EVAdopt: Incentives for Electric Vehicles Adoption

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Members of the research group

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Motivation

- Battery electric vehicles (BEV) are essential for the decarbonization of the transport sector
- In 2022 only 2,3% of the Swiss car fleet are BEV
- Misperceptions on BEV characteristics and lack of information might hinder purchase of BEV
- Goal of the project:
  - Identify barriers to the purchase of BEV
  - Test nudges and information treatments aimed at BEV adoption

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Jan

VW ID.4

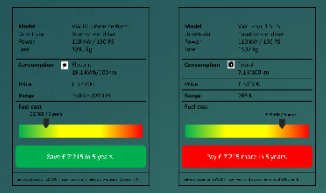
Energieeffizienzklasse A
CO_2-Emissionen kombiniert 0g/km
Stromverbrauch kombiniert 21.4 kWh/100km

Eingesparte jährliche Benzinkosten pro Jahr im Vergleich zu Ihrem bisherigen Fahrzeug: CHF 800 (10.000 km/a)

Mar

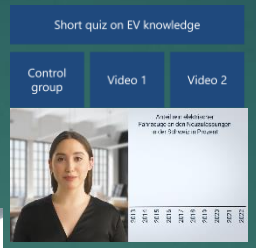
Apr

Jun

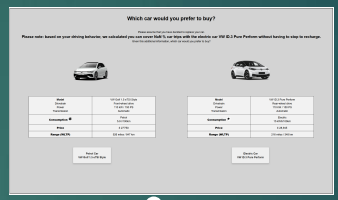


Sep

Jan



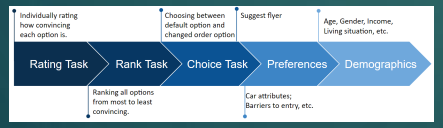
Jun



2022

2023

Survey 1



Survey 2 (pre-test)

RCT Experiment (3000 participants)

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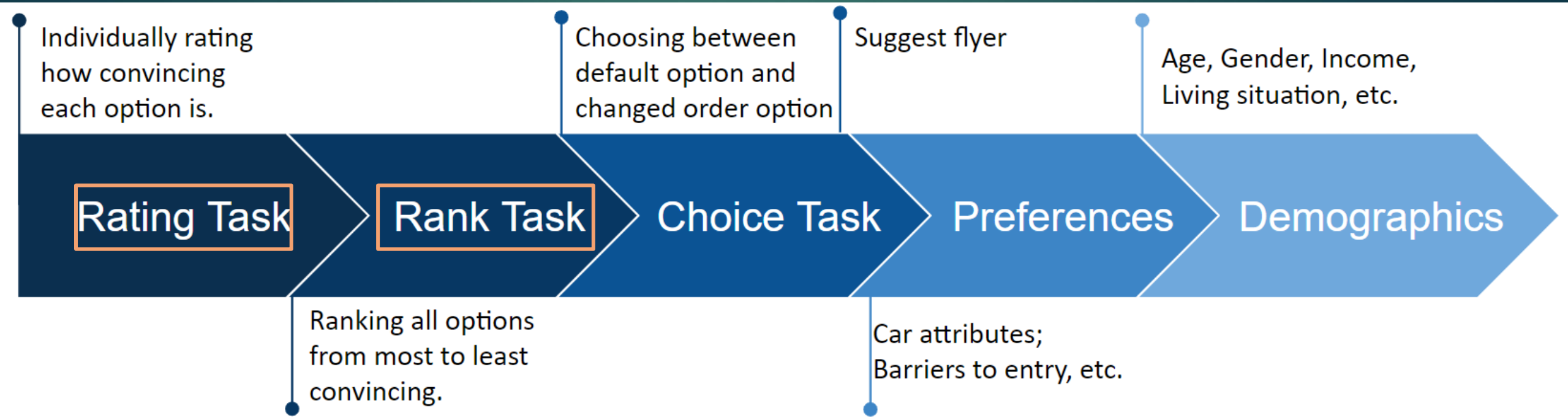
First survey: ranking of information



Ranking results: most convincing information

Best ranked

- Fuel cost savings info
- CO2 emission reduction (in %)
- Battery range info

Mid-ranked

- Charging station location info
- Can charge at home
- CO2 emission reduction (in tons)
- Can charge with normal plug

Worst ranked

- 0 CO2 emissions
- Electric consumption info
- Energy label info
- Share of new EV
- More customers switching to EV

Second survey (pre-test)

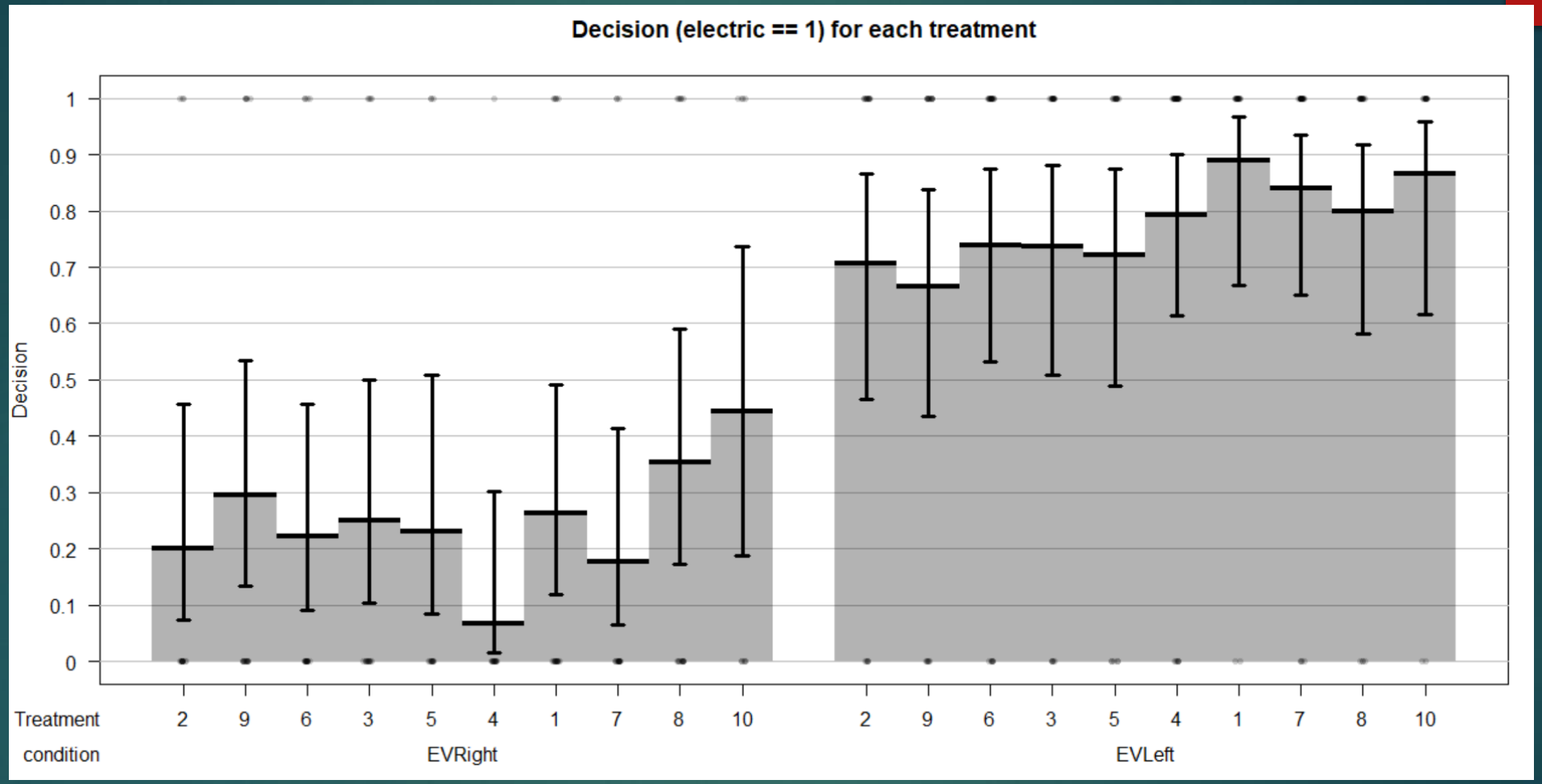
Sample:

- Prolific car owners
- DE or CH residence (N=96)
- Testing for treatments for RCT

Research Question:

- Measuring knowledge of EV
- Choice task (EV or gasoline car) with different information presented
  - Baseline (control condition)
  - Fuel costs
  - Other Incentives
- Advantages and disadvantages of EV ownership

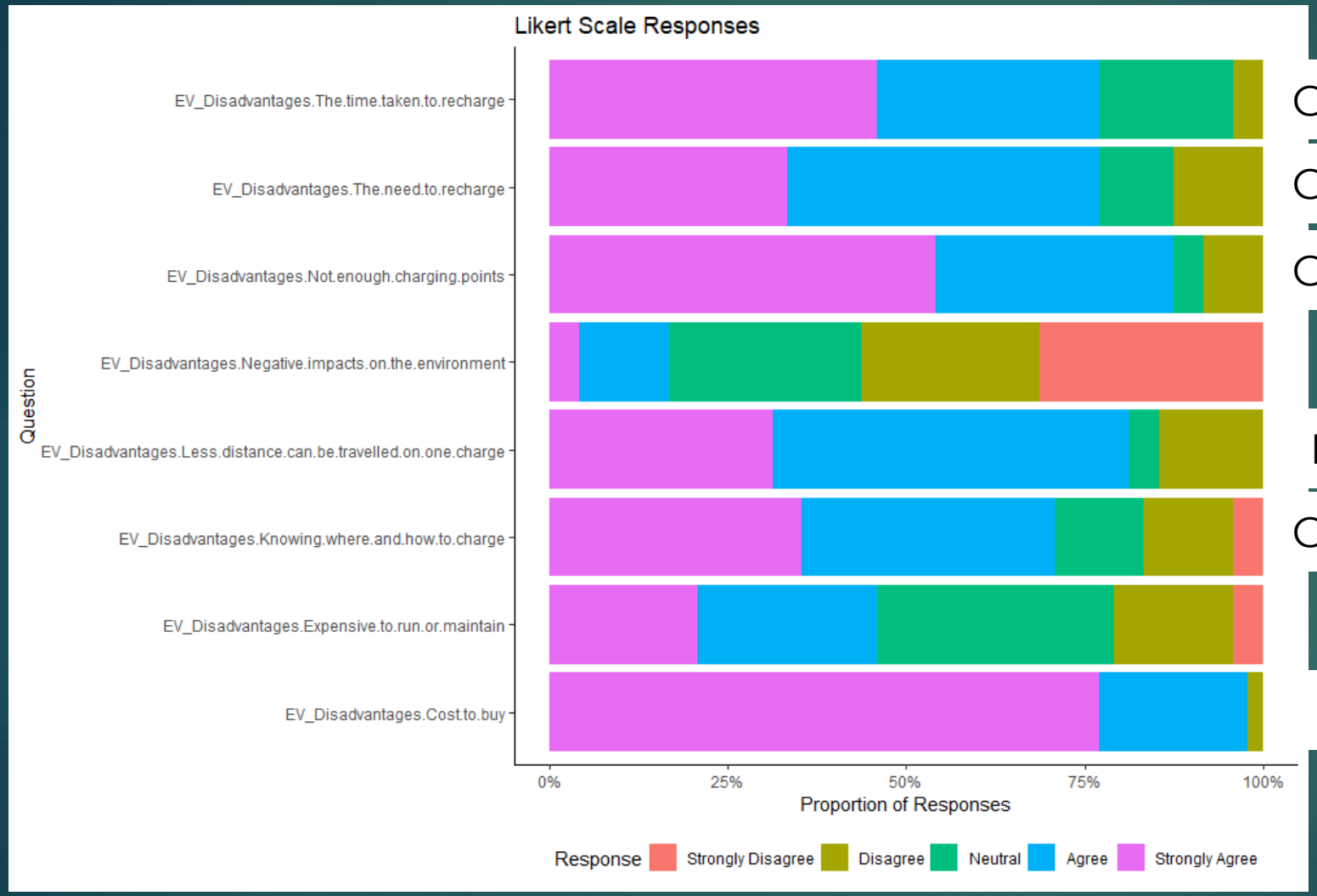
Strong default effect



Low knowledge about EV

Score	Percentage Correct
Range Battery in Km For how many kilometres can you use the battery in an electric vehicle?	22%
EV Charge Cost at Fast Charging Station What is the average cost of driving 100 km with an electric vehicle in Switzerland when charging your car at a fast charging station?	32%
EV Charge Cost at Home What is the average cost of driving 100 km with an electric vehicle in Switzerland when charging your car at home?	36%
Non EV Cost What is the average cost of driving 100 km with an non-electric vehicle in Switzerland?	39%
Life Cycle Emissions Thinking about comparably sized cars, which has higher lifecycle (production and use) emissions?	40%
Household Socket Is it possible to charge an electric car using a household socket?	66%
Average Range What is the average range of electric vehicles available on the market today?	71%
Charge Time How long does it take on average to charge an electric car at a fast-charging station (at 150 kW) from 20% to 80% of battery capacity?	77%
Amount of Charging Stations How many public charging stations are available in Switzerland today?	77%
Fuel Costs Thinking about comparably sized cars, which has lower fuel costs per 100 km.	91%

Stated disadvantages of EV



Charging anxiety

Charging anxiety

Charging anxiety

Range anxiety

Charging anxiety

TCO

Randomized Control Trial structure

1. Intro quiz on perception of compatibility and knowledge on EVs
2. Elicitation of driving and parking behaviour, proximity to charging stations etc.
3. EV advantages and disadvantages survey
4. Demographics
5. EV adoption baseline or Treatment RCT (all for small, medium and large car)
    1. Choice cards (gasoline car vs electric car, with similar characteristics)
    2. Willingness to Pay for comparable EV and ICE
    3. Likelihood of buying EV in next 5 years

Sample: 3000 UK car owners recruited through Prolific
Started in June 2023, ongoing

Range Anxiety

a) Potential number of one way car trips feasible with certain battery size.

b) Driving diary on (1) average week and (2) occasional long-distance trips.

Charging Anxiety

1a) Number of recharges needed per week.
1b) Parking diary on average week.

2a) Proximity of charging stations.
2b) Charging station check on ZapMap.

3a) Convenience of charging.

4a) Estimated growth of number of charging stations.
4b) Actual growth

Total cost of ownership

a) Estimated cost advantage of EV.

b) Actual cost advantage.

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Driving diary: typical weekly trips

Driving Diary - Work Week and Weekend

Please think about the length of car trips that you completed on a daily basis in an average work week and weekend in 2022 and fill in the following form.

Please note: Count outward and return trips separately - for example, if you drove 15 miles to your workplace on five workdays, please indicate the number 15 in the answer fields next to Monday till Friday for trip 1 and trip 2. Please note that a value is required for Trip 1 on Monday to continue. If you never travel on Mondays please input 0 for Trip 1.

	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						

Driving diary: long-distance trips

Driving Diary - Long-Distance Trips

Now please think about additional long-distance car trips above 120 miles that you did in 2022 and fill in the following form.

Please note: Count outward and return trips separately - for example, if you went on vacation by car and drove 300 miles each way, please indicate the number 300 in the answer fields next to trip 1 and trip 2. Please note that a value is required for Trip 1 to continue. If there were no long-distance trips, please input 0 for Trip 1.

Long-distance trips	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
	Trip 13	Trip 14	Trip 15	Trip 16	Trip 17	Trip 18

Which car would you prefer to buy?

Please assume that you have decided to replace your car.

Please note: based on your driving behavior, we calculated you can cover 99 % car trips with the electric car VW ID.3 Pure Perform without having to stop to recharge.

Given this additional information, which car would you prefer to buy?

Model	VW Golf 1.5 eTSI Style
Drivetrain	Front-wheel drive
Power	110 kW / 150 PS
Transmission	Automatic
Consumption	Petrol 5.9 l/100km
Price	£ 27'750
Range (WLTP)	526 miles / 847 km

Petrol Car
VW Golf 1.5 eTSI Style

Model	VW ID.3 Pure Perform
Drivetrain	Rear-wheel drive
Power	110 kW / 150 PS
Transmission	Automatic
Consumption	Electric 15 kWh/100km
Price	£ 28,945
Range (WLTP)	216 miles / 348 km

Electric Car
VW ID.3 Pure Perform

Which car would you prefer to buy?

Please assume that you have decided to replace your car.

Please note: based on your weekly driving behavior, we calculated you would only need to charge once per week with an electric car, VW ID3.

Given this additional information, which car would you prefer to buy?

Model	VW Golf 1.5 eTSI Style
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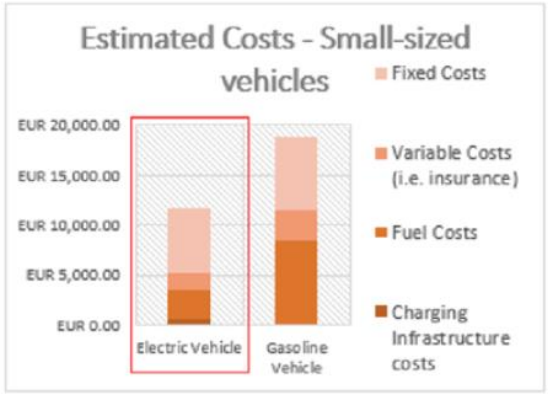
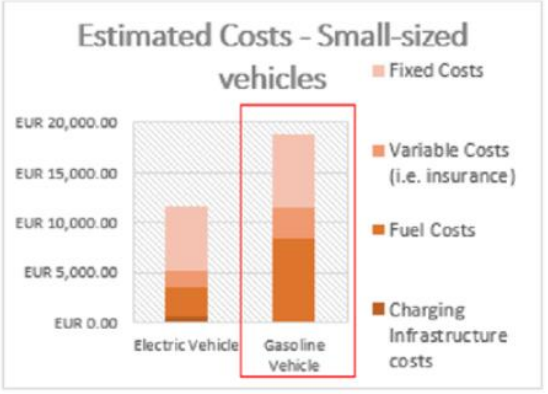
Electric Car
VW ID.3 Pure Perform

Treatment example: total cost of ownership

BMW I3	
Price	39.150 €
Max Speed	150 Km/h
Fuel	Electric Energy
Autonomy	190 km
Space	1100 l
CO2 emissions	0 g/Km



VW Golf 1.5 TSI Evo ACT 150 CV	
Price	28.150 €
Max Speed	216 Km/h
Fuel	Gasoline
Autonomy	700 km
Space	1233 l
CO2 emissions	112 g/Km



Conclusion

- Lack of information about fundamental characteristics of EV
  - Driving costs, battery range
- Default choice matters when choosing between EV and ICE vehicles
- Most important issues of EV ownership: range anxiety, charge anxiety, costs
- Ongoing RCT treatments addresses these three barriers
- Results would show if presenting targeted, personalized information helps mitigating concerns about EV