

# Overtaking motorized traffic on rural roads

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# Background

- Number of crashes on rural roads lower than in urban areas and on highways, but level of severity higher
- Crashes on rural roads account for more than half of all fatal crashes
- Overtaking manoeuvres one of the most risky driving manoeuvres leading to serious/fatal crashes
- 50% fall into the age group 18 to 49
- Little opportunity to learn in driving schools
- Skills need to be acquired after passing driving tests

# Background

- Overtaking is a demanding task and requires:
  - Accurate judgement of distance, speed of lead vehicle, acceleration of own vehicle, speed of oncoming vehicle
  - Observation of subsequent traffic
  - Accurate reaction to changes in the environment (sudden oncoming traffic may require to interrupt takeover manoeuvre)
  - Skills to manoeuvre through narrow roads with high accelerations
- Has been studied in driving simulator studies, observational studies, and FOTs
- Addressed again using NDS data of British, Dutch, French, German, and Polish driver

# Research goal

Aim to...

... better understand the mechanisms behind overtaking on rural roads

... provide thoroughly descriptive statistics

... analyse the effect of factors such as...

*age and gender*

*type of overtaking manoeuvre (flying vs. normal)*

*presence of oncoming traffic*

*time of day*

*weather condition*

*type of lead vehicle*

on performance

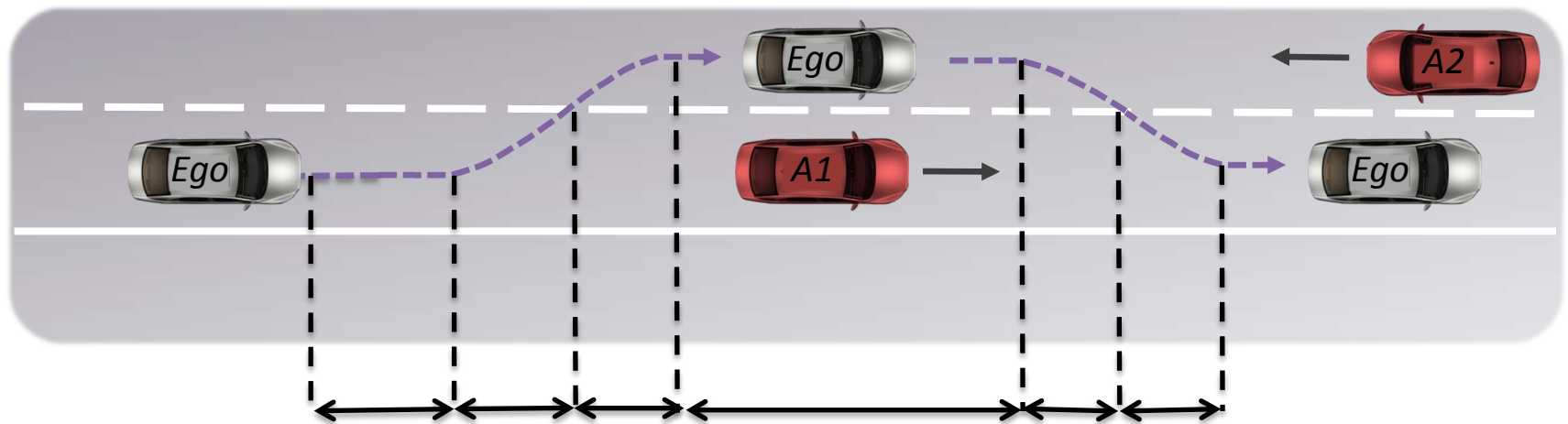
# Method:

## Dataset

- NDS data collected in five European countries
- 55229 trips, 13200 hours of data basis of the analysis
- Extraction of takeover manoeuvres on rural roads
- Definition of a takeover manoeuvre
  - Two consecutive lane changes and passing one or more slower moving vehicles in between
  - Entering the opposite travel lane, passing the vehicles and moving back into own travel lane on a two-lane
  - A lane change is initiated when the lateral acceleration of the vehicle exceeds the 95<sup>th</sup> percentile of the zero-level lateral acceleration and ends the moment it falls below the 5<sup>th</sup> percentile afterwards.
- Number of takeover manoeuvres found:
  - ~1400 found by algorithm

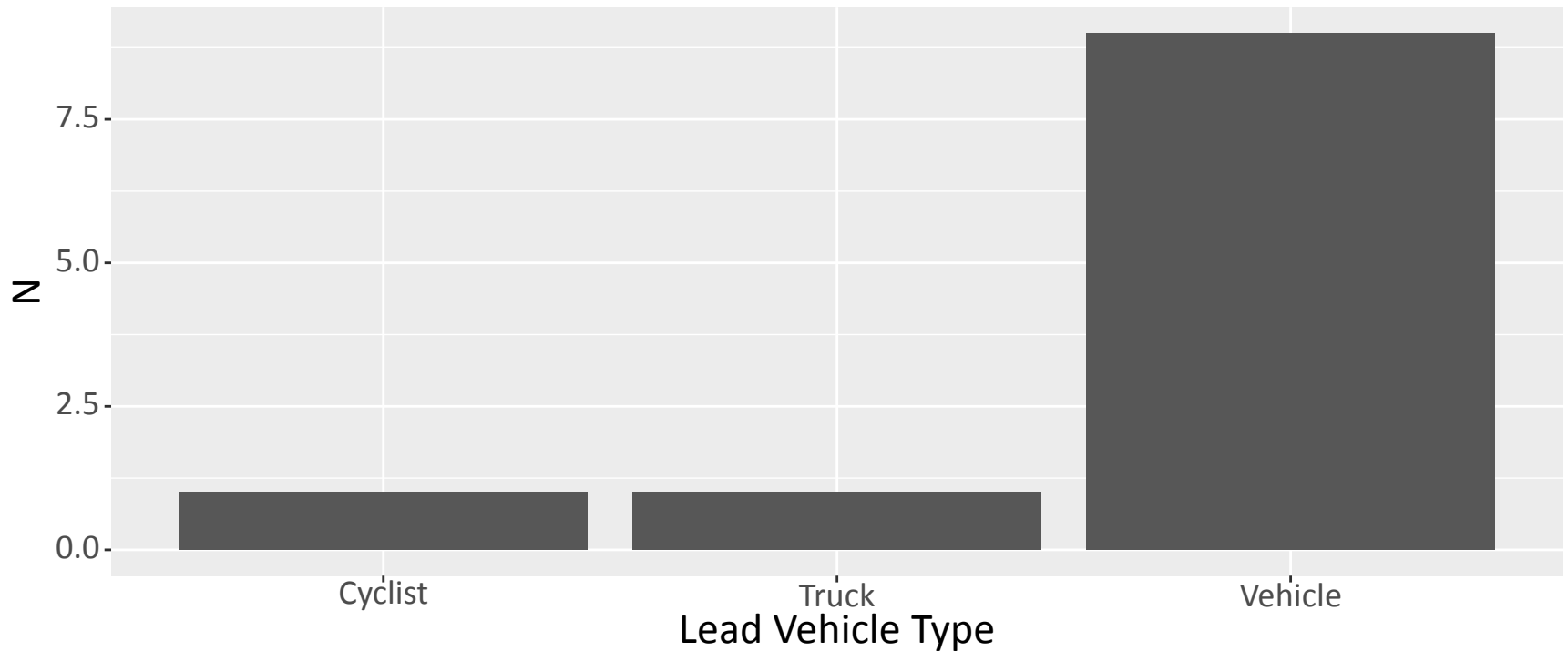
# Method:

## Performance indicators



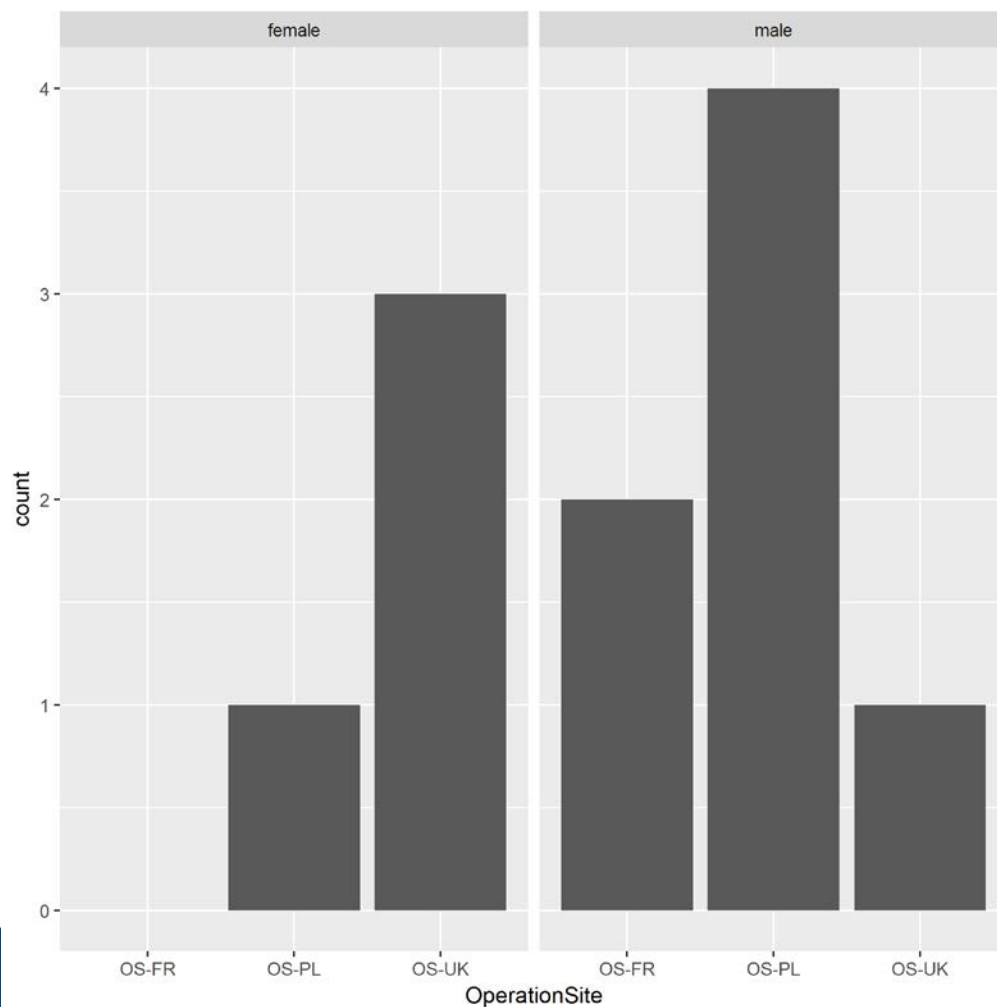
	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Mean lat. accel.		X	X		X	X
Max lat. accel.		X	X		X	X
Duration	X	X	X	X	X	X
Mean long. accel.	X	X	X	X	X	X
Max long. accel	X	X	X	X	X	X
Mean TTC/THW		X	X			
Min TTC/THW		x	x			
Mean TTC/THW					X	X
Min TTC/THW					X	X

# Preliminary results



~1400 found by algorithm, 11 found by video sighting

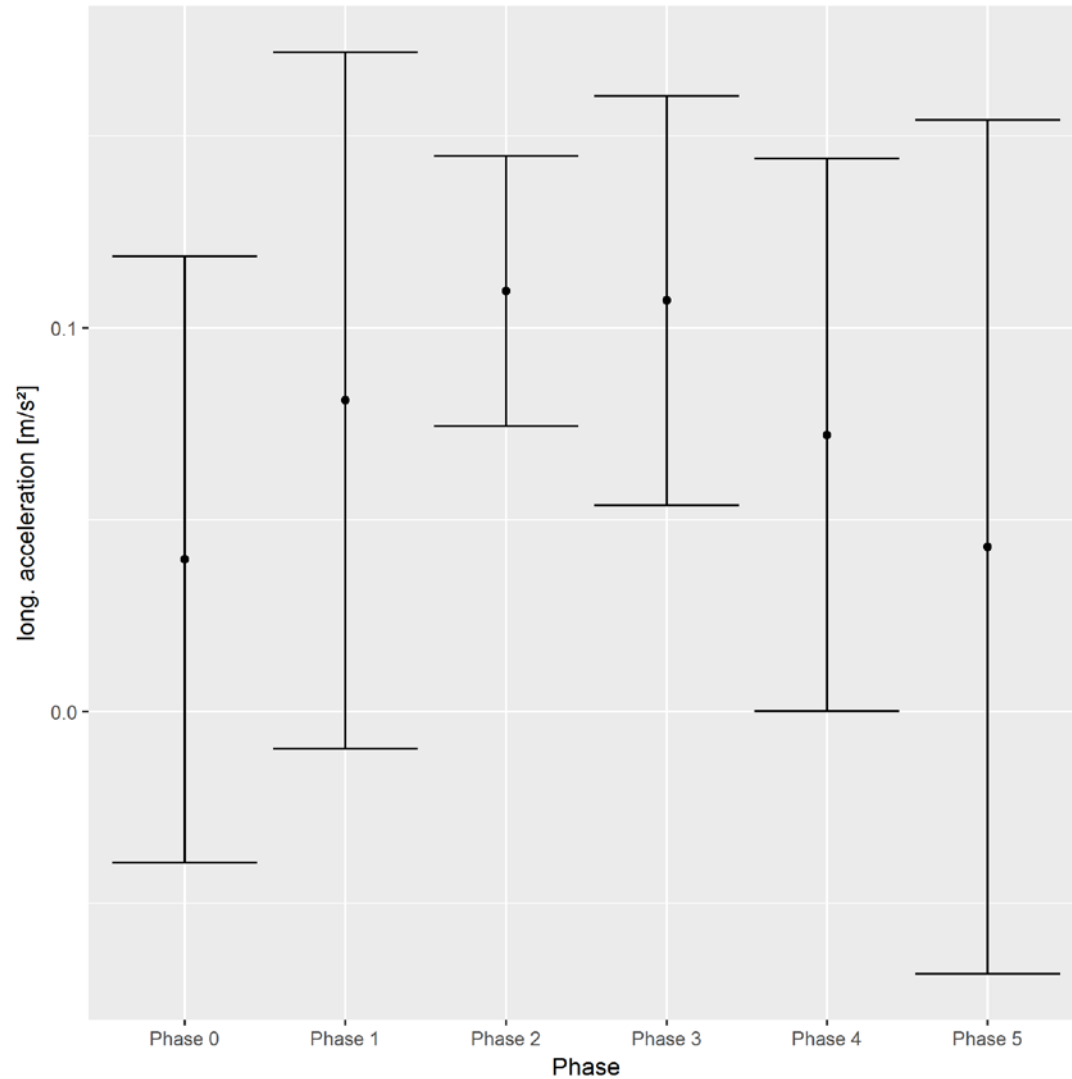
# Preliminary Results



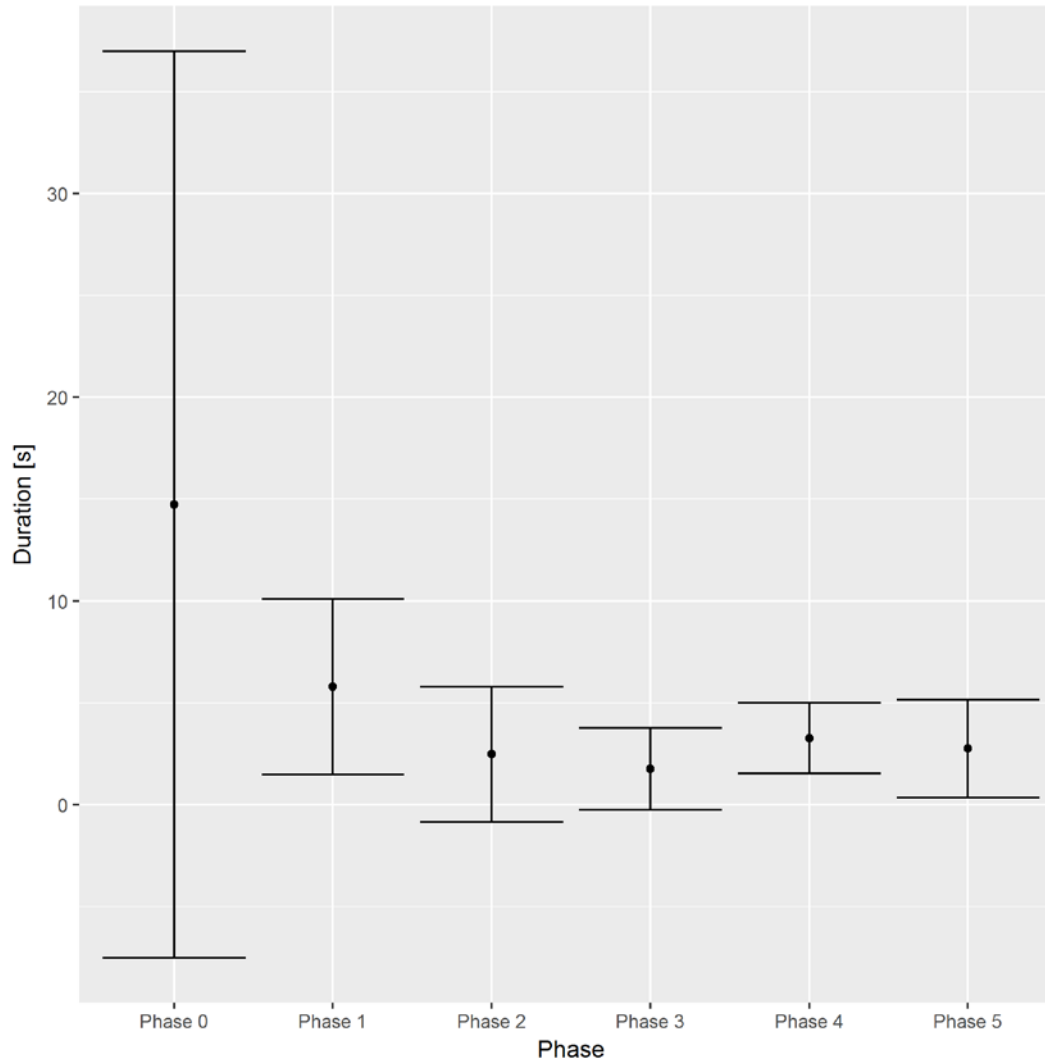
Gender	Operation Site			
	FR	PL	UK	
Female	<b>0</b>	<b>1</b>	<b>3</b>	<b>4</b>
Male	<b>2</b>	<b>4</b>	<b>1</b>	<b>7</b>
	<b>2</b>	<b>5</b>	<b>4</b>	<b>11</b>



# Preliminary results

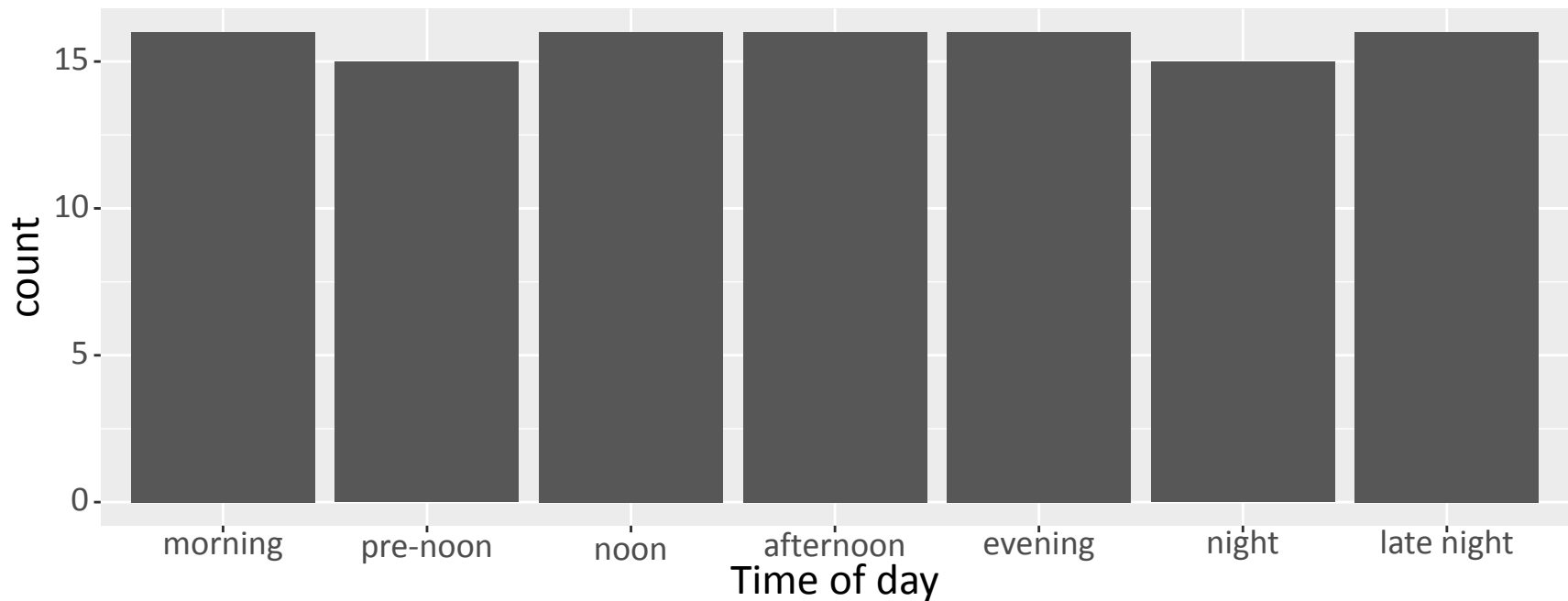


# Preliminary results



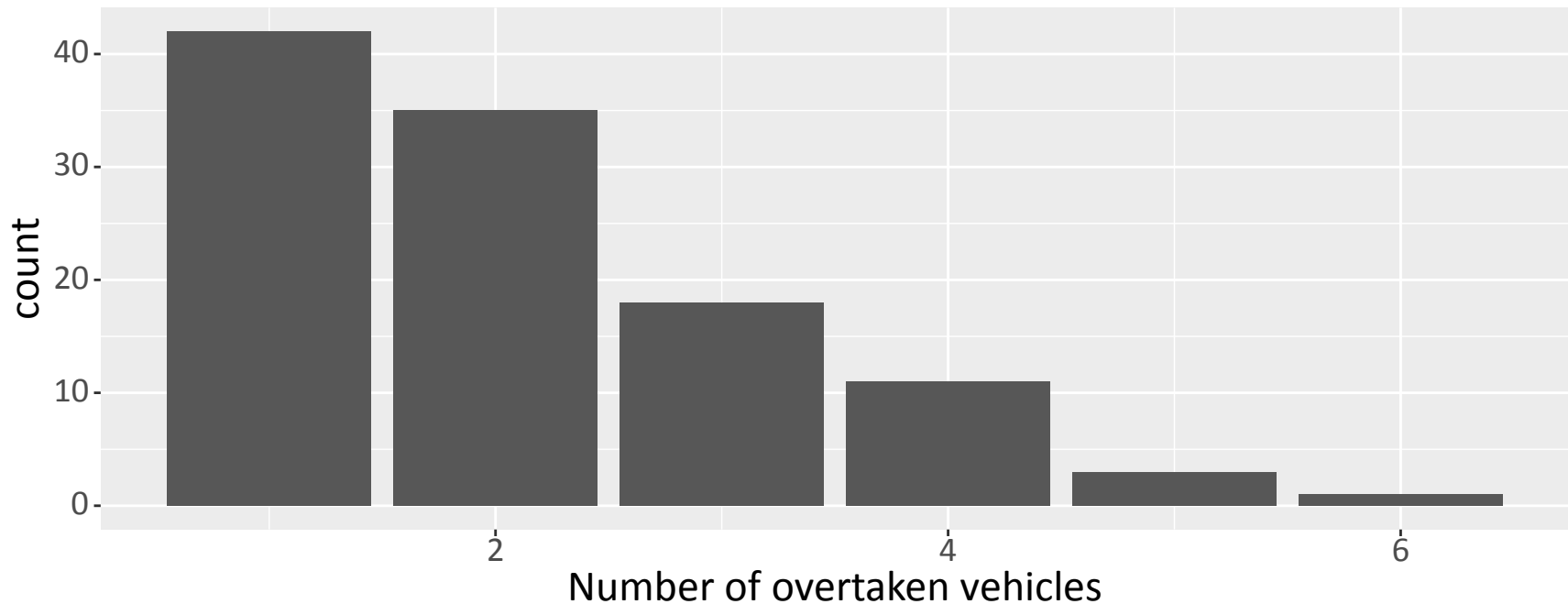
# Expected results

Frequencies over day time



# Expected results

Frequencies number of overtaken vehicles



# Preliminary Results – Reducing false positives

	<b>comment</b>	<b>N</b>
	double bend	31
	turning ego vehicle	24
	lane marking confusion	21
	-	9
	Low speed level	2
	lane marking confusion, turning ego vehicle	2
	glaring sun	2
	construction site, traffic light	1
	overtaking construction site with traffic light	1
	low speed level, indicating vehicle is overtaken	1
	entering city, turning ego vehicle	1
	turning vehicle, decreasing speed	1
	double bend, takeover parking vehicle	1
	overtaking after full stop, tractor, driver is pointed to the gap	1
	followed vehicle is different from the one overtaken	1
	Overtaking cyclist after segment	1
	Low speed level, overtaking parking vehicles, wrong road type	1

# Next steps

- Improve the overtaking algorithm to minimize false positives
- Run analysis scripts
- Produce descriptive results
- Analyse the effect of situational factors on overtaking performance

# Thank you for your attention!

## Countries

