

Choice, Chance, or Necessity?

Understanding Behaviour Change in Transport

**Sonja Haustein, Emma Heiberg, Emma-Sofie Hestbech,
Nina Friser Holst, Alfredo J. Ojeda Diaz, & Dario Stolze**

Agenda

- **Motivation**
- **Methods**
- **Results**
 - **Residential Relocation**
 - **Retirement**
 - **Crash involvement**
 - **BEV and e-bike adoption**
- **Conclusions and Outlook**

Motivation

'Sustainable' trends:

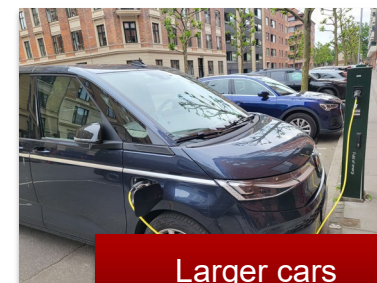


Electrification • Automation • Sharing

Car-centred mobility persists:



More cars

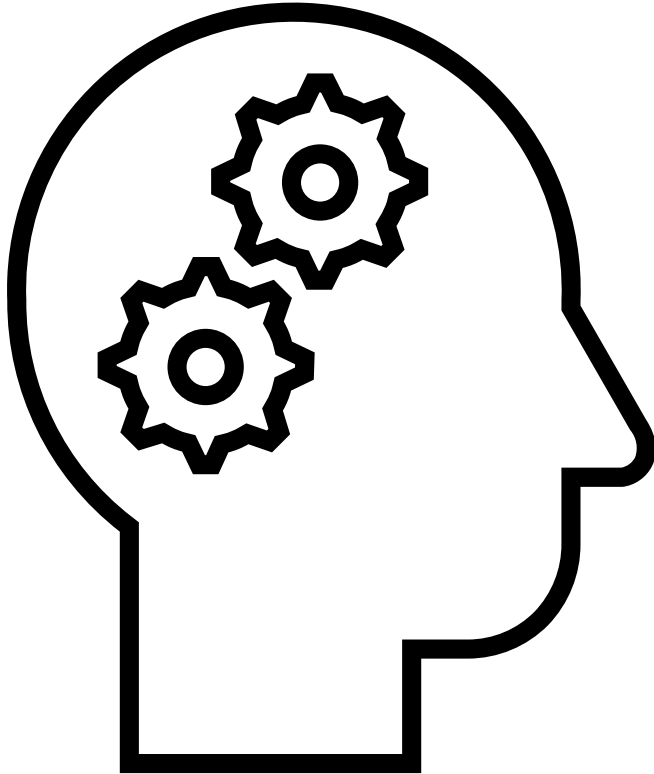


Larger cars



+ 20% GHG
emissions since 1990

So what?



- New transport technologies and services alone:
not the solution
- We need larger **modal shifts**
- To identify & communicate the right measures:
better understanding of human behaviour

WHEN and WHY do people change their travel behaviour?

Survey ($n \approx 12000$)

Case studies on life events ($n \approx 100$)

Bi-annual panel
survey (3 years)

Mobility
behaviour

Attitudes,
norms,
constraints

Travel
satisfaction &
well-being

Environmental
behaviour and
values

Life-events /
demographics

In-depth interviews
before and after
transition

Mobility
behaviour,
changes and
rationales

Mobility
biography

Case study
specific
aspects

App-based mobility
diary (9 months)

Mobility
behaviour

Psychological
constructs

Comments on
behavioural
changes



Residential relocation



Retirement



Crash involvement



Technology adoption
(BEV, e-bike)

Rebound &
spillover

Causality

Effective behaviour change interventions

Data collections

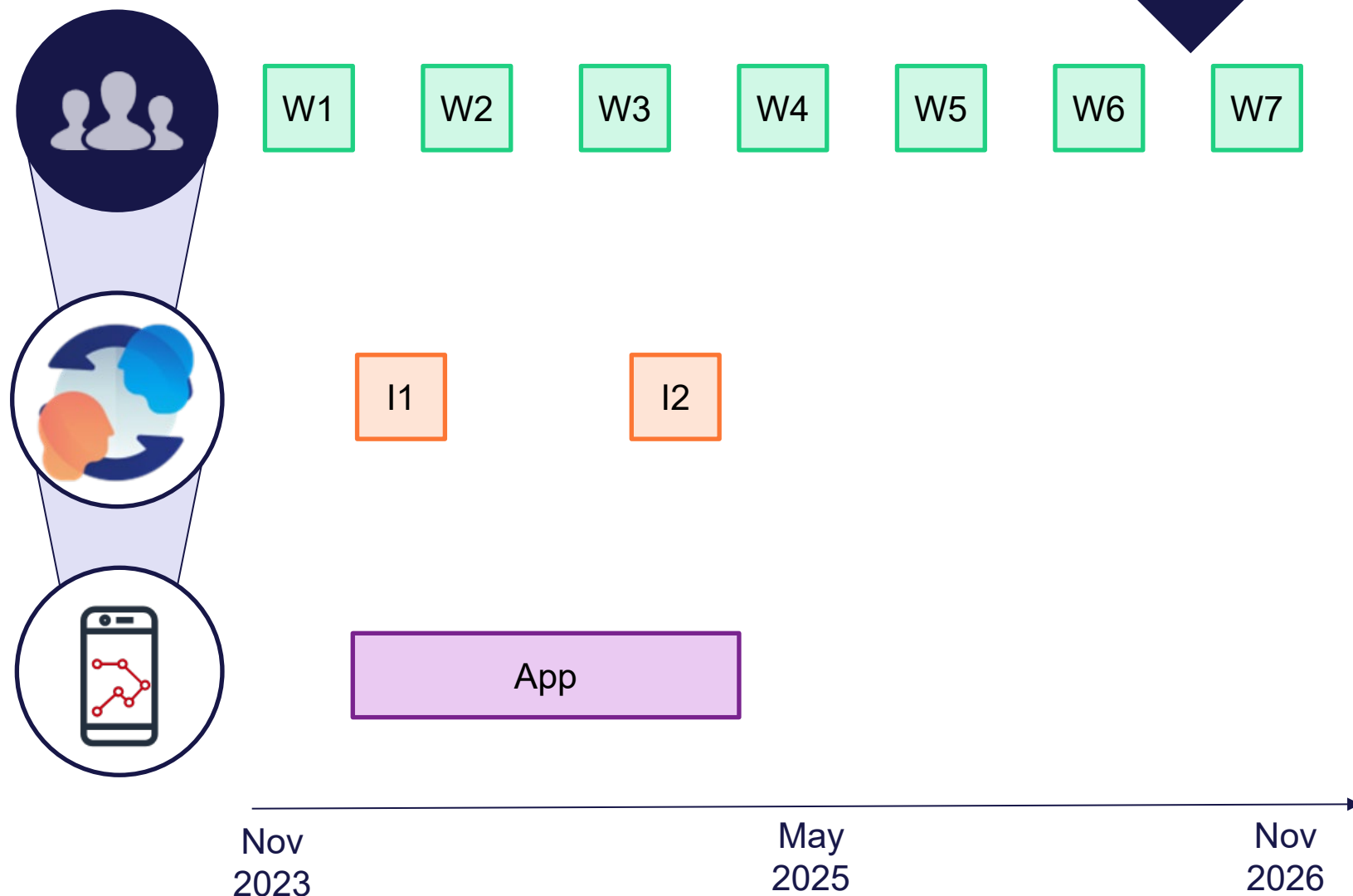
80,000 residents in Denmark invited to join **biannual survey**

W1: $\approx$ 12,000 participants

W2-6: > 5,000 participants

Around 20 panel participants per case study recruited for a pre-post **interview** (n=156)

Interview participants (n=77) and a comparison group not expecting any changes (n=75) used a **mobility app**



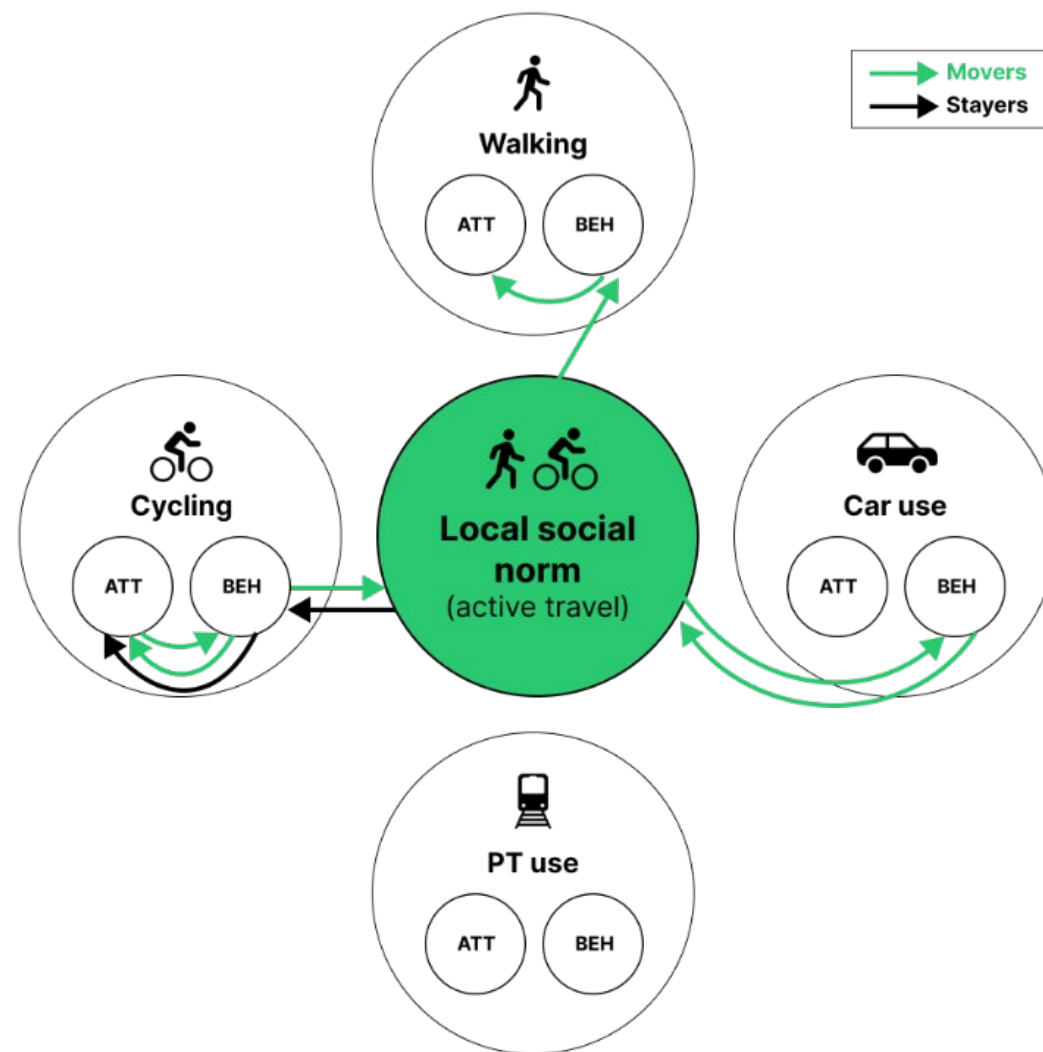
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- Conclusions and Outlook

- Mobility culture plays an important role for behaviour change, in particular descriptive neighbourhood norms (1, 3).
- Moving voluntariness does not predict later (mis)alignment of travel attitude and behaviour, but is linked to different well-being outcomes (2).
- Residential priorities narrow over time and often compete with travel preferences; priorities are often driven by other life events (4).
- Limited evidence for residential self-selection (3, 4).

1		TRANSPORT REVIEWS 2025, VOL. 45, NO. 3, 301–332 https://doi.org/10.1080/01441647.2025.2454414 OPEN ACCESS Unpacking mobility cultures: a review of conceptual definitions and empirical approaches Dario Stolze^a, Thomas Klinger^b and Sonja Haustein^a
2		Forced or desired residential relocation? Moving voluntariness and its effects on well-being and travel behaviour Dario Stolze , Felix Wilhelm Siebert, Sonja Haustein
3		Keeping up with the neighbours? Exploring longitudinal associations of travel-related and locally embedded social norms, behaviour and attitudes Dario Stolze ^a , Taciano L. Milfont ^b, Wokje Abrahamse ^c, Felix Wilhelm Siebert ^d, Sonja Haustein ^e
4	<i>Under review</i>	Zooming in on the travel behaviour change process – a longitudinal qualitative study on residential relocations Dario Stolze & Sonja Haustein

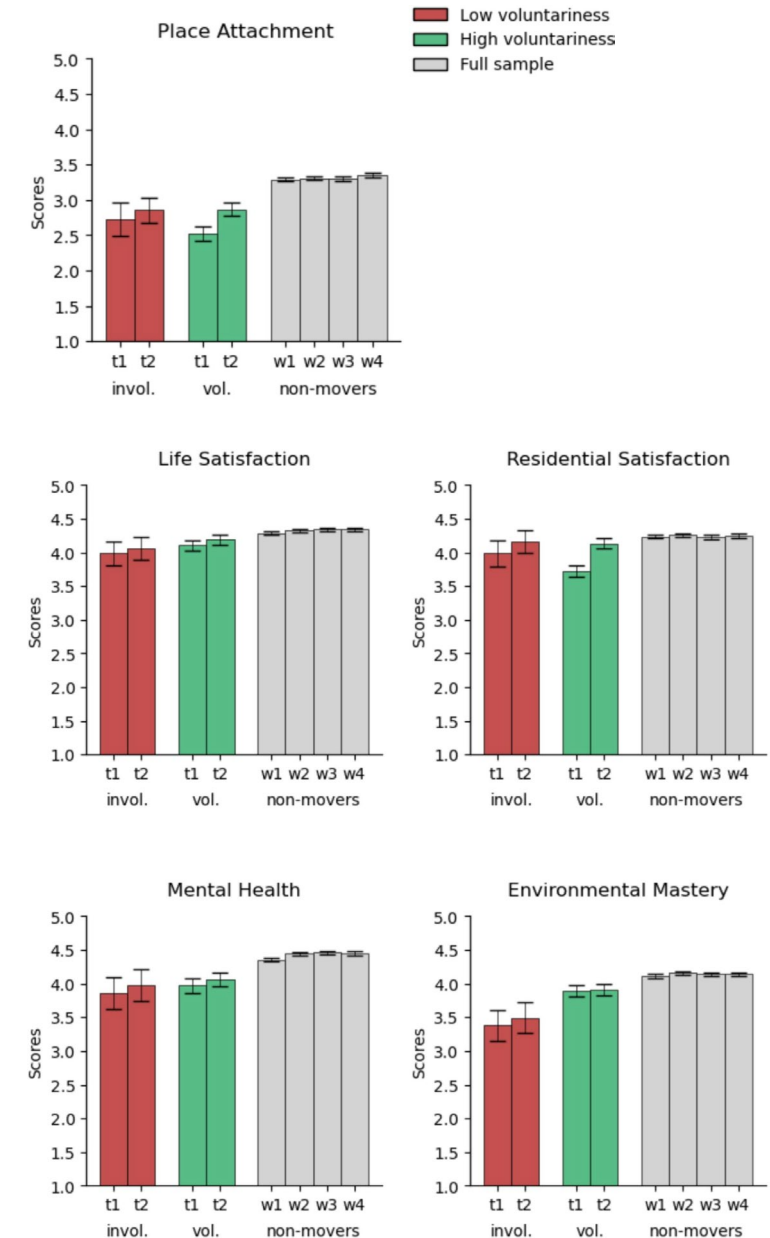
- Mobility culture plays an important role for behaviour change, in particular descriptive neighbourhood norms (1, 3).
- Other than expected, moving voluntariness does not predict later (mis)alignment of travel attitude and behaviour, but is linked to different well-being outcomes (3).
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Residential relocation

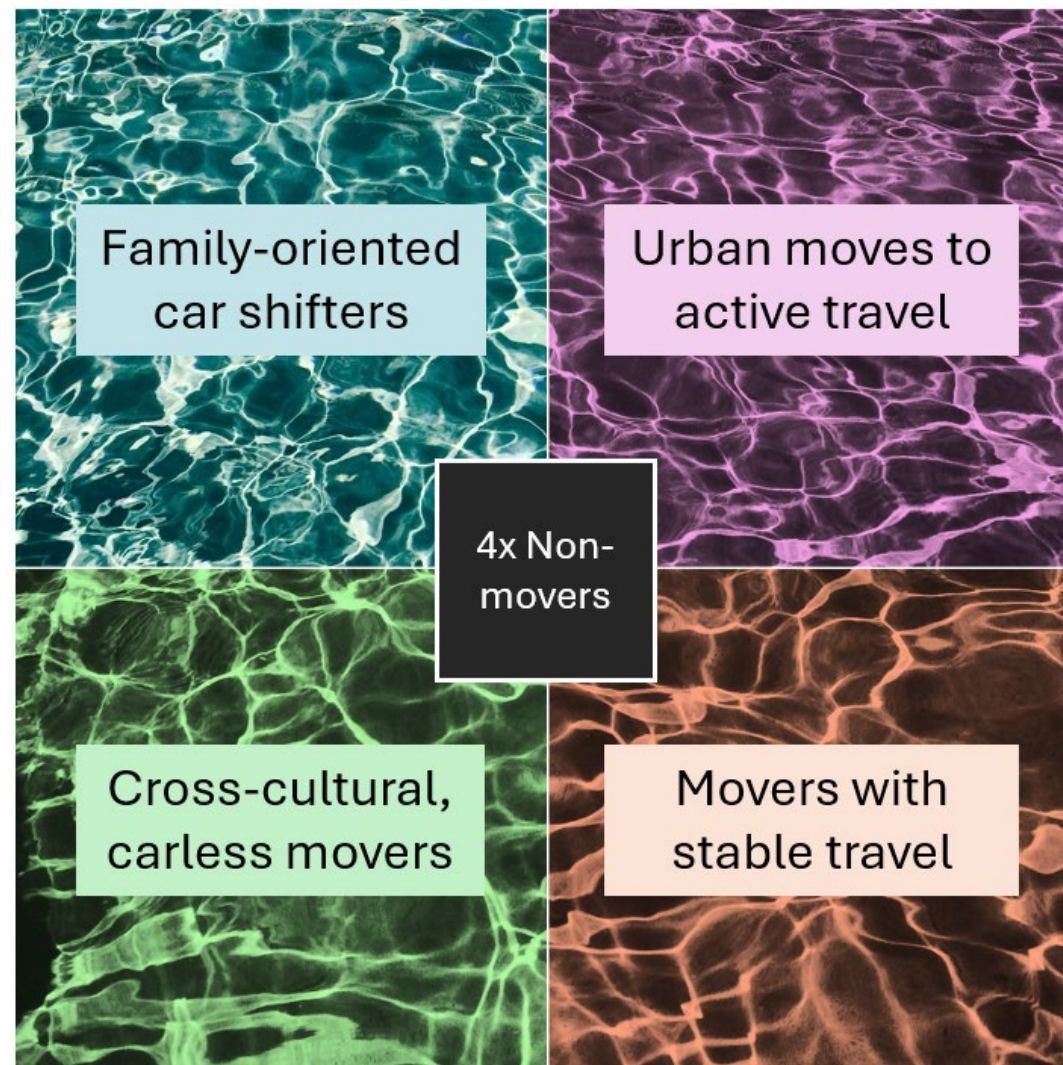
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Voluntary (and involuntary!) movers tend to show higher well-being outcomes:



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- Retirement = independent life chapter: Pursuing dreams, keeping a high level of activity, and enjoying freedom (→ car dependence)
- Three retirement practices: For some, first retirement year functions as a “gap year” involving long-distance travel (while still possible), for others start of a rest at home (→ car dependence)

**Work hard,
retire hard**



**Earned
a rest at
home**



**Stay active
in my near
world**





- **Window of opportunity for car use reduction?**
 - New and old obligations linked to the car (e.g., taking care of parents or grand children, house and garden)
- **Opportunity for promoting active travel?**
 - Early retirement preparation: Mobility changes should be promoted at least 1 year before
 - Economic and health conditions influence decision (when) to retire: promoting/testing e-bikes and (cheap) public transport could be attractive
 - Possible actors to involve: ældresagen, folkeuniversitet, ...



Reach out:

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Changes to everyday transport behaviour after crash involvement

Emma Heiberg, Mette Møller & Sonja Haustein

Reach out: emmhe@dtu.dk



Electric vehicle adoption

- Literature review: Mixed evidence of behaviour change in transport choices and other domains following BEV and e-bike adoption (1).
- Increased car use after adoption not unique to BEV adopters; ICEV adopters show similar increases (2).
- Long-term BEV use reinforces car use alongside stable pro-environmental norms and intentions, whereas ICEV use reinforces car-centric attitudes and lower environmental concern (3).
- As BEV adoption has become mainstream in Denmark, evidence of rebound and spillover effects remains limited (4).
- Limited long-term effects of e-bike adoption; strongest effects among utilitarian users. Key barriers include theft concerns and competing life events (5).

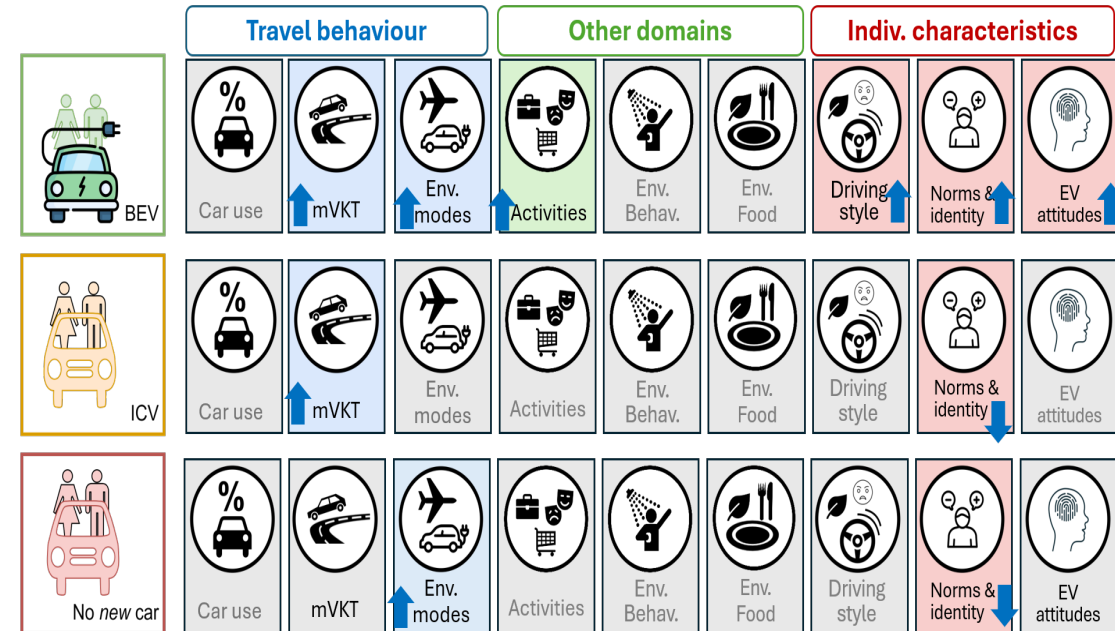
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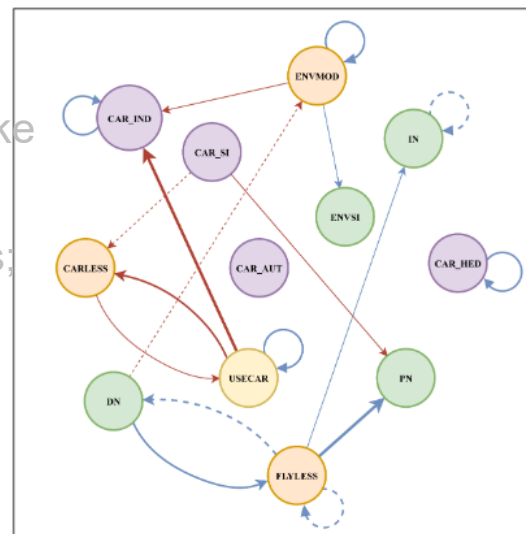
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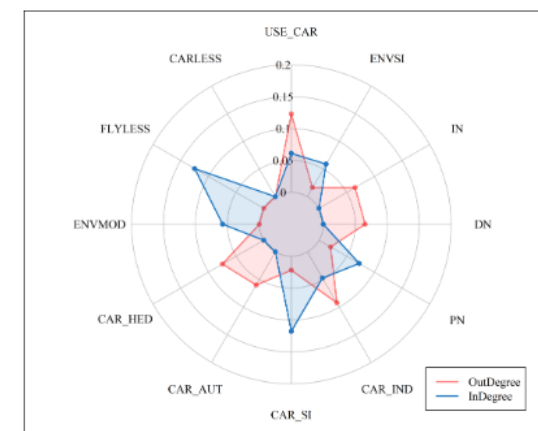
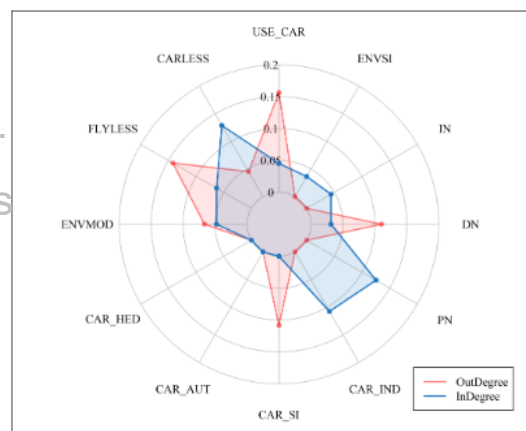
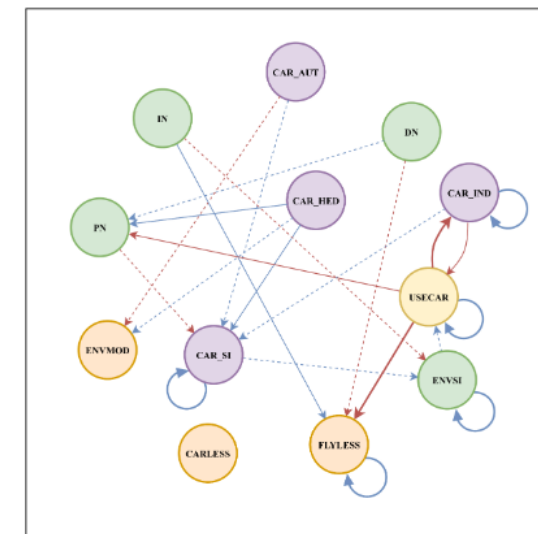
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BEV group

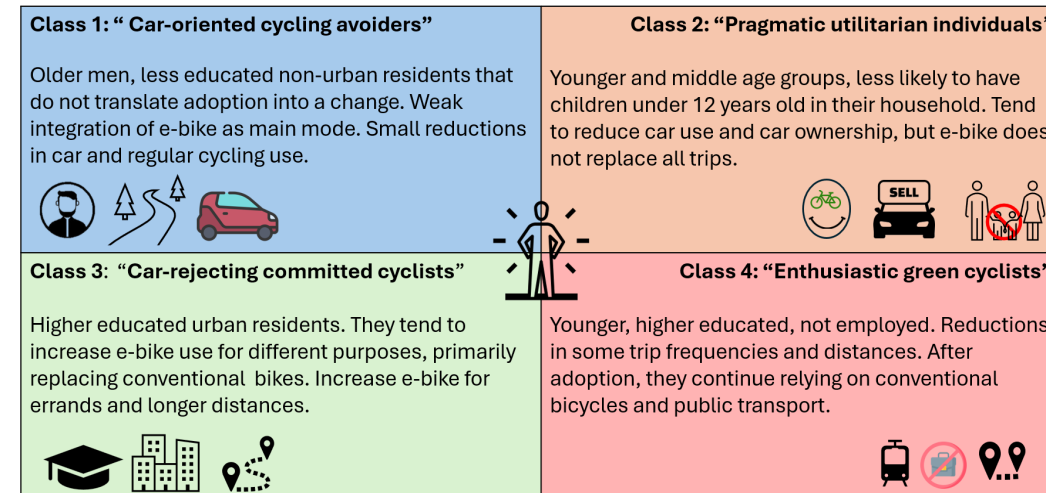
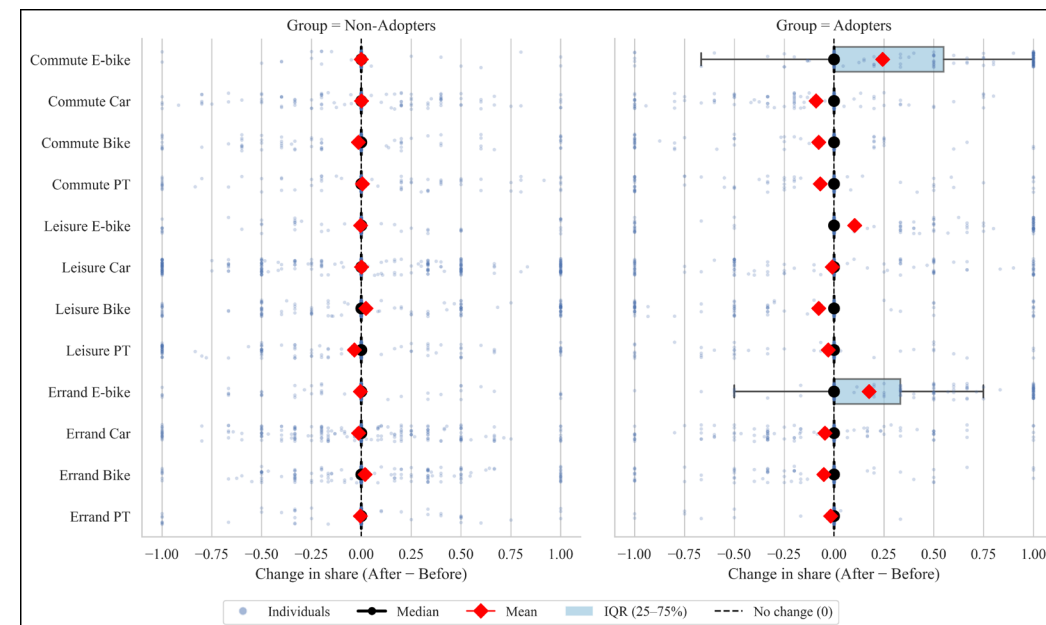


ICEV group



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Some findings across case studies

- Life events/vehicle purchase involve **intensive planning** but unfold through **dynamic**, often **unexpected processes** (esp. moving, e-bike adoption)
- Travel behaviour change often a **consequence** of higher-priority life decisions
- Limited evidence for rebound and spillover effects of electric cars (“It’s just a car”)
- **High car dependence** across all case studies (DK # CPH) expressed in shared beliefs (e.g., “with kids one needs a car”; “to stay independent one needs a car”)

Next steps

Integrate



Interviews:

- Analysis across case studies: role of **travel socialisation** and **loss of infrastructure** for **car dependence**



Survey data:

- **Crash** and **retirement** effects
- Main triggers of travel behaviour change ('chance, choice and necessity') in complete dataset
- **Well-being** and **travel satisfaction** as outcome or driver of behaviour change?



• App data:

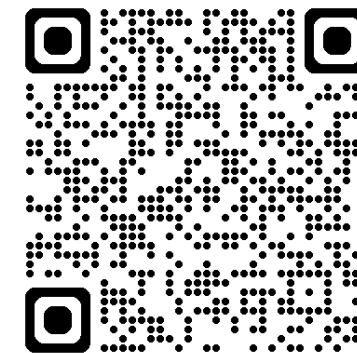
- Examine dynamics in attitude-behaviour relationship
- Relation to self-reported data

Thanks for listening!

Comments?

Questions?

Follow the URGENT project:



Reach out:
Sonja Haustein; sonh@dtu.dk

More on electric vehicle adoption:
25 September: Alfredo's PhD defence