Examining the relationship between life transitions and travel behaviour change: New insights from the UK Household Longitudinal Study

Ben Clark, Kiron Chatterjee, & Steve Melia (UWE)
Gundi Knies and Heather Laurie (Essex)
Tom Gerlach and John Screeton (DfT)

Part of the ESRC Secondary Data Analysis Initiative
Conclusion

1. Life events are important triggers for travel behaviour change
   but we need evidence for this at the population level

2. Understanding Society offers new opportunity to examine how and why travel behaviours are evolving over time
Overview of presentation

1. Adopting a longitudinal approach to travel behaviour research
2. Research questions
3. Data set preparation
4. The new evidence
5. Next steps and conclusions
Cross-sectional vs longitudinal

Explaining differences in behaviour by differences in prevailing circumstances

Explaining evolution of behaviour by differences over time in circumstances
What do life events alter?

- Roles people perform
- Values and preferences
- Resources available for travel
- Context for travel

→ These can change the characteristics of travel considered salient and hence attitudes towards travel modes
Conceptual model for explaining turning points in travel behaviour - role of life events

Life event
(change in roles, values, resources, context)

Life course

‘Transport stressors’

Deliberation

Travel behaviour change (potential or actual)

Mediating factors
Personal history
Intrinsic motivations
Facilitating conditions in the external environment

Life course

‘Transport stressors’
Research questions

1. To what extent are different life events associated with changes in travel behaviour

2. Under what conditions are life events most likely to result in changes in travel behaviour and why?
Don’t we already know that people change travel behaviour at the time of life events?
A data opportunity
About Understanding Society is a unique and valuable academic study that captures important information every year about the social and economic circumstances and attitudes of people living in 40,000 UK households.

It also collects additional health information from around 20,000 of the participants. 

Key facts:
- 40,000 households in England, Scotland, and Wales
- £48.9 million funding
- Approximately 20,000 additional health information

Who is it for?
- Research
- Academics
- Policy makers
- Practitioners
- General public
Conceptual model for explaining turning points in travel behaviour - role of life events

Life event
(change in roles, values, resources, context)

Life course

‘Transport stressors’

Deliberation

Travel behaviour change
(potential or actual)

Mediating factors
- Personal history
- Intrinsic motivations
- Facilitating conditions in the external environment

‘Transport stressors’
## Data set preparation

Sample size – England only

<table>
<thead>
<tr>
<th>Wave</th>
<th>Individual respondents</th>
<th>No. of unique households</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>42,972</td>
<td>25,099</td>
</tr>
<tr>
<td>2</td>
<td>35,729</td>
<td>19,806</td>
</tr>
<tr>
<td>1 balanced panel</td>
<td>32,151</td>
<td>19,263</td>
</tr>
<tr>
<td>2 balanced panel</td>
<td>32,151</td>
<td>19,615</td>
</tr>
</tbody>
</table>
Data set preparation

Data linking

**Travel behaviour** is influenced by the form of the local **built and social environments**

We have linked Understanding Society to:
• Census data (population density)
• NTS area type classifications (not previously conducted)
• DfT accessibility statistics (not previously conducted)
• Indices of Multiple Deprivation
• MOSAIC life style profiling classifications

Allows us to examine the effect of **neighbourhood context** on behaviour change in association with life events.
Data set preparation

Variable derivation

Travel behaviour variables of interest:
• No. of household cars (and change between waves)
• Commute mode (and change between waves)

Explanatory variable groupings:
• Life events
• Mobility characteristics
  • Licence holding, commute time, commute distance, car miles driven
• Socio-demographic characteristics
• Attitudinal and health characteristics
• Built and social environment characteristics
Data set preparation

Life event derivations

- Moving home
- Having children
- Partnership formation and dissolution
- Moving into employment from non-employment
- Moving into non-employment (excl retirement) from employment
- Changed employer
- Retiring from employment
- Gaining a driving licence
How many people in the English population experienced different life events between 2009/10 and 2010/11?
<table>
<thead>
<tr>
<th>Life Event</th>
<th>% English adults</th>
<th>Unweighted sample counts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Residential relocation</td>
<td>6.9%</td>
<td>2032</td>
</tr>
<tr>
<td>Switched employer</td>
<td>6.2%</td>
<td>1770</td>
</tr>
<tr>
<td>Entered employment from non-employment</td>
<td>5.1%</td>
<td>1621</td>
</tr>
<tr>
<td>Lost employment (excl retirement)</td>
<td>3.3%</td>
<td>1065</td>
</tr>
<tr>
<td>Had child</td>
<td>3.1%</td>
<td>939</td>
</tr>
<tr>
<td>Gained a driving license</td>
<td>2.5%</td>
<td>836</td>
</tr>
<tr>
<td>Gained a partner</td>
<td>1.6%</td>
<td>473</td>
</tr>
<tr>
<td>Lost a partner</td>
<td>1.3%</td>
<td>395</td>
</tr>
<tr>
<td>Retired</td>
<td>1.2%</td>
<td>380</td>
</tr>
</tbody>
</table>

Source: Understanding Society, Waves 1 and 2 (2009/10 - 2010/11), English residents only, n=32,159
How many people switched commute mode between 2009/10 and 2010/11?

How many households gained or lost a car between 2009/10 and 2010/11?
<table>
<thead>
<tr>
<th>Behaviour change</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
<th>%</th>
<th>Weighted %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of households gaining a car</td>
<td>1752</td>
<td>17793</td>
<td>19545</td>
<td>8.96%</td>
<td>N/A</td>
</tr>
<tr>
<td>No. of households losing a car</td>
<td>1769</td>
<td>17776</td>
<td>19545</td>
<td>9.05%</td>
<td>N/A</td>
</tr>
<tr>
<td>No. of employed individuals that switched from car commuting</td>
<td>818</td>
<td>14382</td>
<td>15200</td>
<td>5.38%</td>
<td>5.42%</td>
</tr>
<tr>
<td>No. of employed individuals that switched to car commuting</td>
<td>931</td>
<td>14269</td>
<td>15200</td>
<td>6.13%</td>
<td>6.17%</td>
</tr>
</tbody>
</table>
To what extent are different life events associated with changes in travel behaviour?
## % of households gaining / losing cars with / without life event

<table>
<thead>
<tr>
<th>Life event</th>
<th>Gain car with life event</th>
<th>Gain car without life event</th>
<th>Lose car with life event</th>
<th>Lose car without life event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lost a partner</td>
<td>7.0</td>
<td>9.0</td>
<td>42.8</td>
<td>8.4</td>
</tr>
<tr>
<td>Gained a partner</td>
<td>38.6</td>
<td>8.3</td>
<td>14.6</td>
<td>8.9</td>
</tr>
<tr>
<td>Gained a driving license</td>
<td>34.1</td>
<td>7.9</td>
<td>5.7</td>
<td>9.2</td>
</tr>
<tr>
<td>Residential relocation</td>
<td>14.3</td>
<td>8.5</td>
<td>23.3</td>
<td>7.9</td>
</tr>
<tr>
<td>Entered employment from non-employment</td>
<td>15.0</td>
<td>8.4</td>
<td>9.8</td>
<td>9.0</td>
</tr>
<tr>
<td>Lost employment (excl retirement)</td>
<td>9.4</td>
<td>8.9</td>
<td>14.6</td>
<td>8.7</td>
</tr>
<tr>
<td>Had child</td>
<td>11.3</td>
<td>8.5</td>
<td>11.8</td>
<td>8.7</td>
</tr>
<tr>
<td>Retired</td>
<td>6.7</td>
<td>9.0</td>
<td>12.7</td>
<td>9.0</td>
</tr>
</tbody>
</table>
% of individuals switching to/from car commute with / without life event

<table>
<thead>
<tr>
<th>Life event</th>
<th>From car with event (%)</th>
<th>From car with no event (%)</th>
<th>To car with event (%)</th>
<th>To car with no event (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gained a driving license</td>
<td>4.18</td>
<td>5.41</td>
<td>25.78</td>
<td>5.74</td>
</tr>
<tr>
<td>Switched employer</td>
<td>11.07</td>
<td>4.61</td>
<td>11.5</td>
<td>5.26</td>
</tr>
<tr>
<td>Lost a partner</td>
<td>10.27</td>
<td>5.32</td>
<td>5.41</td>
<td>6.13</td>
</tr>
<tr>
<td>Residential relocation</td>
<td>8.87</td>
<td>5.12</td>
<td>9.65</td>
<td>5.87</td>
</tr>
<tr>
<td>Gained a partner</td>
<td>8.96</td>
<td>5.31</td>
<td>8.24</td>
<td>6.09</td>
</tr>
<tr>
<td>Had child</td>
<td>5.81</td>
<td>5.37</td>
<td>7.35</td>
<td>6.08</td>
</tr>
</tbody>
</table>
Evidence highlights

Travel behaviour changes are far more prevalent in association with all life events tested:

• Driving licence acquisition demonstrates a strong commitment to car ownership and use
• Losing a partner results in the loss of car access for some groups
• Having children is linked to both increases and reductions in car ownership
• Different employment switches prompt behaviour changes (in the expected direction)
• Residential relocations are prompts for behaviour change
  – but are often concurrent with household structure changes
  – Is this a spatial structure relationship or something else?
Under what **conditions** are life events most likely to result in changes in **car ownership level** and why?
Regression modelling

Vehicle gains and losses modelled as a function of:

1. Life events
2. Baseline conditions
   • Household structure and life stage
   • Household socio-demographics
   • Neighbourhood context (built and social environment)
Life events

• All else being equal, life events do increase the likelihood of car ownership level changes occurring:

**Example odds ratios**

<table>
<thead>
<tr>
<th>Life event</th>
<th>Gain a car</th>
<th>Lose a car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain partner</td>
<td>x2.95</td>
<td>x0.51</td>
</tr>
<tr>
<td>Lose partner</td>
<td>Not sig</td>
<td>x5.98</td>
</tr>
<tr>
<td>Gain employment</td>
<td>x1.38</td>
<td>Not sig</td>
</tr>
<tr>
<td>Lose employment</td>
<td>Not sig</td>
<td>x1.85</td>
</tr>
<tr>
<td>Switch employer</td>
<td>x1.43</td>
<td>Not sig</td>
</tr>
<tr>
<td>Had child</td>
<td>Not sig</td>
<td>x1.53</td>
</tr>
<tr>
<td>Acquire driving licence</td>
<td>x4.7</td>
<td>x0.63</td>
</tr>
<tr>
<td>Retire</td>
<td>Not sig</td>
<td>x1.59</td>
</tr>
</tbody>
</table>
Rural vs urban

• Employment changes are not triggers for car ownership changes in rural areas
  – Car ownership is more strongly governed by spatial structure in rural areas and less sensitive to other changes in circumstance
London and public transport

- Households located in London have a greater propensity to relinquish cars compared to other groups.
- Living in close proximity to faster public transport links to employment centres reduces the propensity for people to gain cars.
Rich vs poor neighbourhoods

- Households in areas of higher deprivation are *more likely* to *relinquish* cars
  - after controlling for other factors, including income and spatial characteristics
Types of residential relocation

• Car ownership level is adjusted to changes in spatial structure which may occur with a residential relocation
  • Urbanising moves are associated with vehicle relinquishments
  • Ruralising moves are associated with vehicle acquisitions
Self-employment

- Being self employed *increases* the propensity to *gain* cars over and above other types of employment
Conceptualising car ownership level transition spaces

- **0 cars**
  - Younger adults (single, cohabiting) yet to acquire first car

- **1 car**
  - Cohabiting younger adults; with and without children

- **2 cars**
  - Families with offspring of driving age
  - Couples with leisure cars

- **2-3 cars**
  - Families with offspring leaving home
  - Some couples forming 2 car households relinquish second cars after cohabitation

- **3 cars**
  - Older adults relinquishing cars: Health, income constraints

- **0-1 cars**
  - There is a strong tendency for younger adults to acquire a first car

- **1-0 cars**
  - The tendency to acquire a first car or to relinquish a first car diminishes into middle age

- **2-1 cars**
  - Cohabiting older adults moving into retirement
  - Second car ownership remains volatile for cohabiting adults

- **3-2 cars**
  - Families with offspring leaving home

- **Involuntary \ voluntary non-car owners**

The width of the arrow depicts the relative strength of the tendency to change.
Current and future developments

• Development of *commute mode switching* regression models
• Longer history analysis of commute mode switching using British Household Panel Survey (18 waves)
• Running a (small) Understanding Society training event for transport analysts
• Exploring opportunities to exploit further waves of Understanding Society
Conclusion

1. Life events are important triggers for travel behaviour change but we need. We have been able to generate new evidence for this at the population level.

2. *Understanding Society* offers new opportunity to examine how and why travel behaviours are evolving over time.
Life Transitions and Travel Behaviour
Examining the relationship between life transitions and travel behaviour change

Home
Welcome to the Life Transitions and Travel Behaviour research project.

This fascinating study will be finding out about how people in the UK change their travel behaviours over the course of their lives with special attention to major life events such as starting a job, moving home and having children.

Understanding people’s travel routines and how they change is important to help governments around the world plan effective transport systems and policies. Such policies are expected to make an important contribution to tackling some of the big issues of the day, including: energy security and climate change, public health and obesity, how to create healthy urban environments, and supporting economic growth and reducing congestion.

The study began in November 2012 and will be carried out over eighteen months. This website will report the findings of the study and provides a discussion forum for researchers and others around the world to exchange ideas.

Click on the menus above to find out more about the study team and for a summary of the project.