

The mobility intensity of everyday practices: identifying sequences of activities in terms of their travel characteristics

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Structure of the presentation

1. The DEMAND Research Centre
2. Social practices
3. Our goals & approach
4. Findings
5. Conclusions

Demand approach

These propositions underpin 5 research themes.

1 Energy is used in the course of accomplishing social practices.

2 Social practices and energy demand are shaped by infrastructures and institutions.

3 These systems reproduce interpretations of need and entitlement, and of normal and acceptable ways of life.

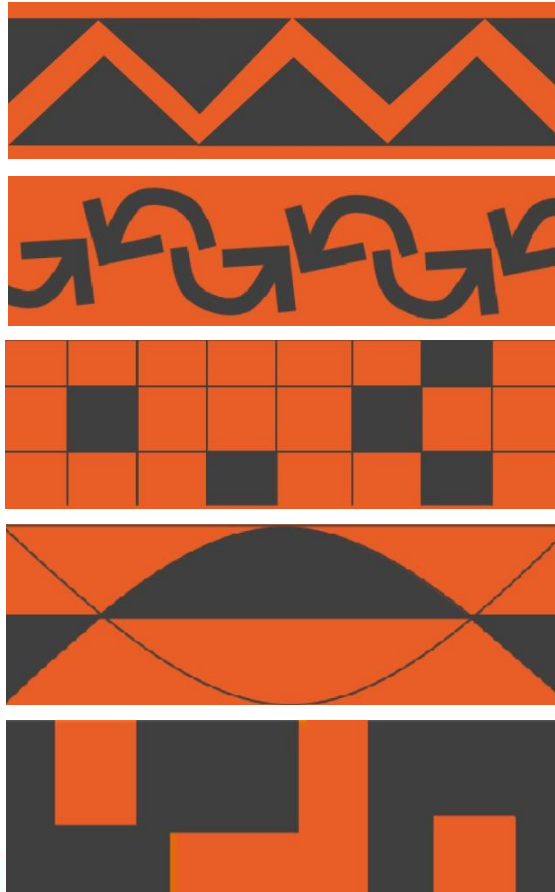
1 How and why do end use practices vary?

2 How and why do end use practices change over time?

3 How do infrastructures of supply and demand shape end use practices?

4 What are the implications for normality, need and entitlement?

5 How is energy demand constituted, transformed and steered?



Research within these themes allows us to:



Identify and explore new opportunities for **demand** management at different scales.



Achieve a step change in how energy **demand** is understood and managed.



Confront fundamental issues of **demand**: what is energy for?

Theme 1

Trends and patterns in energy demand

*“There is a clear need for substantially **more sophisticated analyses of spatial, temporal and social variations in end use practices** in order to produce more refined scenarios of future demand, and to inform current policy initiatives and critically examine their effects.”*

Secondary analysis of existing large datasets. Move **beyond aggregate averages**

CTR Aberdeen team

- WP1.1: structure & social distribution of (current) end practices - **reconceptualisation of mobility practices**

Social practices (Shove et al., 2012)

- **Vs individualistic “ABC”** (Attitude, Behaviour, Choice) approach to climate change policy and research (Shove, 2010)
- Change of perspective: the primary **unit of analysis** should be the ‘**practice**’ (‘routinized types of behaviour’), not be the individual,
- SP exist ‘out there’ (“P as *entity*”) but are constantly enacted/reproduced (“P as *performances*”)
- “**Individuals feature as the carriers or hosts of a practice**” - “to persist and survive, practices have to attract and activate practitioners and other constituent elements”
- “transcend the dualism of structure and agency, determination and voluntarism (..)”

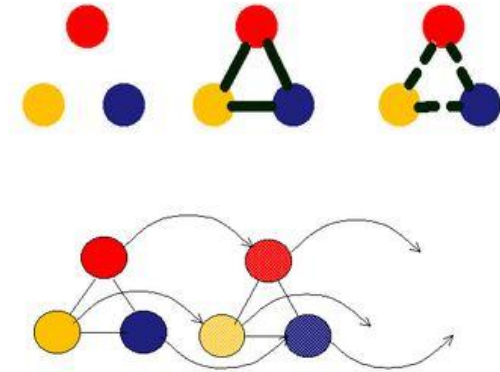
Social practices

(Shove et al., 2012)

P consist of **three types of elements**

- **material**
- **competences**
- **meanings**

.. that are integrated when practices are enacted



- “P emerge, persist and disappear as **links** between their defining elements are made and broken”
- Focus on the ‘**life and careers of practices**’, rather than individuals
- Connections between practices: **bundles** and complexes

Car dependent practices?

Concept widely used in a micro (ABC) or macro (built environment) understanding - we argue for a **meso-understanding** inspired by theories of social practices

WORKING DEFINITION: *Practices where the **car has become the dominant element in the integration** between the different elements (materials, competences and meanings, along with timing and location). If car driving was subtracted from the equation (and substituted with another transport mode), many other elements would have to adapt substantially - or the activity might even not happen at all.*

It **allows us to focus on** need to carry objects (*materials*); need to learn new ways of doing things (*competences*); changes in frequency / timing required by modal shift; leads to question notions of comfort and convenience (*meanings*)

	Activity-Based Approach	Our approach
<i>Understanding of travel</i>	Emphasis on travel as a 'means to an end' / arising from participation in activities & on the sequencing / flanking of activities and travel	
<i>Data</i>	Time diary data, but mostly (ad-hoc) activity-travel surveys at the local / metropolitan level	National time use dataset (British TUS 2000)
<i>Theoretical framework</i>	Individualistic / behaviouralist approach	Anti-individualistic, 'meso-level' approach, practices/activities as the unit of analysis
<i>Focus</i>	Emphasis on interdependence between travel <i>decisions</i> within the day / the household	Emphasis on interdependence in terms of flanking of activities (sequence patterns)
<i>Activity type detail</i>	Few policy / economically relevant activity types	Looking for as much detail / variety as possible
<i>Output</i>	Increasingly sophisticated models to forecast travel demand and the impact of exogenously predefined demand management policies (e.g. road pricing, etc.) on it	Variety of insights into how / why <i>specific practices</i> are responsible for more travel / energy use and/or difficult to steer in a low-energy direction – which can inform policy
<i>Methodological context</i>	Purely quantitative research	Fruitful exchange with interdisciplinary qualitative / historical research on the energy intensity of specific practices

Our approach: goals & methods

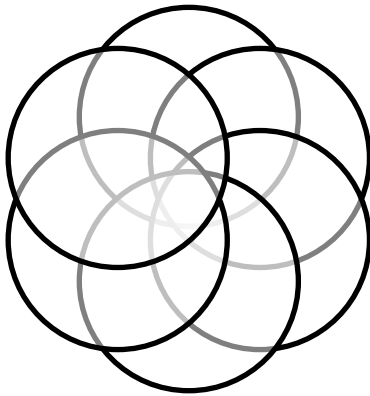
- Quantitative analysis of the detailed information on **activities** in Time Use data with sequence analysis techniques...
- to identify traces / proxies of **practices** (Anderson et al., 2012; Browne et al., 2014)
- characterise activities in terms of their **mobility / car intensity**, drawing implications for travel-related energy demand
- to generate relevant insights for policy
- **mapping exercise to identify the crucial / problematic areas** that deserve further, more in depth (qualitative) study

Visual-TimePAcTS

Linköping University, Vrotsou et al. (Ellegård & Cooper, 2004; Vrotsou, 2010; Vrotsou, Ellegård & Cooper, 2009; Vrotsou, Johansson, & Cooper, 2009)

Computer science (information,
visualization & interaction)

Clustering /
segmentation

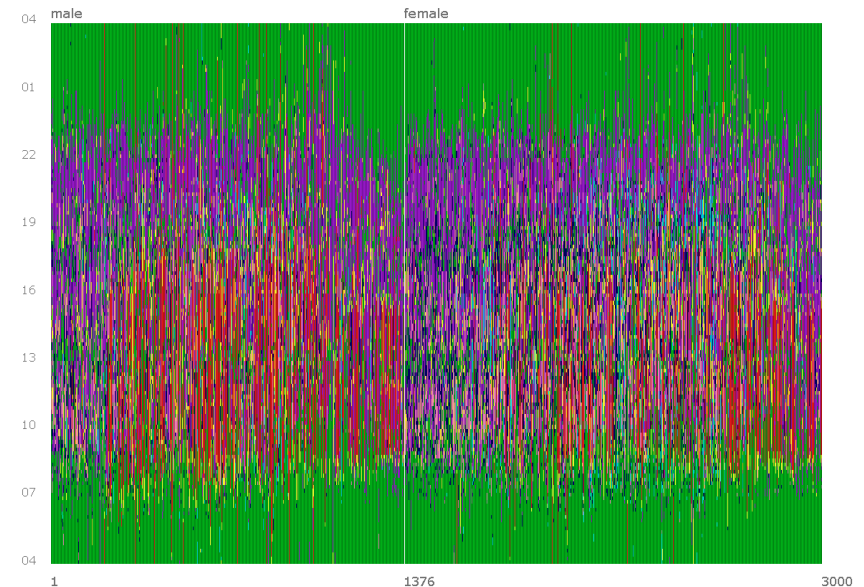


Data-mining

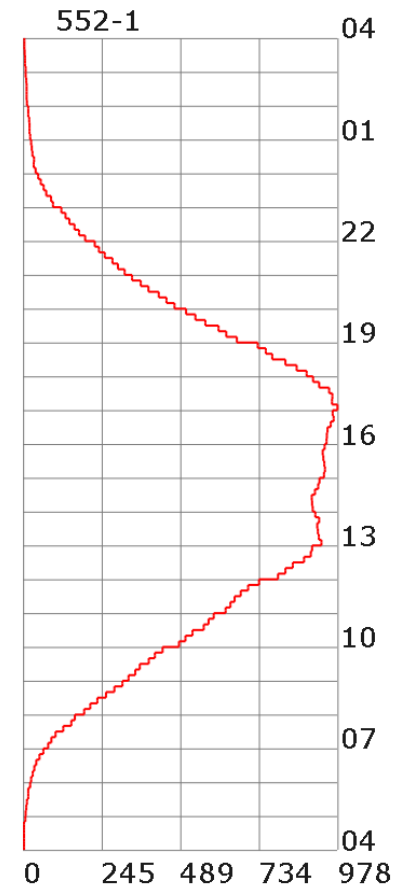
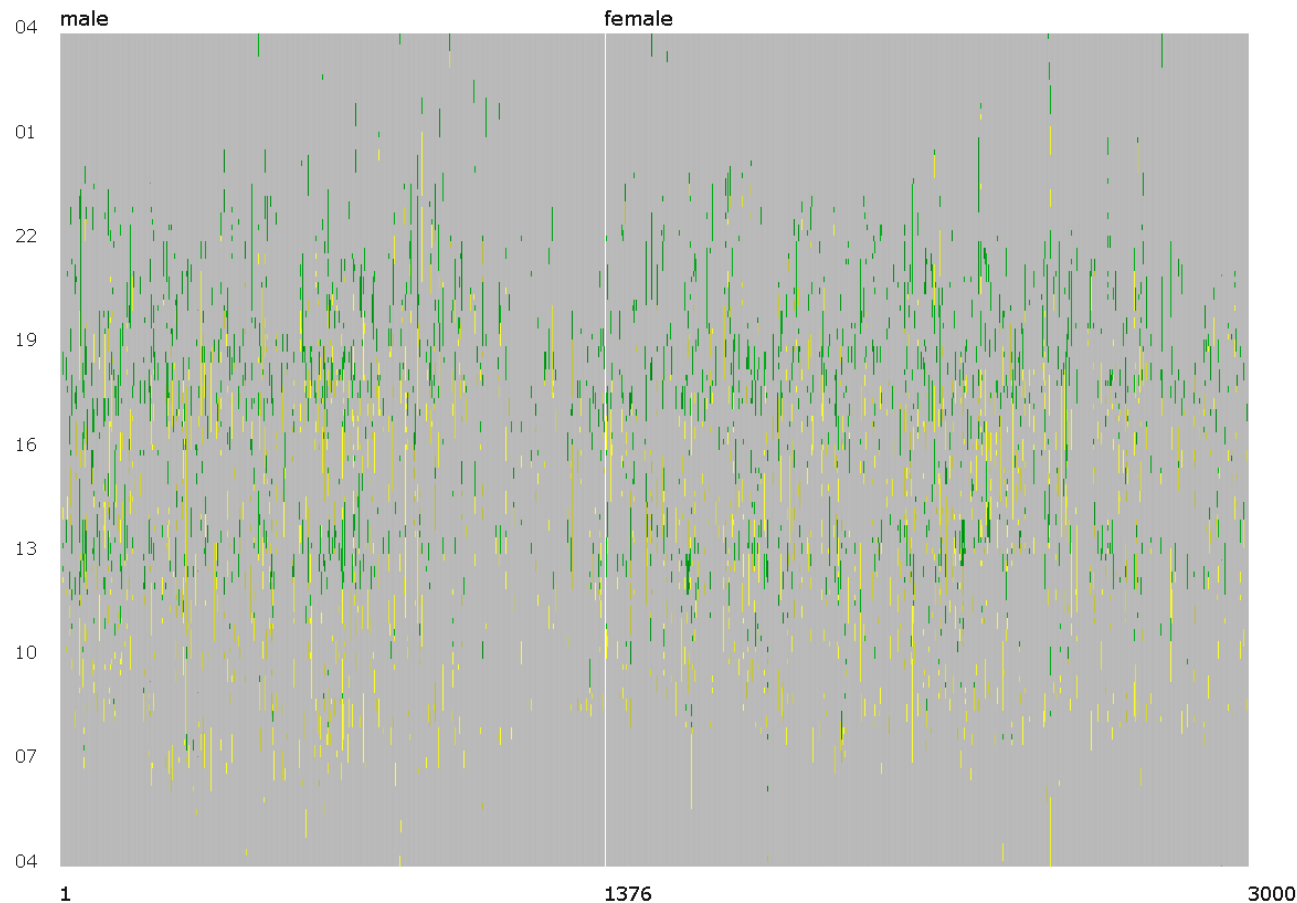
Time-
Geography
Approach

Activity-diary /
time use data

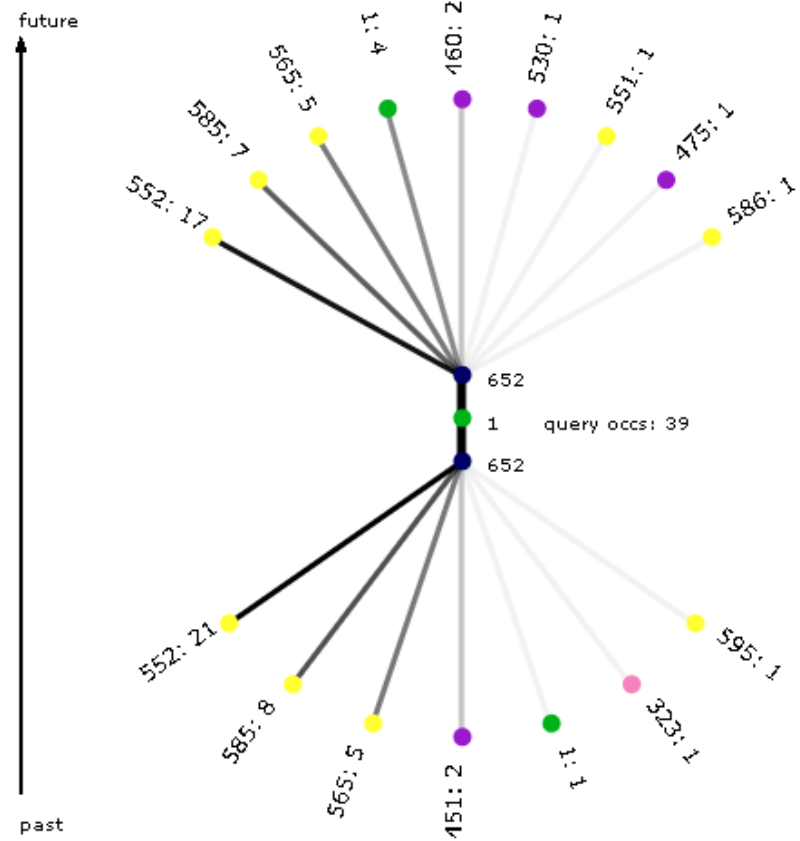
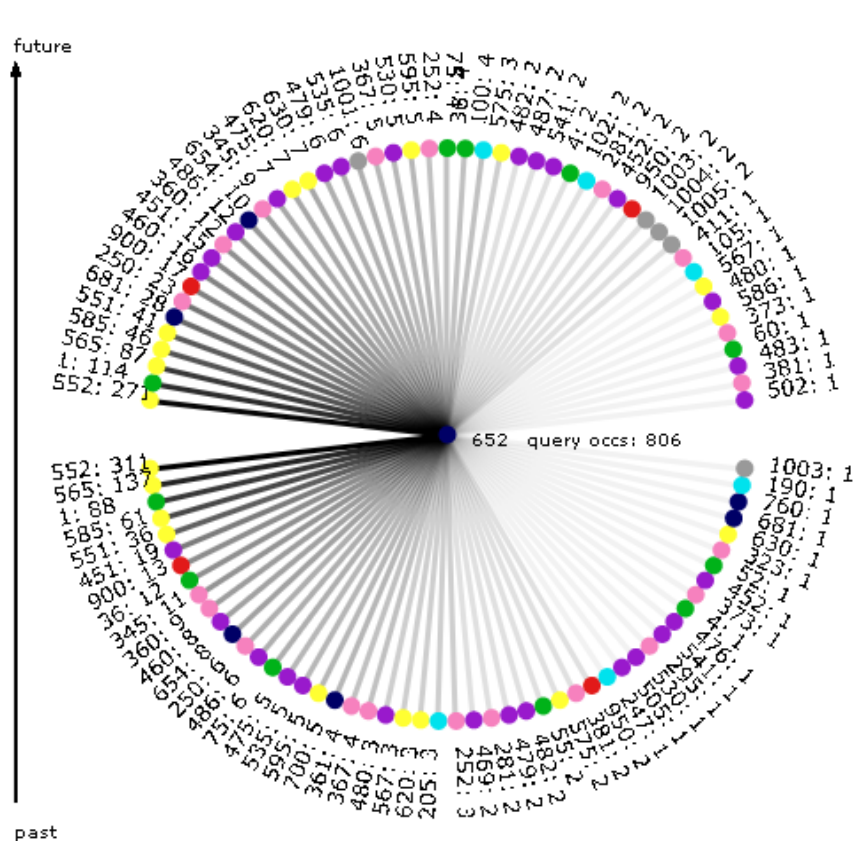
Sequence data
analysis



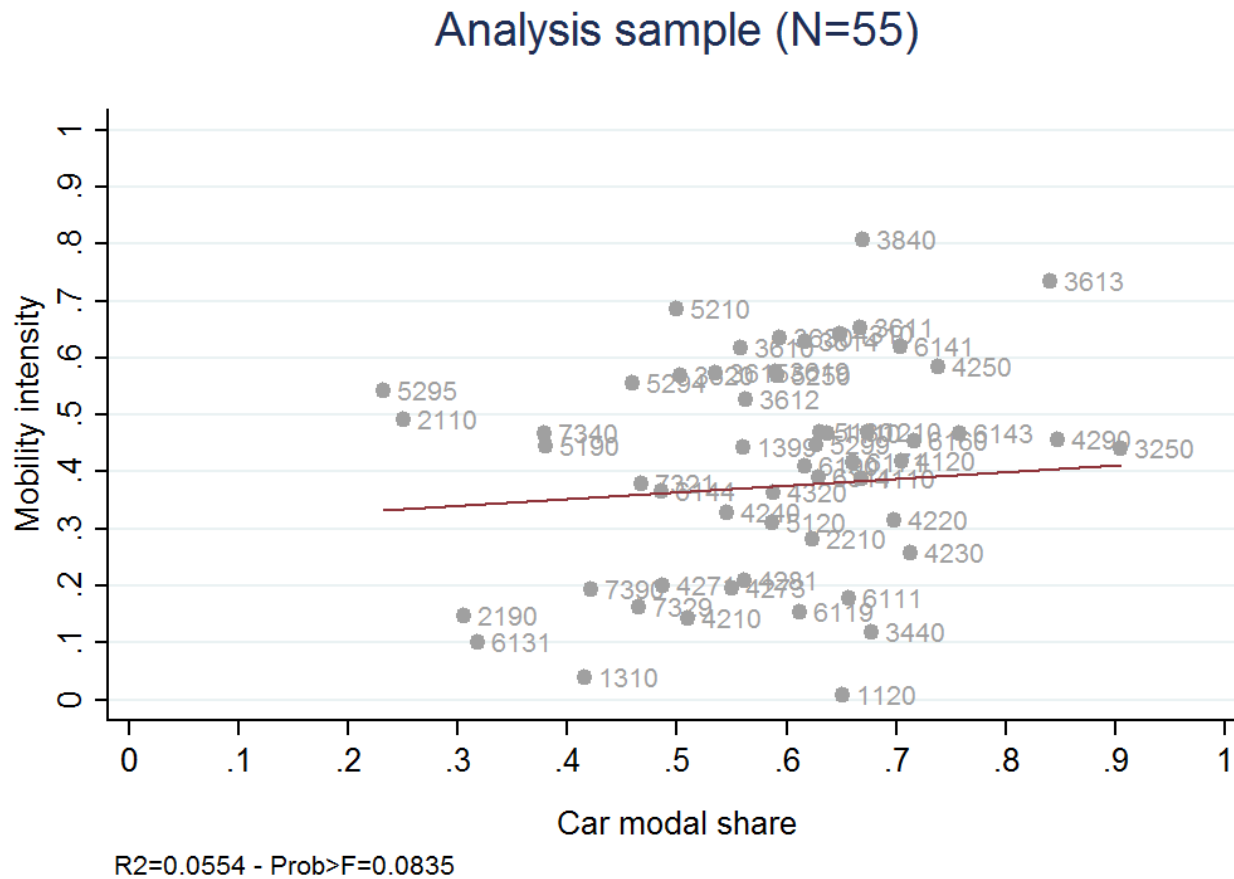
Visual-TimePAcTS – sequence pattern mining



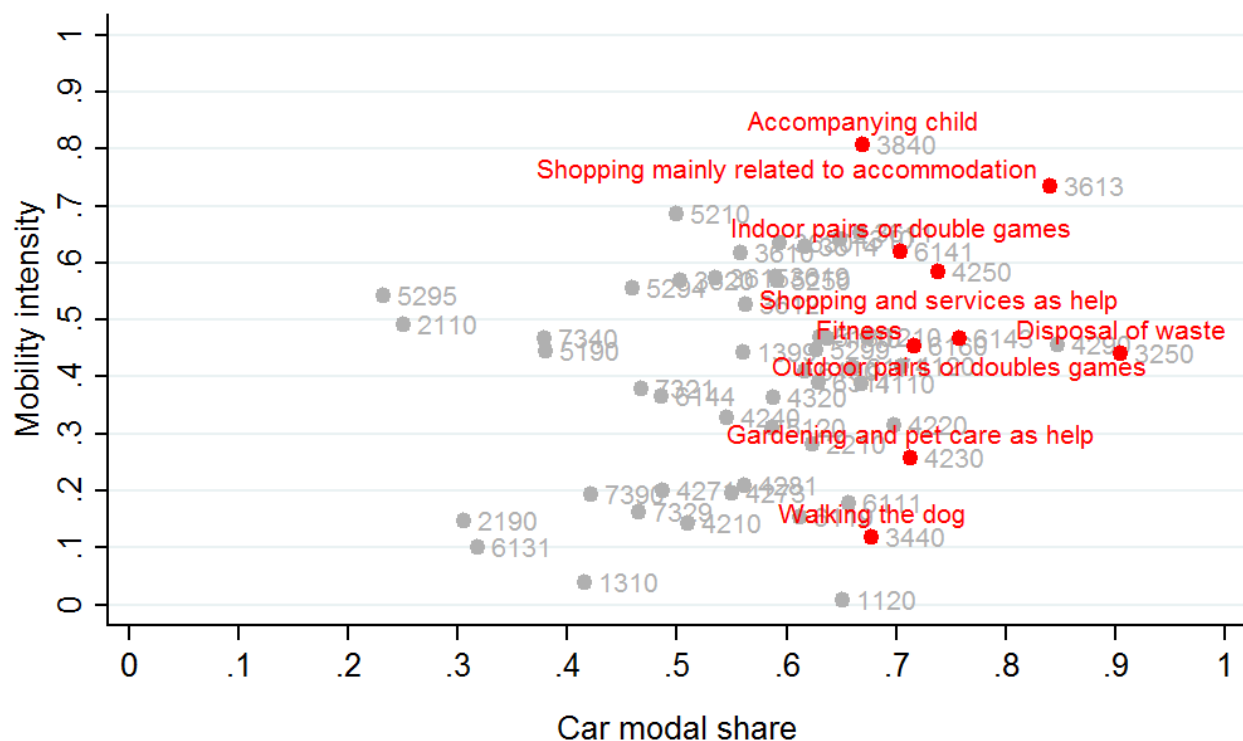
Visual-TimePAcTS - ActiviTree



Mobility intensity and car modal share – relationship



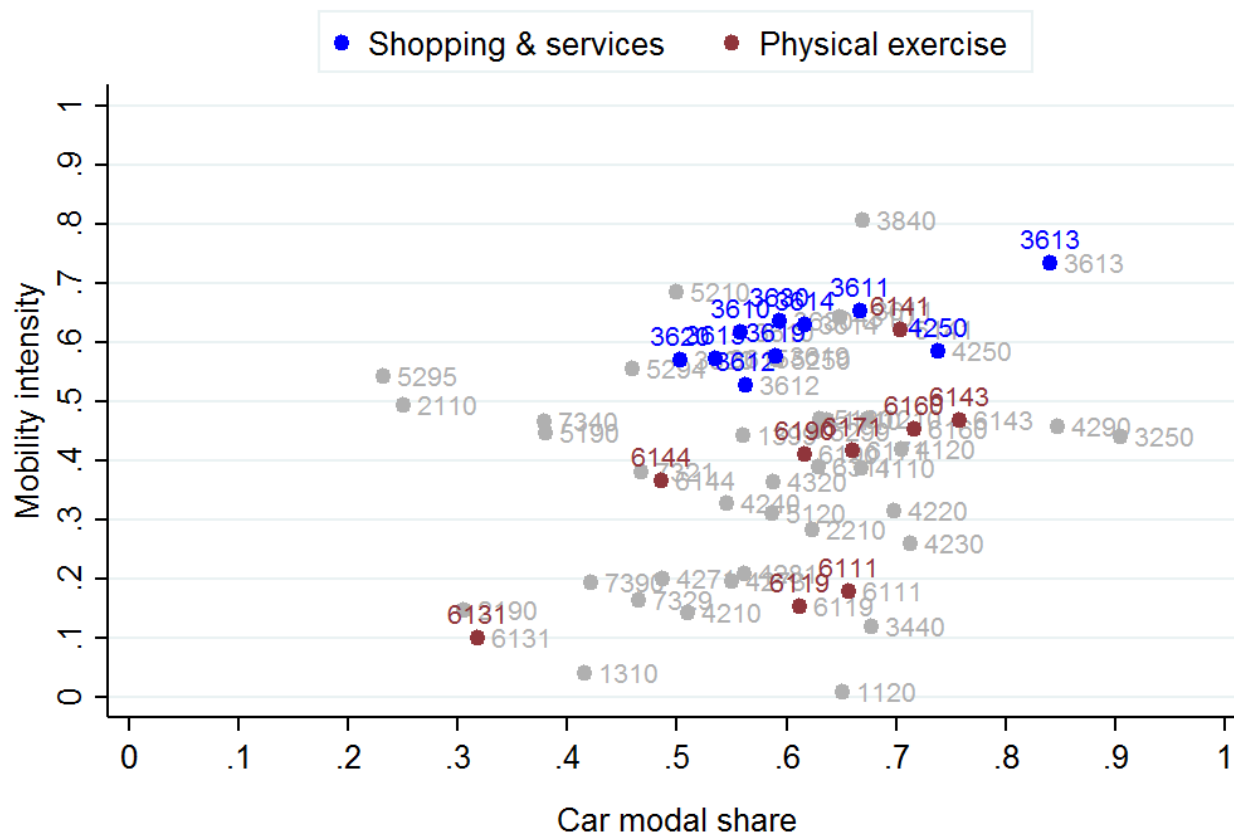
Selected high car modal share activities



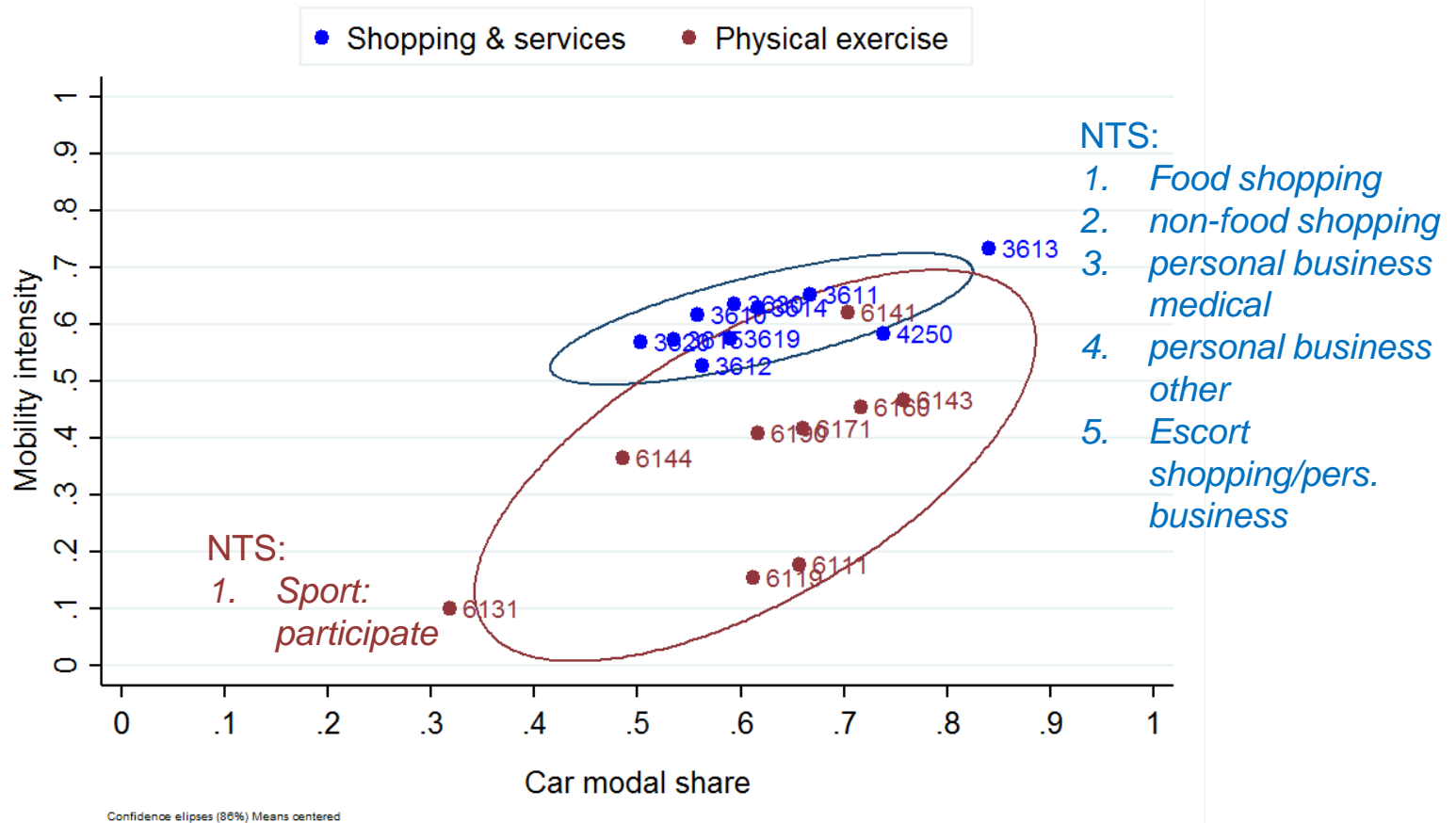
Low car-intensive pub practices?



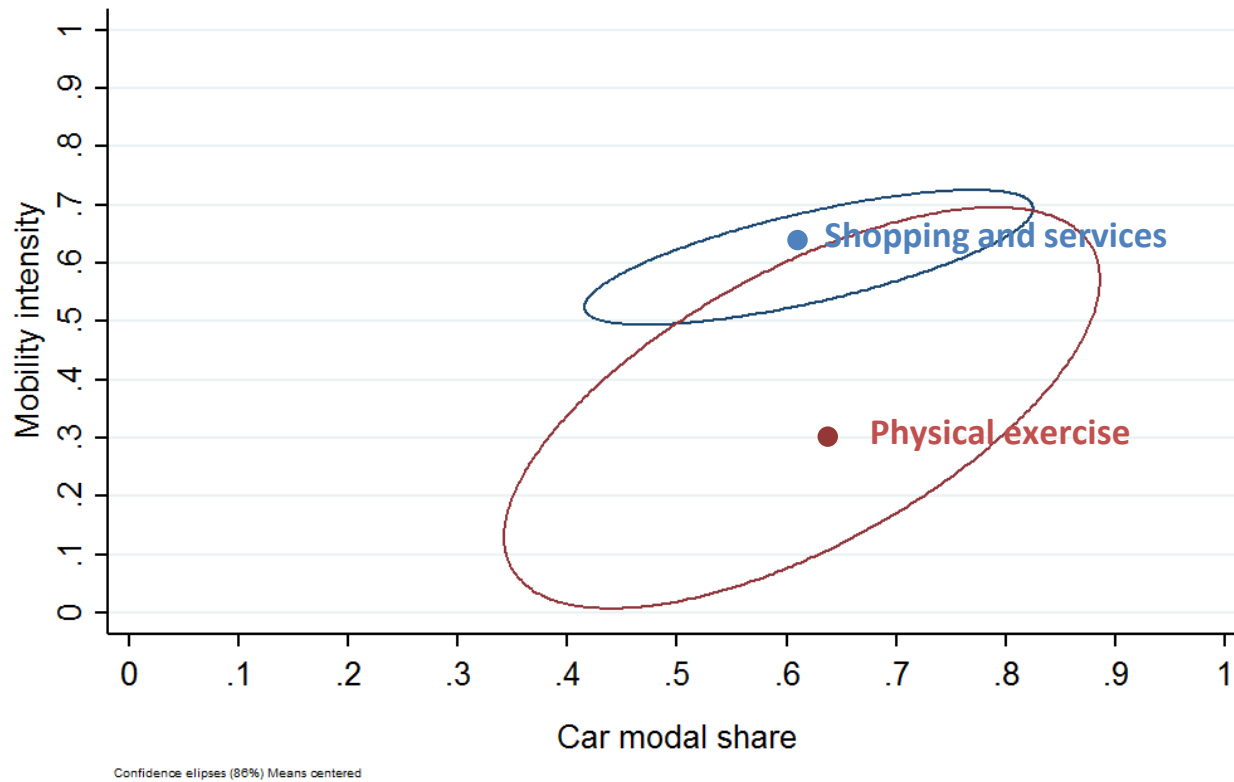
Clusters and scatters of activities



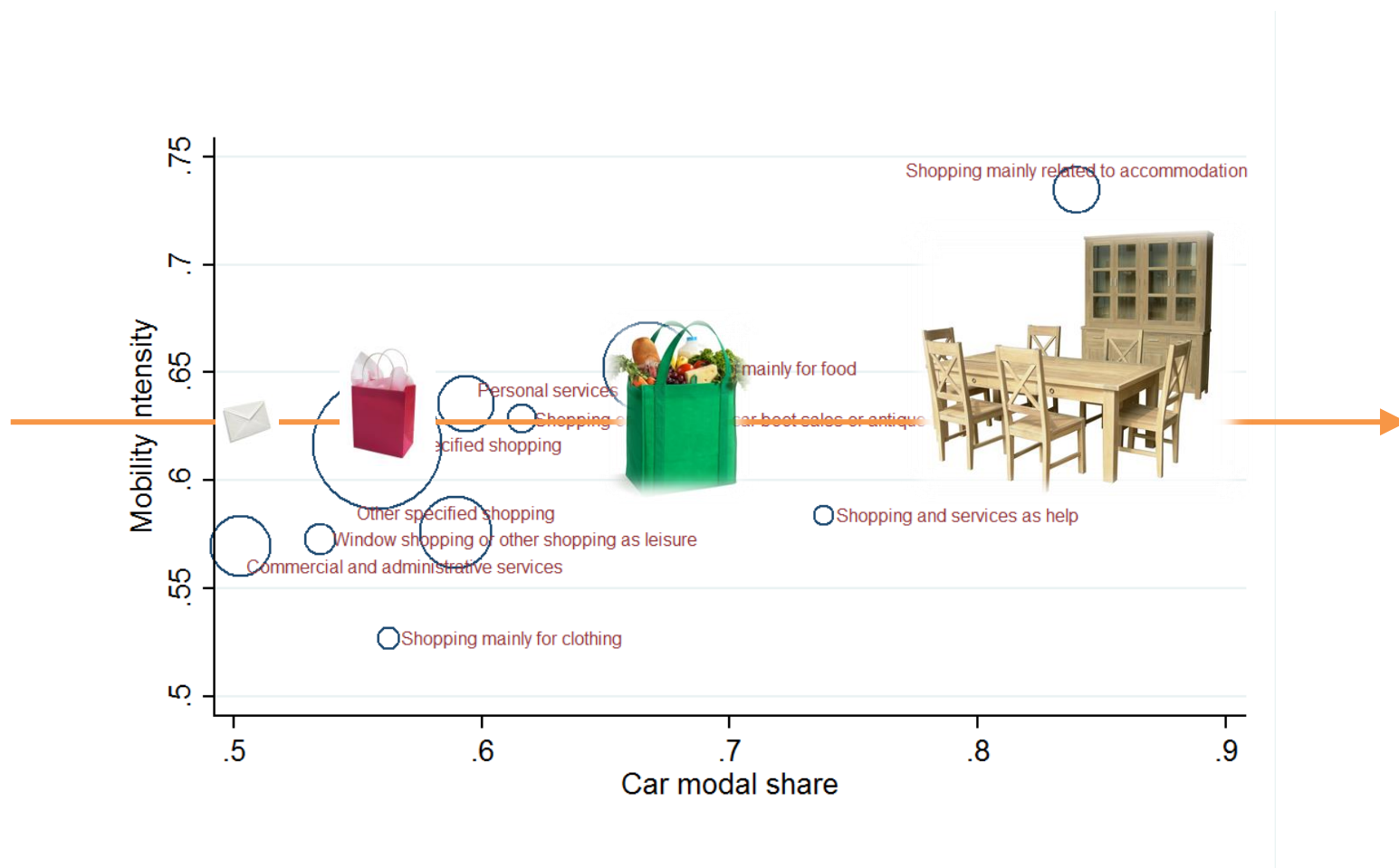
Clusters and scatters of activities



Clusters and scatters of activities

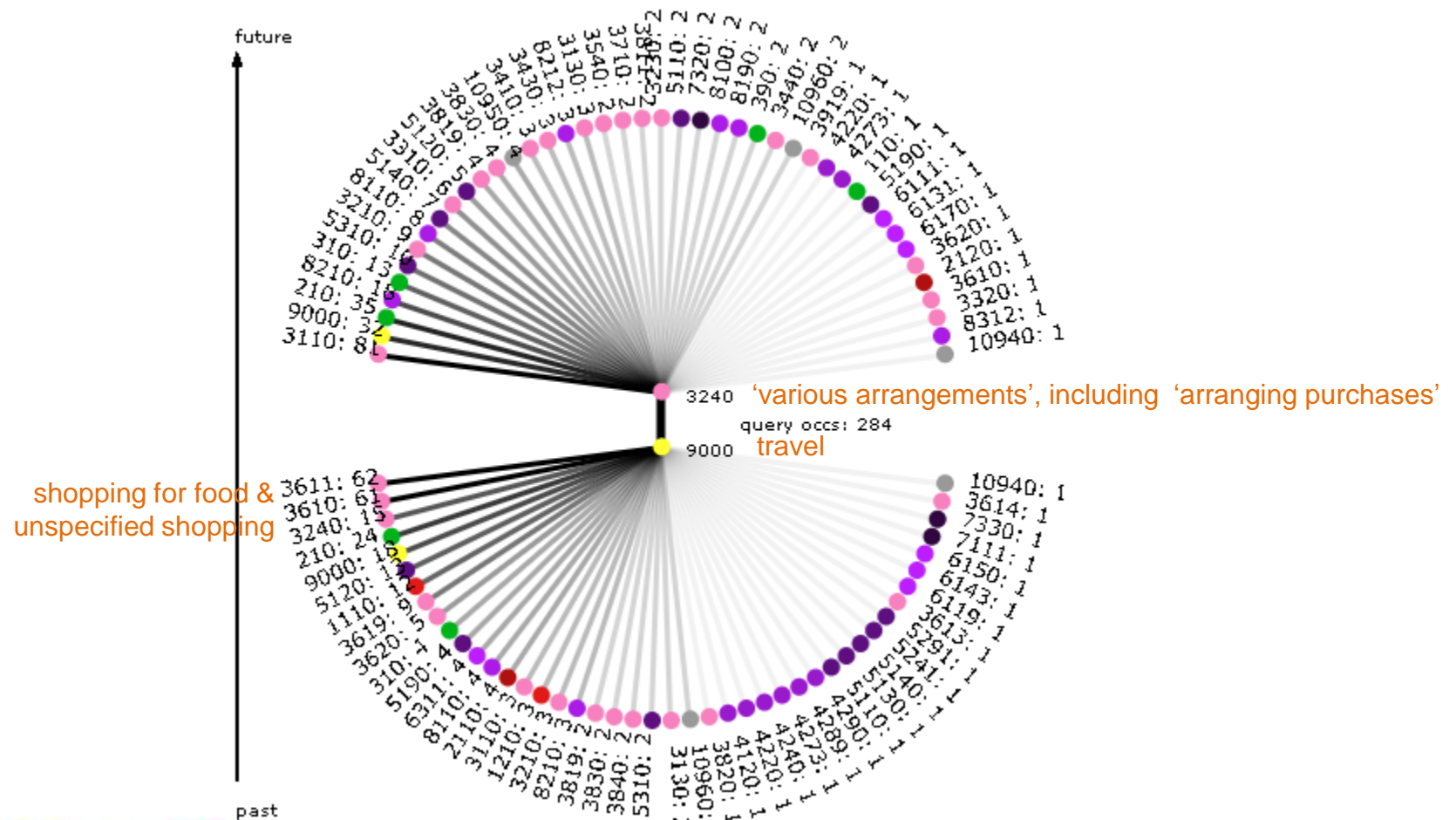


Shopping and services



The freight function of car travel

Exploring sequences for 'arranging purchases'



The freight function of car travel

Exploring sequences for 'arranging purchases'

Hypothesis

Types of shopping most likely to involve a large amount of goods more likely to be followed by arranging purchases

When there is a lot of purchases to arrange, car use is more prevalent

Findings

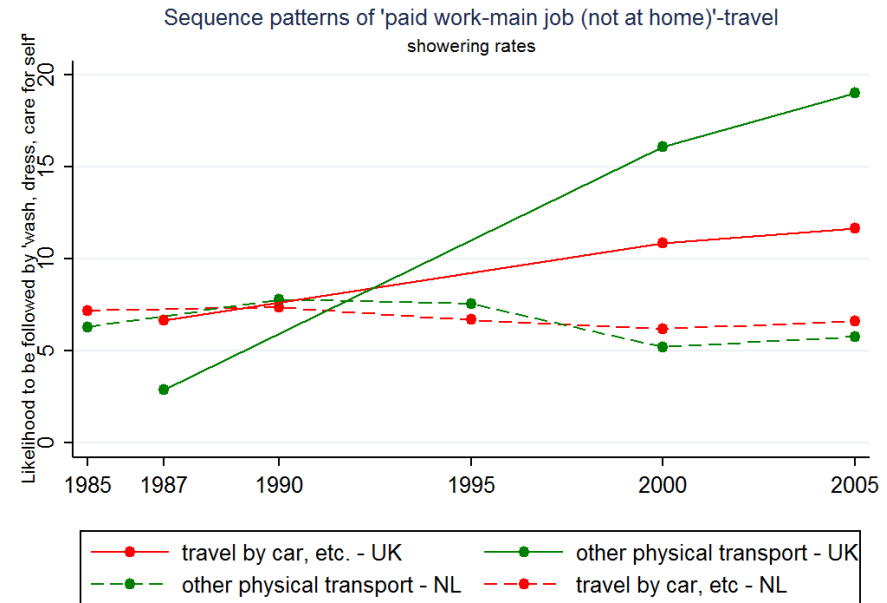
15% of 2-tuples of 'shopping'-'travel' are followed by 'various arrangements'. 27% when it is food shopping vs. 2% for 'shopping for clothing'

Car modal share is higher in 3-tuples of 'shopping'-'travel'-'various arrangements' (72%) than otherwise (51%)

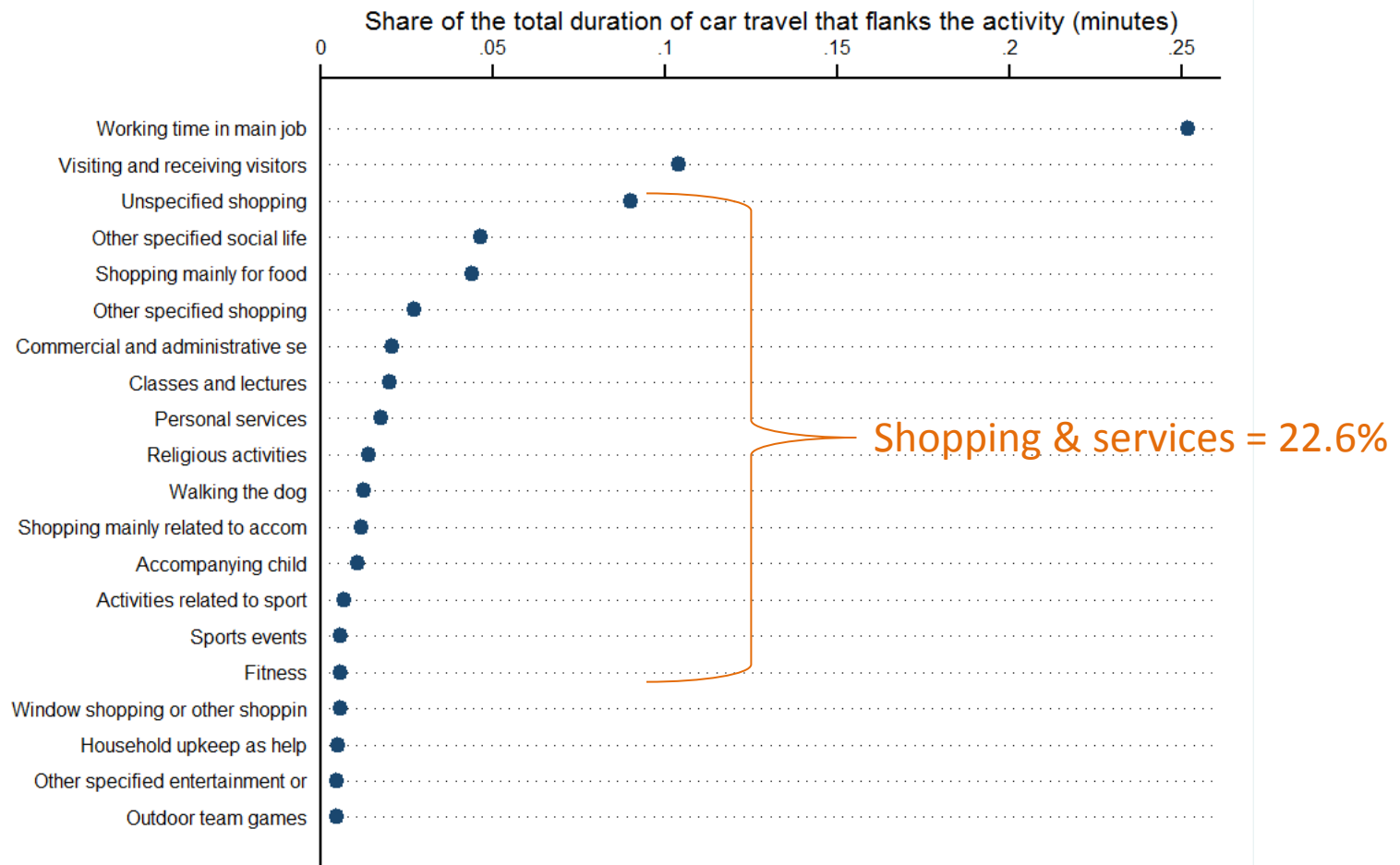
Practices across the transport / home divide

Showering and the cycling commute – MTUS analysis

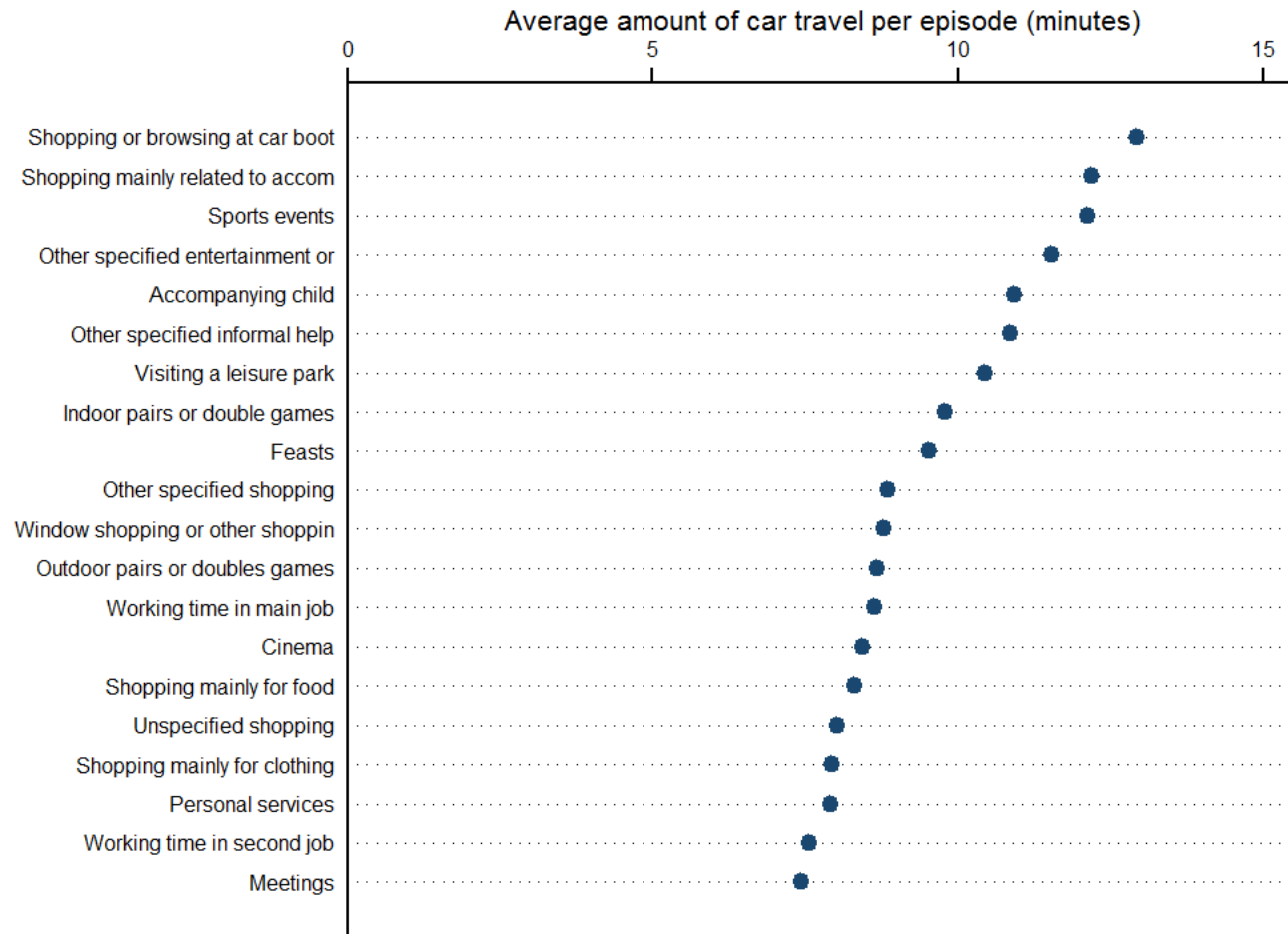
- Finding: in the UK, the **cycling commute is more likely to be followed by showering** (at home/workplace) than the commute by other modes, unlike the Netherlands where showering rate is lower and there is no difference between cycling and travel by car in this respect
- Possible energy rebound effects of modal switch: reduced energy demand for travel = increased energy demand for washing?**
- Following the decline of cycling from ‘mainstream’ in the 1940s to niche (Watson, 2012) the dominant form of cycling in the UK today involves specialist gear, is perceived as a sporty activity (Aldred, 2013; Goodman et al., 2014; Steinbach et al., 2011) and therefore as something necessitating showering



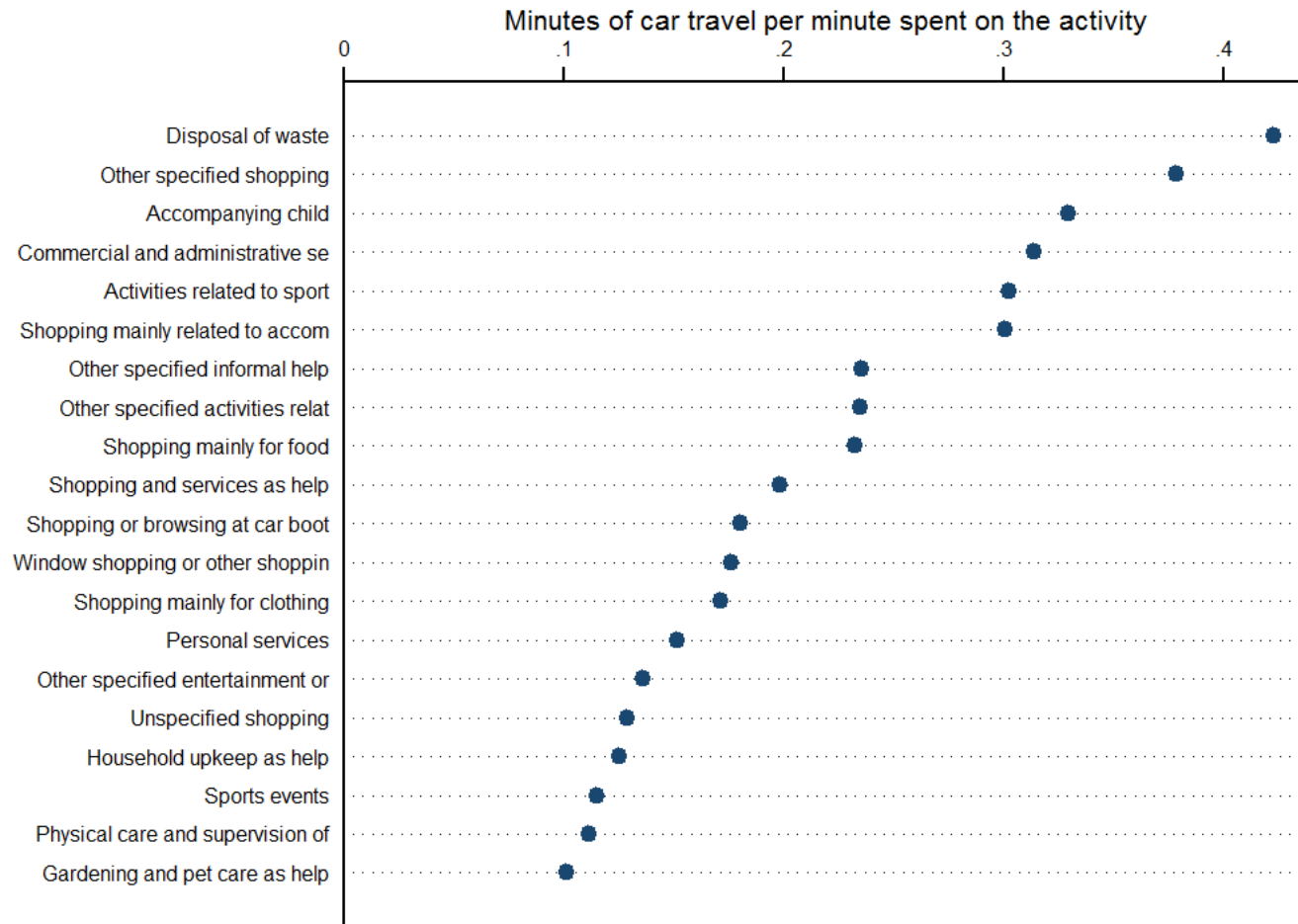
Proxies for travel-related energy intensity of activities – top 20



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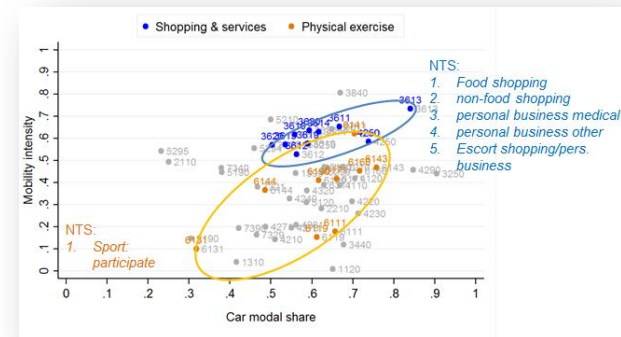
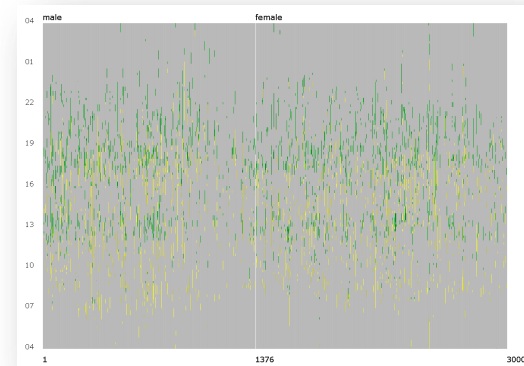


Proxies for travel-related energy intensity of activities – top 20



Conclusions

- TUS can be exploited with innovative **sequence pattern mining techniques** to single out (sequences of) activities strongly associated with car travel= areas of interest for further (qualitative) research on energy relevant practices
- Brings to light **variety** - challenge to activity types typically used in NTS / Activity-Based Travel Modelling (cfr. Buliung & Kanaroglou, 2007; Doherty, 2006)



Policy implications

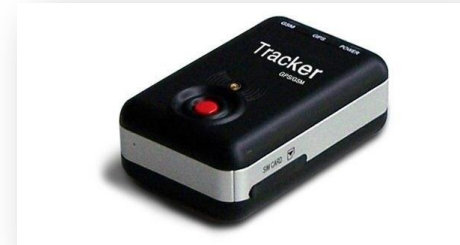
- Challenge to transport policy focus on the journey to work
- Non-energy & non-transport policy has **relevant implications** for travel-related energy demand – e.g. disposal of waste (environmental public policy)
- **Freight dimension of travel:** materials as a site of intervention? Substitution with online shopping / home delivery? (DEMAND Project 3.3)



Future research

Data needs:

- to move closer to energy intensity estimates would require information on travel distance (GPS?), vehicle characteristics, occupancy, etc.
- activity coding schemes in TUS far from ideal for social research on energy – driven by other interests (gender, media, social capital, etc.)
- International / over time analysis with MTUS
- Qualitative / historical in depth studies on areas identified as critical



Thank you for your attention!

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