



What is Transport Adequacy? Quantifying Experienced Transport Poverty in the Netherlands

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Research Questions

- How can **transport adequacy**, defined as the subjective assessment of the quality and sufficiency of one's transport options, be measured via a quantitative survey tool?
- How does **transport adequacy** differ by gender, capabilities, residential location and socio-economic status, and what does this imply for transport inequalities?

Theoretical background and objective

Equity is receiving increasing attention in transportation studies. To assess equity as an aggregate outcome, assessment of individuals' levels of accessibility and inclusion is necessary. Such analyses have traditionally been based on notions of car dependency (e.g. Kenyon et al., 2002) and on the broader concept of *transport poverty* (Lucas, 2012). Lucas' conceptualization states that transport poverty may arise when *transport disadvantage* comes together with *social disadvantage*. System level causes of transport poverty include a lack of transport options being available, the costs of transport (either of car ownership or public transport) and excessive travel times needed to access remote destinations. In addition, exposure to noise, pollution, fear of harassment and traffic unsafety during travel may create barriers to travel. Finally, lack of personal skills (such as ICT skills, command of local language, cognitive skills) may limit the use of transportation. While these causes of transport poverty are well documented, insight is lacking in the *prevalence and extent* of transport poverty in populations.

This study

Focuses on **transport adequacy** as an indicator of quality of and access to transport options and the associated outcomes. Other than transport poverty, which is a binary state, transport adequacy is a quantitative indicator, measured on a continuous scale, based on subjective assessments of citizens. It encompasses travel options/limitations, travel experience, access to destinations and life outcomes.

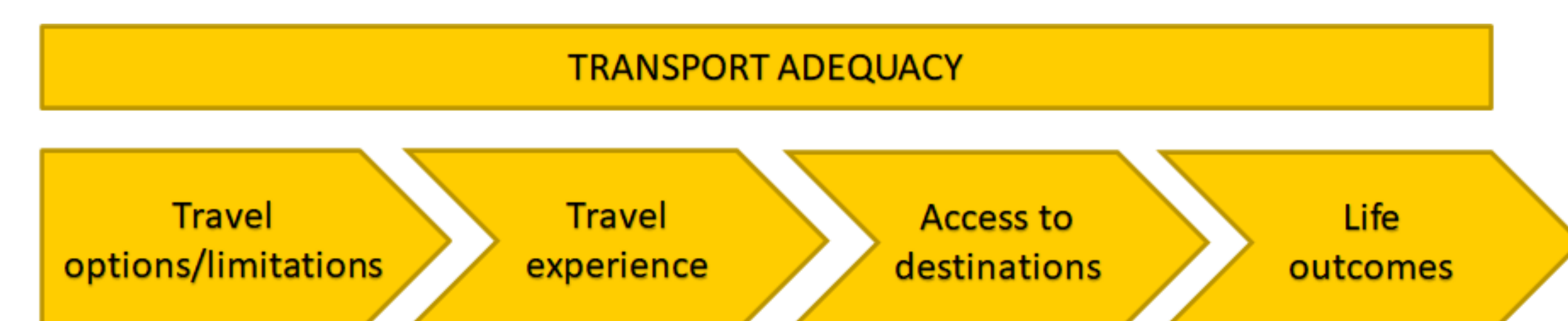


Figure 1: Concept of transport adequacy

The Transport Adequacy scale

Based on Lucas et al. (2016), respondents are asked to express their agreement with nine statements covering travel limitations, travel experience, access to destinations and life outcomes. The transport adequacy score is the sum of the item scores.

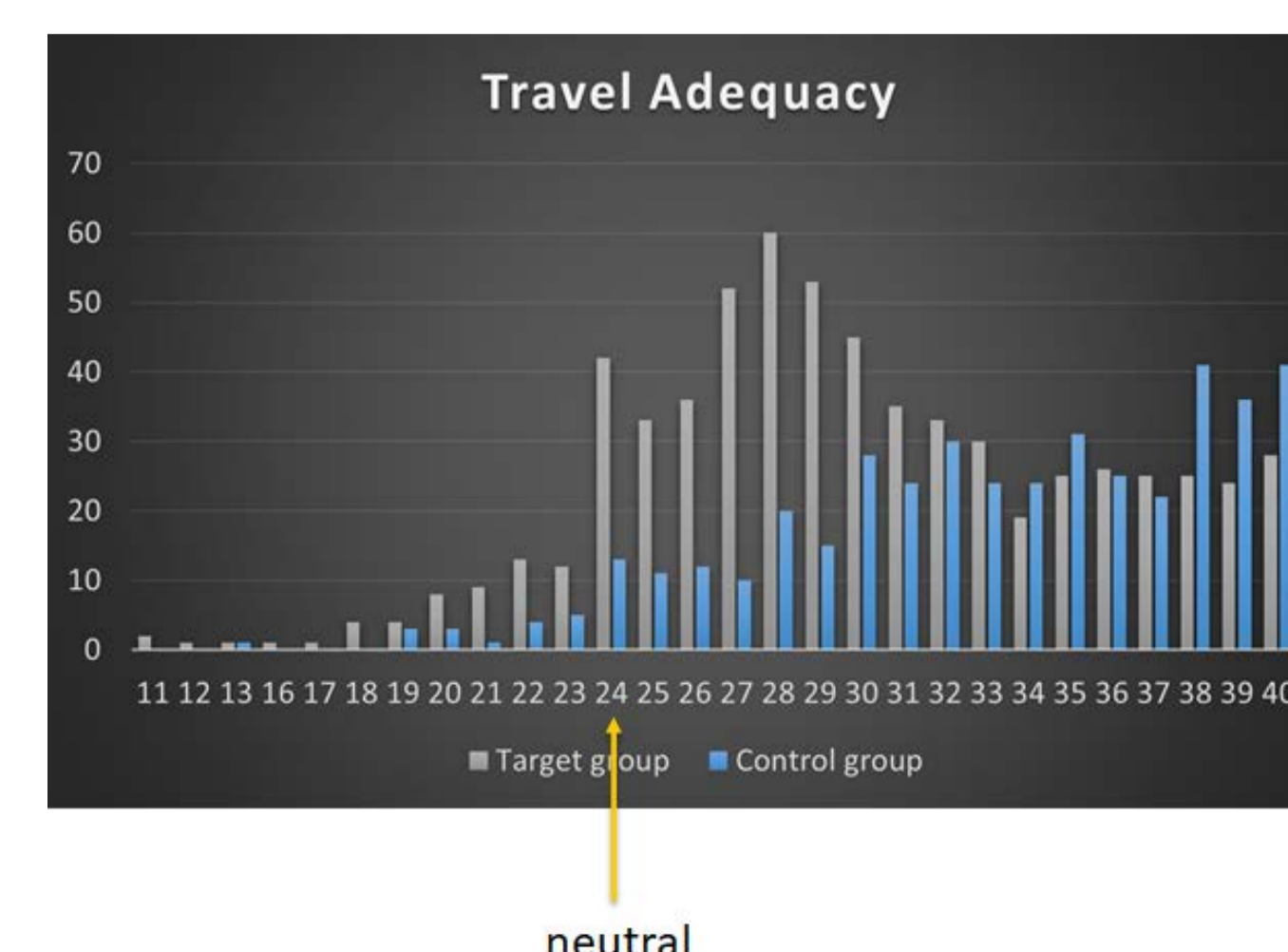
To what extent do you agree with the following statements? With the transportation options available to me...	Totally disagree			Totally agree	
	1	2	3	4	5
I am able to live my life as I want to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is always a transport option available to me at the times I need it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can reach all my regular destinations and activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel safe while travelling to my regular destinations and activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can travel without negative consequences to my health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can travel in a way that is suited to my physical condition and abilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have to spend more money on necessary travel in a week than I can afford	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I spend much more time travelling than I'd like	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am concerned about road safety while travelling to my regular destinations and activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Data and methods

A survey was held in 2021 among inhabitants of Rotterdam and Utrecht. One sub-sample (n=654) was taken from low-income, vulnerable populations. Another sub-sample (n=424) was taken from a higher income population segment having at least a drivers license. Apart from the transport adequacy scale, the survey asked details about people's mobility context and socio-economic situation.

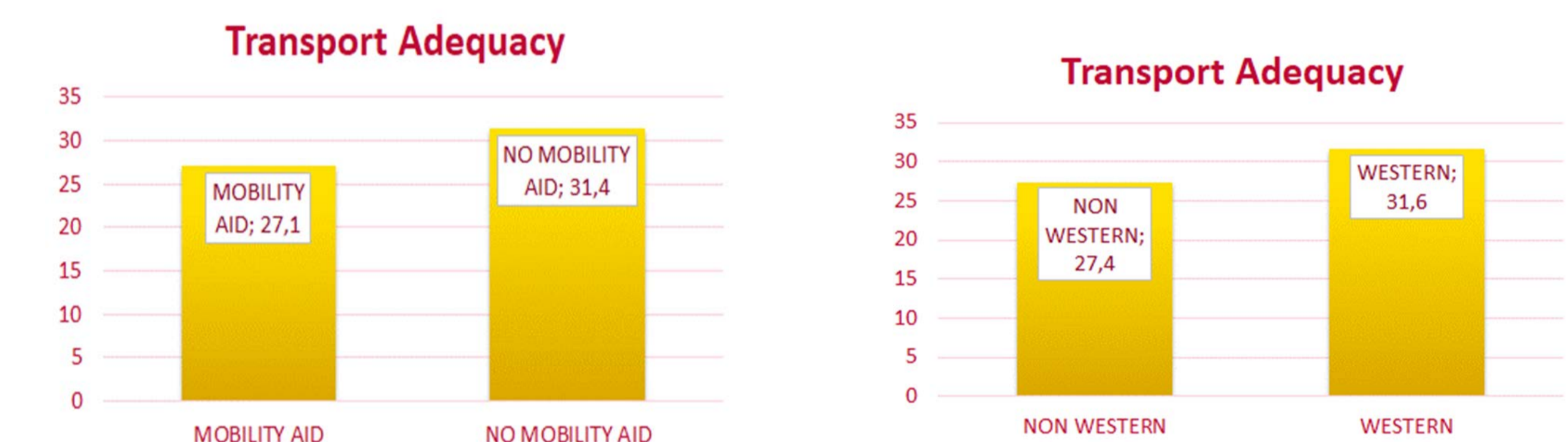
Results

The transport adequacy scale has a high internal consistency (Cronbach's Alpha = 0.83). 7% of the sample score below the neutral midpoint, indicating low transport adequacy. This occurs both for the vulnerable target groups and for the higher income control group.

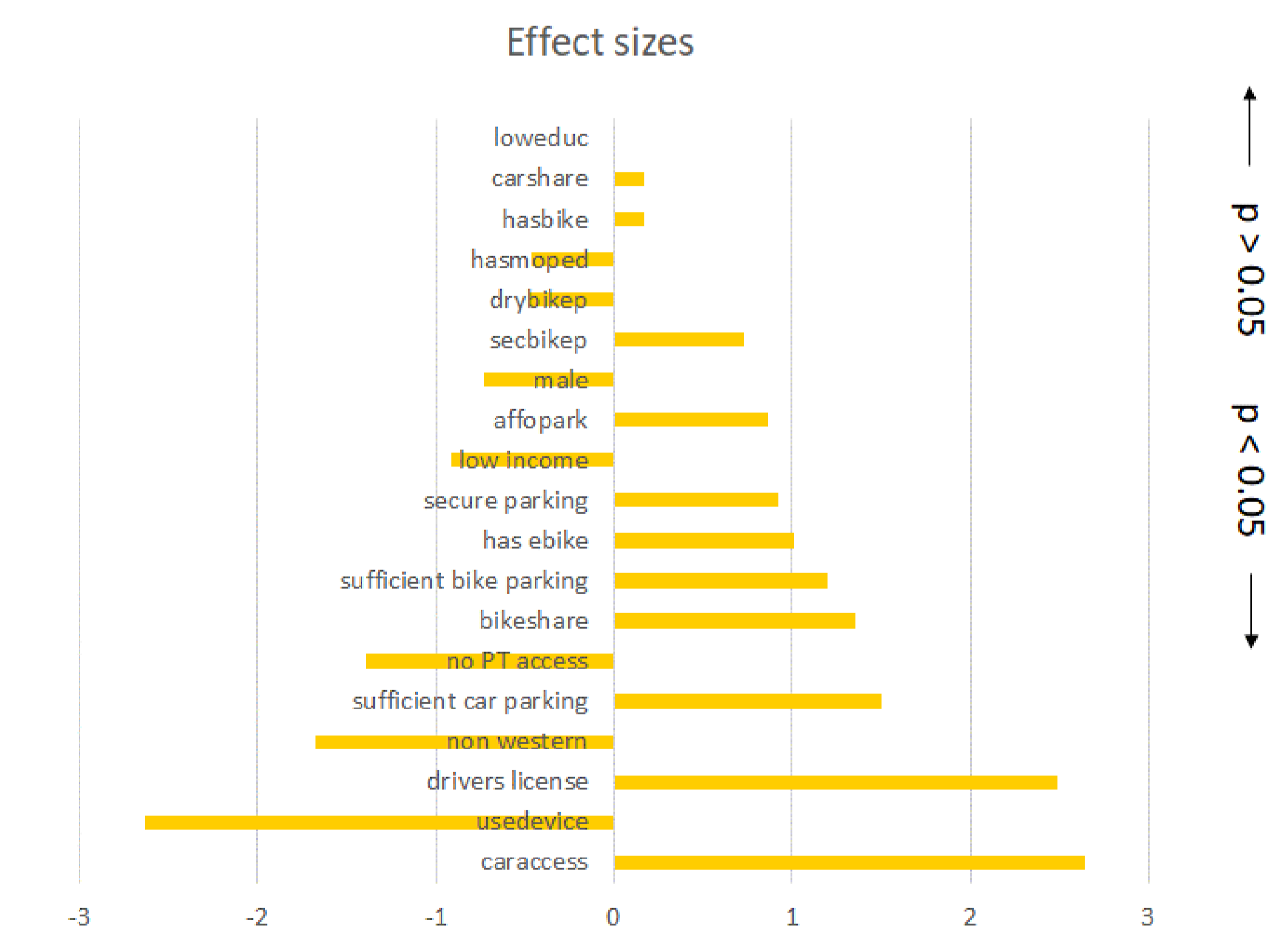


Results

Transport adequacy is markedly lower for people without access to a car, with physical limitations (using a mobility aid) and with a non-western migration background



However, a regression analysis on the transport adequacy score indicates that also parking options for car and bicycle, access to public transport, ownership of an e-bike, membership of a bikesharing scheme, income and gender have a significant impact on transport adequacy.



Conclusion

The transport adequacy scale functions well to quantify perceived access to and sufficiency of transport options, to identify factors contributing to transport adequacy and to identify groups at risk of transport inadequacy. We aim to test the scale in more different geographical contexts and apply it in longitudinal studies to monitor trends in transport adequacy and in-/exclusion.