



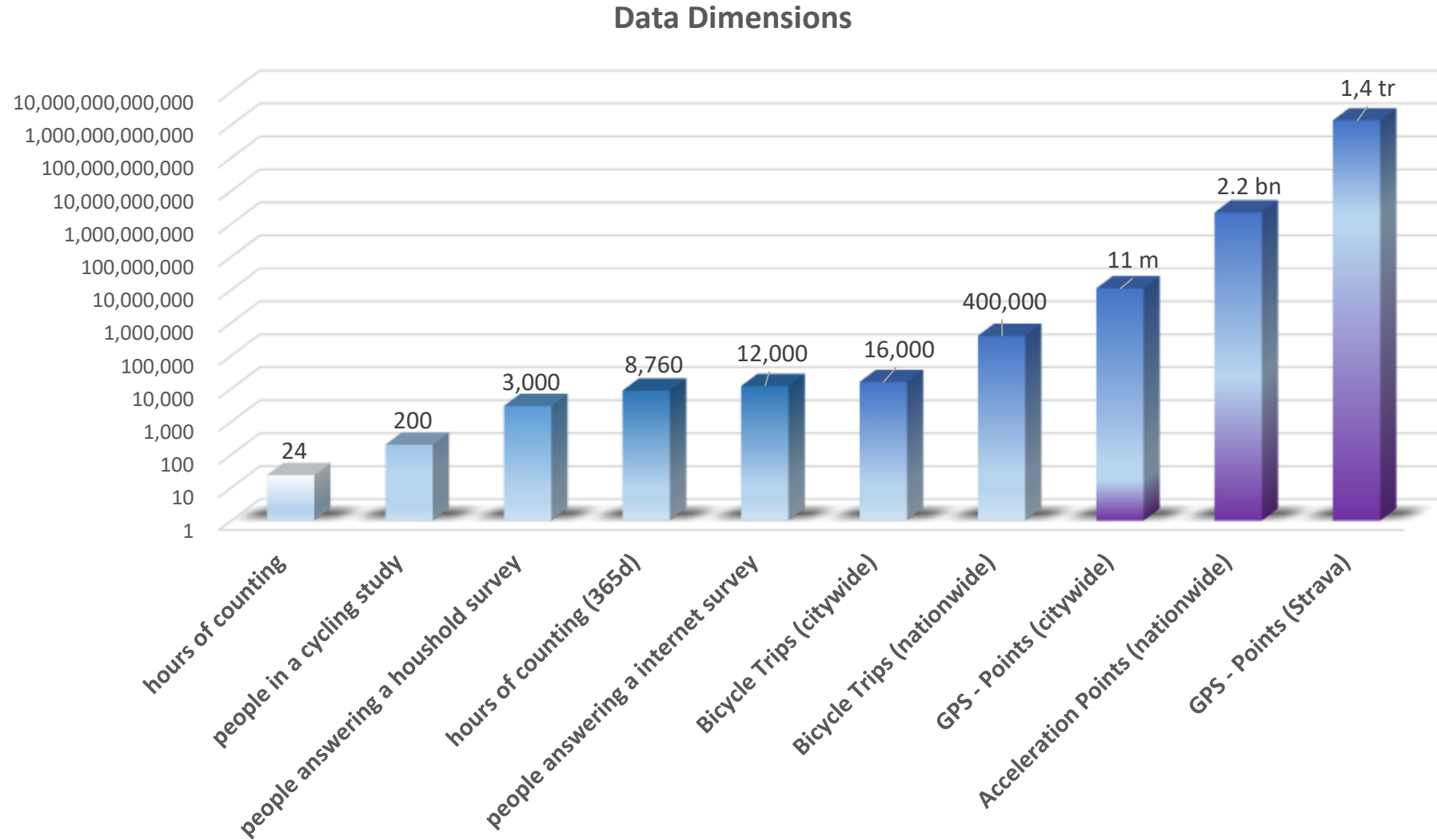
How to interpret Big Data in cycling context?

Dublin // 28th of June 2019

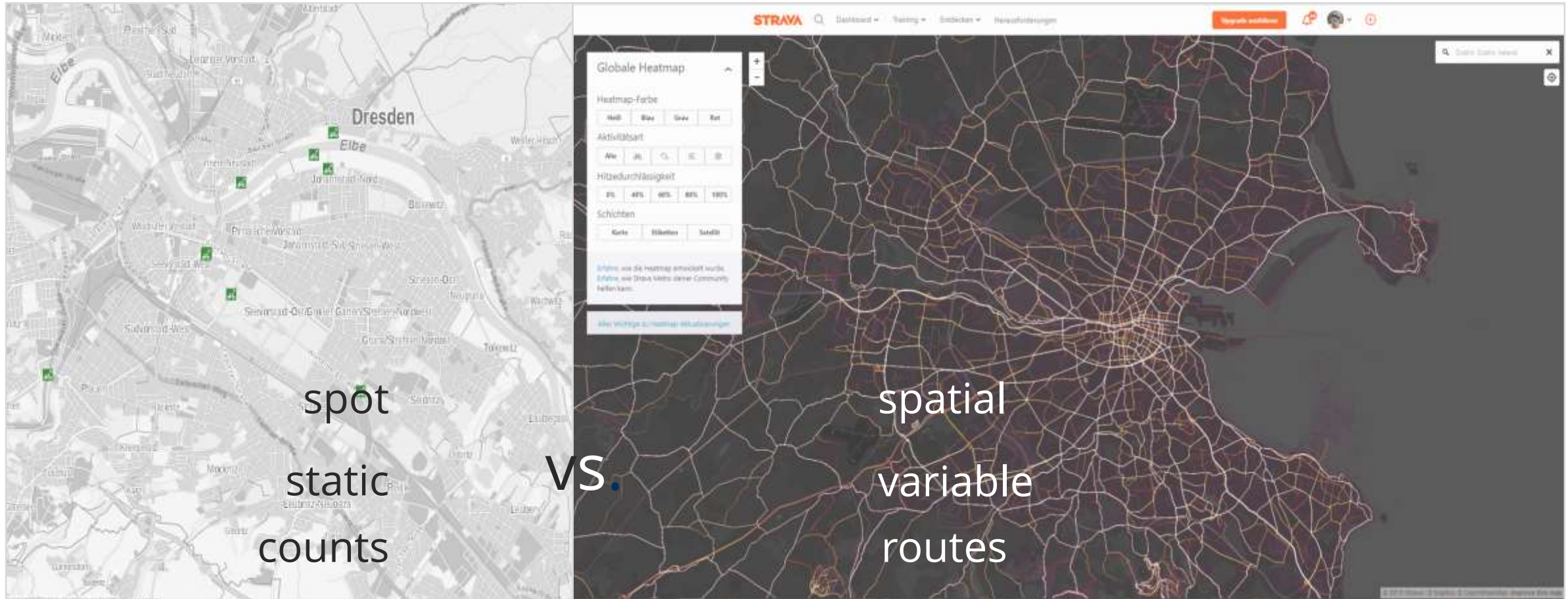
Dipl.-Ing. **Sven Lißner**

Institute for Transportation Planning and Road Traffic - Technische Universität Dresden

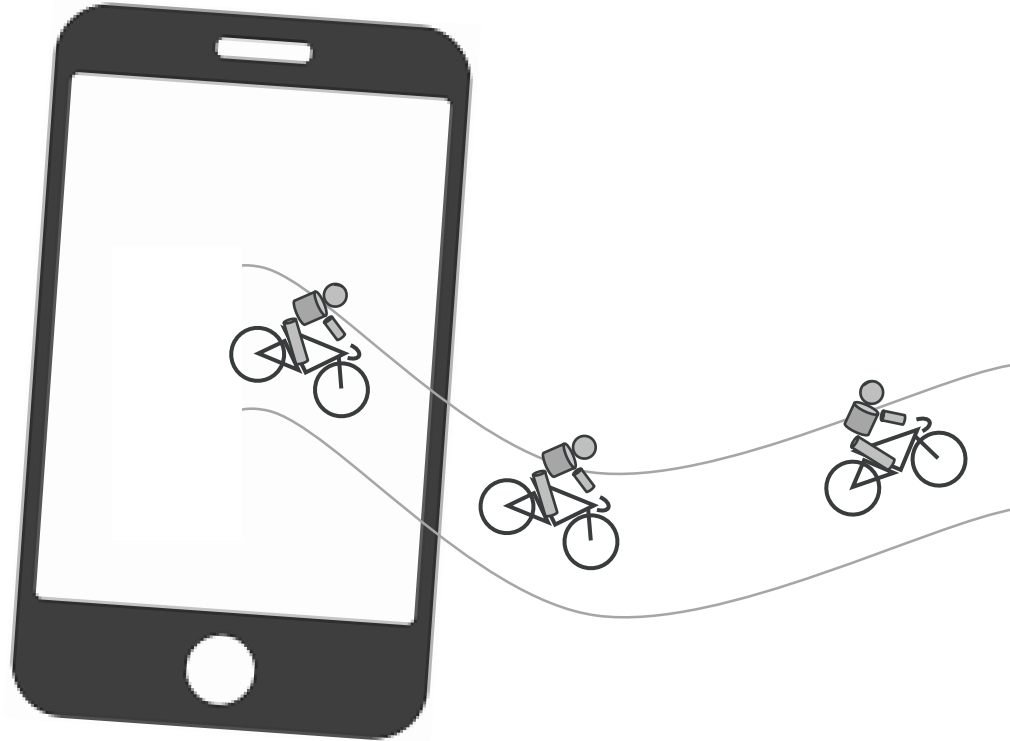
What is Big Data in Cycling?



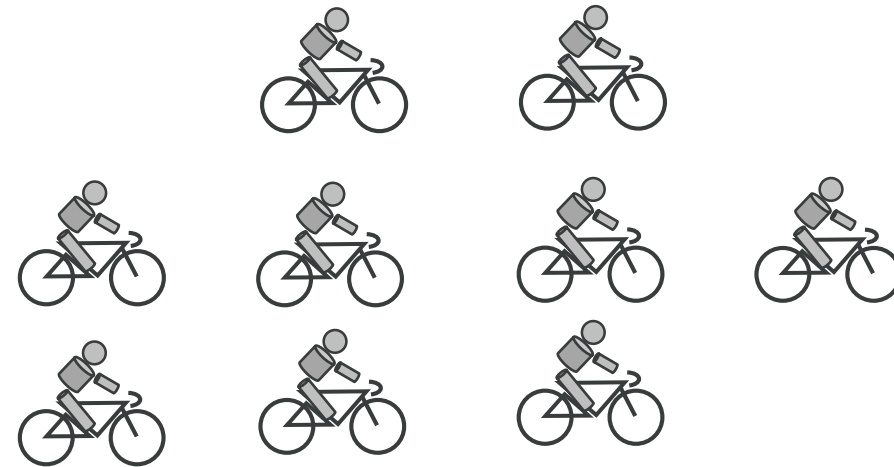
Benefits of Big Data in Cycling



Limitations of Big Data

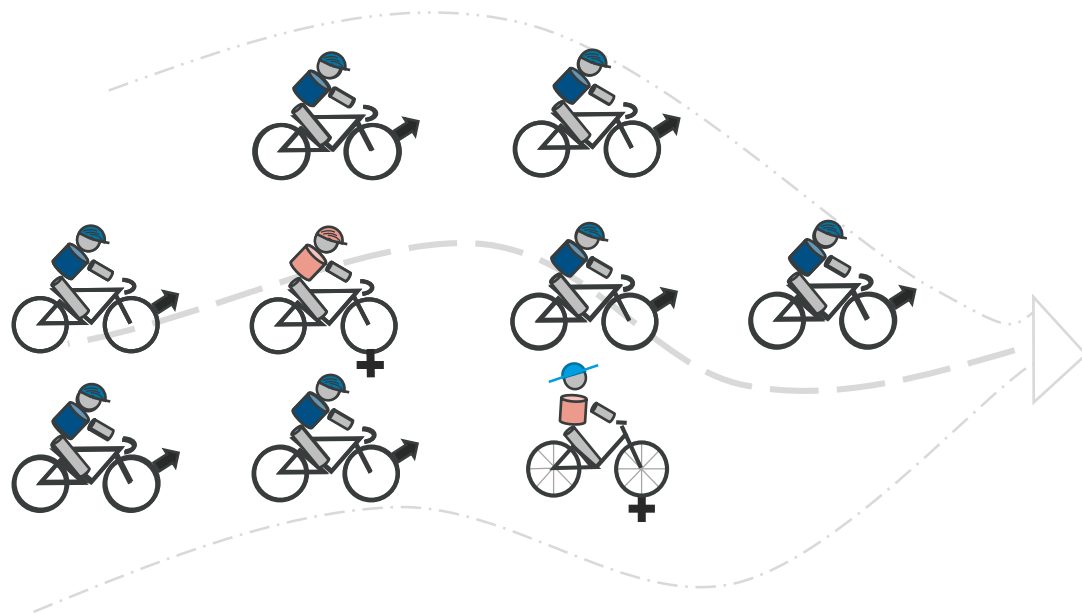


Crowdsourcing means self-selection!

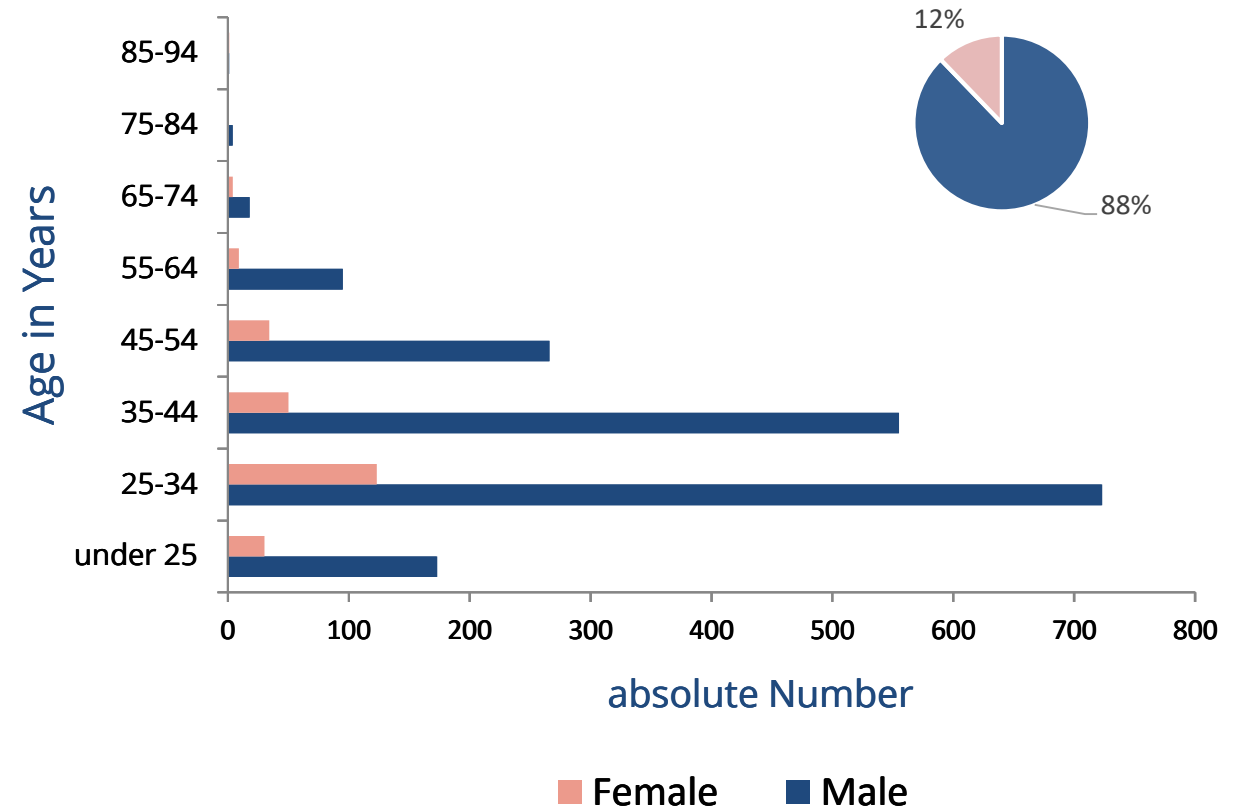


Limitations of Big Data

...and not selection by chance!



Age distribution of Strava users in Dresden



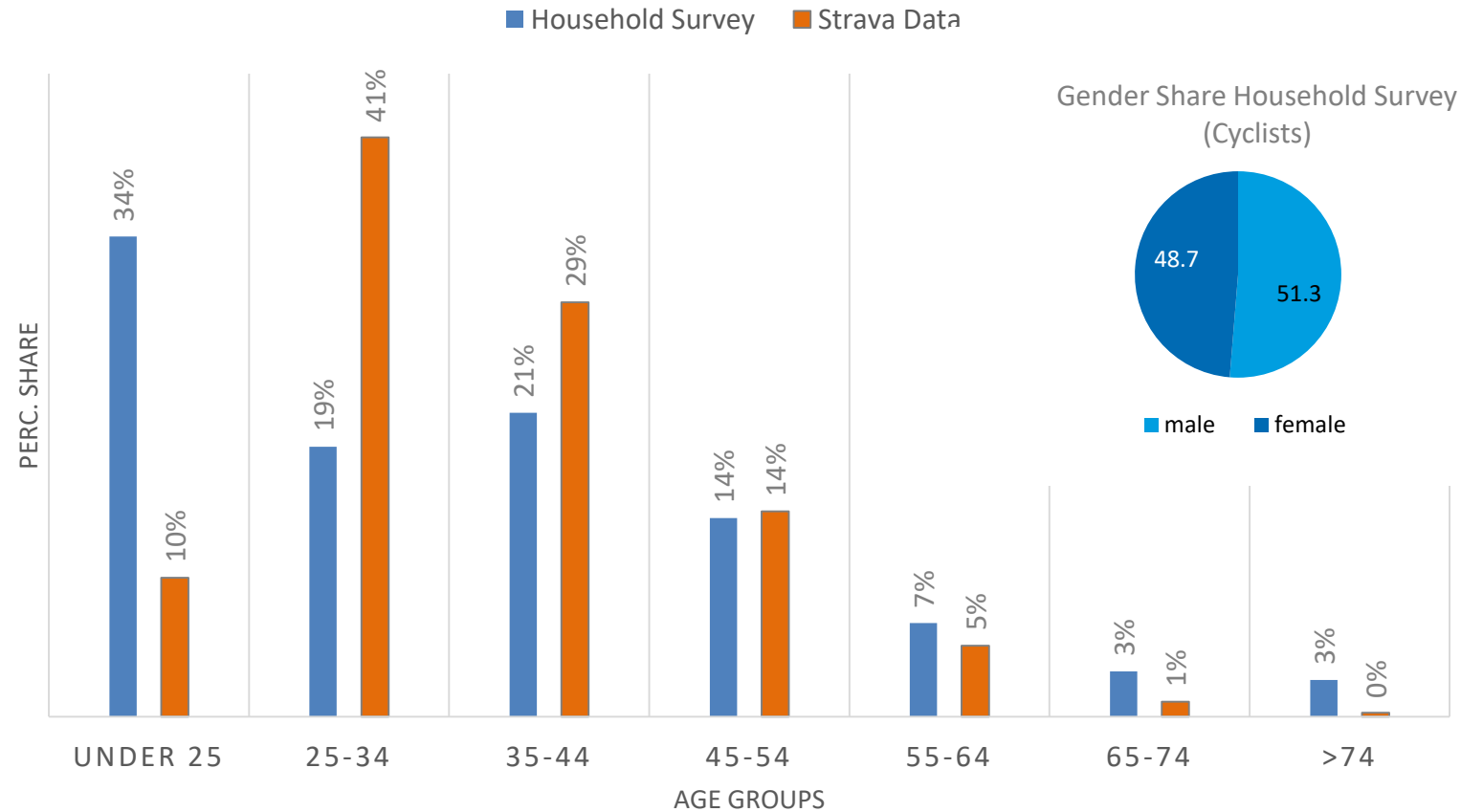
Limitations of Big Data

Self Selection possibly leads to

- Skilled...
- Digital...
- Middle-aged...
- Male.. cyclists

Unlike our Cycling Population?

COMPARISON OF STRAVA AND HOUSEHOLD SURVEY



The big question

Does this bias lead to substantially different cycling behaviour?

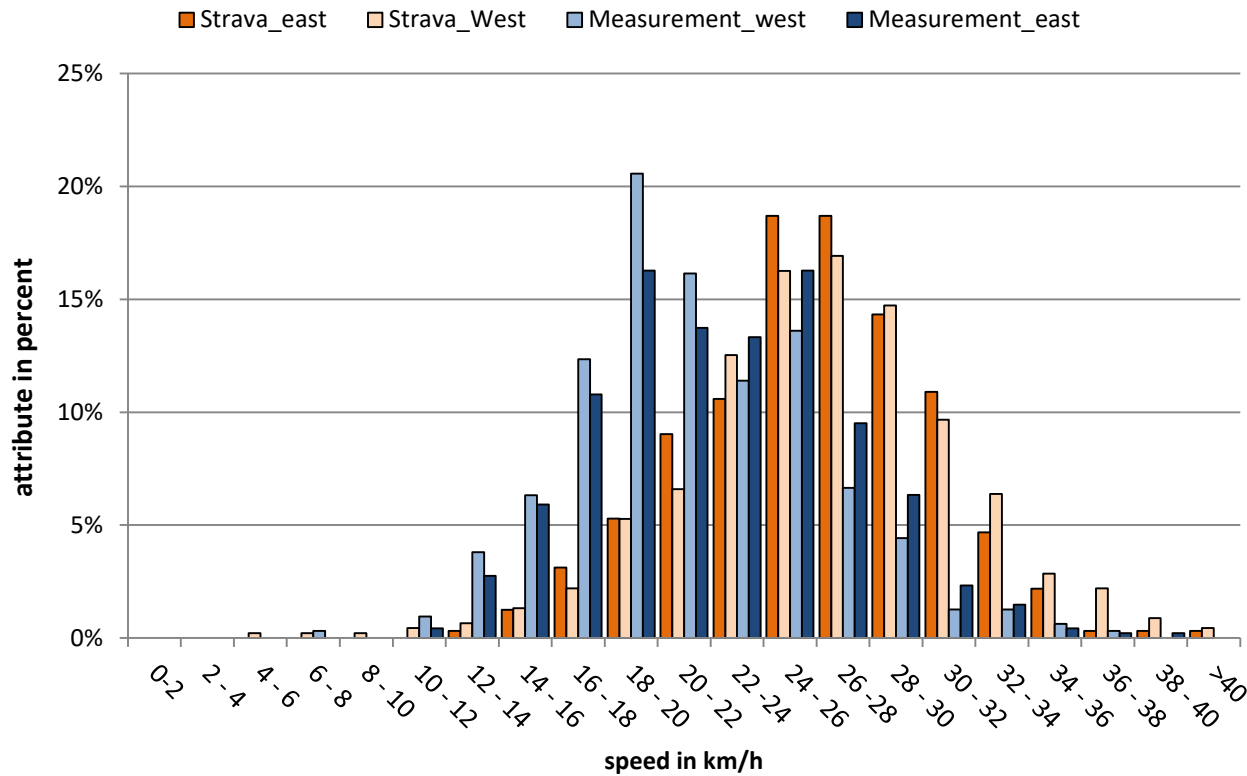


© Matt Ward

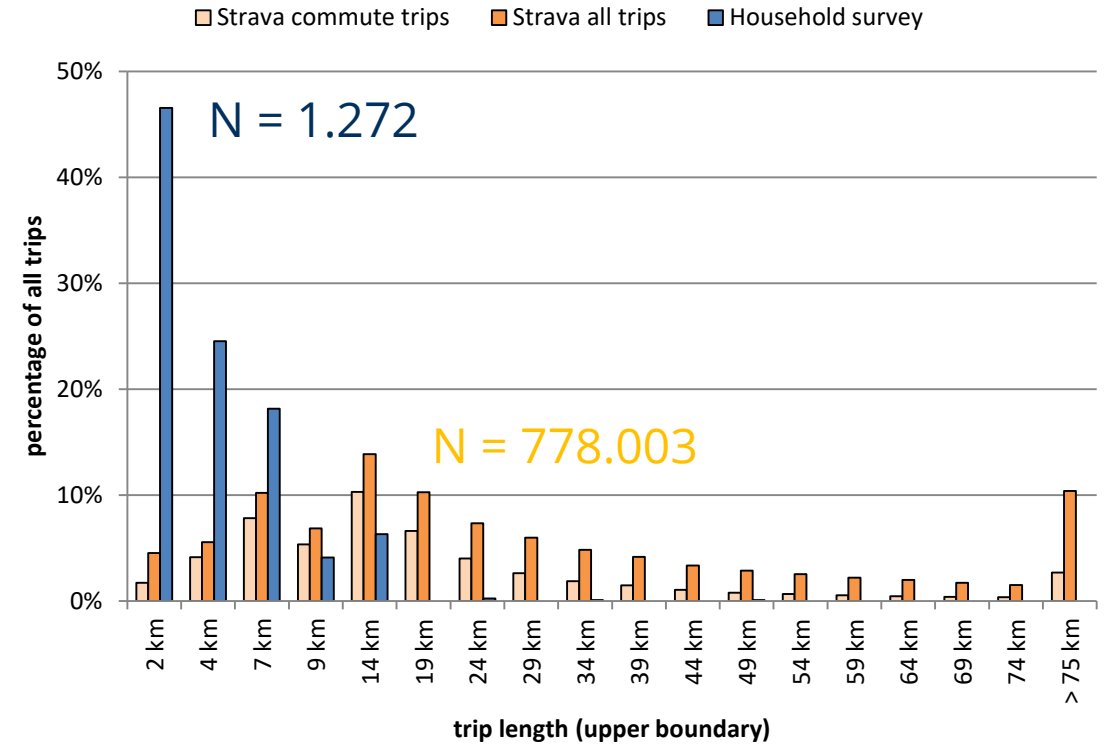


Different Behaviour...

Speed distribution Elberadewg at Waldschlösschenbrücke



Proportion of Strava trip length



...but not really comparable

What did we do?

Step 1: Conduct a Survey!

Seite 07
Zweck

2. Teil: Wie fahren Sie heutzutage Fahrrad?

Wie häufig nutzen Sie die folgenden Verkehrsmittel üblicherweise unter guten Witterungsbedingungen?

	nie	weniger als monatlich	1-3 Mal pro Monat	1-3 Mal pro Woche	4-6 Mal pro Woche	(fast) täglich	keine Angabe
zu Fuß (auch längere Strecken über 2km)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fahrrad (auch Pedelec, E-Bike bis 25km/h)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bus und Bahn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pkw. als Mitfahrer/-in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pkw. als Fahrer/-in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motorrad/Motorroller	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Wie häufig fahren Sie üblicherweise zu den folgenden Zwecken Fahrrad?
bei Überschneidungen bitte doppelt ankreuzen (z.B. falls Sie den Weg zu Ihrer Arbeit mit dem Fahrrad als Ausdauertraining wahrnehmen)

	nie	weniger als monatlich	1-3 Mal pro Monat	1-3 Mal pro Woche	4-6 Mal pro Woche	(fast) täglich	keine Angabe
zu Ihrem Arbeitsplatz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
zu Ihrer Ausbildungsstelle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
dienstlich/geschäftlich	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
für Einkäufe/Errandungen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
zur Begleitung anderer Personen (z.B. in die Kita)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
als Freizeitaktivität (z.B. Ausflüge)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
als Training/Sport (z.B. Ausdauertraining, Radrennen)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sonstiges ZED1_01	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Seite 08

- Twitter, Facebook, Mailing Lists, Radio, Newspapers, Universities....
- “hire your Grandparents”
- Conducted in december 2017
- 11.000 participants

What did we do?

Step 2: Typology of Cyclists



ambitious



passionate

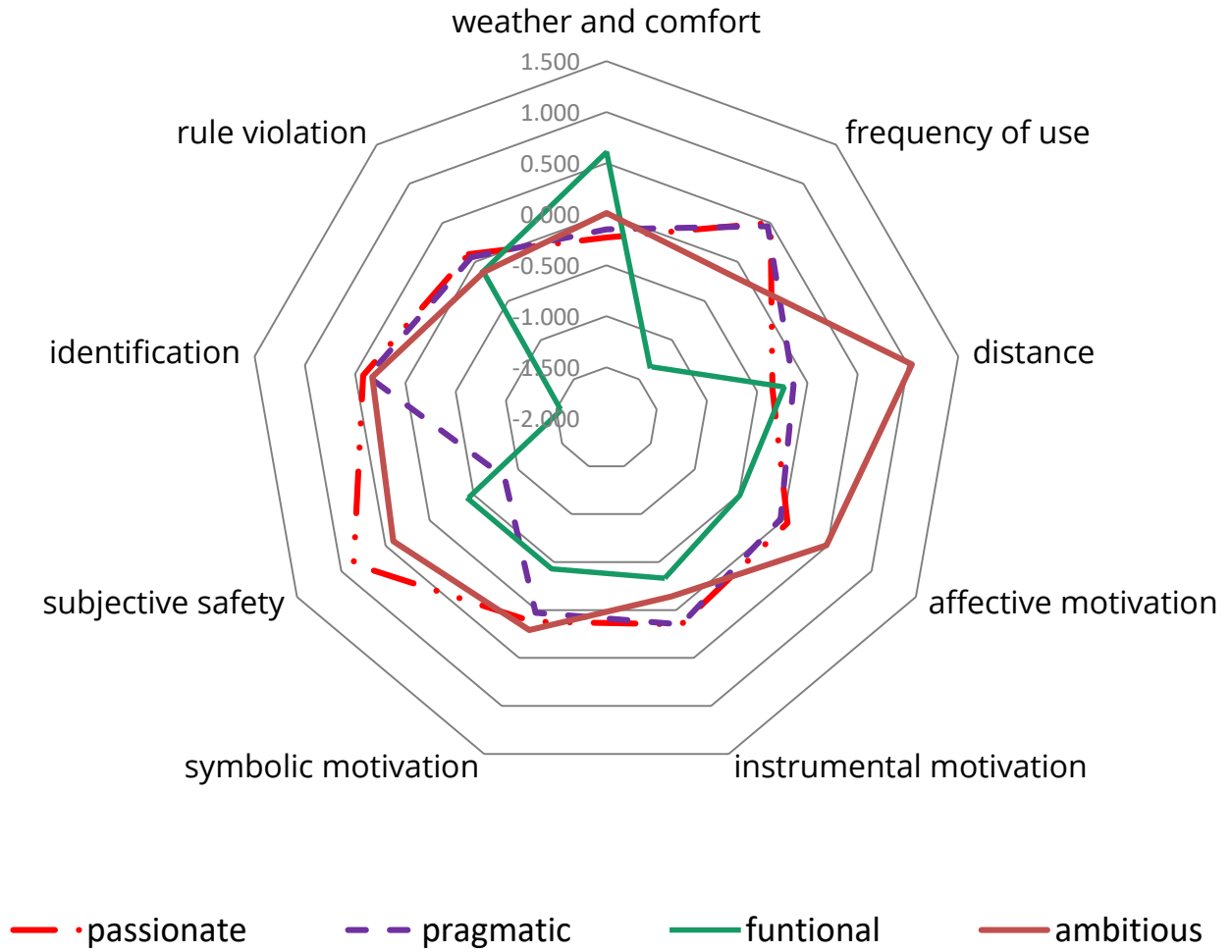


pragmatic



functional

Types of cyclists



What did we do?

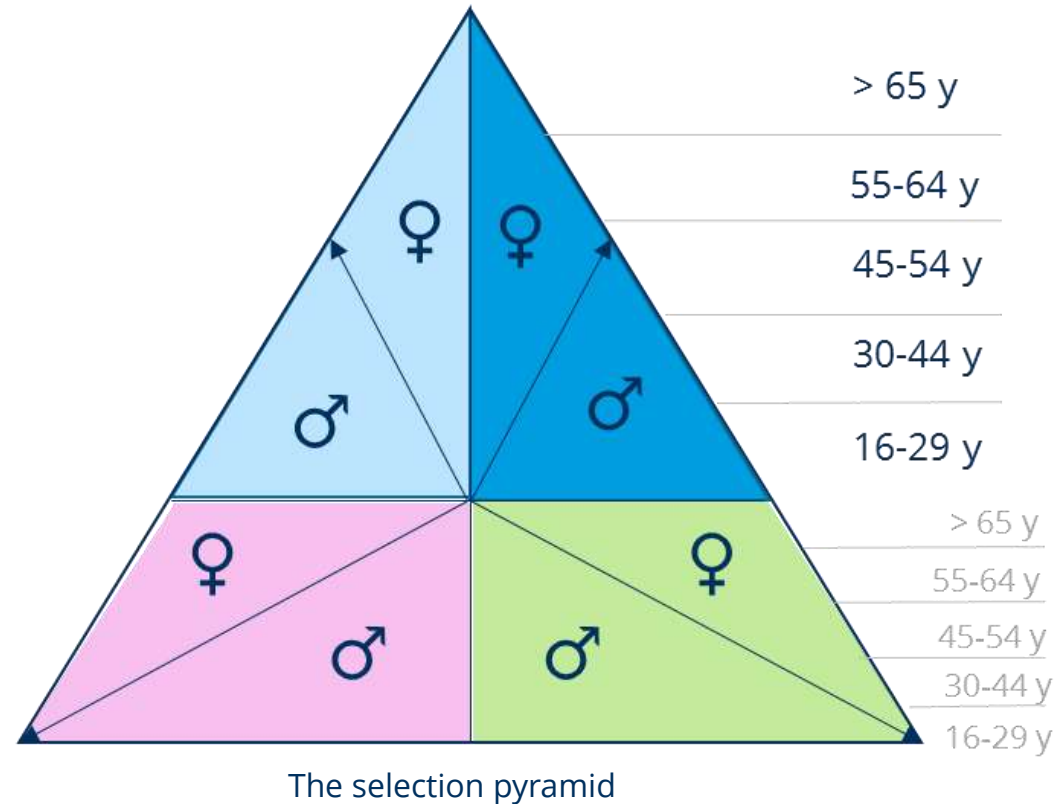
Step 3: Conduct a field experiment

The Setup:

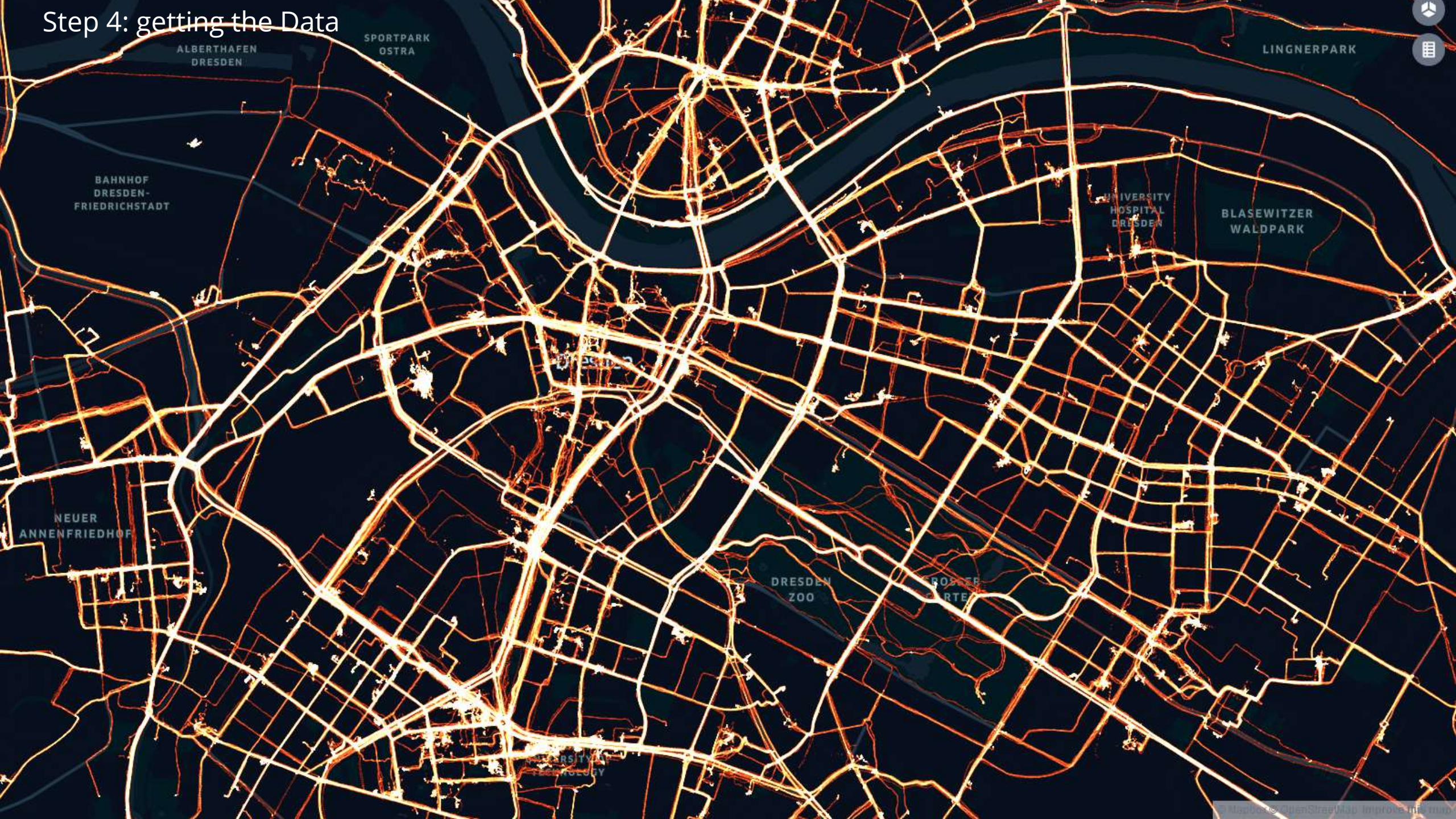
- _200 People
- _100 female
- _50 of each type
- _5 age classes
- _oldest 88y

Duration:

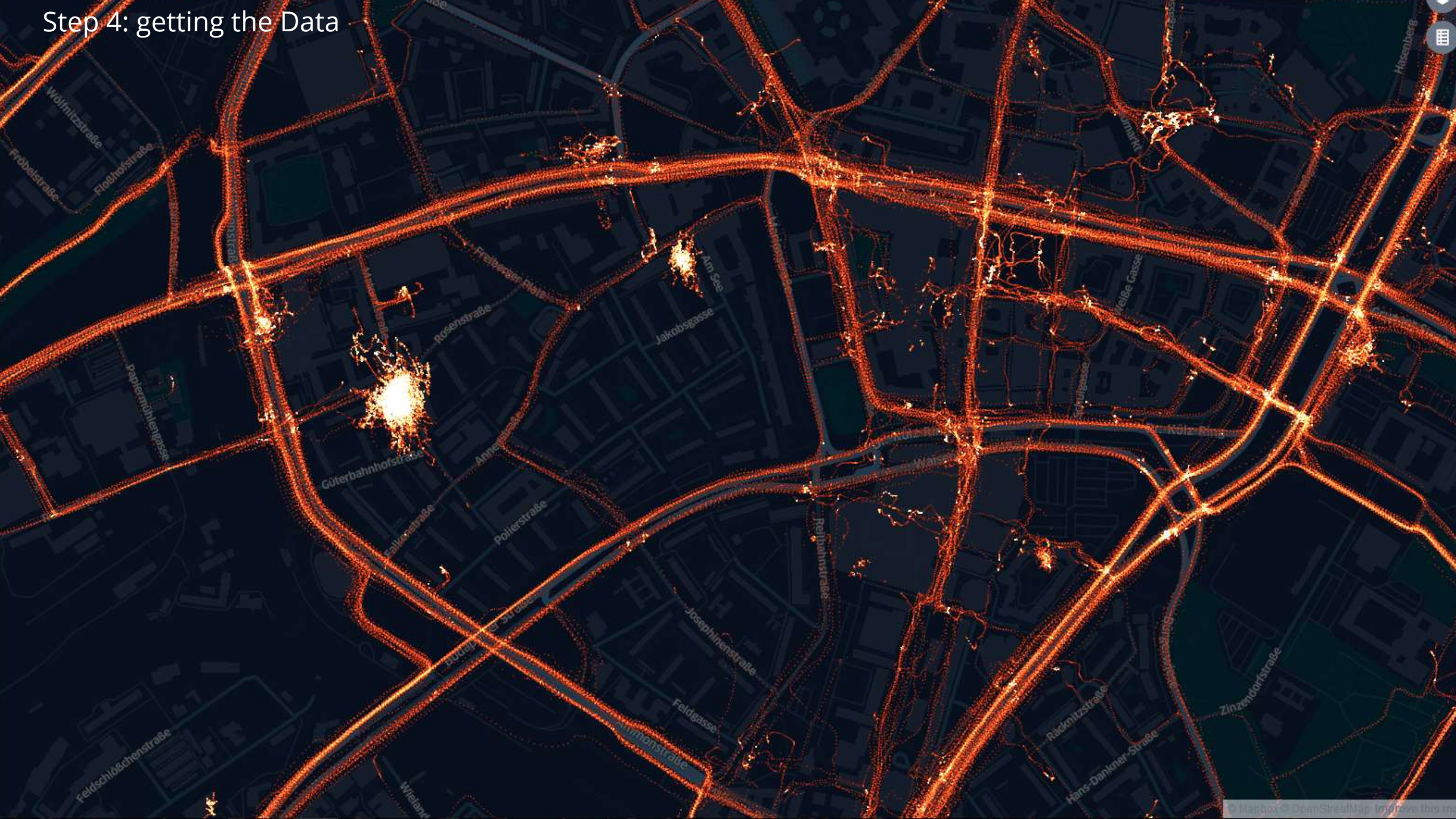
- _2 Waves
- _2 Weeks in Mai/June



Step 4: getting the Data

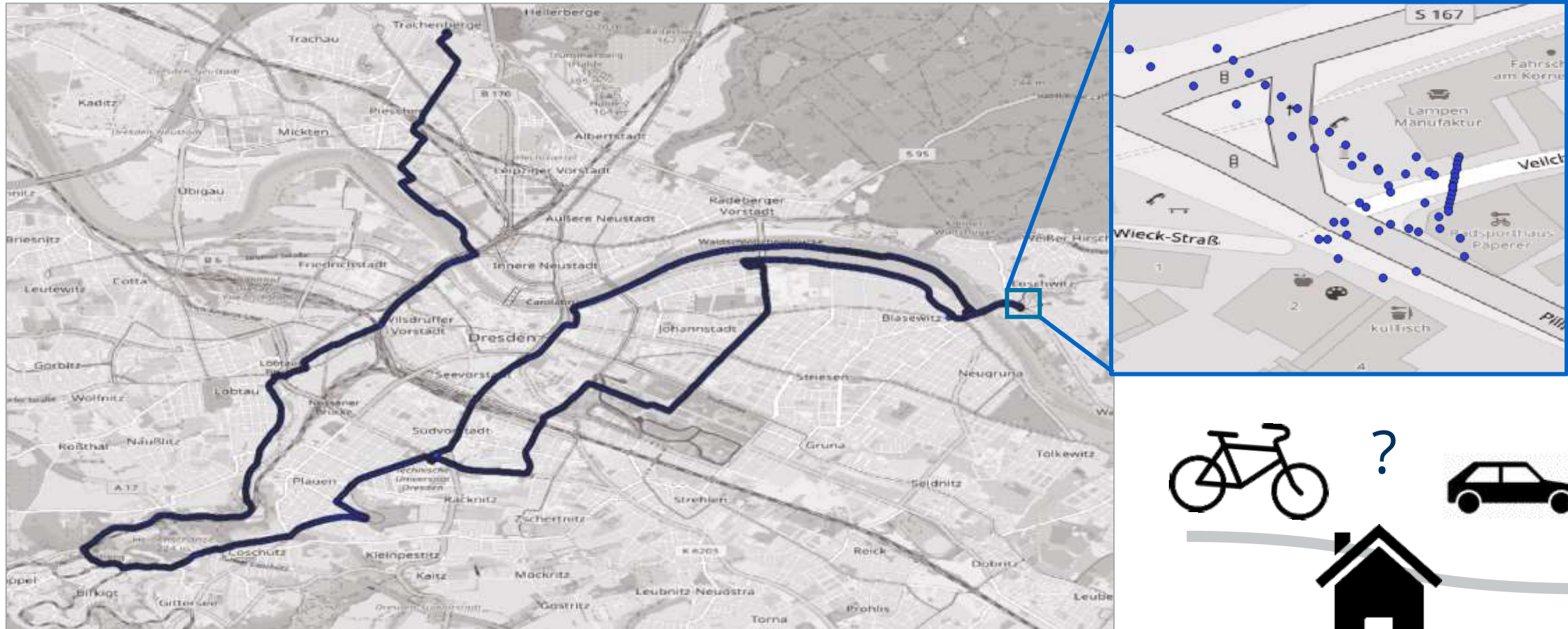


Step 4: getting the Data

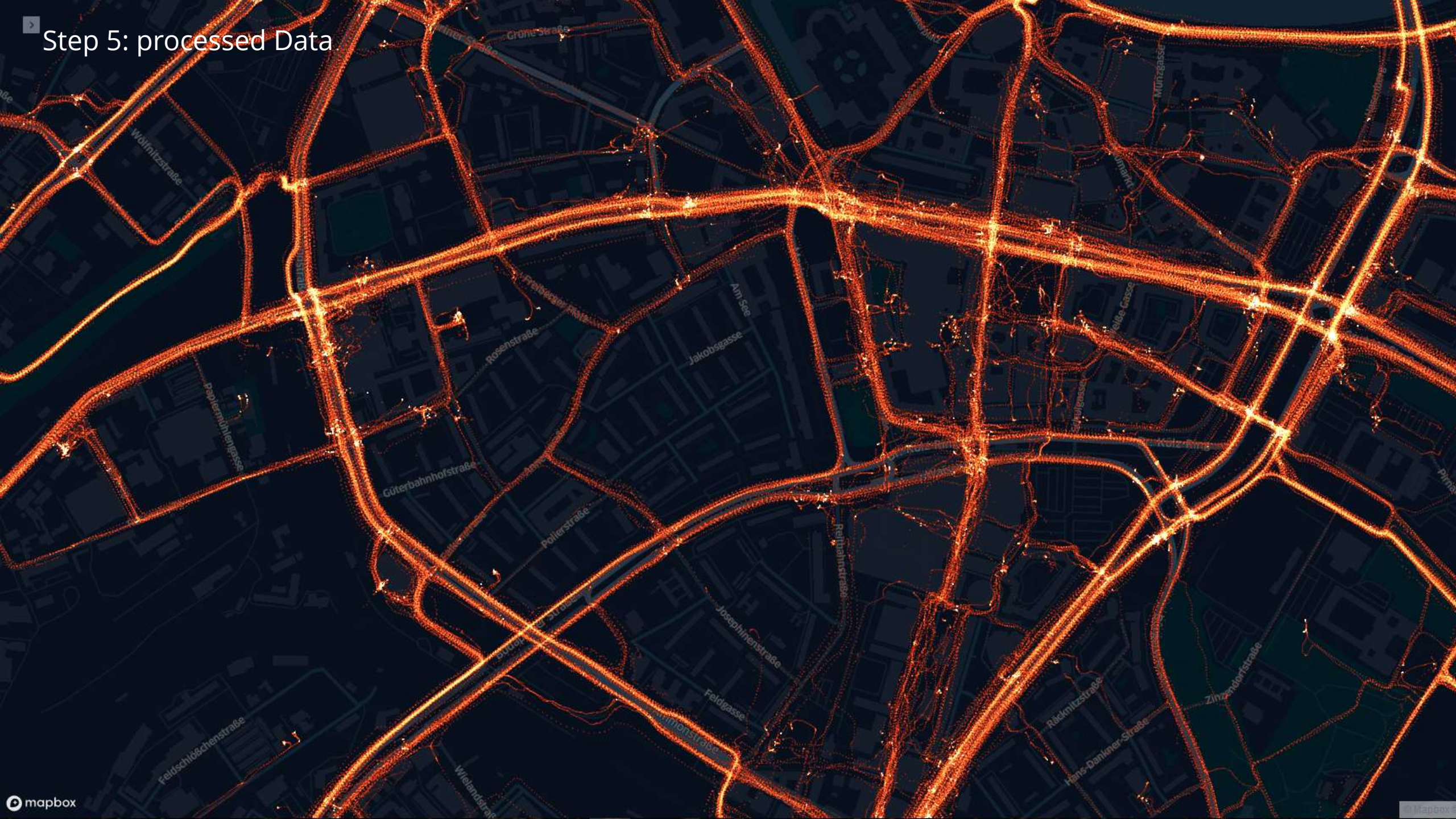


What did we do?

Step 5: Data pre-processing

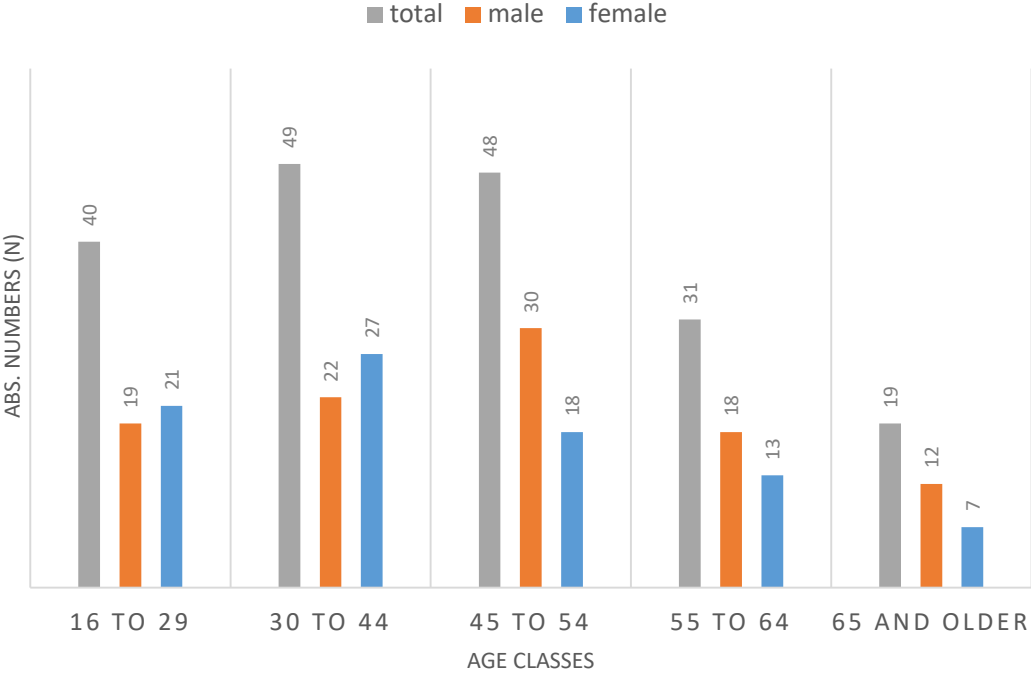


Step 5: processed Data



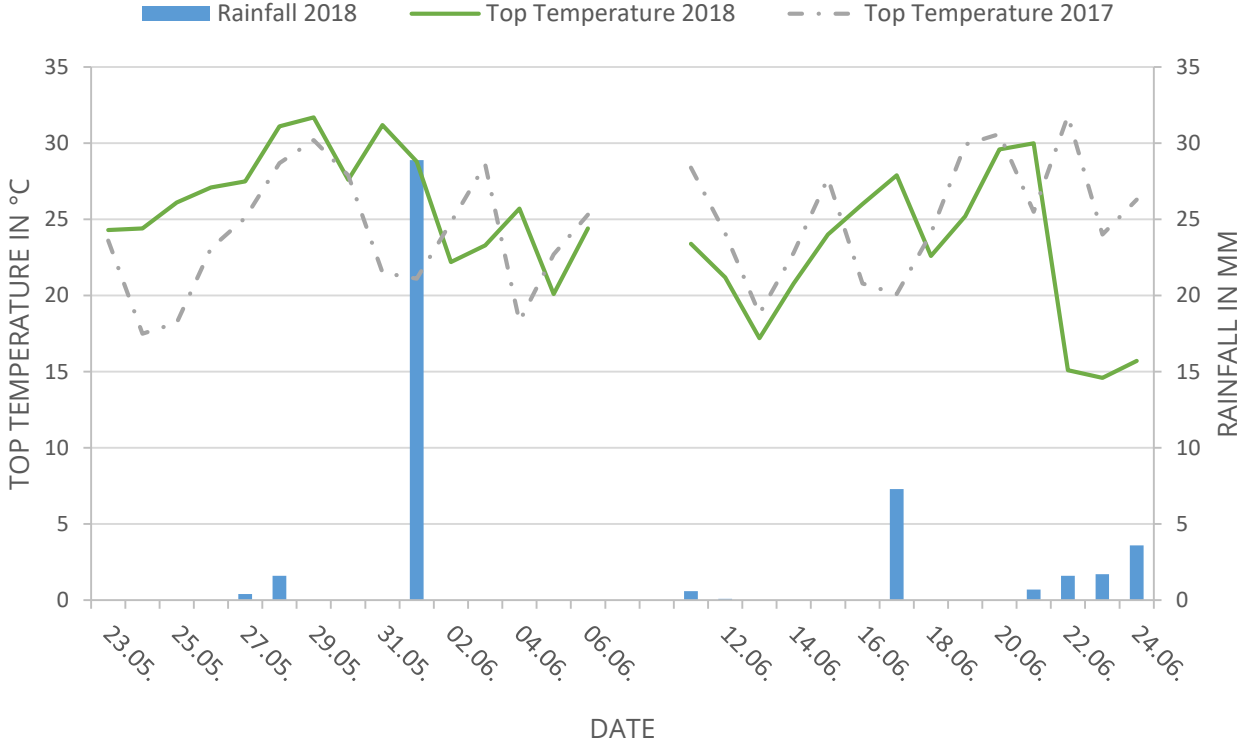
Evaluation

AGE DISTRIBUTION



- 187 Cyclists with usable Data

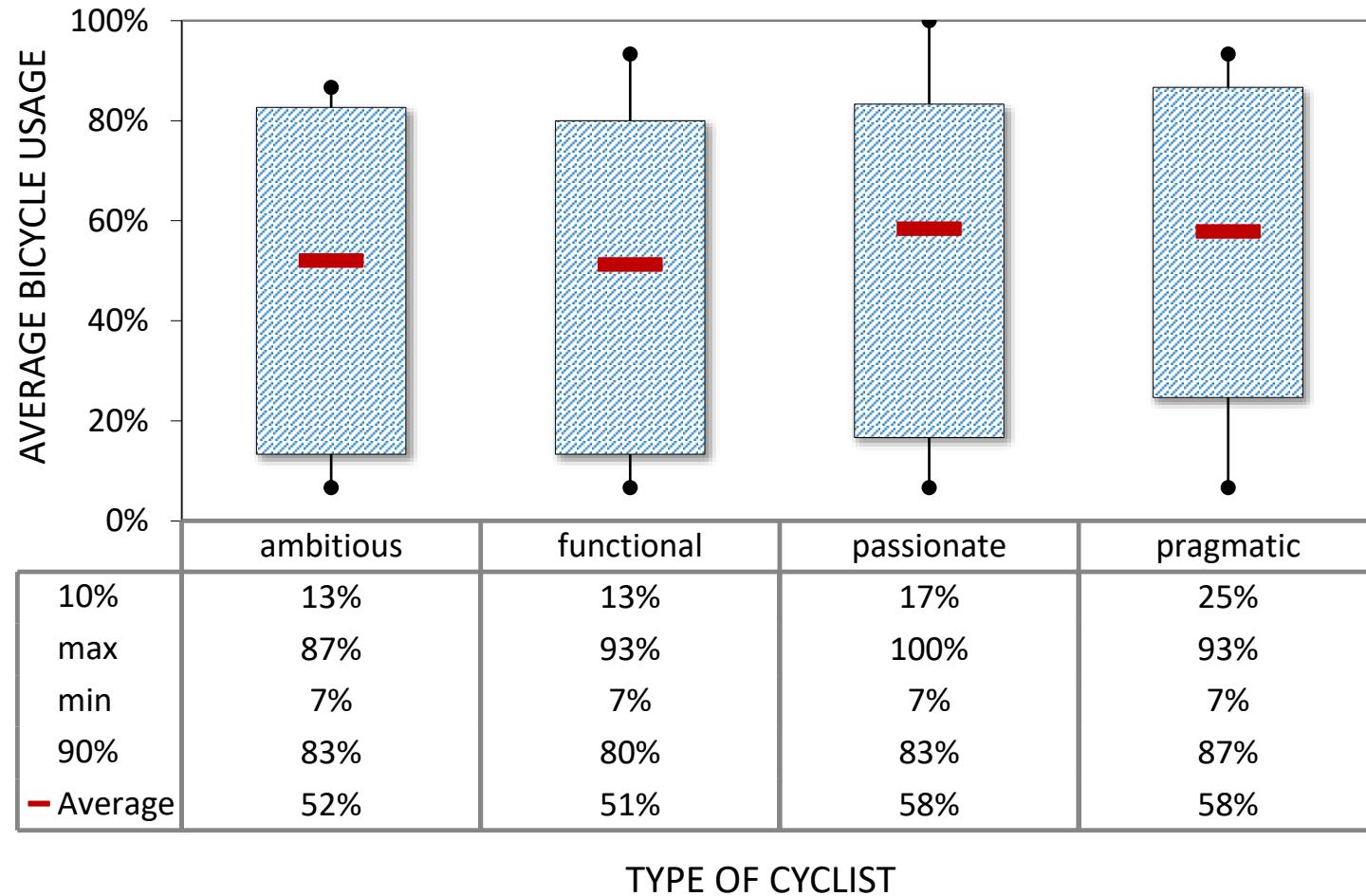
TEMPERATURE AND RAINFALL



- Temperature warm, hardly rainy

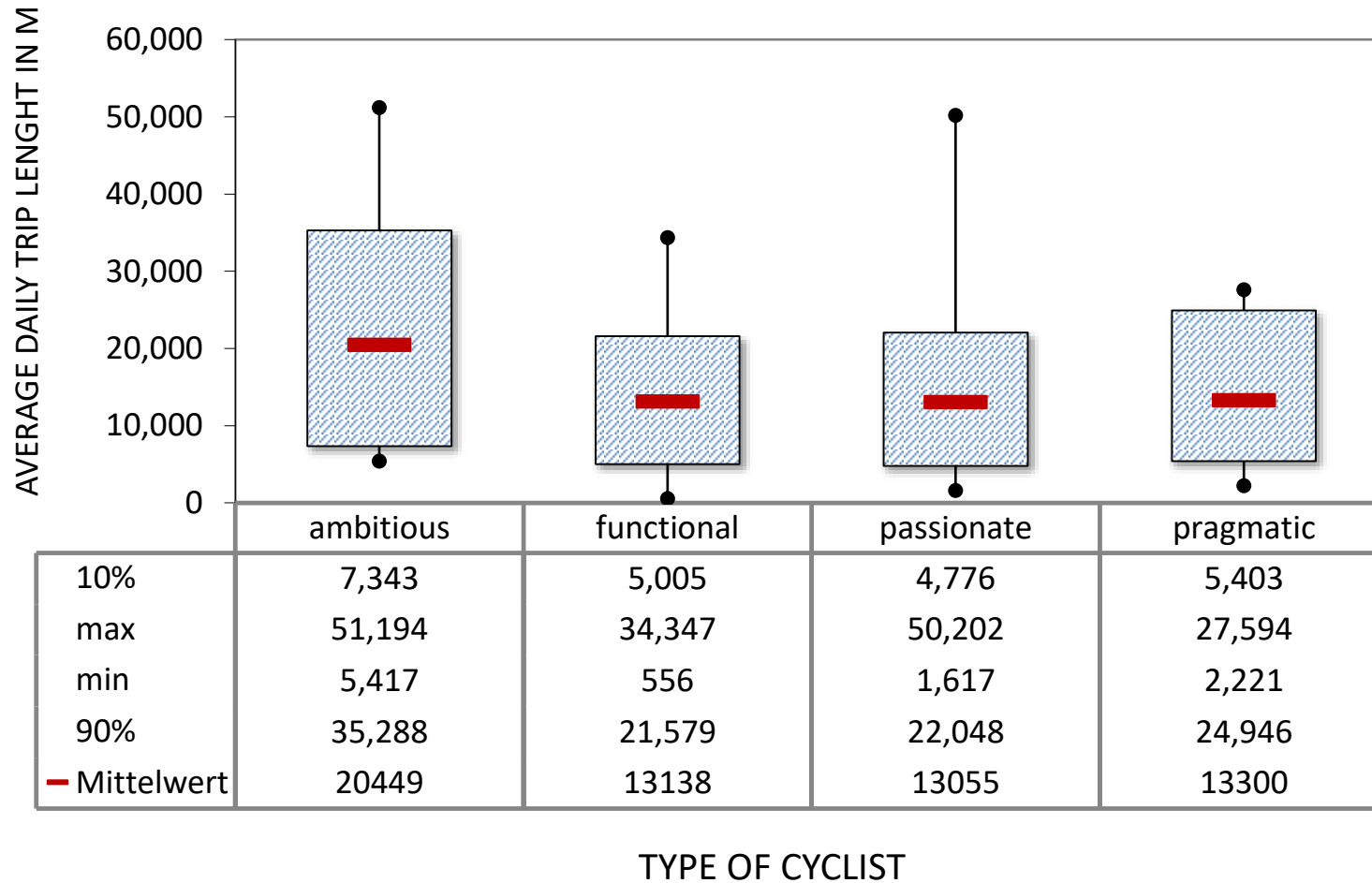
Evaluation

AVERAGE SHARE OF DAILY BICYCLE USAGE IN STUDY PERIOD



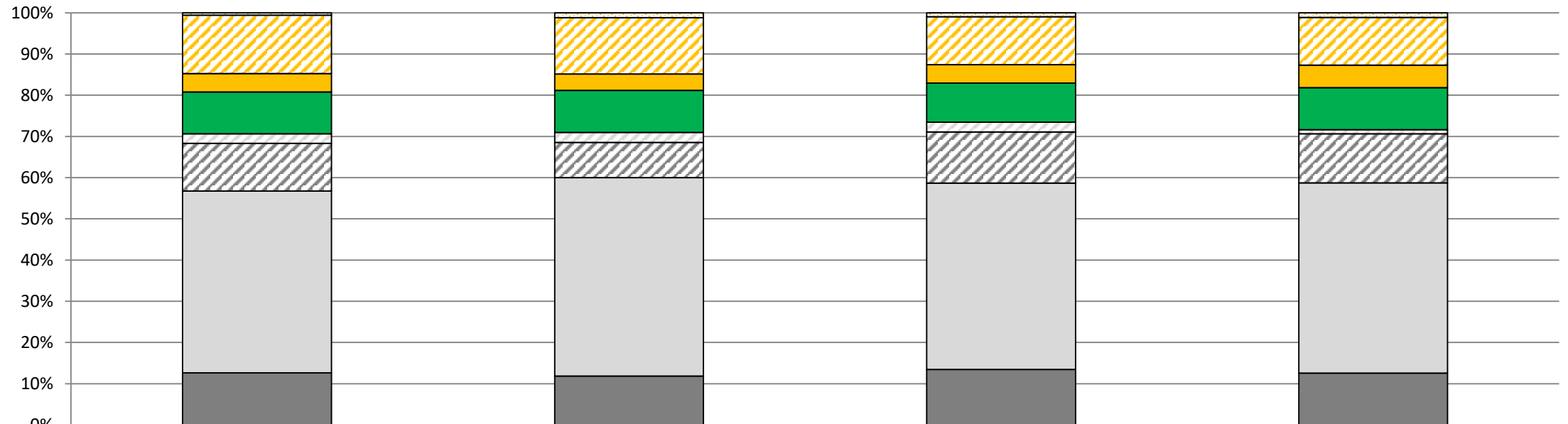
Evaluation

AVERAGE DAILY TRIP LENGTH FOR DIFFERENT TYPES OF CYCLISTS



Evaluation

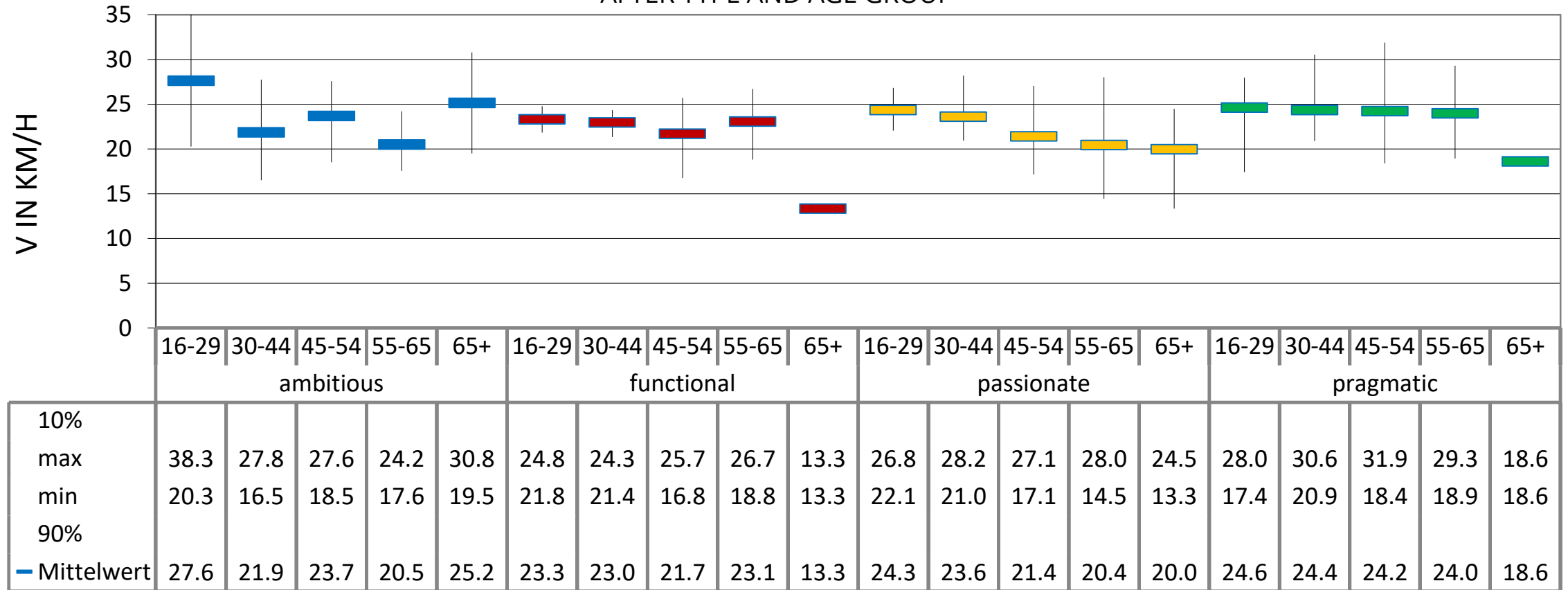
facility type: average share of trip length per type of cyclist



	ambitious	functional	passionate	pragmatic
▨ Sidewalks/others	1%	1%	1%	1%
▨ Shared Cycling/Walking	13%	13%	11%	11%
▨ Sidewalk, cycling allowed	4%	4%	4%	5%
▨ Cycleways	10%	10%	9%	10%
▨ Side Roads on street	2%	2%	2%	1%
▨ Main Street on street	11%	8%	12%	11%
▨ Side road	42%	45%	42%	43%
▨ Main street	12%	11%	13%	12%

Evaluation

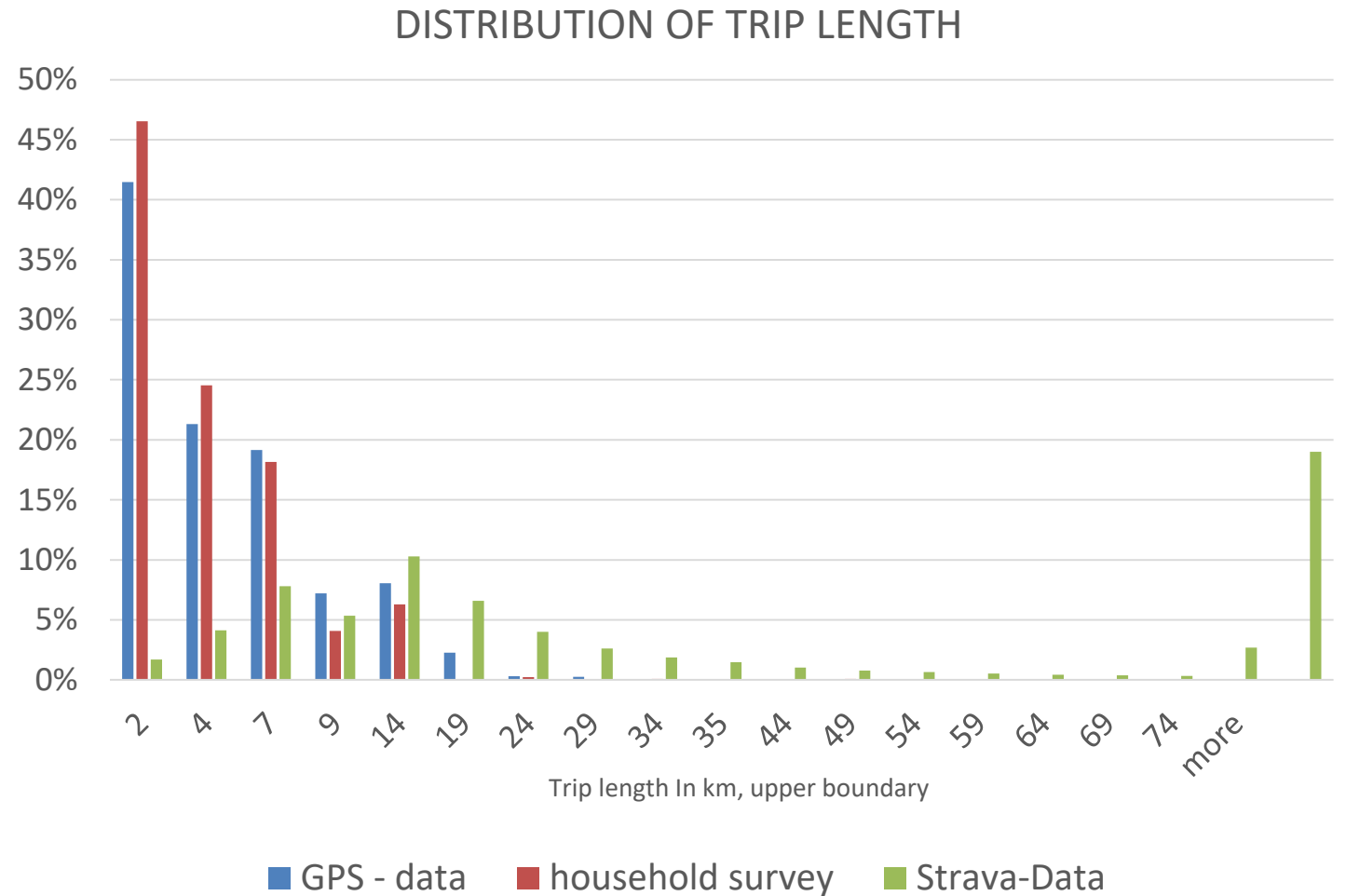
DISTRIBUTION OF SPEED
AFTER TYPE AND AGE GROUP



TYPE OF CYCLIST

Why does this matter?

- Differences between different types of Cyclists are not as big as we thought
- Distribution of trip length looks very similar to random sample from household survey
- This kind of distribution seems representative and is to be achieved in biased samples



THANK YOU!



Sven Lißner
Chair of Transportation Ecology

Sven.lissner@tu-dresden.de



Angela Francke
Chair of Transportation
Psychology

Angela.Francke@tu-dresden.de



Juliane Anke
Chair of Transportation
Psychology

Juliane.Anke@tu-dresden.de



Stefan Huber
Chair of Transportation Ecology

Stefan.Huber1@tu-dresden.de