Do our basic values guide us in our transportation mode choice? An evidence from a Swiss tracking study

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Swiss Mobility Conference, Lausanne, 30th October 2020
Impacts of traffic

Impacts of transport on the environment and health

Transport

Nature and the landscape
Costs owing to loss and fragmentation of plant and animal habitats

Climate and environment
Costs from CO₂ emissions, biodiversity loss, crop shortfalls, forest degradation

Damage to nature and the landscape

Building façades
Higher costs of cleaning and renovation

Air pollution

Health costs
Costs of illness, hospital stays, pensions, lost years of life, lost output

Noise

Health benefits
Healthier and more productive people

Accidents

Physical activity with non-motorised transport

Large share of negative impacts caused by car

Total external costs and benefits of transport, 2017

- Private motorised road transport: 71% | CHF 9.5 bn
  - Passenger: 57%
  - Freight: 14%
- Non-motorised transport: 8% | CHF 1.1 bn
- Public road transport: 2% | CHF 0.3 bn
- Rail: 8% | CHF 1.1 bn
  - Passenger: 5%
  - Freight: 3%
- Air transport: 10% | CHF 1.4 bn
  - Passenger: 9%
  - Freight: 1%
- Water: <1% | CHF 96 m

Large share of negative impacts caused by car

Figure 12 - Total external costs 2016 for EU28 (excluding congestion)
Billion € per year

- Habitat damage
- Well-to-Tank
- Noise
- Climate
- Air Pollution
- Accidents

Data for aviation and maritime: rough estimations for EU28.

Measures undertaken

- **Parking pricing** is common across the world’s most populated cities. Dynamic parking pricing pilot schemes, tested in Californian cities, can reduce ‘cruising for parking,’ which makes up a substantial share of vehicle travel in major cities.

- **Low-emission zones** are commonplace across major European cities.

- **Congestion charging** is fairly uncommon, but can have substantial impacts on vehicle activity and emissions when implemented wisely.

- **Shared bicycle systems** are becoming increasingly commonplace, with over a thousand schemes worldwide.

- **Transit fare subsidies** are typically needed to make public transit operations economically viable, but public revenue needed to sustain public transit varies widely across systems and cities.

- **Parking restrictions**, together with reductions in parking supply, have been implemented in several European and West Coast North American cities.

- **Vehicle access restrictions** have been introduced primarily in cities to reduce congestion and air pollution.

- **Vehicle registration caps**, first pioneered in Shanghai, have spread to multiple Chinese cities and elsewhere.

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

However, demand for private passenger road transport is still dominant and continues to rise...

**Travel by private car in selected countries, 1995-2017**

Passenger-kilometres, 1995=100

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Values and behaviour

Value: “a desirable transsituational goal varying in importance, which serves as a guiding principle in the life of a person or other social entity” (Stern, 2000, p. 21)

Steg et al. (2014)

Schwartz Value Survey (Schwartz, 1992) shortened and adapted by De Groot & Steg et al. (2008) and Steg et al. (2014)

- **Hedonic**
  - Pleasure
  - Enjoying life
  - Self-indulgent

- **Egoistic**
  - Social power
  - Wealth
  - Authority
  - Influential
  - Ambitious

- **Altruistic**
  - Equality
  - A world at peace
  - Social justice
  - Helpful

- **Biospheric**
  - Respecting the earth
  - Unity with nature
  - Protecting the environment
  - Preventing pollution

Research gap

Transportation (2014) 41:873–888

Values, attitudes and travel behavior: a hierarchical latent variable mixed logit model of travel mode choice

Marcel Paulssen · Dirk Temme · Akshay Vij · Joan L. Walker

Studied are based either on survey or on modelling data

No studies analyse observed behaviour captured e.g. through tracking
Research question

What is the effect of hedonic, egoistic, altruistic and biospheric values on the use of different transportation modes?
MOBIS project (September 2019 – January 2020)

Control group

Information group

Pricing group

1. month: observation phase

2. month: intervention phase
Participants

- 18-65 years old (at the end of 2018)
- Regular use of a car (at least two days a week)
- Live in a metropolitan area in the German- or French-speaking part of Switzerland
- Use of a smartphone that can install the tracking app
- Be able to walk 200m without pain or any other discomfort
- You must not work as a professional driver
Data: tracking

Catch My Day

MotionTag GmbH  Maps & Navigation

1  PEGI 3

⚠️ You don't have any devices.

➕ Add to wishlist

Install

Per trip:
- Distance
- Time
- Transportation mode
Data: surveys

- **Introductory survey**
  - Socio-demographics
  - Work-related
  - Endowment with vehicles and public transport subscriptions
  - Frequency of use of transportation modes
  - Attitudes towards transportation-related issues in Switzerland
  - Interest to participate in the study
  - Other inclusion criteria (smartphone, no professional driver, mobile person)

- **Final survey**
  - Absence during the study
  - Δ Work-related
  - Δ Attitudes towards transportation-related issues in Switzerland
  - Car attitudes
  - Intervention perception and understanding
  - Stated preferences experiment
  - Attitudes towards the use of mobility pricing revenue
  - Lifestyles and values
  - Health
  - Payment issues
Dependent variable

Share (%) of the total average daily distance in the observation phase covered by: Bike, Foot, Car, PT

- Bike share: N=1'831
- Car share: N=3'516
- PT share: N=3'247
- Walk share: N=3'519
Independent variables: values

N=3'513

N=3'514
Control variables: socio-demographics

CH: 7'566
(BFS, 2017a)

N=3'508

CH: 41.99
(BFS, 2016)

CH: 30.30
(BFS, 2017b)

N=3'515

CH: 50.42
(BFS, 2018)

N=3'520

### Results

<table>
<thead>
<tr>
<th></th>
<th>Bike share</th>
<th></th>
<th>Car share</th>
<th></th>
<th>PT share</th>
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<th>Walk share</th>
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<tr>
<td></td>
<td>$\beta$</td>
<td>p</td>
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<td>p</td>
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<td>Hedonic</td>
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<td>0.185</td>
<td>0.048</td>
<td>0.011</td>
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<td>0.286</td>
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<tr>
<td>Egoistic</td>
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<td>0.417</td>
<td>0.021</td>
<td>0.264</td>
<td>-0.039</td>
<td>0.044</td>
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<td>Altruistic</td>
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<td>-0.015</td>
<td>0.461</td>
<td>0.016</td>
<td>0.445</td>
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<td>Biospheric</td>
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<td>0.050</td>
<td>-0.049</td>
<td>0.014</td>
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<td>Education</td>
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<td>adj. R²</td>
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<td>F</td>
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<tr>
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<td>3'303</td>
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<td>3'055</td>
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<td>3'307</td>
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</table>
- **Jakovcevic & Steg (2013)**
  - Altruistic values positively related to the intention to reduce car use following the implementation of a policy doubling the cost of car use (adj. $R^2 = .22$)

- **Paulssen et al. (2014)**
  - No direct effect of values (hedonism, security, power) on mode choice. However, indirect effect of values on mode choice through their effect on attitudes towards mode choice (comfort and convenience, ownership, flexibility)

- **Steg et al. (2014)**
  - Values explained 6% of the variance in mileage. Stronger egoistic values were associated with a higher mileage ($\beta = .19, p = .001$). Stronger hedonic values were associated with a higher mileage as well, although this relationship was marginally significant only ($\beta = .12, p = .060$).

- **De Groot et al. (2007)**
  - Biospheric values significantly related to the intention to reduce car use ($\beta = .19, p = .002, R^2 = .16$).


Policy implications and limitations

- **Policy implications**
  - Bike -> highlight positive environmental consequences of bike (activate biospheric values)
  - Car -> highlight negative convenience and environmental consequences of car (activate hedonic and biospheric values)
  - Public transport -> highlight positive financial consequences of public transport (highlight egoistic values)
  - Walking -> highlight positive health/financial and environmental consequences of walking (activate egoistic and biospheric values)

- **Limitations**
  - No differentiation between commuting and leisure
  - No differentiation between private car, car sharing and car pooling
Policy implications: examples

https://wrenmcdonald.com/

https://rtachicago.org/plans-programs/ride-marketing-campaign
Thank you for your attention!