Who are most likely to adapt their travel behaviour to changes in weather conditions?

A study on weather tolerance and travel behaviour in Norway

Presentation by Susanne T. Dale Nordbakke
Research question

- Who are the most tolerant in terms of travel behaviour to weather conditions?

- Purpose: To gain knowledge on what characterizes those who are most likely to defy poor weather conditions and use active transport or public transport instead of a car.
Research Gap

- Less knowledge on what characterizes those who are most tolerant to weather changes:
  - Socio-demographic characteristics
  - Values, attitudes and habits
Expectations

- Age
- Gender
- Education
- Driving license/access to car
- Geographical location («Learned robustness»)
- Environmental attitudes
- Habits/«transport identity»
Data

- A representative questionnaire survey in Oslo and Stavanger in 2015 (November)
- Internet panel
- Response rate: 57.3 percent

<table>
<thead>
<tr>
<th>City</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oslo</td>
<td>1060</td>
</tr>
<tr>
<td>Stavanger</td>
<td>1037</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2097</strong></td>
</tr>
</tbody>
</table>

- This study is limited to those who are either working or attending school: N=1663 (Oslo N= 855; Stavanger N=808)
- Data is weighted by gender, age and education according to public statistics from Statistics Norway
The questionnaire

- **Perceptions** of weather and seasons
- **Values and attitudes** related to transport and weather
- **Habits** (travel mode, «typical me»)
- **Opinions on climate change** and its effects
- **Socio-demographic** characteristics
- Access to **Transport resources**
How can we explain the relation between environmental friendly attitudes, (habits/transportation identity) and weather tolerance (response to weather in terms of transport modes)?

- Do environmental friendly attitudes make people choose more active, exposed and environmental friendly transport modes despite poor weather?

- Or does being a **regular user of active transport** modes (and being physical active) make a person more environmental friendly?

- Is the association between **environmental friendly attitudes** and weather tolerance spurious?

- A spiral effect going back to **young age**? Socialisation and habits of parents? Used to being outdoors - become more fond of nature - which again influence attitudes towards the environment?
Indicators

- Example:
  - «I always drive when it rains» (disagree – agree)
  - «In which of the following combinations of temperature and precipitation are you willing to walk (2-3 km. N=1663.)?»
    - From no precipitation to steady rainfall/snowfall
    - From low temperatures to high temperatures
Indicator

«I always take the car when it rains»

«I always take the car when it rains». Percent. N=1221
Indicator

«In which of the following combinations of temperature and precipitation are you willing to walk (2-3 km. N=1663.)?»

Those who have reported «yes» on each combination. In percent. N=1663
Multivariate analysis of «I always take the car when it rains»

- Logistic regression
- Only those who reported that they had a car in the household received this question
- Dependent variable: «Agree»/»Not agree»
- N=Those report that they usually travel to work/school by cycle, foot or public transport during spring and aged 18 years or older (N=642)
- Model: Background factors + environmental attitudes+ habites/»transport identity»
Multivariate analyses of willingness to walk 2-3 km in different combinations of temperature/precipitation

- All respondents (including car drivers) aged 18 + years
- Purpose:
  - To explore whether the same factors are important when car drivers are included
- Two models:
  - Model I – Dependent variable: Willingness to walk 2-3 km in -10 °C (or less) and steady snowfall/rainfall
  - Model II – Dependent variable: Willingness to walk 2-3 km in 20 °C (or more) and steady snowfall/rainfall
  - Both models include:
    - Same background variables (age, gender, education, city)
    - Same variables about attitudes and habits/transportation identity
## Summary

<table>
<thead>
<tr>
<th></th>
<th>Disagree «I always drive when it rains»</th>
<th>Willingness to walk 2-3 km: -10 °C (or less)/steady snowfall</th>
<th>Willingness to walk 2-3 km: 20 °C (or more)/steady rainfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>N= Those who do <em>not</em> drive regularly to work/school</td>
<td>All respondents</td>
<td>All respondents</td>
<td>All respondents</td>
</tr>
<tr>
<td>Gender (female – male)</td>
<td></td>
<td>(+) **</td>
<td></td>
</tr>
<tr>
<td>Age (low – high)</td>
<td></td>
<td></td>
<td>(-) *</td>
</tr>
<tr>
<td>Education (low – high)</td>
<td></td>
<td>(+) **</td>
<td>(+) **</td>
</tr>
<tr>
<td>Driving license (yes – no)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City (Oslo – Stavanger)</td>
<td>(-) *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental friendly attitudes</td>
<td>(+) **</td>
<td>(+) **</td>
<td>(+) **</td>
</tr>
<tr>
<td>Cycling – typical of me</td>
<td>(+)**</td>
<td>(+) **</td>
<td>(+) **</td>
</tr>
<tr>
<td>Public transport – typical of me</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking – typical of me</td>
<td>(+)**</td>
<td>(+) **</td>
<td>(+) **</td>
</tr>
<tr>
<td>Car driving – typical of me</td>
<td></td>
<td>(-) *</td>
<td>(-) **</td>
</tr>
</tbody>
</table>

**p<0.010, *p<0.05, empty cells=not significant**
Conclusions

▪ Many of the expectations are met:
  ▪ **Environmental attitudes / Values** - associated with weather tolerance
  ▪ **Habits/transportation identity** - associated with weather tolerance
  ▪ **Education** – associated with willingness to walk
  ▪ **Gender** – associated with willingness to walk in cold weather

▪ Additionally:
  ▪ **Geographical location** – living in Stavanger positively associated with always driving when it rains.
  ▪ **Age** – no effect on weather tolerance except for walking in warm weather
Main finding

- **Environmental attitudes, values** and **(daily) travel habits** are associated with weather tolerance.

- **Attitudes** and **habits** are important for how people react to changes in weather conditions, when other factors such as age, gender, education and city/residential location are controlled for.
Thank you!