

# Transportation mode choices of music festival visitors in Germany – a stated choice experiment

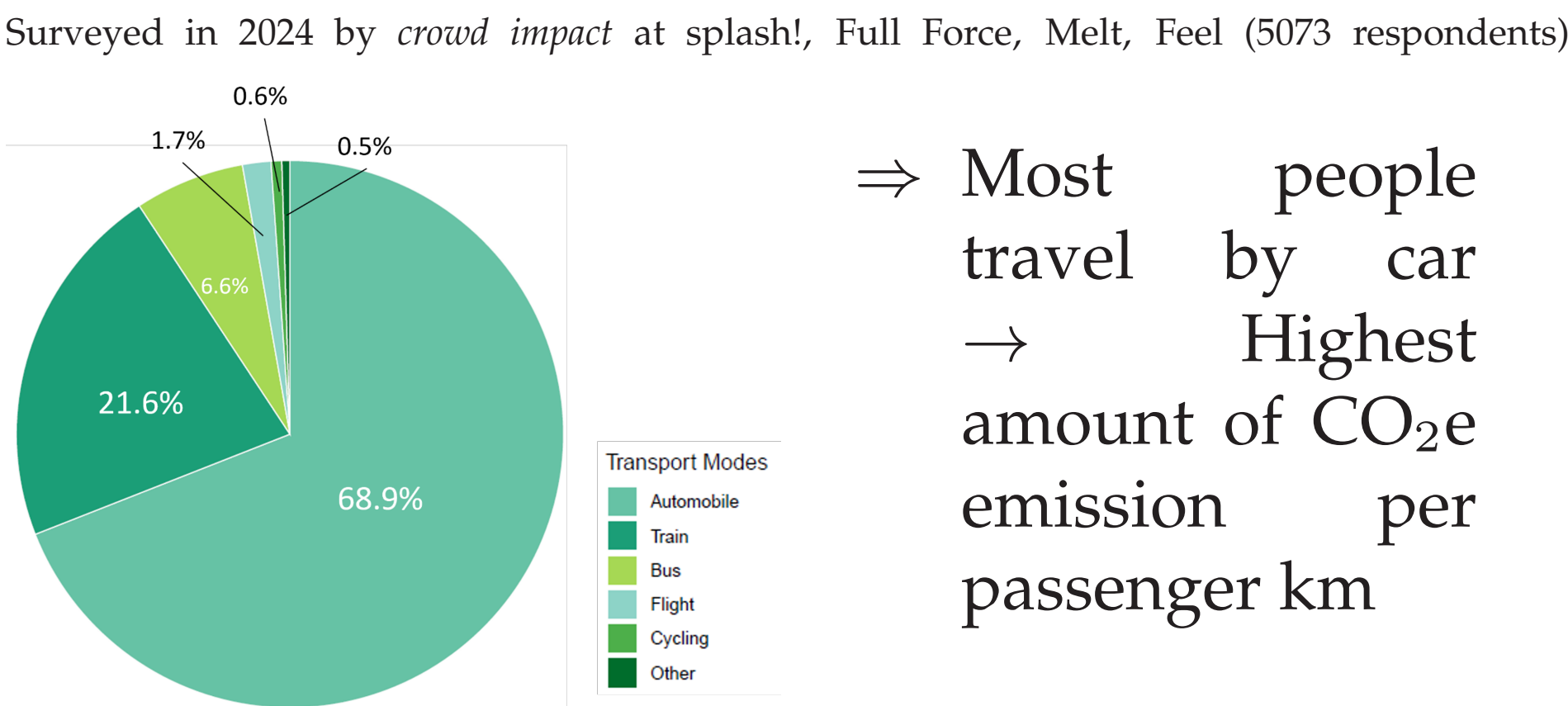
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Research project: Eco2Concert - Sustainable festival mobility and logistics in the Central German lignite mining region

## Motivation

- Increasing number of music festivals with thousands of visitors
- Specific transportation problem deviating from general transportation mode choices, as visitors typically camp on the site for several days, bring tents and other supplies with them
- 40% to 80% of total festival emission caused by audience travel

## Current situation



## Research questions

- RQ0: How to make audience travel more sustainable?
- RQ1: Which characteristics of travel modes influence travel mode choice?
- RQ2: What is the impact of socio-demographic and psychometric factors (attitudes and values) on travel mode choice?

## Survey structure and sample

- Socio-damographics (e. g., gender, age, state of residence, educational level, . . . ), topic-related characteristics and personal traits (e. g., car ownership, NEP Scale, habit of car usage, attitudes towards comfort and flexibility, . . . ) and generated treatment using a “Good to know” statement
- Distribution channels: Mail/ticketing lists of festivals, social media channels of festivals; target group: Regular or first-time attendees of music festivals; Respondents:  $N = 723$

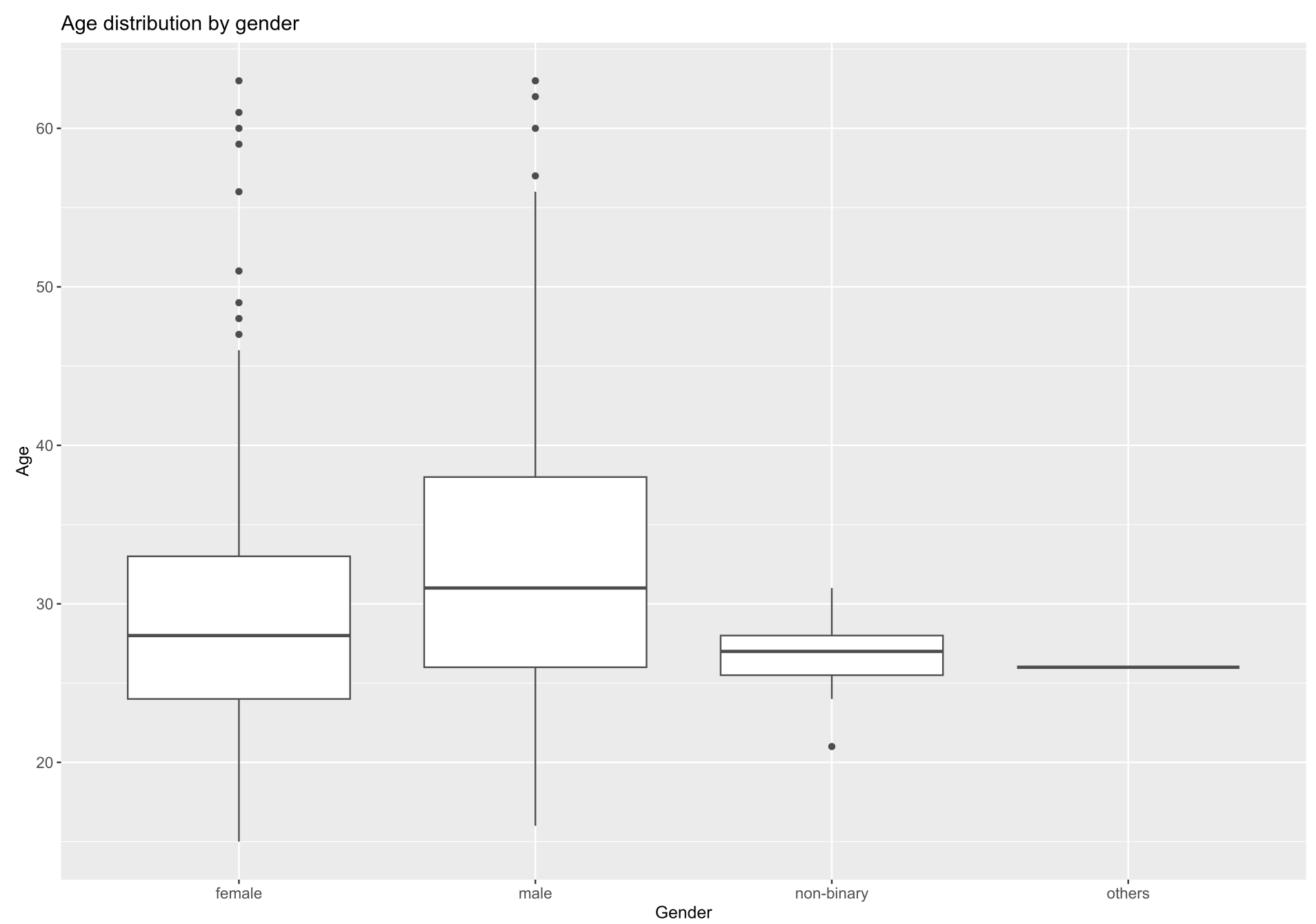
## Attributes and levels

| Attributes   | Levels                      |                              |                              |
|--|-----------------------------|------------------------------|------------------------------|
|  | Distance group 1<br>(80 km) | Distance group 2<br>(250 km) | Distance group 3<br>(450 km) |
| Price (EUR)  | 7, 11, 15, 19, 24           | 35, 42.5, 50, 57.5, 65       | 105, 117.5, 130, 142.5, 150  |
| Travel time (min)                                    | 40, 50, 60, 70, 80          | 140, 150, 160, 170, 180      | 280, 290, 300, 310, 320      |
| Access time (min)                                    |                             | 0, 5, 10, 15, 20             |                              |
| CO <sub>2</sub> -emissions (kg CO <sub>2</sub> e/km) | 1.5, 3, 4.5, 6, 7.5         | 20, 25, 30, 35, 40           | 30, 37.5, 45, 52.5, 60       |
| Departure time (min)                                 |                             | 0, 5, 10, 15, 20             |                              |
| Parking fee + car camping (EUR)                      |                             | 0, 30, 50, 70, 100           |                              |

- Identification of attributes through literature review & discussion with experts
- 36 choice tasks divided in 6 blocks per choice scenario
- $d$ -efficient design

## Descriptive results

- 46.1% female, 52.7% male, 1.1% non-binary, 0.1% others



## Model specification

$$U(Car) = \beta_1 \cdot price_{Car} + \beta_2 \cdot travel\_time_{Car} + \beta_3 \cdot acc\_time_{Car} + \beta_4 \cdot co2_{Car} + \beta_5 \cdot dep\_time_{Car} + \beta_6 \cdot park\_fee_{Car}$$

$$U(Train) = asc_{Train} + \beta_1 \cdot price_{Train} + \beta_2 \cdot travel\_time_{Train} + \beta_3 \cdot acc\_time_{Train} + \beta_4 \cdot co2_{Train} + \beta_5 \cdot dep\_time_{Train} + \beta_6 \cdot park\_fee_{Train}$$

$$U(Bus) = asc_{Bus} + \beta_1 \cdot price_{Bus} + \beta_2 \cdot travel\_time_{Bus} + \beta_3 \cdot acc\_time_{Bus} + \beta_4 \cdot co2_{Bus} + \beta_5 \cdot dep\_time_{Bus} + \beta_6 \cdot park\_fee_{Bus}$$

⇒ Including deterministic heterogeneity: car ownership, NEP, habit, flexibility, comfort, hedonism, self-direction and some socio-demographics

## Results: Nested logit model

Table 1: Coefficients considering distance group effects

| Attribute  | Distance group 1 | Distance group 2 | Distance group 3 |
|------------|------------------|------------------|------------------|
| b_tc       | -0.042***        | 0.009*           | 0.016***         |
| b_tt       | -0.011***        | 0.004*           | 0.007**          |
| b_act      | -0.025***        | 0.006            | 0.011*           |
| b_co2      | -0.075***        | 0.034*           | 0.059***         |
| b_dep      | -0.014***        | 0.01*            | 0.007.           |
| b_park_fee | -0.002**         | -0.002           | -0.002.          |
| b_tc_age   | 0.0004*          |                  |                  |
| b_act_sex  | 0.009*           |                  |                  |
| b_co2_sex  | 0.01*            |                  |                  |
| lambda     | 0.405***         |                  |                  |

Significance levels: \*\*\* (p<0.001), \*\* (p<0.01), \* (p<0.05), . (p<0.1)

Table 2: Interaction effects

| Attribute  | Train     | Bus       |
|------------|-----------|-----------|
| asc        | 3.196***  | 2.197*    |
| . dis2     | -1.552*** | -1.575*** |
| . dis3     | -0.52**   | -0.554*** |
| . treat    | -0.028    | -0.036    |
| . carowner | -1.552*** | -1.588*** |
| . nep      | 0.297.    | 0.418**   |
| . habit    | -0.252*   | -0.184.   |
| . flex     | -0.271*   | -0.168    |
| . comf     | -0.249*   | -0.304**  |
| . hedo     | -0.19*    | -0.225**  |
| . selfdir  | -0.217*   | -0.268*   |

Obs.=4340; adj. Pseudo- $R^2$ =0.28

Table 3: Differences between selected distance group specific coefficients

| Expression           | Difference |
|----------------------|------------|
| b_tt_diff_dis1_dis2  | -0.02***   |
| b_tt_diff_dis1_dis3  | -0.02***   |
| b_tt_diff_dis2_dis3  | -0.00      |
| b_tc_diff_dis1_dis2  | -0.05***   |
| b_tc_diff_dis1_dis3  | -0.06***   |
| b_tc_diff_dis2_dis3  | -0.01*     |
| b_co2_diff_dis1_dis2 | -0.11***   |
| b_co2_diff_dis1_dis3 | -0.13***   |
| b_co2_diff_dis2_dis3 | -0.02***   |

## Conclusion

- Price, travel time but also CO<sub>2</sub>-emissions most important
- Socio-demographic and psychometric variables influence the decision for a specific mode choice
- Mode choices do not significantly vary with the “Good to know” intervention
- Further interventions: supermarkets, reducing travel costs for public transport, car pooling

## Contact & Funding



Funded by:

