PILOT MOBILITEITSBEWEGING

Report on Mobility Justice

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Authors
Frauke Behrendt
Henk-Jan Dekker
Ruth Oldenziel

With contributions from
Chris Thielman (Bachelor Student)
Christine Smits (Bachelor Student)
Joachim Wildeboer (Bachelor Student)
Leon Vauterin (PhD student)
Clara Glachant (PhD student)
Krzysztof Janko (PhD student)
Hanbit Chang (PhD student)

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Executive Summary

We conducted a brief review of the literature on mobility and transport justice-related issues including transport poverty. We then conducted a roundtable with experts to identify key issues, potential research methodologies, and formulate a set of interview questions. In phase three, bachelor students conducted interviews with three different groups (public transit lobbyists, refugees, students) about their experience and opinion of mobility justice.

This report contains a short introduction to mobility justice theories, a report on the roundtable, and summaries of all the interviews. The final section draws out some common themes, recommendations for future research and reflections on the methodology.

1. Introduction

This scoping project aims at providing a fresh perspective on the topic of mobility justice. The end goal is to generate several questions for further research. By mobility justice we mean questions of accessibility and social inclusion; transport poverty; and climate justice. In addition, mobility systems are unequal by design and the power to understand, criticize, and influence these systems are also part of mobility justice. In this report, we focus on the way different groups of people encounter mobility justice issues in their daily life. To present a variety of perspective, we will interview members from three different groups: refugees who have been granted a residence permit; older volunteers from the Rover public transit advocacy group; and students from Eindhoven University of Technology. The three groups are chosen because they give a variety of perspectives in terms of age, preferred/dominant mode choice, and socioeconomic status and consequently different experiences and views of mobility and accessibility issues. The students are young, use public transit but often envision future car ownership. The Rover volunteers are generally older, use public transit exclusively, and also provide a perspective on how different-abled persons experience this system. The refugees are in the middle in age terms, use a mix of transport modes, but tend to prefer cars as well.

The refugee group experiences challenges with mobility as they have to travel to and from the asylum seekers' centre, which by design are located in remote places. Becoming mobile is a major goal for these people, for whom cycling or public transit are often unfamiliar modes or modes with a status problem. Access to the OV card, language issues, or financial issues can all produce obstacles to achieving mobility and are there mobility justice issues.

The representatives of Rover present a different perspective, centred around public transit, possibly integrated with other modes. With a background in advocacy work, these people will provide a different and possibly more articulate view on the mobility justice issues surrounding public transit and access.

Finally, the third group consists of young students from Eindhoven University. While mobility has become a struggle or issue of debate for the other two groups, these students might never have given much thought to the way they move about. For one, their free-public transit card gives them access at no cost, while most will have a bicycle for egress. They are also of another generation than the other two groups and should provide a contrast in perspective.

In what follows we first briefly introduce the theoretical framework of mobility justice and related concepts. We then present the main conclusions from a roundtable on the topic conducted at Eindhoven University. Next, the empirical findings are presented in the form of interview summaries. The final discussion section will reflect on these findings as well as the methodology employed.

2. Theory

2.1 On Equity and Justice

Although interest in mobility-related social exclusion might have increased in the last one or two decades, the topic is not new on the political agenda, nor on the academic one. Verlinghieri and Schwanen's literature review on the topic, and Bek's work, show that transport poverty has been discussed since the 1960s and '70s (Bek et al., 2021; Verlinghieri & Schwanen, 2020b). Over the years, the topic has been raised, tackled and framed in many different ways. Kuttler and Moraglio's summary of the different terms that have been developed and used interchangeably with the term 'transport poverty' is exemplary for this variety:

> 'accessibility poverty' or 'poverty of access' (Farrington and Farrington 2005, 3; Martens and Bastiaanssen 2014, 6–7), 'transport disadvantage' (e.g. Currie et al. 2009, 97–98), 'transportrelated' or 'transport-based social exclusion' (e.g. Preston and Rajé 2007, 152–154; Schwanen et al. 2015, 123–125), 'social equity', 'fairness' and 'justice in transport' (e.g. Martens 2009, 4–6; Jones and Lucas 2012, 9; Sheller 2015, 86) and 'transport wealth' (Stokes and Lucas 2011, 4–7) [(Kuttler & Moraglio, 2021: 7)

Despite these differences, however, Kuttler and Moraglio claim that there are considerable overlaps between these different approaches.

In the literature, scholars usually make a conceptual distinction between *transport equity* and *transport justice* (Enright, 2019; Karner et al., 2020; Martens, 2017), between *transport justice* and *mobility justice* (Cook & Butz, 2018; Kuttler & Moraglio, 2021; Sheller, 2018b), or between all three of them (Verlinghieri & Schwanen, 2020b). Still, different authors define these terms differently or emphasize varying aspects of them. It should be noted that the approaches presented here are not homogeneous and the boundaries between them are blurry sometimes. Still, some general lines of thought can be identified.

2.2 From transport equity to transport justice

When trying to conceptualize 'transport equity', the term is usually contrasted with 'transport justice'. Karner et al. describe 'equity' approaches as typically being state-led, whereas 'justice' perspectives can be viewed as community-led approaches. In terms of content, 'transport equity' is usually characterized by a mere technical take on the issue. Based on quantitative modelling analyses, such approaches aim to increase "all travel time savings, independent of the income level of the traveler that benefits from the time saving." (Martens, 2017:30) In this sense, the 'transport equity' approach is an egalitarian approach, meaning that everyone should have the same transport provisions available. In practice, this largely comes down to a focus on the construction of new roadways and mitigation of congestion. The idea is that, by increasing the road space, more people would have access to it, while maintaining a seamless traffic flow. However, such planning principles favor people with higher trip rates. Moreover, they don't consider demographic differences in terms of place of residency, physical and mental abilities

and skills, level of income or personal preferences, nor do they consider the different outcomes of these policies of different people (Jeekel, 2018; Martens, 2017).

This idea of transport equity is countered by the concept of ‘transport justice’. This approach is explicitly normative and focusses on accessibility (Cook & Butz, 2018; Dill & McNeil, 2020; Gallez & Motte-Baumvol, 2017; Karner et al., 2020; Kuttler & Moraglio, 2021; Martens, 2017; Miralles-Guasch et al., 2015; Verlinghieri & Schwanen, 2020b). In this reasoning, planning shouldn’t just deal with increasing the road space. Rather, it should deal with providing access to multiple modes of transport and alleviating any financial, physical or mental burden that might hamper people’s access to cars, trains, busses, bicycles or other modes of transport. This perception of ‘transport justice’ is often explicitly based on the Capabilities Approach. In this sense, accessibility is not just defined in terms of access to particular transport modes, but rather to particular provisions and activities. People don’t just want to catch a bus; they want to go to work, see friends or do grocery shopping. Transport is a means to an end, not an end in itself. In terms of planning and policy making, this means that “the focus of transport policies should be on guaranteeing all individuals a minimum level of access to key activities that allow basic needs (commerce, education, healthcare, employment) to be met.” (Kuttler & Moraglio, 2021: 41) Physical proximity doesn’t suffice in this reasoning. As Verlinghieri and Schwanen put it bluntly, “having access to a bus, a bike, or a healthcare centres is not particularly helpful if you don't know how to read a timetable, don't cycle because you feel it is too unsafe, or can't negotiate the stairs or ramp at the entrance of the clinic.” (Verlinghieri & Schwanen, 2020b: 2)

2.3 From transport justice to mobility justice

The ‘transport justice’ approach has received different points of critique. A first issue that has been raised, is the fact that such an approach is still based on quantifiable measurements. That means that a minimum threshold is to be determined: below this line, one can be considered finding themselves in transport poverty (Karner et al., 2020; Kuttler & Moraglio, 2021). The question then becomes who gets to decide this for whom. This question faces two difficulties. Firstly, the transport justice approach presupposes an open, democratic debate in which a consensus can be reached. This ignores not only possibly opposing opinions and interests. It also ignores power imbalances present in this decision making process as well as different marginalized groups being excluded from it (Enright, 2019; Sheller, 2018a; Vanoutrive & Cooper, 2019). Secondly, such policies often come down to planners and policy makers deciding measurements for others. Consequently, policies run the risk of being paternalistic (Vanoutrive & Cooper, 2019, 2020). Moreover, such special treatments in fact separate the ‘transport poor’ from the rest of society, both symbolically and practically (Attoh, 2016; Enright, 2019; Sheller, 2018a; Vanoutrive & Cooper, 2019, 2020).

To go beyond the notion of ‘transport justice’, Mimi Sheller has coined the term ‘mobility justice’(Cook & Butz, 2018; Dill & McNeil, 2020; Karner et al., 2020; Kuttler & Moraglio, 2021; Sheller, 2018a; Verlinghieri & Schwanen, 2020b). Her description of the term resembles

more commonly spread ideas in both academia and grassroots movements. It is very much rooted in the principles put forward in the new mobilities paradigm, emphasizing different forms of (im)mobility, the socio-cultural value and meaning of mobilities, and a relational understanding of mobility and space(Cresswell, 2010; Hannam et al., 2006; Kuttler & Moraglio, 2021; Sheller & Urry, 2016). With the term 'mobility justice', Sheller tries to bridge the disciplinary divide between transport justice and spatial justice, by going "beyond a focus on transportation and beyond a spatial imaginary of the city scale" (Sheller, 2018a: 20). She criticizes 'transport justice' scholars for ignoring the spatial context in which transport is happening. Instead of happening in an empty space, one's mobility is relationally defined by the very concrete context they find themselves in, both physically, mentally and virtually. People experience their environment differently, and those bodily experiences are determined by, among other things, one's gender, race, age, ability, level of income and level of education. As such, some scholars have noted that Sheller's notion of mobility justice also strongly relates to Lefebvre's and Harvey's notions of the right to the city (Attoh, 2016; Enright, 2019; Kuttler & Moraglio, 2021; Verlinghieri & Schwanen, 2020b).

Following this relational perspective – or what she calls a 'mobile ontology' – Sheller also points out the multi-scalar dimension of mobility justice. Our individual bodily experiences relate to processes happening at the level of the nation state as much as with global processes, such as climate change or migration. Similarly, our experiences are embedded in a historical context, which is fraught with capitalist, racist, sexist, ageist and ableist forms of exclusion and oppression. Consequently, mobility justice should not only strive for *deliberative* and *procedural* forms of justice, in which marginalized groups of people are included in the decision making process. It is as much about acknowledging different forms of knowledge (*epistemic justice*) and about accounting for the injustices that have been done to these groups (*restorative justice*). In short, as Sheller puts it, we need to "think […] about how power and inequality inform the governance and control of movement, shaping the patterns of unequal mobility and immobility in the circulation of people, resources, and information" (Sheller, 2018c).

A mobility-justice informed approach will therefore go beyond "asking what is the right or wrong approach to the planning and design" and also ask " how to 'care' optimally for the mobility needs of the most vulnerable and for the non-human environment" (Verlinghieri & Schwanen, 2020a, p. 6). Verlinghieri and Schwanen (2020a, p. 6) speculate that rather than supporting high-tech and high-carbon approaches for the few (e.g. planes, autonomous cars) cities might increasingly turn to mobilities that "help to fulfil everybody's needs and cause less human and non-human suffering, now and in future, nearby and far away".

2.4 Data perspectives on mobility justice

Mobility experiences are becoming intrinsically linked with digital and data experiences. Being mobile increasingly involves the production, storage and sharing of data (consciously or not), from car sensor data for diagnostics and insurance apps for driving, to ticketing apps for public

transport, urban micromobility share schemes, Google maps, fitness and wellbeing apps, Internet of Things (IoT) sensors, or air pollution data. The 'datafication' of mobility raises new questions with regards to justice. What kinds of inequalities emerge at the intersection of mobilities and datafication? Whose mobility gets included and excluded through data collection and sharing, why and how? How are mobilities enabled and restricted through data? How are access and ownership to mobility and data changing?

To find answers to these questions, data justice needs to be considered alongside mobility justice. Taylor defines data justice as 'fairness in the way people are made visible, represented and treated as a result of their production of digital data' and highlights the associated importance of 'ethical paths through a datafying world' (Taylor, 2017, p. 1). The way mobility data is used around representation, visibility and actions clearly matter for ethical approaches to studying or designing mobilities. According to Dencik et al, data justice 'position[s] data in a way that engages more explicitly with questions of power, politics, inclusion and interests, as well as established notions of ethics, autonomy, trust, accountability, governance and citizenship' (Dencik et al 2019: 874). Data Justice thus takes into account how 'our understanding of social justice is changing in the context of datafication' (Dencik et al 2019: 873) and extends the 'ongoing historical struggles against inequality, oppression and domination' (Dencik et al 2019: 876).

We posit that a focus on justice is crucial to understanding and analysing the implications of emerging entanglements of mobility and data in people's everyday lives, in the making of new urban infrastructures, and in the crossing of international borders. It is urgent to take a justice perspective when data access, collection, cross-referencing, and algorithmic processing increasingly determines who, what, when and where various mobilities can and cannot take place. Whether entering a building, ordering a delivery, crossing a border, paying for goods, finding our friends, setting up a meeting, or sending a monetary transfer, various acts of mobility require access to data systems, leave traces in data systems, and *only can take place* through hybrid physical and data mobilities. This implies that crucial dimensions of (in)justice are embedded in these actions and in what Keller Easterling (2015) calls the 'dispositions' of such infrastructure spaces.

Some examples that highlight the importance include: how 'mobile phone location data have become tied to understandings of and responses to the COVID-19 pandemic' (Frith & Saker, 2020); how 'face-recognition technologies routinely fail to identify non-white faces—which is a problem when that influences your ability to travel or to access government services' (Redden, 2018), see also (Crawford, 2016); how older people are often invisible in smart mobility data (Sourbati and Behrendt 2020), a proposal to track and 'monitor the movements of migrants moving towards the EU's southern borders' that would include 'machine learning performed on satellite images […], social media output and local online reporting' (Taylor, 2017, p. 5); and the carbon emissions of data constantly moving between "cloud" data centres and mobile phones (Lucivero, 2020; Pasek, 2019).

3. Roundtable

Drawing on the theories discussed above, and in preparation of the empirical research, we conducted a roundtable session with an Eindhoven group of PhD students (Leon Vauterin, Clara Glachant, Hanbit Chang, and Krzysztof Janko) working on sustainable micromobility as well as the three student researchers (Christine Smits, Chris Thielman, and Joachim Wildeboer). The goal of this session was to reflect on the mobility justice literature and its most pressing and relevant concerns and oversights, and to consider how to operationalise it for the empirical data collection.

A key point that emerged is the need to distinguish (apparently objective) quantifiable measurements of transport poverty from subjective feelings of discrimination. Research on transport poverty seems to primarily take the form of quantitatively studying the availability of transport options based on geographic spread, costs, and so on. However, the mobility justice literature shows it is also important to conduct qualitative research of the type demonstrated below in this report. By talking to different groups, allowing them to share experiences with mobility in their everyday lives, we get a different perspective on the problem of transport poverty. Barriers to mobility, or unwritten norms shaping travel, which would not emerge from quantitative studies, can be brought to light in this way. Instead of asking how many buses stop in a neighbourhood one could also ask how welcome someone feels on public transit for instance. Questions like these might not occur immediately to more privileged travellers, but form real barriers for groups who experience mobility poverty more acutely.

Studying mobility justice also needs to take into account the different forms the issue takes in urban, suburban and rural contexts. Some of the more central concerns of today's mobility world (the rise of shared mobility and the gig economy of food deliveries) seem primarily urban. In a densely networked country like the Netherlands, this distinction might have different connotations than elsewhere, but it still matters. Regarding shared mobility, the distribution of the vehicles for instance tends to be in city centres, where mobility options already abound. E-scooters or bikeshare systems less often serve suburbs, especially if they are socioeconomically less wealthy.

Mobility itself is also a term that needs to be considered broadly. Besides taking care not to focus too narrowly on city centres, we should also not focus to narrowly on the journey to work. There are many other patterns of mobility that are relevant. Traveling to care facilities, sports venues, cultural attractions, and so on, form other examples. If we widen our lens beyond people of working age, the journey to school or higher education and the travel patterns of senior citizens come into view. These all will see mobility from a very different viewpoint and contrasting their stories, as done in the research of this project, creates a fuller picture.

In conclusion, theoretical reflections need to be combined with specific examples, and especially qualitative, narrative material. The empirical research presented in the next section exemplifies how such a story-telling approach can lead to new insights into mobility justice.

4. Methodology

We conducted a series of semi-structured interviews focused on mobility justice with three different groups of respondents:

- Refugees (statushouders) who face barriers in travelling to and from refugee centers (AZCs) and other destinations. They now live independently and have developed different ways of using the Dutch mobility network.
- Volunteers from the Rover public transit lobby group.
- Students from Eindhoven University of Technology.

These interviews were conducted by 3 students working on their Bachelor End Project (BEP) at TUE. Each student interviewed 1-2 member(s) of each of the three groups of interview subjects to gain a broad perspective on the issue. The interview schedule can be found in the appendix. The Eindhoven mobility team supported and supervised them in the process. To get at the issues the interview subjects face in mobility, we also aimed to include other methodologies, like travel-along or documenting journeys with photographs to complement and contrast with more discursive methods. This was however complicated by the short timeline, limited availability of students and interview subject, and ongoing covid concerns.

Interviews were transcribed, and summaries created. Key material was translated from Dutch to English.

The methodology for the empirical data collection received ethical permission from Eindhoven University (Reference ERB2022IEIS4) and the interviewees were awarded a bol.com gift voucher in return for participating.

5. Results

In what follows the main results from the interviews are presented, sorted by the three groups we interviewed. Where available, the interviews are also illustrated with photographs from the travel-alongs. The summaries have been written by the three student interviewers. The interviewees have been anonymized.

Public Transit Volunteers Rover

Rover Volunteer 1

RV1 is a 66 year old male living in Zeist. He is an enthusiastic public transport user who also really enjoyed using public transit. He does not seem really annoyed with problems which sometimes occur or by the fact that the trains to certain destinations have a low frequency. This interviewee has a flexible mindset, planning his meetings in such a way that it fits the train schedule. On our travel-along, he looked outside frequently and knew a lot about the routes and used this sometimes to illustrate his points. When asked about other modes of mobility he would not consider them a real option for himself as he liked using the public transport and thought everything was, for him, doable with it. However, when asked if there were groups who would profit from other modes he agreed that not everything was as accessible with public transport and showed an example in the train showing a farm which would probably not have any public transport in the neighbourhood.

He also mentioned a few studies which are already being done into some forms of disabilities how to improve their accessibility to the OV such as Sunflower (hidden disabilities) and Joint venture (accessible recreation). Some examples he gave of people who are not as mobile are people with mental rather than physical disabilities such as dyscalculia or hearing disabilities. In some areas only a time is given for when the train leaves next to a round clock. However, for people who cannot read this clock it can be difficult to know in how many minutes the train leaves. Also, people who are deaf cannot hear the broadcast in the train, which means they miss information about, for instance, delays. A solution already sometimes adopted for this is that they can also show these issues on the screens available in the train.

As to comfort, one issue is that there are not always toilets in the train. This can be problematic for people who frequently need to use the toilet. Another aspect which can be annoying is when you can only travel outside rush hours with the train. For some tickets this is the case, meaning you need to have checked-out before 4 o'clock otherwise you need to pay for the trip anyway. Another option is to travel after the rush hour but that could mean that you might come home very late especially if you have to travel far.

Financially, one aspect impacting transport choice sometimes is that it is made easier to declare kilometres travelled by car than it is to declare kilometres made by other transport for your work. This means some jobs can promote travelling by car to make this easier for them administratively.

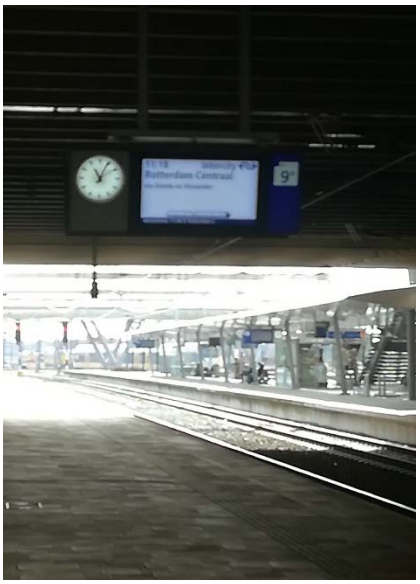
During the trip we observed a few things. We disembarked in Rotterdam and there were two people from NS carrying a metal panel to help someone with a wheel chair get out. However, the communication was not optimal which meant they had to run to the other side of the train to get the person out. Also when waiting for the lift there was a sticker next to the open button which meant people can call if the elevator is not working.

When passing by Rotterdam Blaak station he also mentioned that there was an elevator there which is now broken and people who cannot go to that platform can go to Central Station and get

a train back to get to that platform. However, this is a hassle as people need to travel to Rotterdam and back to be able to take the right train.

Also he mentioned the fact that as the government is trying to get people to switch from their cars to the public transport they are trying to make train trips faster reducing stops at small stations. However, this would mean that some stops would need to be scrapped which would make public transport less accessible for some groups as they would not be able to walk the new distance to their stop. Micro mobility is also not always an option in this case as these people who cannot walk a long distance might also not want to use these micro mobilities.

There is not enough money to keep some of these routes so the public transport companies have to cut some. This means that the accessibility especially for people in the rural areas will probably decrease in the coming years if no investments are made to keep these stops. Also sometimes the bus goes there already during the week days but during the weekends the buses won't stop along these routes to save money. However, this means that people would need to use the car or cycle, but the distance for cyclists are sometimes too long as well. This means that the people without a car sometimes have decreased accessibility during the weekends.



Rover Volunteer 2

RV2 is 70-yeard old, retired mechanical engineer. After studying at HTS, he has always worked in the engineering industry (specialized in quality control, welding techniques, managerial endeavors). He has been the director of the local Labor council. His income is above average the of €2500 at about €5000 (before tax). He is currently moving about in a wheelchair due to a leg amputation.

Before corona, for RV2, traveling was a regular occurrence (about 3-4 times a week), in particular to several meetings throughout the province of Limburg and occasionally Belgium. However, due to the pandemic most of these meetings have been held online (Zoom, Teams). He previously had a 65+ NS subscription to travel outside of rush-hour for a discount, but he canceled this due to lack of usage. But the plan is to re-take this subscription once the pandemic restrictions are relaxed. Total monthly travel expenses amount to approximately €100, due to traveling outside of rush-hour and thus avoiding higher costs. RV2 also acknowledges the high price of traveling in public transport systems, and therefore being a potential barrier for some individuals to use such systems, creating a less fair environment.

He usually travels by public transport, unless the chance presents itself to tag along with someone else in their private vehicle. Even though the interviewee is currently in a wheelchair this does not seem to be a challenge regarding mobility. According to RV2 it's about adjusting to the new reality. Biking is for instance not possible anymore, and he has never had a driver's license, as he regarded driving a car not necessary for his mobility needs.

RV2 usually travels alone, but occasionally in company of others depending on the destination and purpose of travels. The only combination of travel modes he utilizes is bus and train. He usually does not encounter situations where his destination was not reachable with public transportation, except for one time when he had to go to a crematorium. But considering this is not a destination he has often, this does not represent much of a mobility challenge for him. During this section of the interview, it becomes clear that RV2 essentially adapts to where he can get with public transport. In cases where the destination is not accessible by public transport, he 'chooses' not to go.

RV2 has never used shared mobility, since they were not very present in his vicinity a while back, when he still was physically able to bike and use other active modes.

He also emphasizes that Rover is not against cars and acknowledges the need of cars in more rural areas.

RV2 enjoys the possibility of multi-tasking while traveling in the train, since he can be productive while traveling. One downside he mentions however, is that traveling by public transport usually takes longer. However, he does appreciate the fact that parking is a non-issue with public transport, compared to cars (which is relatively expensive according to RV2).

Furthermore, RV2 does not consider the environmental implications of his travels very much, mostly due to the fact that he does not believe this to be very different between electric and

combustion engine busses. He elaborates on the way electricity is currently produced (largely unsustainable) and the fact that these busses still have diesel engines for the heating systems. He chooses to apply sustainable practices in the way he resides, rather than moves. He mentions renovating his kitchen and heating system at home and incorporating more sustainable appliances and systems.

RV2 appreciates that international train trips as opposed to flights are allegedly increasingly promoted, however shares concerns about the capacity of this industry to compete with the aviation industry, regarding ticket prices. This is due to the unequal playing field, since rail companies have more expenses than aviation companies (e.g., taxes). He also says that the train industry could learn from the aviation industry regarding cooperation and the linking of different rail companies. He mentioned the ease of booking a flight to a random destination, and this being much easier than booking a train trip, since it usually includes multiple railroad companies, each with their own systems and schedules.

RV2 considers the cost of travel to be the biggest barrier for mobility justice. He also considers accessibility (especially in rural areas) to be a barrier in certain areas, while also understanding that this usually is a business decision based on cost and benefit. He also states that social resistance is sometimes also a factor, e.g. citizens who voice protest against the addition of a bus stop in their street.

He also believes more can be done regarding the offering of incentives for people to travel outside of rush-hour. Since rush-hour is already saturated, he believes there to be little point in adding incentive to travel during rush-hour. And by filling in empty seats outside of rush-hour, there would also be additional profit to make. Furthermore, RV2 also questions the current practicality of subscriptions, especially in light of recent ‘work from home’ developments, where people increasingly have less standard traveling schedules, and suggests a re-think of the strategy by public transport providers.

RV2 goes on by discussing some projects they are working on in Rover, a call-in system used in rural areas and hydrogen busses. He also discusses safety concerns with hydrogen vehicles and the feasibility of their implementation in the Netherlands. He suggests more creative scheduling of the public transport by possibly using a reservation system, rather than a call-in system, which would decrease the barrier for people to use said system.

At the end, he reverses the roles of the interview and asks me about my mobility pattern and whether I have encountered any challenges in mobility. Furthermore, he highlights the challenge of infrastructure, and takes the central station of Eindhoven as example. He states that the location and way it is build makes it difficult for further expansion, which explains the current oversaturation of busses that exists at the central bus station.

He also expresses concerns about the political aspect of mobility, since the governmental parties usually are focused on short term goals and challenges, which generally excludes certain aspects of mobility. He suggests for this to be considered when discussing future mobility policies.

Rover Volunteer 3

RV3 is a 66 year old Dutch male who lives in the neighbourhood of Amsterdam Zuid. He was a frequent user of the public transport system but also likes to cycle to places for his health. He did not think of himself as immobile to go to places as he had the possibility to cycle, use the OV and to use his own car. He lived in Canada and Brussels as well which he used in multiple examples of other ways of transport systems in which problems could occur or lessons can be learnt from the Dutch system.

He didn't really use any micromobility but did have an opinion about their usage decreasing the public transport which would be disadvantageous for the public transport system, who already might not have enough funds. Especially also when looking at the electric cars which get almost 3 times as much subsidy while electric busses do not and the OV companies need to fund themselves. Also some forms of micromobility would decrease cycling usage as well and are not available to many user groups.

For the trip we just stayed in Amsterdam Zuid in which he showed me around the station area and some problems on the station and some things they adjusted and thus improved in terms of mobility justice. This included extra screens at the beginning and half way the station to know when the Metro's went instead of only knowing it at the stop. Another issue was that the escalator and elevator were broken and took a long time to fix. When we walked by they were both working again temporarily, which reduced the accessibility of the stop. Another issue at this station was the distance from the train station to the busses and trams. This was quite a walk (figure 1) for which there was also not a lot of places to get out of the rain. Also the bus and tram stops were pretty narrow and only just accessible for wheelchairs. Also for the amount of travellers using these services there were hardly any places to stay under when it was raining outside which decreased the comfort of these options as can be seen in figure 2.

When looking at the bikes at this area, this was recently improved to have more parking places for bikes. This was first not big enough which meant bikes were parked everywhere instead of in the parking places. This meant this did not stimulate bicycle usage to the station, but now is improved to facilitate this.

There were some other areas he did know issues with but we did not visit as there were problems reaching these areas. They did not have a bus stop nearby anymore, although it used to be there. As we would already have trouble reaching these areas this was a reason for him not to visit them. This illustrates that when dependent on public transit there are locations which are too much of a hassle to travel too in some cases.

Some other issues surrounding accessibility are the price of the tickets of public transport, but also integrating the payment systems of the different companies so that people do not always need to pay for the boarding fee every time they change from company in their train/bus trip. Also by integrating these systems the subscriptions and prices can be combined.

Another issue is that sometimes by increasing speed of transport for some groups the accessibility of other groups is decreased as the distance to bus stops is increased. There is a rule in Amsterdam that there should be a public transport stop at least 800 meters away to call it

“hoogwaardig” (high quality). However at this point these distances are calculated as the crow flies and not the actual walking distance.

Also in some new areas public transport is only provided when enough people live there, meaning the first people that move to the area would not have public transport. He mentioned that the municipality should place public transport in these newly built areas earlier to also accommodate these people quicker. Now it sometimes takes another 10 years to build a proper stop and that is in his opinion too long.

Another issue is that it is not always clear is where to buy a ticket and for what options one can use it. If you have for example a day ticket for the metro/tram this cannot be used for some of the bus lines. This means people then need to buy another ticket. Also when using multiple modes checking in and out to use different public transport providers can be complicated and sometimes easily forgotten. These steps can make the system complicated to use.

Rover Volunteer 4

RV4 was an elderly woman, who was physically disabled and depended on a wheelchair to get around in daily life. The woman was very knowledgeable about current mobility trends and an active member in her local community (Capelle and Rotterdam area), who achieved pushing for change in infrastructure in her environment.

The interview was quite interesting, as the interviewee was quite knowledgeable with different modes of transport and was an active member in advising local policy-makers. She has achieved a better level of accessibility in Rotterdam and Capelle for physically disabled people (mainly out of a sense of self-interest she mentioned), which changed her environment.

She also was quite positive about some newer modes of transport, such as shared micro-mobility and autonomous vehicles, but acknowledged these were not yet well implemented.

Her main issues regarding the use of transport alternatives stemmed from the ease of use of these alternatives and the importance of time and money in general on the supplier side of transport options.

Rover Volunteer 5

RV5 was a younger male, in his late twenties, who was actively engaged with transport in his professional life, as well as in his personal life. He likes to travel by public transport and does so on a daily basis. He also drives a public bus in his free time and volunteers for mobility advisory groups. The interviewee seemed to underline the importance of different user groups participating in daily transport and the importance of not generalizing these different groups based on the needs of the largest group. There is no one-size-fits-all solution.

Shared mobility could play a supporting role in supporting public transport and providing alternatives to travel to less common areas and during unusual travel times.

Overall, the interviewee seemed satisfied with the level and quality of transport alternatives in the Netherlands, although the price is sometimes a bit high and the government could sometimes step in to subsidize the marginalized groups a bit more, but overall the price seems justified due to the level of reliability and comfort of the Dutch public transport system.

Statushouders

SH1

SH1 is a female refugee from Uganda who has lived in the Netherlands for 4 years, and currently resides in Diemen.

She travels a lot and pays 300 to 400 euros a month for this. This varies from travelling for school and appointments to her volunteer work. She doesn't have a paid job. She uses multiple modes of transport varying from cycling to using the metro, train and bus. She would want to have a car but this is currently too expensive for her. She also does not have a Dutch driver's license. She did learn to drive in Uganda but this is a different way of driving not recognized by the Dutch authorities.

When she arrived in the Netherlands she didn't yet know how to cycle. This is something she had to learn herself when she arrived as woman are not allowed to cycle in her home country. She didn't look at this as a fond memory, but now she has learnt it, she is proud of herself. This is why she also had trouble learning this in the Netherlands as she had never cycled before. This took her almost 2 months to learn with a lot of falling and trying again. She thought it was important to learn as this was one of the only options to travel for free. People were hesitant on if she would learn how to cycle as she had never cycled before and thus didn't really help her out that much. This is why she had to learn this mostly by herself. Her first bike also didn't have working breaks meaning once she learned how to cycle she almost had an accident. In the winter when it's cold she is also not a fan of using the bicycle to get around and would rather use public transport.

She travelled away from her home country by plane as there is no other means of transport to easily get out of the country. This is a trip she was just happy she arrived at the location she was supposed to go to, it didn't matter how comfortable it was. The whole trip the only thought was to arrive at the location. She doesn't remember the whole trip as it was a while ago but she does remember she had to take multiple modes of transport when she got out. She first didn't travel to the Netherlands but to a different country. However, when she got there she was still not very safe and travelled to the AZC.

Another problem is that at one point she had no money and had to get to an important appointment with her doctor. This is the moment it is really difficult to get around. She had to go by train and bus to the location as there was not really another option, however with no money this is made very difficult. She had to travel without checking in and when a conductor came along to check tickets she had to get out and wait for the next train so she could get to the right trains station. For the bus she checked in with an hour free transport card she already used however the bus driver noticed but let her off the hook. He also understood that with no money she still had to travel.

The next time she has to go to the AZC is in a few weeks when her kids come to the Netherlands however she has to travel more than 3 hours to get there by public transport. This trip is something she isn't looking forward to that much as it also costs money.

The price of public transport is also one of the things she would want to change as this is way too high. Also the fact that the discount on her ticket is only after the rush hour is annoying. This means when she has to be in places early like when going to school, she still has to be pay full price for her ticket. Another thing she mentioned was that the transport should become more sustainable.

SH2

SH2 is a 54-year old male, born in Syria, married with two kids. He has a master's degrees: administration and ecology and has been in the NL for 2 years and 3 months. His family arrived in the Netherlands in December 2020. SH2 is currently learning the Dutch language (for the past year). He lives close to Amersfoort, and his income is about €1400 (governmental aid).

His mobility before his family arrived: He lived in Amsterdam for 7 months, Amersfoort for 1 month, 2-3 in Arnhem. He mostly used the train to travel, which he found quite expensive, and he felt restrained by the costs, especially considering his income. He used the day-card when it was too far to bike, but especially while living in Amsterdam he tried to bike as much as possible to save on traveling costs.

His mobility after his family arrived: He felt like he needed the car for the added flexibility, which he considers of crucial important when considering his kids. To travel to the municipality (food program), swimming lessons etc. due to the poor bus connections to the places which they frequently visited. Furthermore, he expressed that it was a challenge to obtain his driver's license, due to the costs and difficulty of driving through busy cities.

He also considers a car to be less expensive, especially since they always travel in a group of 4. Although he expresses that his kids do enjoy traveling by train more than traveling by car, due to the perceived freedom of movement and additional excitement.

He explains that he prefers not to drive in busy cities such as Rotterdam and Utrecht, due to them being overcrowded and the confusing instructions of Google Maps. He also states that the parking is quite expensive in the city, all of which would be more convenient if he travels by train (which is doable regarding costs, if traveling alone).

There was only one instance where he did not feel comfortable while traveling by train, but this was due to a misunderstanding by the NS employee and a technical issue with his OV-chipcard. Other than that, he never felt uncomfortable while traveling.

He finds the bus connection difficult at times, especially since Google Maps (which is the application he is usually comfortable using) is not always updated and mentions an instance where a bus station was unserved, yet this was not indicated by Google Maps.

He also states that he finds it difficult to understand instructions given in the train, since in his experience these are solely given in Dutch. This then excludes everyone who does not understand the Dutch language or are not proficient enough in the language. He used an example of a train door, which was out of order, with a Dutch sign which states the status of the door. However, since he did not understand Dutch very well, he could not understand that the door was not functioning, which in the end led to him stepping out at a later station. This was an inconvenience for him, because he had to wait for a train in the opposite direction and ran late for his appointment. This is not only regarding the signs, but also the voice announcements in the trains, which in his experience are also only given in Dutch, suggesting further that there is a very present language barrier in the Dutch public transport system.

His expenses per month when it comes to mobility are between €200-250. He considers this a lot, considering his income of €1400. This is due to the high costs of gas, together with additional expenses such as tax and insurance.

SH2 likes to travel, especially for the kids. He finds it important to provide his kids with activities.

The language barrier remains the main issue according to SH2, since he finds learning the language to be a process, and thus it being important for the public transport to be inclusive.

Furthermore, he states that being concerned about the environment is more of a luxury for him, since his current priority lie on his travels being as cost effective as possible. In absence of the financial barriers, he would be more open to the sustainable element of mobility.

In Germany he experienced the possibility of having a subscription for a month, which would allow people to travel everywhere within the district without additional costs. This is according to SH2 something that the Netherlands could adopt, since they currently only have a day-card. According to SH2, if a more geographically restricted, yet more affordable month card is introduced, many people would benefit, since they usually do not need to travel far anyway.

Compared to the Netherlands, cycling in Syria (his home country) was not a popular mode of transport due to safety concerns and the lack of infrastructure. In Syria, the car was the most preferred mode of transportation. Although regarding mobility justice, he finds the two countries to be comparable. Nevertheless, the war in Syria has changed a lot, yet he chose to use the pre-war scenario as reference.

In the end, he reiterates that the language and financial barriers are the main challenges for mobility justice in the Netherlands.

Students

Student 1

Student 1 is a 21-year old ,aster student in innovation management (Bachelor: sustainable innovation). He lives in Helmond (10mins by train from Eindhoven) and usually combines cycling, the train and walking to get to the university. He usually works in the summer vacation and on weekends he tends to go out with high school friends (to Eindhoven, Helmond or Wageningen). He usually takes the car when traveling for leisure for convenience. Due to the continuous access to a car, whether it being his own or his friends', he never had the feeling of places being inaccessible.

Since usually does not use public transport, the interviewee did not feel like the questions were applicable to him.

However, Student1 does have experience with shared mobility (Go-scooters), and likes these scooters a lot. He finds them fascinating, due to them being electric with high acceleration. Although this is done more for leisure/personal enjoyment, and not to travel to school or work.

His two favorite modes of transportation are driving and walking. What he finds enjoyable about driving is the unwind factor, since he can relax and play music while traveling in isolation. Nevertheless, there are also irritating aspects of driving, like driving in busy/crowded cities, which he is not a fan of. He finds it stressful, due to all the unfamiliar and unpredictable factors, which removes the element of relaxation which is one of the main reasons he enjoys driving.

When it comes to walking, he tries to walk to any destination which is less than 30 minutes away because he finds it relaxing, being in nature with headphones on. Although this depends on the weather. He does not mind the cold, but the rain would be a deal-breaker.

Regarding mobility justice, he finds that the handicap spots for parking are not always located in the most practical locations, which seems illogical to him. Even though he did not have to use said spots himself, it is something that he observes.

He personally finds that he never felt excluded when it comes to transportation and regards the Netherlands as a country where public transportation is leading when it comes to accessibility and inclusion. Especially the considering the bicycle infrastructure, which allows for individuals without a car to still be relatively mobile and be able to go almost everywhere.

He also could not find any room for improvement. Furthermore, he regards the Netherland as an example for other countries.

Regarding sustainability, he tried to walk or cycle as much as possible, and only uses the car when the destination is further away than 30 minutes walking distance. He is also skeptical about the true environmental impact of electric cars, due to the energy production being largely unsustainable. He also states, that although he keeps the aspect of the environment in mind, it rarely impacts his decision making when it comes to traveling, aside from the personal set values already mentioned above.

He also finds that the students are in quite a convenient position, regarding mobility due to the special offers and subscriptions available.

Regarding the impact of traveling on other countries, he states that the gas prices at times does influence where people go for gas. And considering that the gas prices are lower in Germany, people who live close to the border might choose to go to Germany for gas instead of filling their car up in the Netherlands.

Student 2

This was an interview with a student which used to study at the TU/e, but now officially studies in Kopenhagen. However, she lived in Lund in Sweden and traveled to Kopenhagen by train. Now in the Netherlands she lives in Luyksgestel, a village near the Belgian border, and travels to Eindhoven regularly. For activities closer to home like going to the supermarket she uses the bike.

In her first year of her study at the TU/e she still lived in Maastricht and had to travel back and forth towards the TU/e almost daily.

Now she regularly travels with her boyfriend by car to the TU/e. However, she has to get up early to travel with him, but this is cheaper, more comfortable and faster than taking public transport. What she also finds annoying about public transport are the times they drive on do not always connect to the train rides. Another thing is that the bus sometimes leaves earlier from the bus stop than the schedule when it is quiet time. This means she missed her bus a few time which is particularly annoying when it only leaves every 30 minutes or every hour. Also, the combination of using the bus and train can be quite annoying for her as the times don't match up and the step over time is really long. When she wants to go for a drink in the evening she also has to watch the time so she does not miss the bus home. This restricts the places she can visit a lot and is a reason she would like a driver's license.

Her main complaint for using public transport was the price of the tickets as she does not really have an income to spend on tickets, except for a compensation from her master thesis of about 650 euros a month. As she is also not a student in the Netherlands she also does not get a student OV chip card. Both of these situations means she almost pays a sixth of her income on her transport usage.

She has not used micromobility in the Netherlands yet. In Sweden she did use it a few times and she thought it was useful. There they stopped when reaching the outside of the cities. When considering micromobility she thought they could sometimes be good substitutes for using public transport as they are not time related. The one time she thought it would be useful to get an OV bike she thought she needed a subscription on it and didn't have one, which meant she could also not get one. This would be more useful, according to her, to be able to get an OV bike with your personal OV chip card without the need of the subscription.

If she were to choose her mode of transport in the future she would use the car as that would make places more accessible. The only reason she wouldn't choose to have her own car if it were to become easier and cheaper for her to get to the center of Eindhoven by public transport while it would become harder to get there by car. At this point it is in a convenience perspective much better to travel by car. Also when looking at reaching areas outside city centers she mentioned it to be difficult and micro mobility could sometimes be useful to get there.

She also mentioned a few difficulties she saw other people have when using public transport. Sometimes she also saw some people in a wheelchair who had to wait for personnel with a ramp to get in or out of the train. However, these personnel sometimes don't show up which means people can't get on the train. Some older people didn't know how to check out with their OV

chip card and tried to use it on the wrong area. Also she saw some people who were probably on vacation trying to get some tickets, but didn’t really understand how the machines worked as they spoke Spanish.

For a small trip we walked from Demos to the Gemini building at the TU/e, hereby passing the 18 Septemberplein. This is an area which is not very clear where cyclists can cycle and where exactly people should be walking. This creates a bit of chaos sometimes. We also walked past the tunnel next to the station on the west side. This is a tunnel she did not feel safe to walk through as there was bad lighting. The route she normally took was via through the station. This took a small bit longer as she had to pay to have enough money on her card so she could walk through. Just outside the station when walking to the university there was a path which had quite slippery tiles, which she had slipped on a few times when they were wet. At the Limbopad going from the station to the campus there is a bit she mentioned would probably be less accessible to some as it is pretty steep. She did like to walk across the rest of the campus as it has a nice feeling to it.

Student 3

This student is a 19 year old woman studying in her 2nd year at the TU/e. She uses different modes of transport to get around. Mainly she uses the bicycle for the short distances but if the weather is bad she switches to public transport. She used the electric moped as well sometimes except she cannot ride it really well so is not a fan of using it herself, but sometimes she does sit at the back if her boyfriend drives one. Every week she also takes the public transport to get back to her home town to work there. She gets annoyed if something happens on the rails which means she can't get home easily. Luckily her parents most of the time pick her up with the car when this happens. This is also why she likes using the car sometimes as well as she finds that a lot more reliable than using public transport. Especially because if something happens on the rails there is not really a good substitute except for going back and trying again later or having to travel a longer route to get home. While with the car problems occur less often. She also mentioned the environmental effect of travelling a few times, especially on how expensive it is to travel by train even though it is more sustainable. A nice example was that it takes more money to get to Amsterdam by train than it is to travel to Barcelona by plane, which she didn't find a fair pricing distribution.

The trip she took me on was a trip by public transport from the Eindhoven station to her student home. This was because the bus we took stops a 10 minute walk from her house and that is quite far. There is a bus stop near her except she could never take that bus as it only goes once an hour and has a horrible connection to her possible train connection when she has to go to her home town or get back from her home town. She also was not happy as this meant if she left a bit too late she had to run to her bus and that happened a bit too often. When considering this she also mentioned the older population which lived near her who might not be able to make the trip to the bus stop as that might be a too long walk for them. Also when she comes back or goes to her home town she sometimes has some luggage with her which can be quite tedious to carry for the 10 minute walk.

Another issue is the price of the public transport for when she does not have free transport. The prices are one of the reasons she decides to travel on Friday to her home and back on Monday morning, even though having to travel back on Monday means she has to wake up really early when she has to be at university for lectures in the morning. However, in the weekend she also has to travel to her work and back and she usually does that the with public transport as well so then she only gets some discount on her ticket.

When she visits her sister she also sometimes uses a shared scooter as she lives in a more rural area which takes a lot longer to get to by public transport while using a shared scooter only takes like 10 minutes. It is also annoying that these rural areas do not have a frequent connection with the public transport which can sometimes be frustrating if you miss it. Another issue is when she needed to work once at 7:00 and her bike broke down, as it was really early the public transport was not driving yet this was an issue. Luckily she was able to use her housemates bike otherwise she would have had to walk a very long way.

Also she mentioned that for her it would sometimes probably be cheaper to have a small car to get around if the public transport were not free, especially for the trips from her student home to

her parents' home. Also, on some trips from her mom's to her dad's place which has annoying stop over times she wouldn't mind owning a car for this trip either as this would spare her a lot of time.

Student 4

The interviewee is a young male in his mid-twenties, who is in the final year of his master's education and has to travel by different means of transport on a frequent basis to and from his place of education and his home. The interviewee lives in Eindhoven and has to travel by means of public transport to Den Bosch for his education. Within Eindhoven and in the weekend for leisure trips, he mainly uses a combination of public transport and occasionally different forms of shared mobility.

The interview provided quite some insights in the perspective of the mobility system in the Netherlands, as seen from the standpoint of a student, who is very dependent on the public transport network and provided services for students in this country. From the interview, it became clear money played an important role in his daily transport decisions.

The interviewee uses a wide range of transport modes in his weekly life, ranging from travelling by buses and trains to and from his place of education to travelling with smaller vehicles, such as normal bikes, shared bikes, shared scooters and shared cars in his personal life.

In his leisure time, he does like to visit different cities and areas more often, based on his personal available budget and the availability of public transport to get to these places generally. With his personal budget increasing over the years however, trips have become more frequent and different modes of transport (other than public transport) were also considered to be used for such trips.

The interviewee has a girlfriend who comes from Romania, so he used to travel a lot by plane to visit her as well, but she since moved to the Netherlands, so his frequent use of planes has decreased as well.

With the subject being at the end stages of his education, more thought is put into the future use of vehicles for certain purposes, where owning at least one private vehicle in his household would currently have preference.

Student 5

The interviewee is a young woman in her mid-twenties, who recently moved to the Netherlands after completing a study abroad in Romania. She has just started working in the Netherlands and moved in with her boyfriend in Eindhoven. She travels daily with public transport or personal bike and mainly travels within Eindhoven.

The interview was quite interesting as to see the perceived differences in the Dutch mobility system, seen from a younger person who just moved here. Dutch public transport seemed to offer her a great deal of stability, safety and reliability, but she still had to concern herself with the costs of using transport. Compared to her home country, she does feel more safe travelling in the Netherlands and likes the experience here a lot more. There were some hindrances using Dutch public transport in her case, as a Dutch bank account is needed to use an OV-chipcard and without one, less flexibility can be enjoyed when travelling and more needs to be planned in advance.

Furthermore, due to not living near to a public transport hub and needing to go to a direction in the opposite direction of the closest hub, public transport by itself still proved to be unreliable to get to work during days with bad weather and Shared-scooters did offer an solution sometime.

6. Reflections on the Methodology

In this project we engaged with interviews and travel-along methodologies. Are travel-alongs as a methodology useful and interesting? Can they form a meaningful part of a larger research agenda around mobility justice? We believe they can, but quite some thought and care has to go into designing interview questions (or other interactive methods) which can tease out the lived experience of travelling. Right now, some of our interviews tend to give us insights that other methodologies can also give us, like the problematic frequency of bus transport in less dense areas. A future research project would therefore start with an inventory of existing transport poverty research, identify the insights that this research has already given us and the type of knowledge and experiences we haven't accessed yet.

In our project, given the short timeline, covid concerns, and limited availability of researchers, it was hard to realize travel-along interviews. They require quite some logistic organizing but also thinking about where to go and what to get out of them. Having said that, the travel-along is a method which can at the very least increase awareness of issues among policymakers and engineers. As such, we can envision making travel-alongs a part of the working visits of policymakers. From the researcher perspective, it would require some training or background in ethnographic methods like participant observation to get at non-verbal cues and responses to the mobility environment and experience.

In addition, the travel-along can also be turned on its head by asking participants to imagine or design their ideal travelling experience. This methodology might provide insight into what aspects of mobility the participants address first when given the freedom to, and therefore the aspects they apparently find most important. This in turn can be a conversation-starter on the actual state of this aspect in our current mobility system.

Altogether, this report explored the way in which these qualitative interviews and travel-alongs can serve as an alternative methodology to quantitative approaches. We belief that the subjective experiences recorded by these are missed by such approaches and that this approach is therefore at least an important complementary research strategy when it comes to investigating mobility justice.

7. Conclusions: A Future Research Agenda for Mobility Justice

There are a number of key areas for future research that emerge from this project: Firstly, how can we combine people's concern with the cost of transport with achieving sustainable mobility? Can we increase awareness of the (hidden) costs of automobility? Relatedly, how can we address the mobility needs of families? Is there a way of changing the (perceived) necessity of owning a car for families? Thirdly, can we broaden mobility justice approaches to recreational mobility? Much research focuses on commuting at the moment, but is there a right to leisure? And is access to recreation distributed fairly at the moment? A fourth point concerns the increasing digitalization of mobility and the data-harvesting and-mining that goes on. The first process excludes group without digital skills or access to for instance smartphones, while the second process generates questions about ethical ways of dealing with our mobility data. Finally, in another new development, micromobility modes are growing in popularity fast, but are available only to a small, already hypermobile, segment of the population. At present they aggravate mobility injustices while they have potential to alleviate it. These are all issues that deserve further study.

Before outlining these, we cannot omit to mention that a main point of emphasis among the Rover volunteers were concerns with **accessibility**, noticeably for disabled people, and the density of public transit in the countryside. These are more well-known concerns and seem relatively well-researched already.

7.1 Mobility justice perspectives on the cost of transport for people and planet

While not a new insight, the fact that the **cost of transport** is a key variable is the clear outcome of this pilot study. This issue pertains particularly to public transit in the Netherlands. Free or reduced public transit fares exist in the Netherlands for certain groups, but to a limited extent. The interviewees generally assume owning a car to be cheaper than using Dutch public transit. Given the public subsidizing of road infrastructure and parking spaces, there are legitimate questions here about fairness and justice.

Future research should therefore consider how justice can become a central concern for transport pricing, closely interlinked with climate concerns. How can we distribute the cost of access to transport in a more precise, tailor-made, and just way, while at the same time reflecting the climate impact of specific transport modes? Research could for example combine detailed fiscal insight into transport-related tax breaks and subsidies with a mobility justice perspective. Current policy instruments in this regard are often quite blunt (e.g. giving *everyone* a tax break), or strongly favour automobilities (e.g. incentives for electric cars – that cannot bring down carbon emissions fast enough, and mainly benefit those with higher incomes). Given the significant amount of money going around in this sector, both in terms of consuming people's personal budget as well in government expenditure, mobility justice perspectives towards a fairer distribution of the cost of mobility in conjunction with a fairer reflection of climate impacts would be an important future research agenda.

To elaborate this a bit further, many of the explicit or implicit remarks about money by the interview participants are troubling from a mobility justice and climate justice perspective. For one, there seems to be quite some evidence of how the entire public transit system is geared towards those who have paid jobs and hence towards commuting. All other people seem to be treated as not necessarily welcome guests (with pricing encouraging off-peak travel). While this is understandable from an economic point of view, it does inhibit other kinds of travel, especially for people with families. Secondly, there seems to be a very strong focus on profit-making, especially for the rail operator. In a country where so many people use it for everyday travel and where high personal mobility is a requirement to participate fully in the society, this principle seems to stand in contrast to a mobility justice agenda. Finally, it seems that if only private cars were more affordable, the interviewed people would switch to them in an instant (apart from the Rover public transit volunteers). **This seems quite troubling in the light of the climate crisis and in terms of being exposed to other members of the society, from other walks of life**. For example the students mostly care about convenience and very little about the climate impacts. The current setup also seems particularly discriminatory against refugees, who are required to be quite mobile, while they need to foot the travel bill themselves.

Behavioural change is a central element of these considerations. Here, aspects of the mobility justice approach might conflict. From an inter-generational (climate) perspective there is a clear need to achieve mode substitution away from cars to active modes and public transit. However, significant parts of the population seem to strongly prefer driving, if affordable enough. Mobility justice approaches value autonomy and self-determination, raising questions about the ethical appropriateness of nudging, financial measures as discussed above, or behavioural campaigns. The fierce backlash against measures that make climate-damaging practices like flying or eating meat more expensive suggests that this is a very tense and sensitive area.

This section has highlighted why it is important for future research to take a justice perspective on the intersection of transport pricing, climate concerns and behaviour change.

7.2 Mobility Justice beyond commuting: variety of group sizes and trip purposes

Within this broader context, future research should particularly focus on a variety of trips (e.g. care, education, shopping, leisure) and a range of group sizes, particularly families. This would complement the large body of research that largely focuses on individual travellers and commuting trips. This future research would ask: How could new insights on a variety of group sizes and trip purposes foster more just mobility experiences and opportunities across society?

In this report these concerns have been especially visible in the *statushouders* interviews, expressed though the needs of **families**. In many studies, the implicit assumption of travel seems to be that the traveller is alone. This however creates a fictional traveller with greater flexibility than the average family. Families also tend to have a greater car-dependency, or at least believe they do so. Questions taking the family as a starting point could be interesting. E.g.: how do families without cars travel? And are their costs comparable or even higher than owning a car? And, from a climate perspective, are there viable ways to reduce car dependency among families?

We can also note that mobility, at least in the way the interview participants thought of it, is quite narrowly conceived of as commuting. One thing a mobility justice perspective can do is to make a strong case for looking at the **non-work related mobility** and at the value that access to mobility brings in feeling like a citizen. It does seem that the approach to the Dutch (public) transport system is still very instrumental, very much about providing an efficient way to generate more economic value, while neglecting other more socially-oriented aspects. In this respect it is worth remarking that micromobility, where used by the interviewees, was often used in a leisure setting rather than a commuter setting.

The introduction of micromobility—(shared) scooters and bicycles—is a fast-growing market in cities. However, these systems tend to be concentrated in city centres. Providers of docked systems will provide docking stations at selected points, while providers of dockless systems redistribute scooters to locations where potential use is highest. As a result, locations farther away from city centres are underserved by these new mobility modes. Typically, these are more suburban or low-income neighbourhoods, where micromobility could serve mobility needs of people who face barriers to transport. Currently, micromobility is mainly provided in areas where mobility options already abound and are used typically by groups who are already highly mobile. In short, micromobility has potential to address traffic poverty, but we would need public regulation of private companies to achieve this.

This section highlighted how future research that considers a variety of group sizes and trip purposes (rather than largely focusing on single commuters) would show how more just mobility experiences and opportunities across society could be achieved.

7.3 Mobility Justice and micromobility

The third key element of future mobility justice research concerns micromobility. For example, our interviewees discussed a range of experiences and issues around cycling and the use of shared bicycles and e-scooters.

Going beyond well-known approach of considering cars, public transport and active modes (walking and cycling), we urgently need research that broadens this lens to investigate how micromobility could play a much larger role in the future, and what the mobility justice implications of this are. What can a mobility justice approach show us about the impact and potential of micromobility, and how can it reveal broader justice implications of our current mobility system and visions for future mobilities? Recent studies (Brost et al. 2022; Philips, Anable, and Chatterton 2020; Cairns et al. 2017) have shown the significant potential of micromobility to substitute car trips, while the vast majority of incentives and infrastructure investment is geared towards electric cars, which have much less potential for reducing carbon emissions, and to be affordable to broad parts of the society quickly.

Definitions of micromobility are contested, but typically include a range of small, light vehicles that are fully or partially powered by humans and/or motors, such as bicycles, e-bikes, step e-scooters or moped e-scooters, while some definitions also extend to micro-cars. All are significantly lighter than traditional cars (up to 300 or 500 kg, often significantly less) and

limited to about 45km/h (some to 25km/h), requiring substantially less energy to move them. They can be personally owned or part of shared services.

The interviewees mentioned how the use of privately owned and shared bicycles is very different. For people who did not grow up in the Netherlands there were obstacles such as needing to learn to cycle. While some initiatives on this point are taken by cycling activists, there is generally a lack of resources for this. Additionally, lack of knowledge of the Dutch language, or a lack of access to a Dutch bank account can make it harder to use systems like the OV shared bike. Newer shared modes, noticeably scooters, suffer from a lack of stations in areas that would potentially benefits the most. Providers of docked systems will provide docking stations at selected points, while providers of dockless systems redistribute scooters to locations where potential use is highest. As a result, locations farther away from city centers are underserved by these new mobility modes. Typically, these are more suburban or low-income neighborhoods, where micromobility could serve mobility needs of people who face barriers to transport. Currently, micromobility is mainly provided in areas where mobility options already abound and are used typically by groups who are already highly mobile. In short, micromobility has potential to address traffic poverty, but we would need public regulation of private companies to achieve this

Many other forms of micromobility are emerging. Their introduction in the Netherlands was not discussed much in the interviews. Given their potential compatibility with public transit journeys, they will have to play a major role in future mobilities, so it is crucial to research how they cannot just help lower transport carbon emissions, and provide new business opportunities/models. Rather than serve as a fashionable hipster mode of gentrification, we should take measures ensuring micromobility will contribute to just future mobilities.

7.4 Mobily Justice in the Digital/Data Age

The fourth key element of future mobility justice research is the increasing digitalisation and datafication of our societies and everyday lives, including people's mobilities.

Digital and data aspects of mobility were also mentioned by the interviewees and relate clearly to justice concerns. For example, missing or incorrect information about public transport stops or times on google maps impacted use and perception of public transport negatively. Another example is the need for a digital OV Chip card for access to OV bicycles, which restricts access to those who cannot or do not wish to use the chip card. With the increasing digitalization and datafication of mobility, further research into the intersection of digital/data justice and mobility justice becomes increasingly urgent.

With the increasing bundling of mobility services into Mobility as a Service, this data/digital elements becomes even more amplified, further highlighting the need for justice research on mobility in the digital/datafied age.

7.5 In short

We see 4 main tangents of research. Firstly, the relationship between personal choice in mobility and climate change is problematic. Values clash here: personal autonomy vs. (intergenerational) climate justice. Secondly, we identified some perspectives which should be more prominent in studies with a justice component. Specifically, the family as a unit of analysis, and recreation as a type of mobility. Thirdly, there are some new trends in mobility which are concerning from a mobility justice perspectives. We need to study the full implications of the datafication of mobility. Finally, we also need to study the background conditions for the uptake of (shared) micromobility modes more. These can play a crucial role in combatting climate change, but many barriers to use exist at present.

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