Adaptive behaviour in mode choice

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Outline

• Mode choice
• Adaptive behaviour
• Case study
• Results
• Conclusions
Mode choice: what is it?

How do we get from A to B?
Modelling mode choice is one of the steps of the 4-step model, a widely used methodology to forecast travel choices.

- Trip generation
- Trip distribution
- Mode split
- Assignment
Mode choice modelling: why is it important?

- It helps design transport services able to meet the demand
- It gives insights when interventions to the transport services are planned: a new bus/cycle route, a new mode
- It helps assess the best fare for the services
Mode choice modelling: how do we choose?

Their importance depends on the type of user (age, wealth)

But also real-time events can influence our choices… e.g.:

- You planned to walk (a short trip 15min), but, you are about to leave and it starts raining… do you still walk?
- You have to catch a train and planned to reach the station by tube; you reach the tube station and it is temporarily closed due to overcrowd…. Do you wait?
Adaptive behaviour

User characteristics
- Age, Gender
- Health concern

Trip characteristics
- Cost, travel time, N changes

Feasible Mode Set
- Calculate Probability of each mode to be considered for the trip

Mode ranking

Real-Time Events
- Real-time arrival time, vehicle availability, weather, disruptions and crowdedness

Final mode choice
- Check Real-Time events
- Reassess Probability

Mode ranking

Association

<table>
<thead>
<tr>
<th>Mode</th>
<th>Real-Time events</th>
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</thead>
<tbody>
<tr>
<td>Bus/Train</td>
<td>Real-time arrival time, Disruptions &amp; crowdedness</td>
</tr>
<tr>
<td>Walking/Cycling</td>
<td>Weather</td>
</tr>
<tr>
<td>Bike-sharing</td>
<td>Bike availability &amp; weather</td>
</tr>
<tr>
<td>Car club</td>
<td>Car availability</td>
</tr>
<tr>
<td>Tube</td>
<td>Disruptions and crowdedness</td>
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Case study: area of London
Case study: the scenarios

SCENARIO 1) The regular commuting trip home from the College at the end of the day.
“….. describe the decision making process when assessing the possible mode options or choose a specific mode”

SCENARIO 2) A hypothetical trip from the College to Sloane Square [Leisure / Important appointment]
“….. what is your preferred mode option?” → real-time event →
Do you choose alternative modes?

Adaptive behaviour  Planned behaviour
Results

The % of respondents who showed an adaptive behaviour:

<table>
<thead>
<tr>
<th></th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Either scenario</th>
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<tbody>
<tr>
<td>Average percentage</td>
<td>34%</td>
<td>86%</td>
<td>92%</td>
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Adaptive behaviour is more evident in Scenario 2 (unfamiliar trip) and for important appointments.
Conclusions and future work...for you?

This study suggests that mode choice is influenced by real-time events.

Future work:
- Further investigation with a wide dataset
- How best to model this adaptive behaviour
- To adapt existing modelling software to include adaptive behaviour
- To develop flexible planning tools (Mobility as a Service) to facilitate mode switch towards sustainable modes
Thank you!

The study is published on ITS UK review: http://www.its-ukreview.org/tag/mode-choice/

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