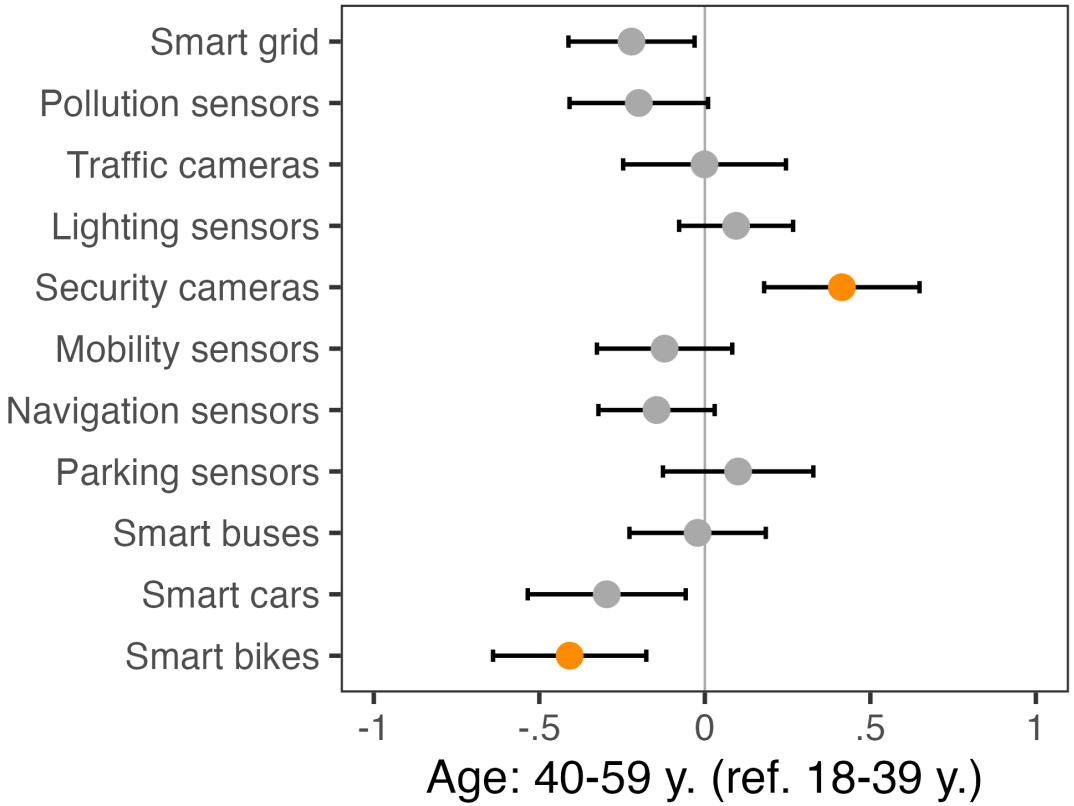
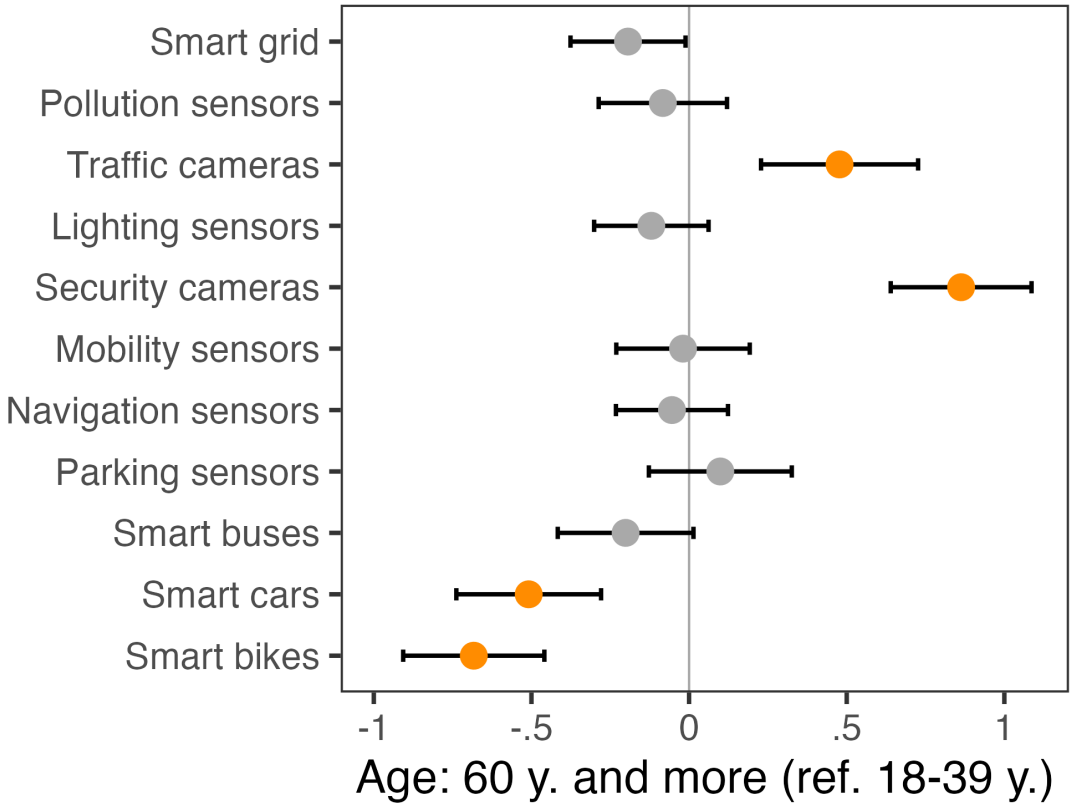
Age





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How familiar are the applications?

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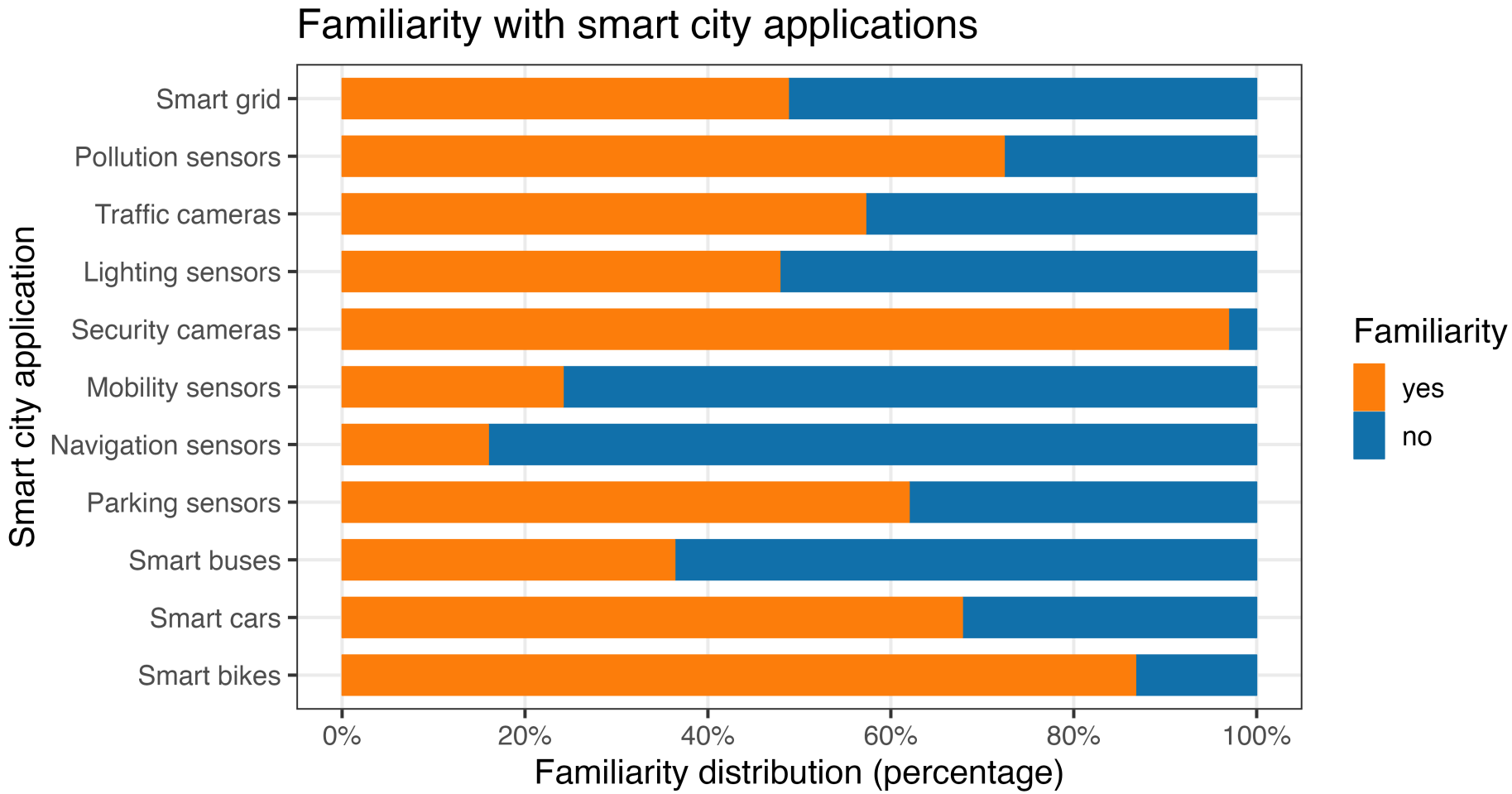

Does familiarity vary by ...?

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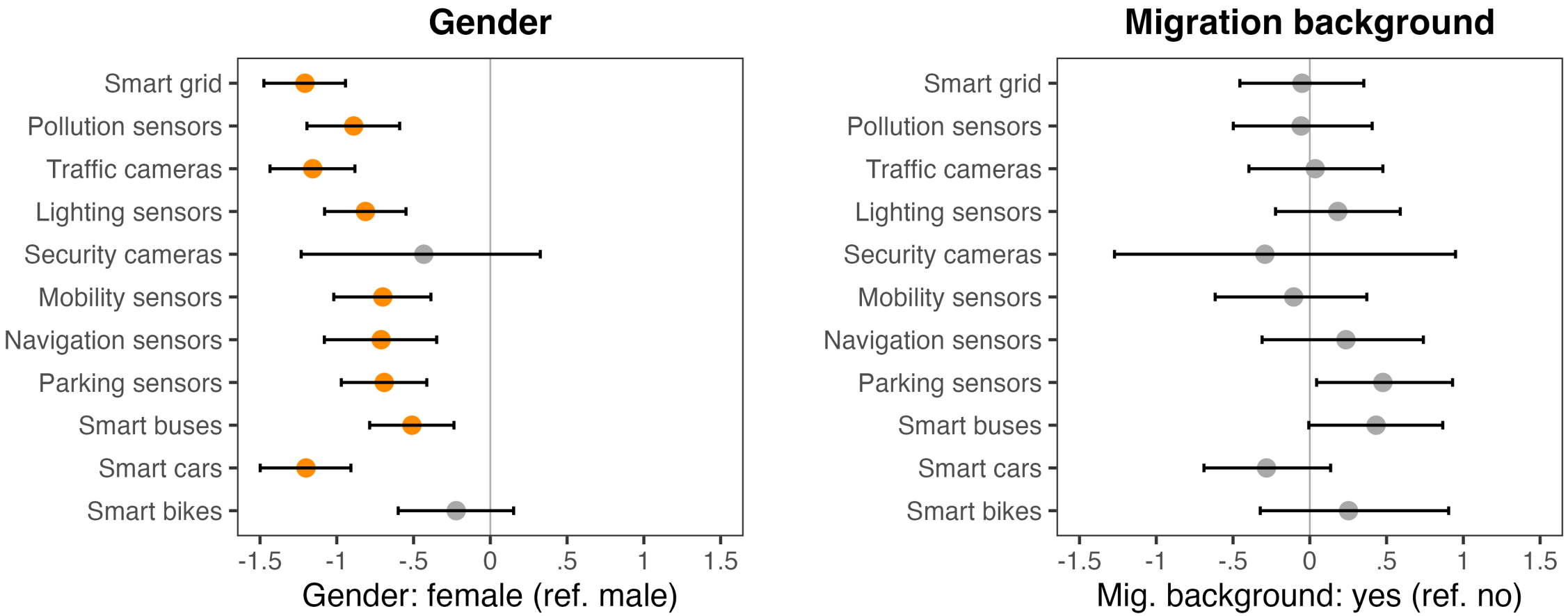

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Does familiarity vary by ...?

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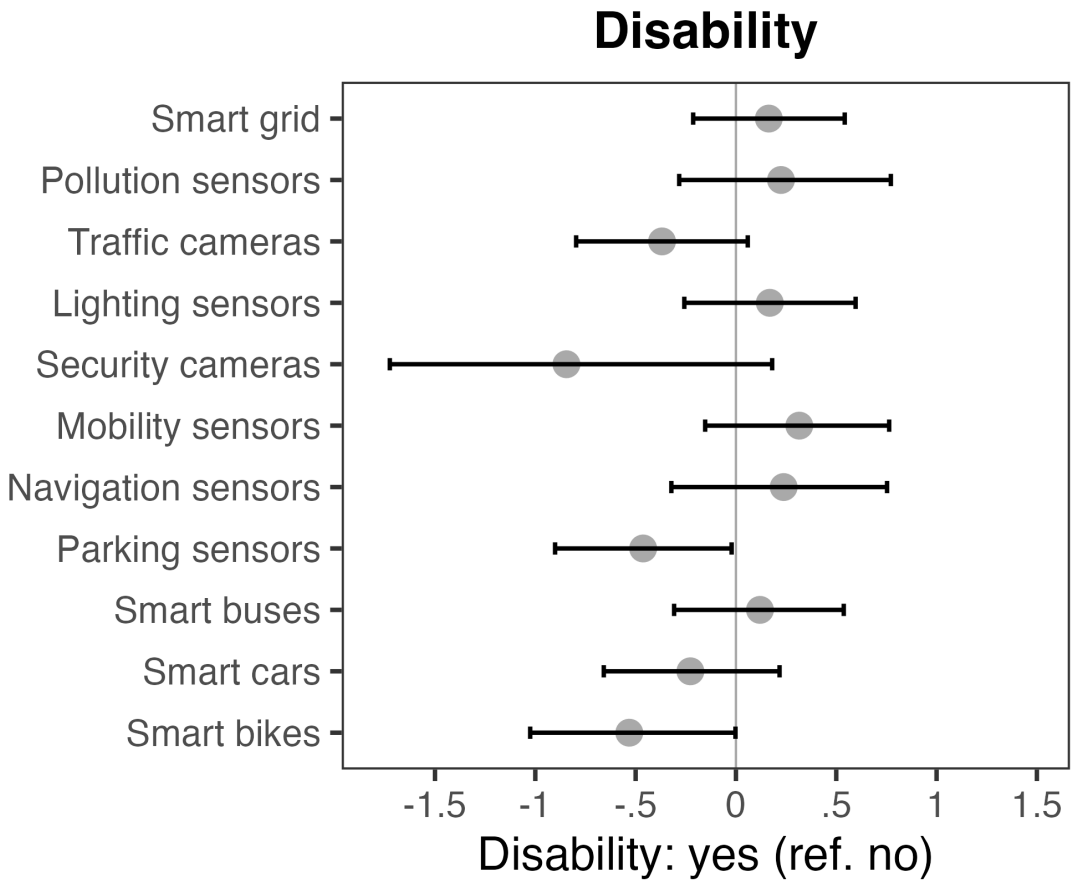

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Does familiarity vary by ...?

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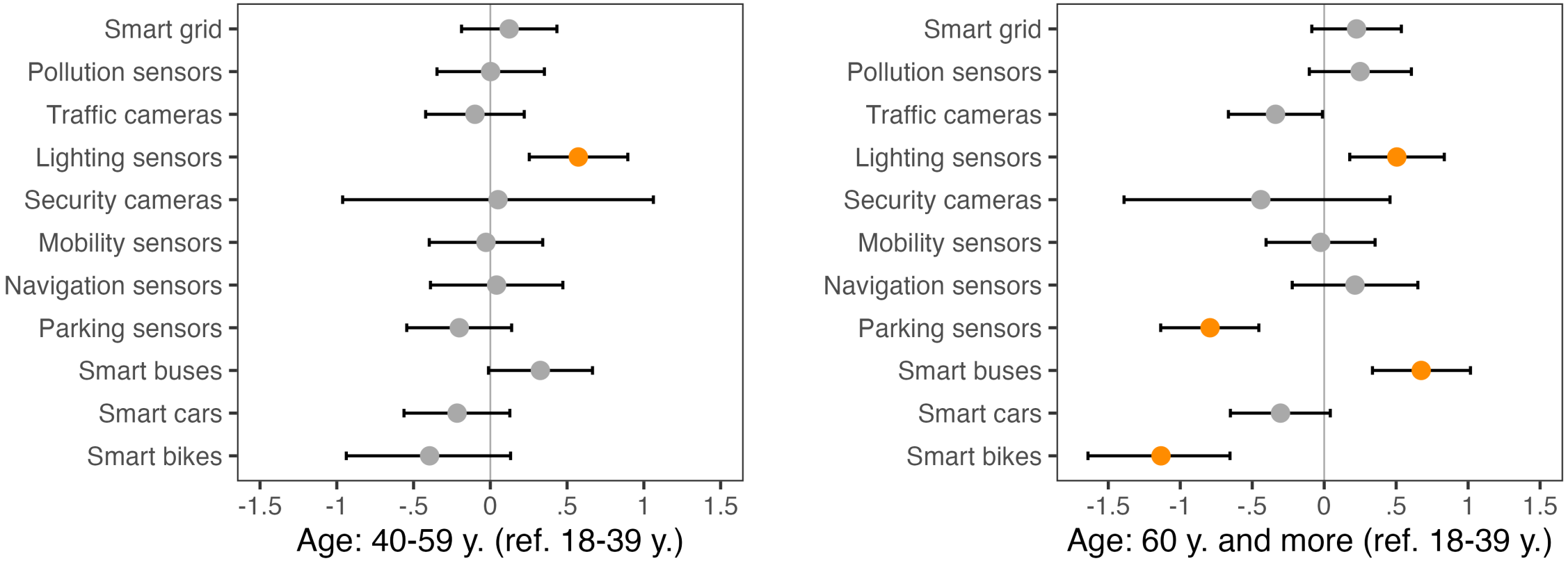

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Discussion

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To what extent are the axes of inequality reflected in the attitudes towards smart city applications?

- Noboby wants to live in a dumb city: overall rather high **desirability**
  - Vulnerable groups more in favor of safety measures; smart mobility less desirable among groups affected by exclusion
- Differences in **familiarity** most prominent between women and men
  - True difference or over-/underreporting?

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Thank you very much for your attention!

Interested in learning more or discussing further?

Feel free to reach out to me at

daria.szafran@uni-mannheim.de

Sample characteristics[a]

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	Sample	Population		Sample	Population
Gender (binary)			**Migration background**		
male	49.8% (1,004)	49.3%[b]	yes	11.5% (232)	14.8 %[b]
female	50.2% (1,014)	50.7%	no	88.5% (1,781)	85.2 %
Age (years)			**Disability**		
< 39	33.7% (681)	31.7%[c]	yes	11.3% (223)	9.4%[d]
40-59	34.3% (692)	32.8%	no	88.7% (1,759)	90.6%
≥ 60	32.0% (647)	35.4%			

[a]Sample frequencies and percentages are based on complete responses.

[b]German Federal Statistical Office; data for March 2023

[c]German Federal Statistical Office; data for 2022

[d]German Federal Statistical Office; data for 2021

What is a *smart* city?

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- Definition proposed by Abadía et al. (2022):

A smart city is a city which provides transparency and an optimal setting for the development of the citizens, the economy, and the environment, using information and communication technologies in harmony with politics, infrastructure, natural resources, and human capital.

Smart city applications & their descriptions

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Mobility applications	Smart bikes	public bicycles that can be rented via an app
	Smart cars	smart cars that share data with road sensors and other cars to improve traffic flow
	Smart buses	smart buses that dynamically adapt their route to the needs of passengers
	Parking sensors	sensors at parking lots that show drivers available parking spaces
Social inclusion applications	Navigation sensors	sensors throughout the city that are connected to apps used by visually impaired individuals to help them better navigate the city
	Mobility sensors	sensors that measure pedestrian and wheelchair traffic to improve urban planning

Smart city applications & their descriptions

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Public safety applications	Traffic cameras	street cameras that automatically monitor whether traffic rules are being followed
	Lighting sensors	sensors that adapt urban lighting to the current behavior of the inhabitants
	Security cameras	security cameras in public spaces to prevent crime
Environmental applications	Smart grid	smart grid that adapts the flow of electricity to current demand
	Pollution sensors	sensors that measure air quality and noise in order to derive measures to improve both livability and climate protection

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