

# Thematic report

## Moped drivers and Motorcyclists



George Yannis, Alexandra Laiou, Dimitrios Nikolaou – NTUA

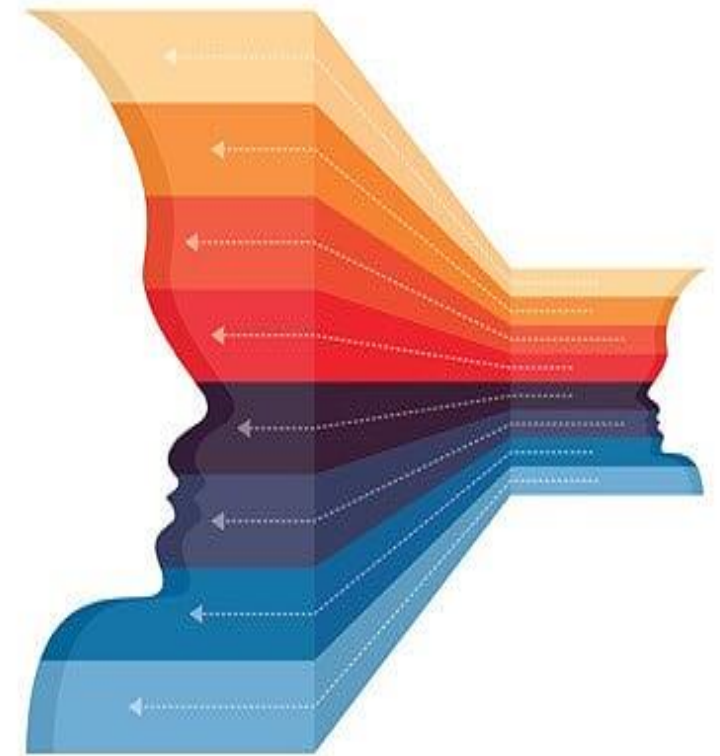
Davide Shingo Usami, Veronica Sgarra, Anastasia Azarko – CTL

16 December 2020 – ESRA2 Webinar Series: Measuring Global Traffic Safety Cultures to Support Effective Road Safety Policy Development



# Presentation outline

- ▶ The ESRA project (2)
- ▶ Background and Objectives (3)
- ▶ Descriptive statistics (14)
- ▶ Statistical modelling analysis (5)
- ▶ Key results and recommendations (2)



---

# The ESRA project

# The ESRA project

- **ESRA** (E-Survey of Road users' Attitudes) is a joint international initiative of research centers and road safety institutes across the world
- The project now is in its **second stage** (ESRA2, 2018-2020)
- Project partners:
  - ESRA coordination: Vias Institute (BE)
  - ESRA2 core group partners: BAST (DE), bfu (CH), CTL (IT), IATSS (JA), ITS (PO), KfV (AT), **NTUA (EL)**, PRP (PT), SWOV (NL), TIRF (CA)
  - 17 more supporting partners





- external databases
- expert survey

---

# Background and Objectives

# Background (1/2)

- Mopeds and motorcycles (PTWs) form an **important component of the transport system**, as they offer increased mobility at a reduced cost and a special sense of pleasure.
- However, riding a PTW is much **more dangerous** than using other motor vehicles.
- PTWs accounted for **18%** of overall road fatalities in EU countries in 2018 (EC, 2020).
- Globally, users of motorised two- and three- wheelers represent **28%** of all road fatalities (WHO, 2018).
- These **alarming numbers** of potentially avoidable deaths highlight the need for increased attention to motorcycles and mopeds.





# Background (2/2)

- **Vehicle age** and the **lack of helmet** use have been found to have an impact on increased crash severity (Ziakopoulos et al., 2018).
- **Behavioural issues** play a major role in PTW crashes.
- **Risk taking and sensation seeking** are typical behaviours of riders that are usually expressed through:
  - speeding
  - disobeying traffic signals and signs
  - ignoring overtaking restrictions or pedestrian crossings
  - maintaining short distances with the vehicles ahead of them
- PTW users' behaviour is related to **age and riding exposure**. PTW riders that speed appear to be more often younger and male (Vlahogianni et al., 2012).





# Objectives

- Moped drivers and Motorcyclists Thematic Report seeks to elucidate **performance and attitudes of PTW riders** regarding road safety in 32 countries (20 European, 2 North American, 5 Asian-Oceanian, 5 African).
- Make **comparisons** between countries/regions and demographic characteristics.
- Identify which **factors** are related to PTW riders' self-declared behaviour based on statistical modelling.
- Provide certain **recommendations** for road safety stakeholders at different levels which could be implemented in efforts to enhance PTW riders' road safety.



---

# Descriptive statistics

# Frequency of using a PTW

- The use of PTWs as a transport mode is **more widespread** in Africa and Asia-Oceania.
- The use of **electric mopeds** is less widespread compared to non-electric ones.
- Regarding the use of **electric motorcycles**, it is observed that they are not used to the same extent as non-electric ones as the percentages of respondents who have never used an electric motorcycle in the past 12 months are quite higher.
- In general, the use of **non-electric PTWs** is more common than that of electric ones.

"During the past 12 months, how often did you drive a **moped** ( $\leq 50$  cc or  $\leq 4$  kW; non-electric)?"

Region	at least 4 days a week	1 to 3 days a week	a few days a month	a few days a year	never
Europe20	1.5%	2.5%	3.3%	5.7%	87.1%
AsiaOceania5	8.5%	8.7%	8.4%	7.9%	66.5%
NorthAmerica2	1.2%	0.8%	1.8%	2.8%	93.3%
Africa5	4.8%	6.4%	7.5%	11.5%	69.8%

"During the past 12 months, how often did you drive a **motorcycle** ( $> 50$  cc or  $> 4$  kW; non-electric)?"

Region	at least 4 days a week	1 to 3 days a week	a few days a month	a few days a year	never
Europe20	2.1%	2.7%	3.5%	5.3%	86.3%
AsiaOceania5	26.2%	14.4%	9.6%	6.4%	43.4%
NorthAmerica2	1.3%	2.4%	3.0%	3.8%	89.5%
Africa5	6.5%	6.3%	9.2%	11.0%	67.0%

"During the past 12 months, how often did you drive an **electric moped** ( $\leq 4$  kW)?"

Region	at least 4 days a week	1 to 3 days a week	a few days a month	a few days a year	never
Europe20	0.7%	1.3%	1.9%	3.2%	92.9%
AsiaOceania5	3.5%	5.8%	6.6%	6.7%	77.4%
NorthAmerica2	0.6%	0.9%	1.9%	2.6%	94.1%
Africa5	2.9%	4.2%	5.5%	6.9%	80.5%

"During the past 12 months, how often did you drive an **electric motorcycle** ( $> 4$  kW) ?"

Region	at least 4 days a week	1 to 3 days a week	a few days a month	a few days a year	never
Europe20	0.7%	1.3%	1.8%	2.8%	93.4%
AsiaOceania5	5.1%	6.9%	7.3%	6.7%	73.9%
NorthAmerica2	0.7%	1.0%	0.9%	1.6%	95.8%
Africa5	3.0%	4.5%	6.0%	7.3%	79.2%

# Safety perception of using a PTW

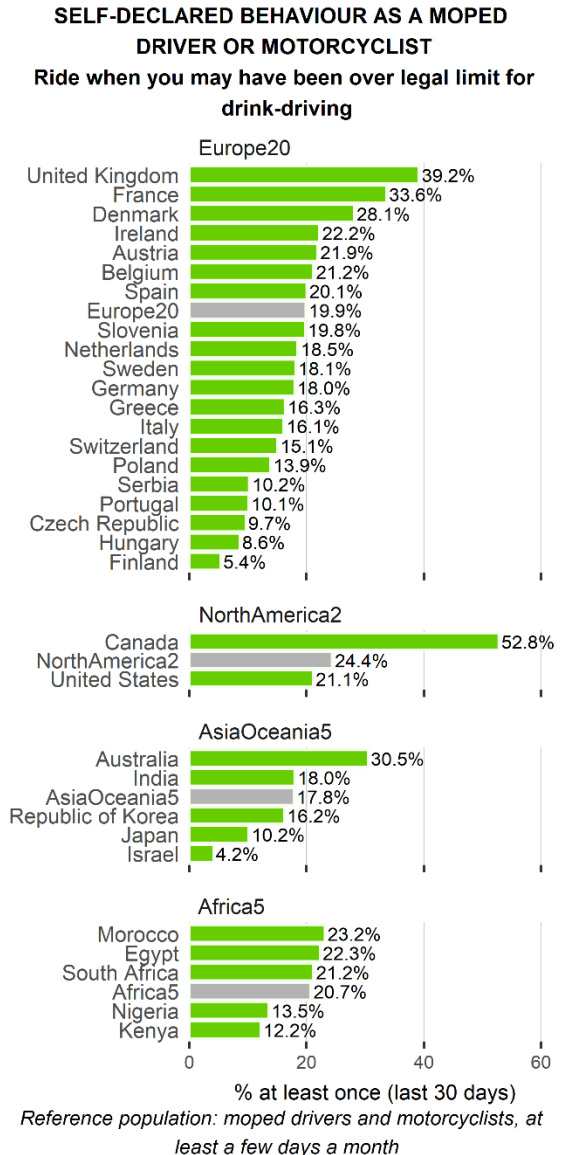
- In all the examined countries the safety perception scores for PTWs **do not exceed 7 points**.
- The country with the **lowest** scores for both moped and motorcycles is **Israel**.
- Among European countries, the lowest safety perception scores for PTWs correspond to **Greece**.
- With regard to non-electric motorcycles, **Switzerland is at the top** of the safety perception ranking (6.8) followed by India (6.6).
- India** is also the country with the **highest safety perception scores** for mopeds, electric mopeds and electric motorcycles (6.7, 6.6 and 6.7 respectively).

Country	Moped ( $\leq 50$ cc or $\leq 4$ kW; non-electric)	Motorcycle ( $> 50$ cc or $> 4$ kW; non-electric)	Moped (electric $\leq 4$ kW)	Motorcycle (electric $> 4$ kW)
Australia	5.7	5.8	5.8	5.8
Austria	6.0	6.1	4.9	5.2
Belgium	5.6	5.7	5.3	5.6
Canada	5.8	6.1	5.9	6.7
Czech Republic	5.6	5.6	5.3	5.6
Denmark	6.6	5.8	6.2	5.6
Egypt	5.6	5.4	5.3	5.4
Finland	6.5	6.4	6.2	6.7
France	5.5	5.3	5.1	5.6
Germany	6.5	6.5	5.3	5.8
Greece	4.8	4.7	4.8	4.8
Hungary	5.5	5.1	5.1	4.9
India	6.7	6.6	6.6	6.7
Ireland	5.3	5.6	5.8	5.6
Israel	4.0	4.0	3.9	3.9
Italy	5.5	5.8	5.1	5.2
Japan	5.5	5.4	5.1	5.4
Kenya	5.2	5.4	5.2	5.6
Morocco	5.6	5.2	5.5	5.1
Netherlands	6.5	6.4	6.4	5.9
Nigeria	5.0	5.1	4.6	4.7
Poland	6.1	6.2	6.0	6.0
Portugal	5.7	5.9	5.8	6.2
Republic of Korea	4.0	4.2	4.1	4.0
Serbia	5.4	5.2	5.0	4.7
Slovenia	6.0	5.7	5.9	5.8
South Africa	4.7	4.6	4.8	5.0
Spain	5.3	5.6	5.3	5.6
Sweden	5.7	5.8	5.7	5.0
Switzerland	6.4	6.8	5.6	6.2
United Kingdom	5.5	5.7	5.6	5.3
United States	5.2	5.6	5.4	5.4

Table: Average safety perception of using moped and motorcycle by country (11-point scale from 0= very unsafe to 10= very safe)

# Self-declared drink and riding, by country

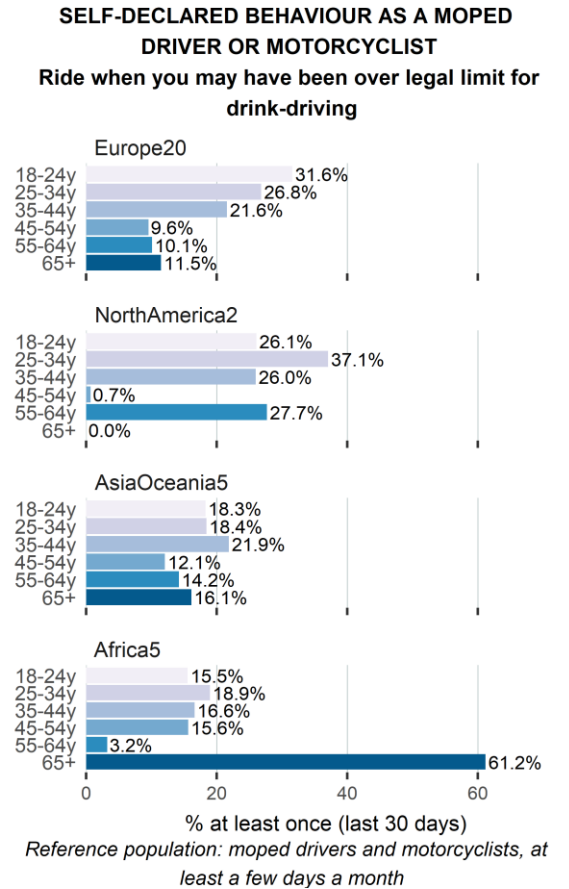
- Self-declared drink driving **varies from 18% in Asia-Oceania to 25% in North America**.
- With regard to the two North American countries, **a significant difference** can be observed between Canada (53%) and the United States (21%).
- In **Europe**, PTW riders from the United Kingdom (39%) reported the highest rates of drink driving, whereas PTW riders in Finland (5%) reported the lowest rates.
- In **Asia-Oceania**, Australian PTW riders most frequently reported drink driving (31%) and Israeli PTW riders the least frequently (4%).
- In **Africa**, Moroccan PTW riders reported drink driving (23%) more frequently than riders in Nigeria (14%) and Kenya (12%).





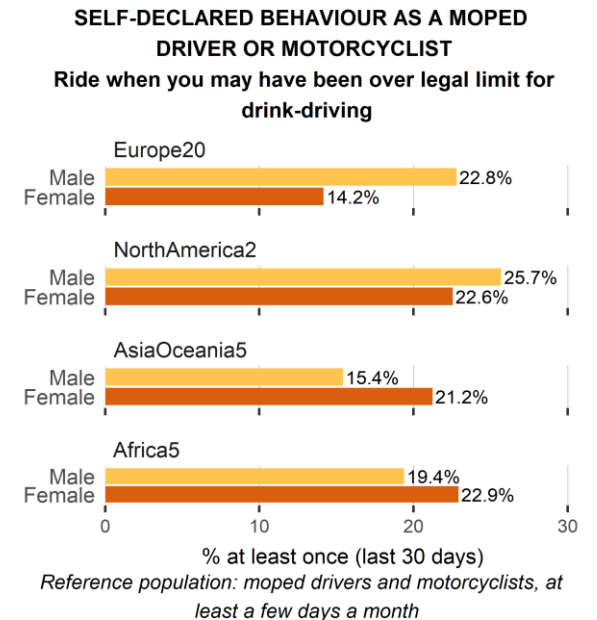
# Self-declared drink and riding, by age group

- A **comparable pattern cannot be observed** for drink and riding among the different age groups in the four world regions.
- **In Europe**, the highest rates are found among the youngest PTW riders, aged 18 to 24 (32%) and the lowest rates are found among the age group 45 to 54 (10%).
- **In North America**, a significant difference is observed concerning the rates for age groups 45-54 and 65+ compared to the others, as for these age groups the respective rates are almost equal to zero.
- **In Asia-Oceania**, rates are not much different between age groups. The highest rates are found among the age group 35-44 (22%), while the lowest rates correspond to PTW riders, aged 45 to 54 (12%).
- Surprisingly **in Africa**, the highest rates are found for the oldest age group (61%).



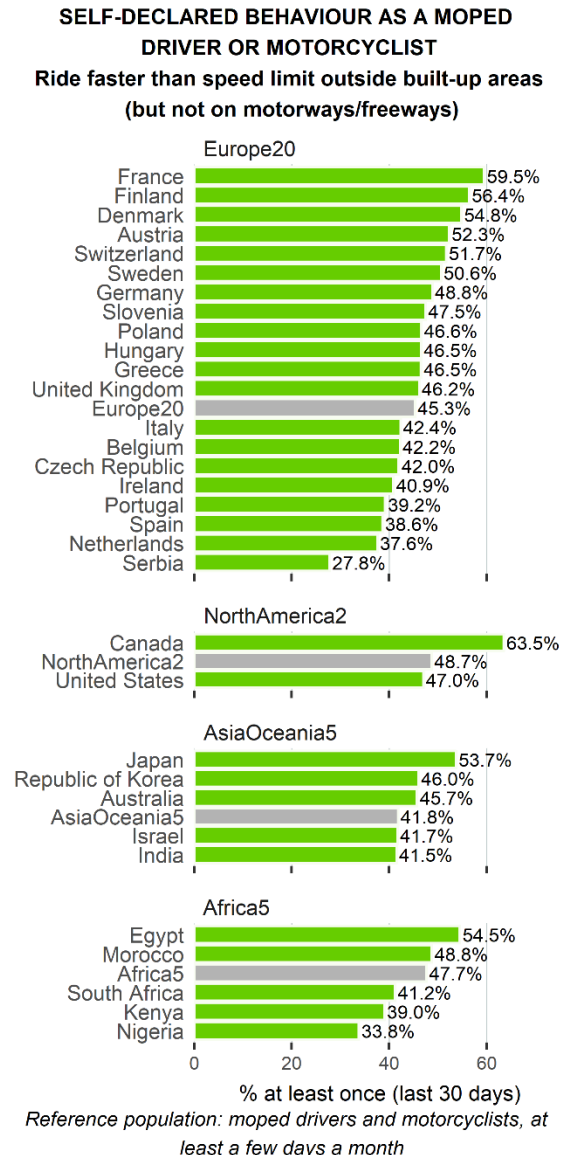
# Self-declared drink and riding, by gender

- In Europe and North America, self-declared drink and riding rates are **higher for male** PTW riders (23% to 26%) than for female PTW riders (14% to 23%). In Europe, the difference between males and females is more substantial.
- On the contrary, in Asia-Oceania and Africa, the self-declared drink and riding rates are **higher for female** PTW riders (21% to 23%) than for male PTW riders (15% to 19%).



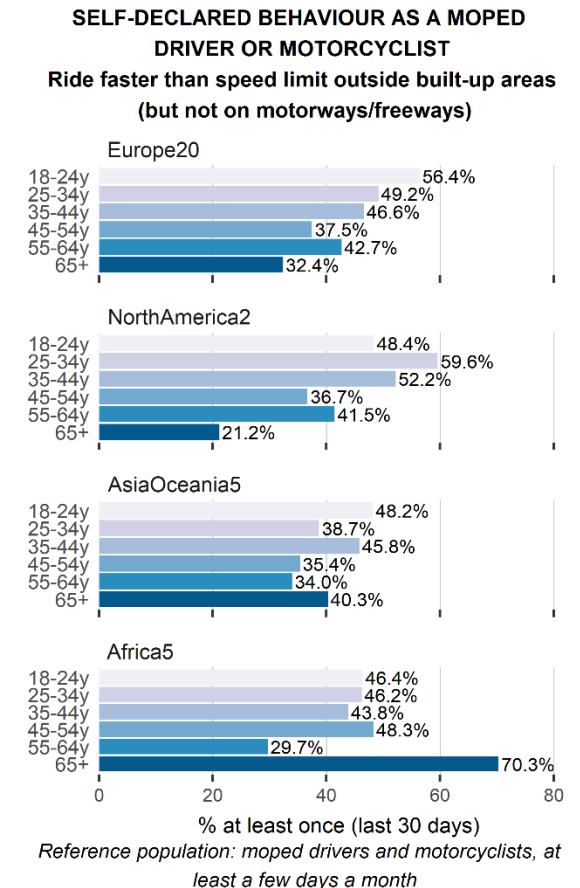
# Self-declared speeding outside built-up areas (not on motorways), by country

- The rates of PTW riders who admit speeding **varies from 42%** in Asia-Oceania **to 49%** in North America. The respective rates are 45% in Europe and 48% in Africa.
- Among European countries**, the highest self-declared speeding rates are found in France (60%), in Finland (56%) and in Denmark (55%), whereas PTW riders in Spain (39%), Netherlands (38%) and Serbia (28%) report the lowest rates.
- In North America**, the self-declared speeding rate in Canada (64%) is significantly higher than the respective rate in the United States (47%).
- In Asia-Oceania**, Japanese PTW riders report speeding most frequently (54%) and Indian PTW riders least frequently (42%).
- In Africa**, the highest rate is observed in Egypt (55%) while the lowest in Nigeria (34%).



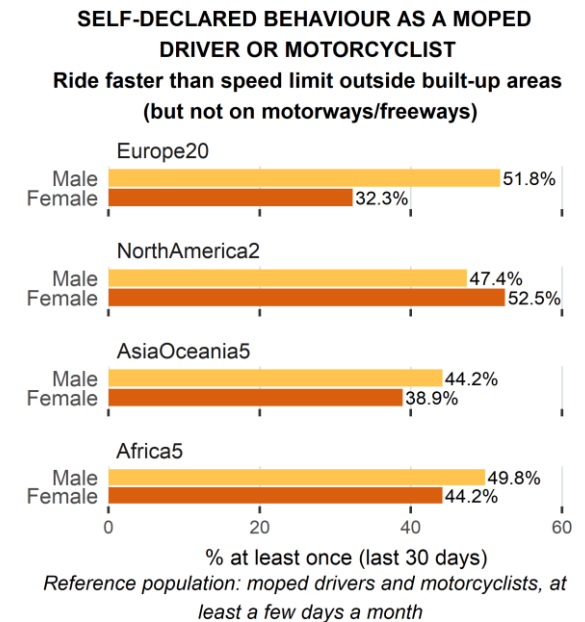
# Self-declared speeding outside built-up areas (not on motorways), by age group

- In Europe and North America, the self-declared speeding by PTW riders is **higher among the younger aged** PTW riders than among older age groups.
- **In Europe**, the highest rates are found in the age group 18-24 (56%) and **in North America** in the age group 25-34 (60%).
- **In Asia-Oceania** the highest rate corresponds to PTW riders aged 18 to 24 (48%). However, the self-declared speeding rate of PTW riders aged 65+ is also quite high (40%).
- In contrast to these findings, **in Africa**, the self-declared speeding is far higher (70%) for the oldest PTW riders' age group (65+) than for the younger age groups.



# Self-declared speeding outside built-up areas (not on motorways), by gender

- In three of the examined world regions and more specifically in Europe, Asia-Oceania and Africa, self-declared speeding rates are **higher for male** PTW riders (44% to 52%).
- **In North America**, slightly higher rates correspond to **female** PTW riders (53%) in comparison with the respective rates for male PTW riders (47%).

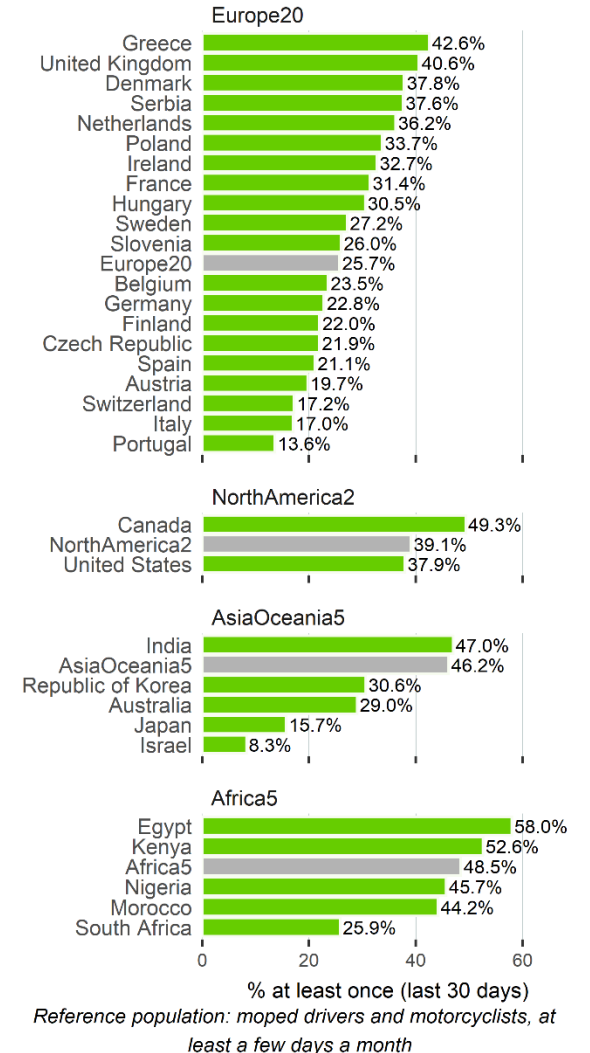




# Self-declared behaviour of riding without a helmet, by country

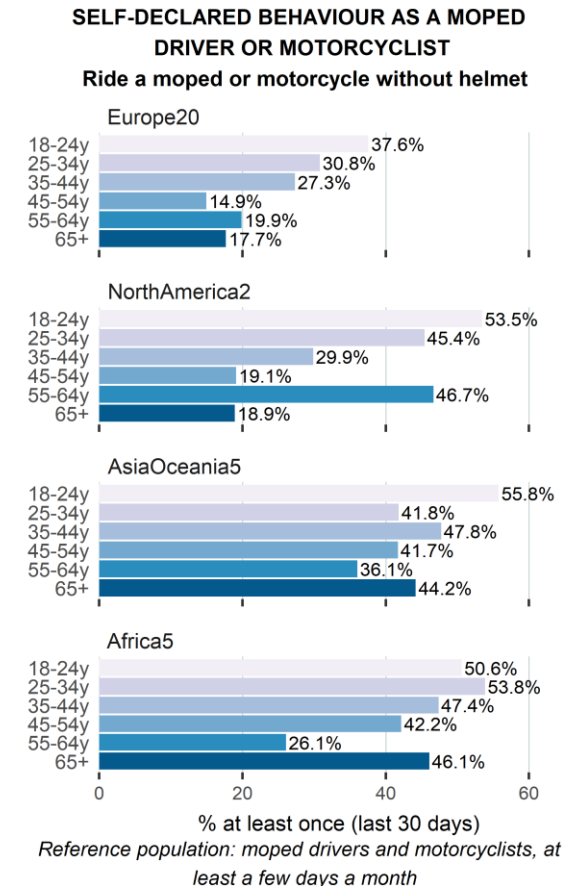
- The rates **vary from 26%** in Europe **to 49%** in Africa.
- **Among European countries**, the highest rates of self-declared behaviour of riding without a helmet are found in Greece (43%) while PTW riders in Portugal (14%) report the lowest rates.
- **In North America**, nearly half of Canadian PTW riders (49%) admit riding without a helmet, whereas the respective rate of PTW riders in the United States is 38%.
- **In Asia-Oceania**, significant differences are observed between the countries. The highest rates are found in India (47%), while the lowest rates in Israel (8%).
- The rates of African PTW riders who admit riding without helmet are **quite higher** compared to the respective rates in the other regions. The highest rates are found in Egypt (58%) whereas South African PTW riders report the lowest rates (26%).

SELF-DECLARED BEHAVIOUR AS A MOPED DRIVER OR MOTORCYCLIST  
Ride a moped or motorcycle without helmet

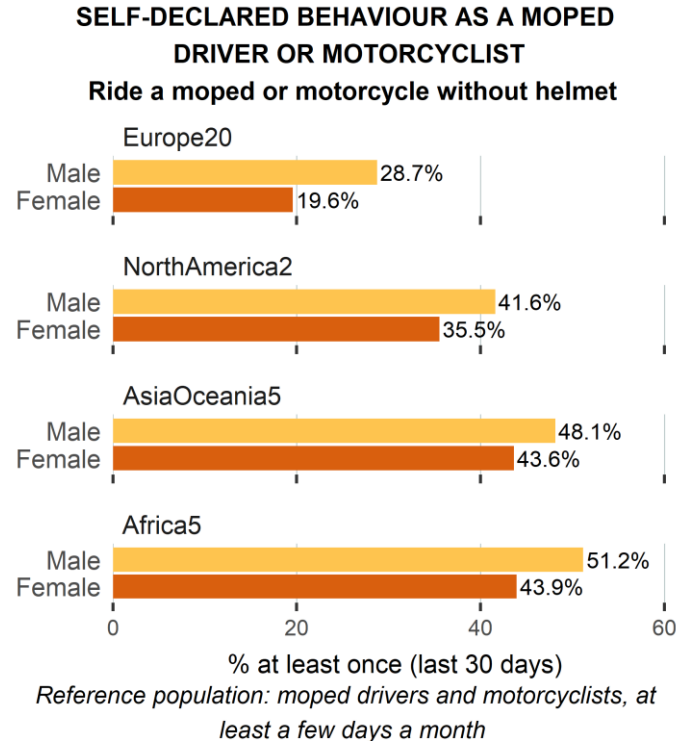


# Self-declared behaviour of riding without a helmet, by age group

- The self-declared behaviour of riding without a helmet by PTW riders is **higher among the younger** aged PTW riders than among older age groups.
- In Europe (38%), North America (54%) and Asia-Oceania (56%) the highest rates are found among the youngest PTW riders, **aged 18 to 24**. However, among African PTW riders, the highest rates are found in the age group 25-34 (54%).
- In Asia-Oceania and Africa, the **differences between age groups are small** and it can be observed that the rates for each age group are generally higher than the rates of the respective age groups in Europe and North America.



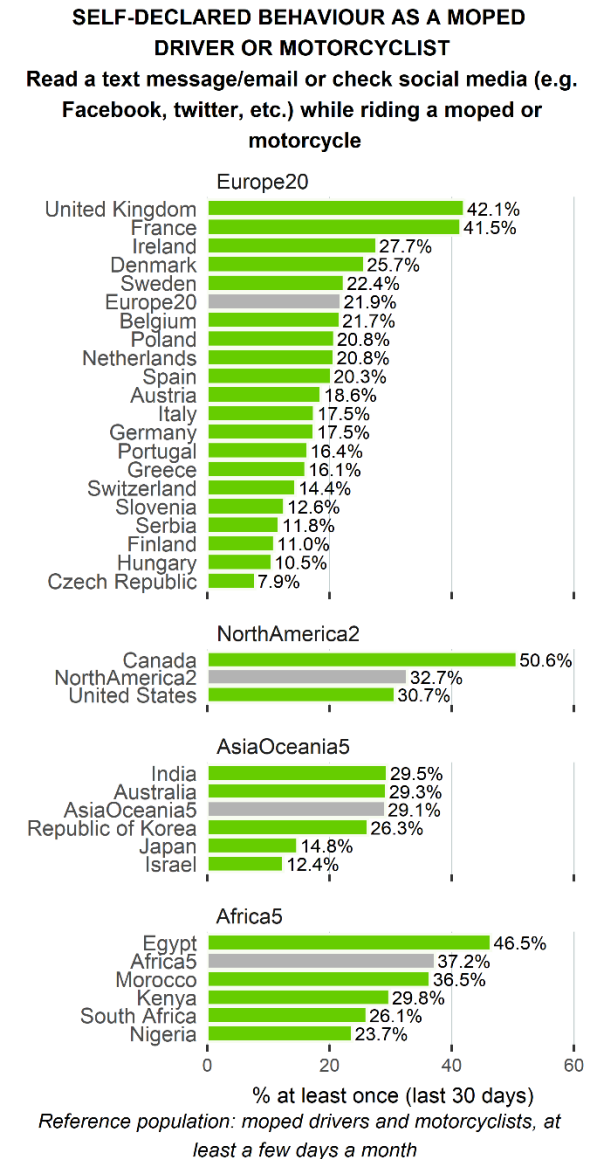
# Self-declared behaviour of riding without a helmet, by gender



- In all world regions, **the rates of male PTW riders are higher** than the respective rates of female PTW riders.

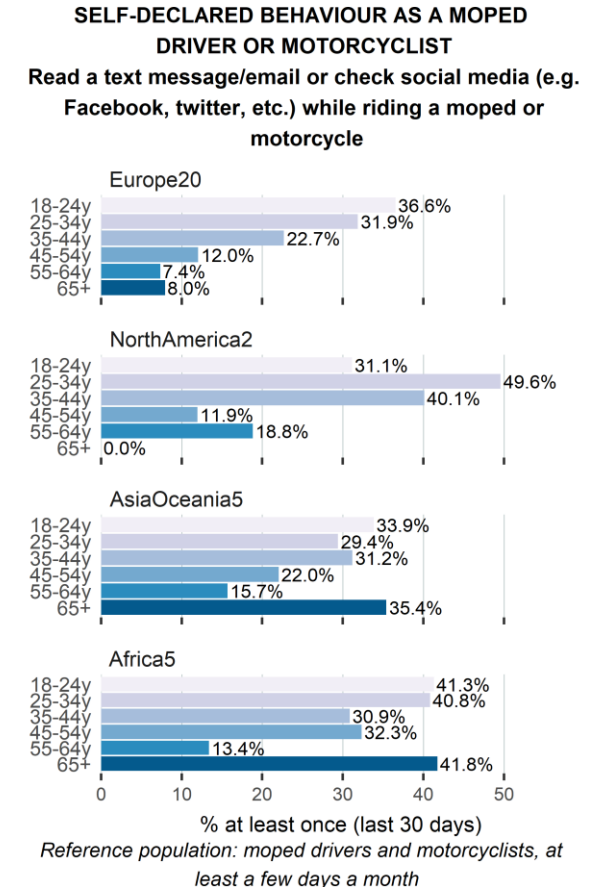
# Self-declared behaviour of reading a text message/email or checking social media, by country

- The rates **vary from 22% in Europe to 37% in Africa**.
- In Europe**, the highest rates are found in the United Kingdom and France (both 42%). On the other hand, PTW riders in the Czech Republic (8%) report the lowest rates.
- Among the two countries of **North America**, half of Canadian PTW riders (51%) admit reading a text message/email or checking social media while riding, whereas the rate of PTW riders in the United States is lower (31%).
- In Asia-Oceania, there are **no particular differences** among the countries. The highest rates are found in India (30%), while the lowest rates in Israel (12%).
- Regarding the rates of **African PTW riders**, the highest rates are found in Egypt (47%) and Morocco (37%), while Nigerian PTW riders report the lowest rates (24%).



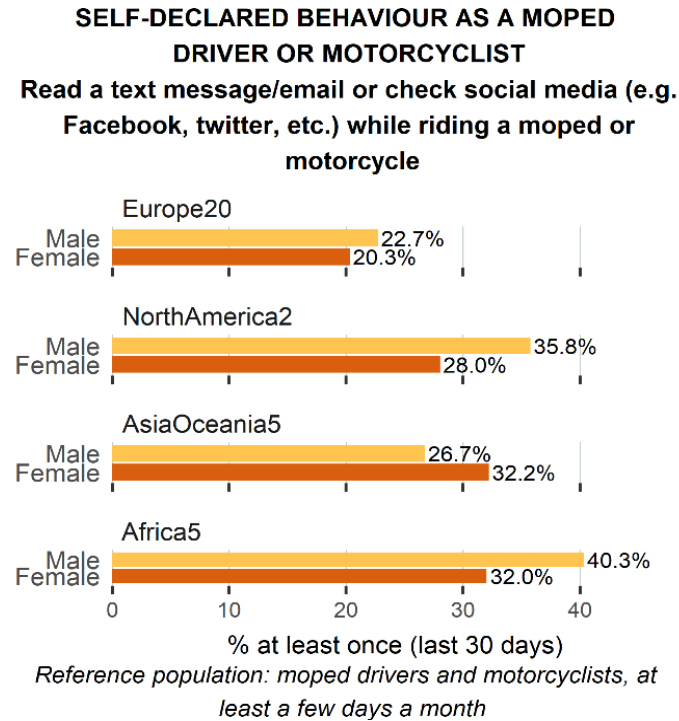
# Self-declared behaviour of reading a text message/email or checking social media, by age group

- Self-declared behaviour of reading a text message/email or checking social media while riding by European PTW riders is **higher among the younger** aged PTW riders than among older age groups. The highest rates are found among the youngest PTW riders, aged 18 to 24 (37%).
- In North America**, the highest rates are found among the age group 25-34 (50%). It is remarkable that the respective rate reported by North American PTW riders aged 65+ is equal to zero (0%).
- In Asia-Oceania and Africa**, the self-declared rates are not much different between young and older age groups. Surprisingly, in these two regions, the respective rates are the highest for PTW riders aged 65+ (Asia-Oceania: 35% and Africa: 42%).





# Self-declared behaviour of reading a text message/email or checking social media, by gender



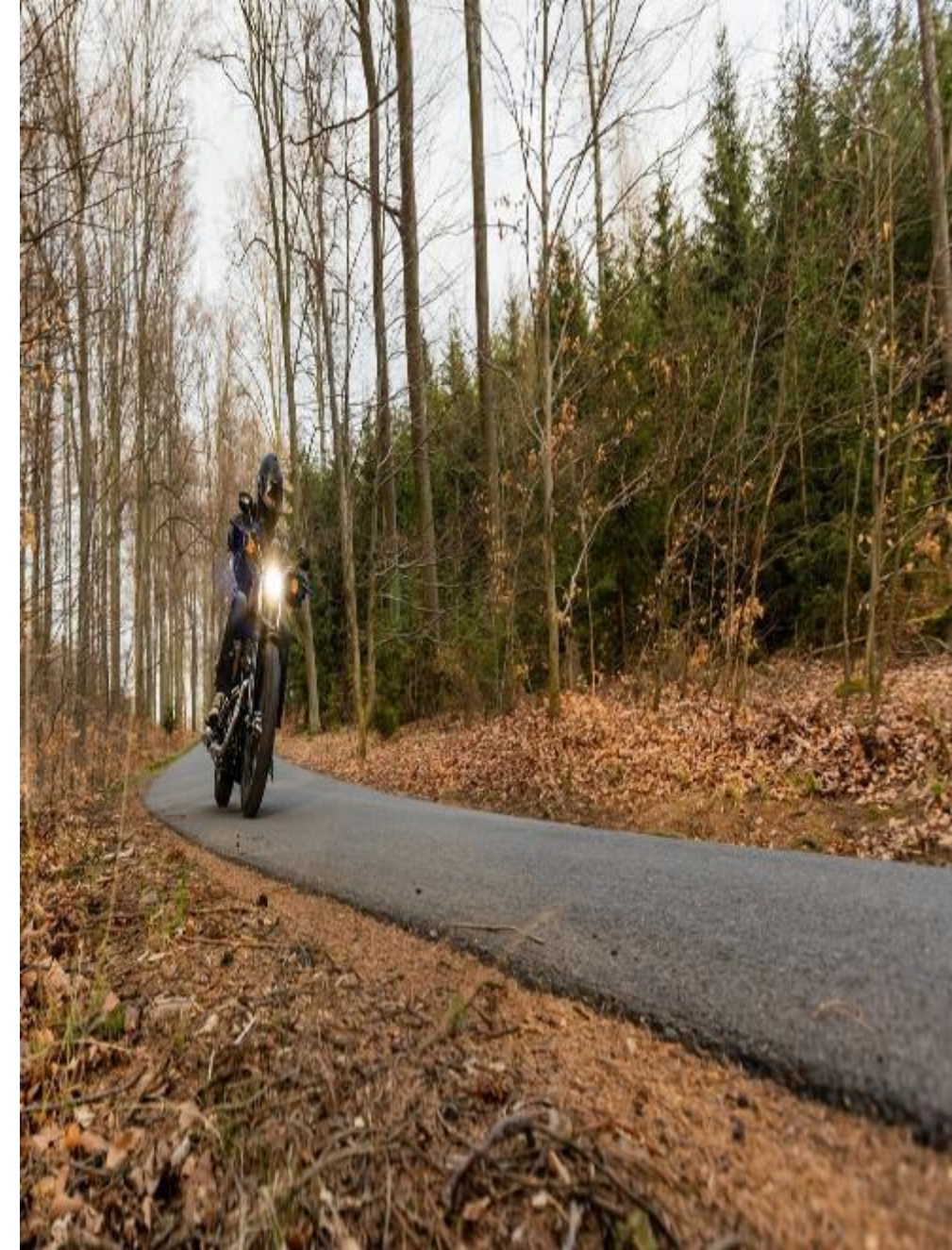
- In all the examined regions with the exception of Asia-Oceania, **the rates of male PTW riders are higher** than the respective rates of female PTW riders.

---

# Statistical Modelling Analysis

# Statistical Modelling Analysis

- **Binary Logistic regression** models:
  - Over the last 30 days, how often did you as a moped driver or motorcyclist ride when you may have been **over the legal limit for drinking and driving**?
  - Over the last 30 days, how often did you as a moped driver or motorcyclist **ride faster than the speed limit outside built-up areas** (but not on motorways/freeways)?
  - Over the last 30 days, how often did you as a moped driver or motorcyclist ride a moped or motorcycle **without a helmet**?
  - Over the last 30 days, how often did you as a moped driver or motorcyclist **read a text message/email or check social media** (e.g. Facebook, twitter etc.) while riding a moped or motorcycle?
- In each model, **the outcome is a binary variable** indicating the absence (0 = never) or presence (1 = at least once) of self-reported behaviour over the last 30 days.





# Drink and riding

- **Male PTW riders** in Europe are 1.66 times more likely to report drink and riding than female.
- Respondents who believe that they have **high self-efficacy** are much more likely to report that they ride under the influence of alcohol.
- PTW riders who **oppose to a legal obligation to install an alcohol “interlock”** for drivers who have been caught drunk driving are in almost 45% cases (in Europe) and 65% cases (in Africa) more likely to report drink and riding.
- For each time the PTW rider was **involved in a crash** in the past 12 months, they are 2.3 times more likely to engage in drunk riding in Europe, 1.9 times in Asia-Oceania and 1.96 times in Africa.



# Speeding outside built-up areas (but not on motorways/freeways)

- **Male PTW riders** are generally more likely to report fast riding with a significant gender difference in Europe and Africa.
- PTW riders who declared speeding because of the **impression of losing time** are 3.5 times more likely to do so in Europe and 3.57 times more likely to do so in Asia-Oceania.
- PTW riders who **trust themselves** when riding significantly faster than the speed limit are 1.57 times more likely to do so in Europe, 1.45 times in Asia-Oceania and 1.96 times in Africa.
- PTW riders who **often drive faster than the speed limit** are 3.8 times more likely to do so in Asia-Oceania and 1.75 times more likely to do so in Africa.





# Riding without a helmet

- **Males** are more likely to report the behaviour of riding without a helmet with a significant gender difference. In European and African countries, these rates are 1.67 and 1.5 respectively.
- In all regions, **people who support the legal obligations** related to helmet are less likely to ride without a helmet.
- For each time the PTW rider was **involved in a crash** in the past 12 months, they are 2.43 times more likely to engage in riding without a helmet in Europe and 2 times in Asia-Oceania.



# Reading a text message/email or checking social media while riding

- The odds of reading a text message/email or checking social media **decrease with the increase of the rider's age** in Europe and Africa.
- **The higher the agreement towards using a mobile phone while riding** a PTW is, the higher the odds of reading a text message/email or checking social media becomes.
- Riders who **use a mobile phone because they want to be available** are 5 times more likely to use their phone in Asia-Oceania and 1.9 times in Africa.
- In Europe and Africa, riders who **are willing to save time** are about 2 times more likely to use the phone while riding.
- Riders tending to **trust themselves when checking the messages** on the mobile phone while driving are 2.34 times more likely to use their phones in Asia-Oceania.



---

# Key results and recommendations



# Key results

- In all the examined countries the safety perception scores for PTWs do not exceed 7 points. This fact indicates that road users **do not consider these transport modes to be safe enough**.
- Risky behaviours are more common among **male and young** PTW riders.
- The most frequent unsafe behaviours reported by PTW riders are **riding faster** than the speed limit outside built-up areas (but not on motorways) and riding **without a helmet**.
- Self-declared riding without a helmet is **significantly higher** in Africa (49%), North America (46%) and Asia-Oceania (39%) than in Europe.



# Key recommendations

- The high percentages of self-declared risky behaviours by PTW riders impose **targeted measures** to improve their behaviour on the road.
- As risky behaviours are more common among male and young PTW, measures for the elimination of such behaviours should concern the general PTW population but also particularly **target the male, young riders.**
- **Awareness raising campaigns** should be organised to explain the increased risk and vulnerability of PTW with the ultimate aim to develop a traffic safety culture promoting safety and mutual respect of all road users.
- **PTW safety enforcement** should be well-structured, systematic and visible.
- **Road infrastructure** should be adapted to particular PTW characteristics and needs (e.g. installation of PTW friendly barriers), creating a self-explaining and forgiving road environment.



# Thank you very much for your attention !

George Yannis  
Professor NTUA  
[geyannis@central.ntua.gr](mailto:geyannis@central.ntua.gr)