A Cross-City Survey on Personal Protective Equipment Use in Vulnerable Road Users

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8th IRTAD International Conference (IRTAD 2026)

Better Road Safety Data for Better Safety Performance

15-17 April 2026, Athens, Greece

IRTAD Conference 2026
Better Road Safety Data for Better Safety Performance

Outline

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Background

- Every year, 20 to 50 million people around the world suffer life-altering injuries due to road traffic accidents (WHO)
- These are more than just numbers—they represent lives forever changed, families disrupted, and communities impacted
- It is time we include in our focus long-lasting consequences of injuries in addition to survival
- We must tackle the long-term consequences (LTC) of road traffic injuries to truly protect and support all road users

The IMPROVA project

- **IMPROVA:**
  - "Injury Mitigation to Promote Vision-Zero Achievement"
  - improva-roadsafety.eu

- **Project partners:**
  - 13 partners across 7 EU countries, involving: National Technical University of Athens

- **Duration of the project:**
  - 48 months (June 2024 – May 2028)

- **Framework Program:**
  - Funded by the European Union
  - This project has received funding from the Horizon Europe programme under grant agreement No GAP-101146652

Objectives

- Research gaps:
  - Vulnerable road users (VRUs), face disproportionately high risks in road traffic due to limited physical protection
  - Despite the availability of personal protective equipment (PPE), adoption remains low across Europe

- This study aims to investigate PPE usage patterns among VRUs and identify behavioral and contextual factors that influence their adoption, to support future road safety interventions and policy development

Survey design

- PPE grouped into three categories:
  - Regulated & well-established (e.g., motorcycle helmets)
  - Known but optional (e.g., cycle helmets, protective clothing, hi-vis gear)
  - Innovative / emerging PPE (e.g., airbag helmets, smart protective clothing)

- Target group:
  - Urban users (16+)
  - Motorcycle, bicycle, or e-scooter use in last 30 days

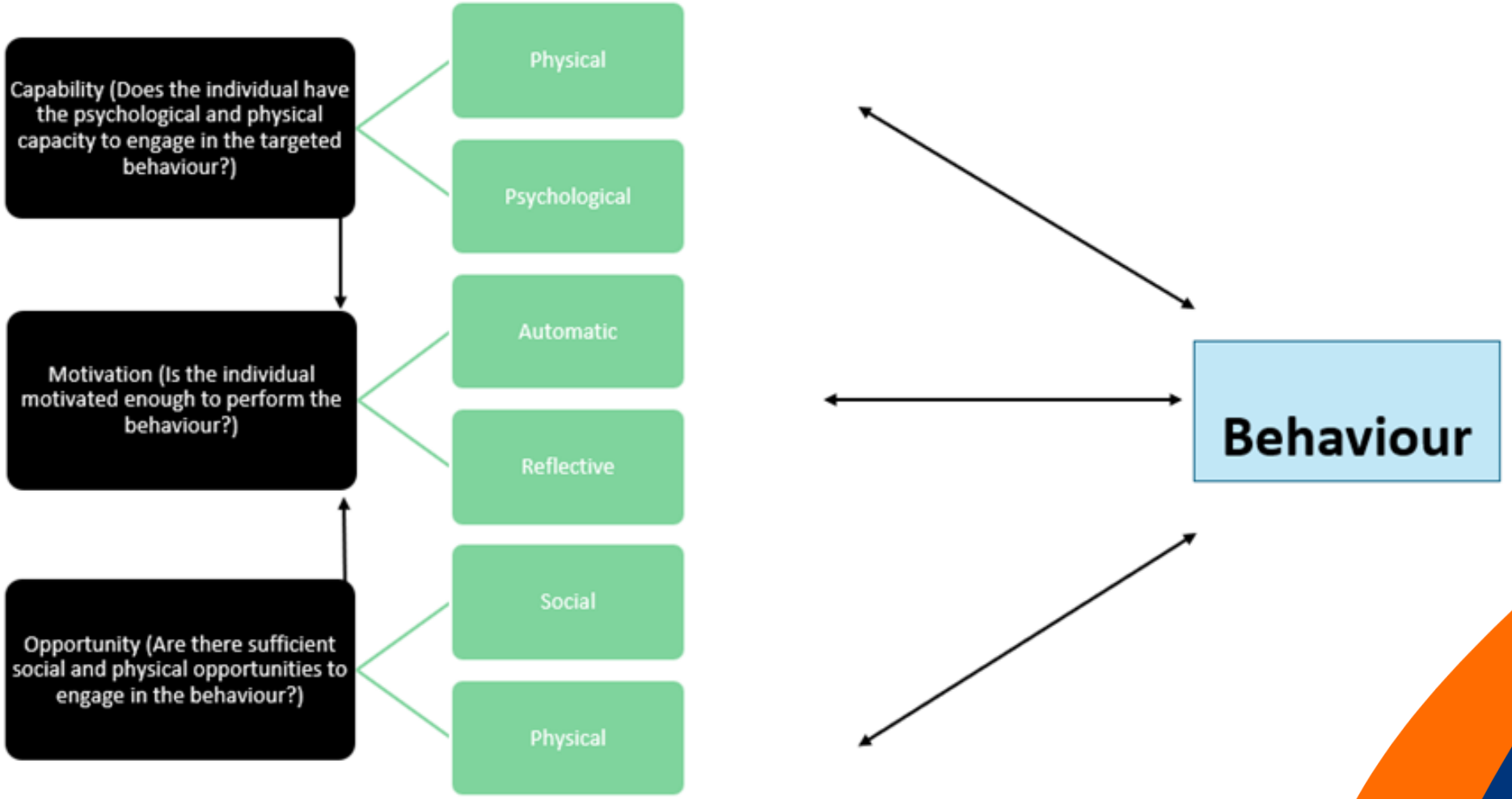
- Cities selected (diverse contexts):
  - Copenhagen, Athens, Rome, Barcelona, London

- Total sample: 1,813 respondents

City / Country	Completed interviews
Copenhagen (Denmark)	400
Athens (Greece)	310
Rome (Italy)	400
Barcelona (Spain)	403
London (United Kingdom)	300
Total	**1,813**

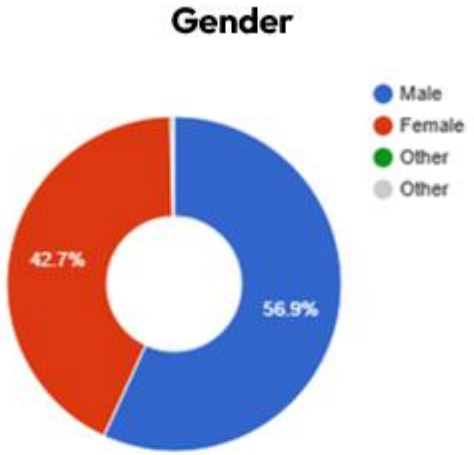
Behavioural framework

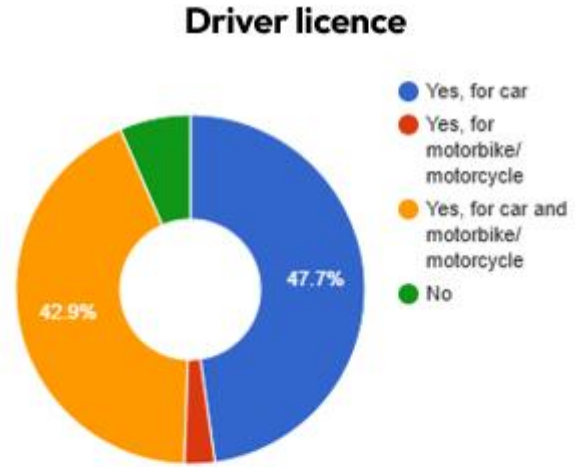
- Application of a behavioural model (COM-B) to identify key physical, psychological, and social barriers to PPE adoption by user group

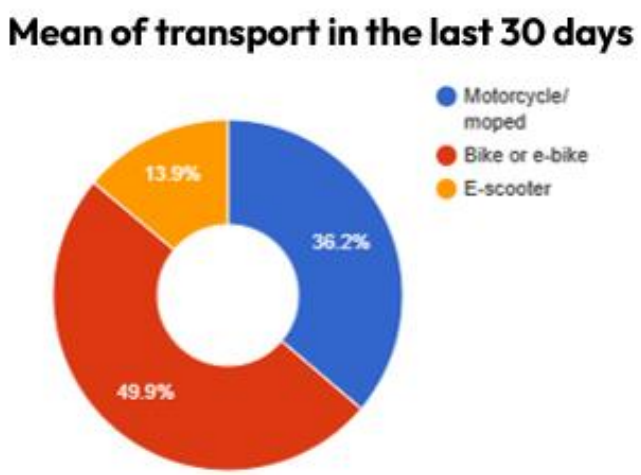


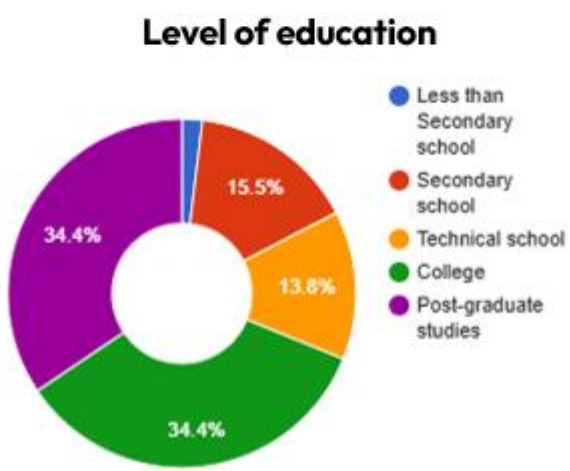
Demographics of the sample

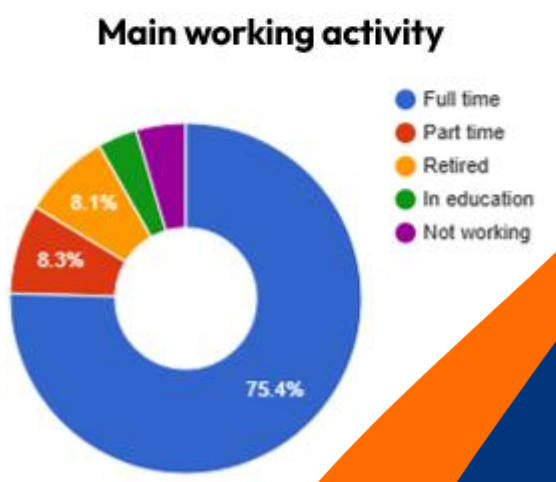
- Among the participants:
  - 905 had recently used a motorcycle or moped
  - 1,261 had used a bicycle or e-bike
  - 334 had used an e-scooter





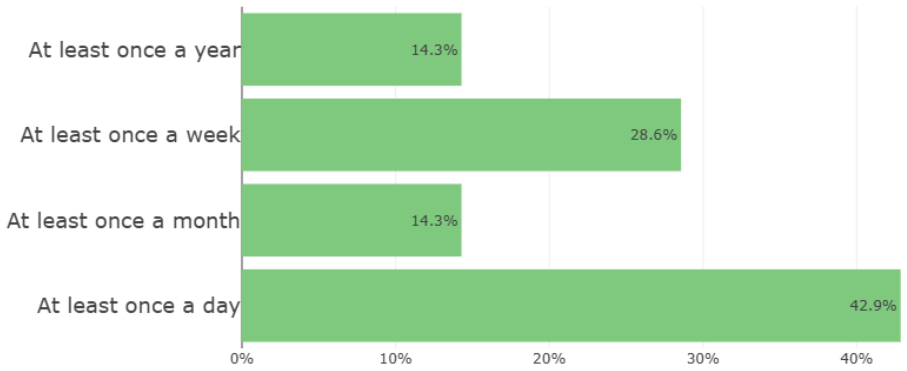




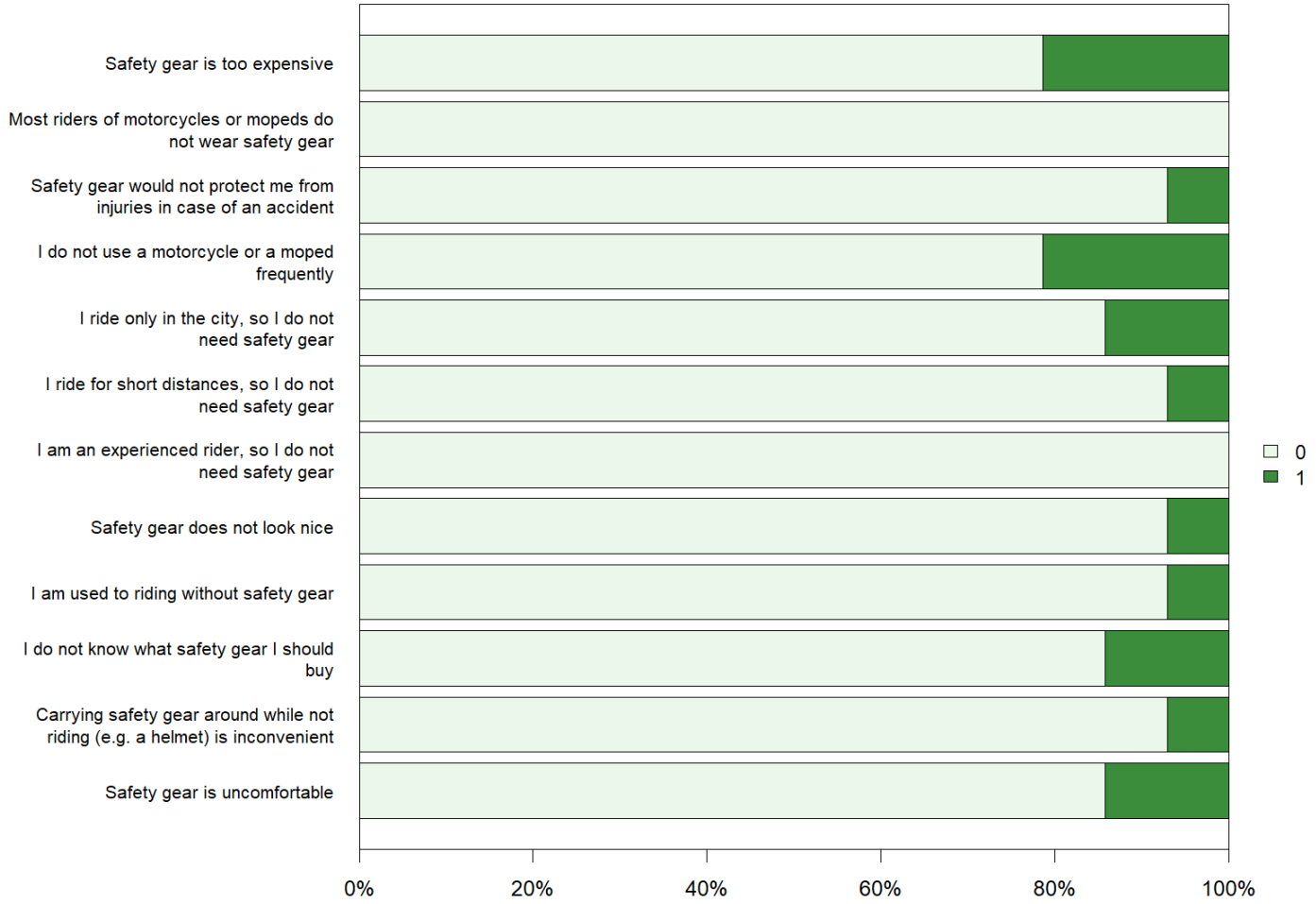


Survey results - Motorcyclists

	Number of users (N=905)
Helmet	859 (94.9%)
Jacket with protection	546 (60.3%)
Leg protection	314 (34.7%)
None of the above	14 (1.5%)



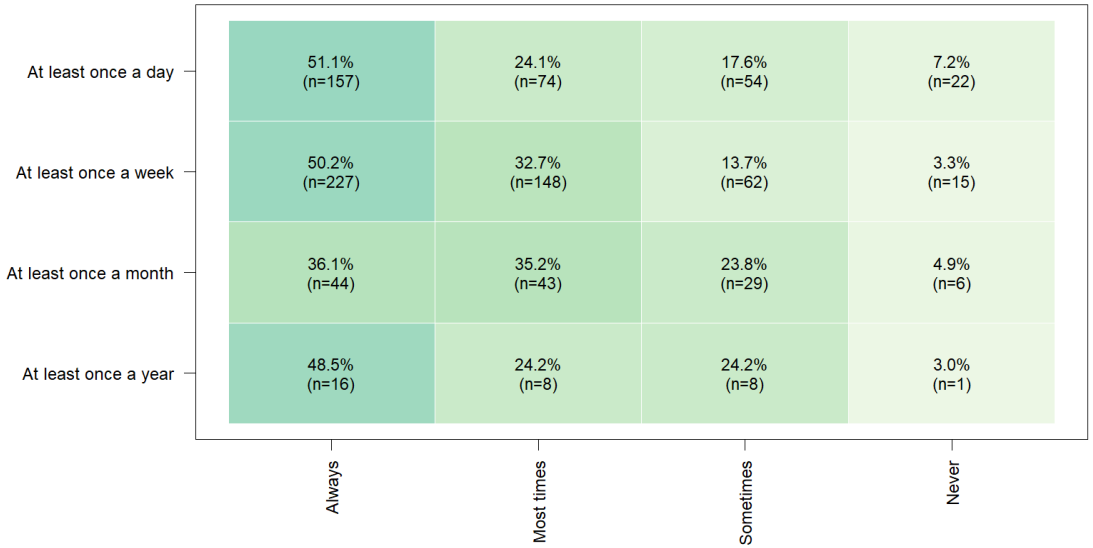
Frequency of riding a motorcycle/moped in participants not owning PPE (n=14)



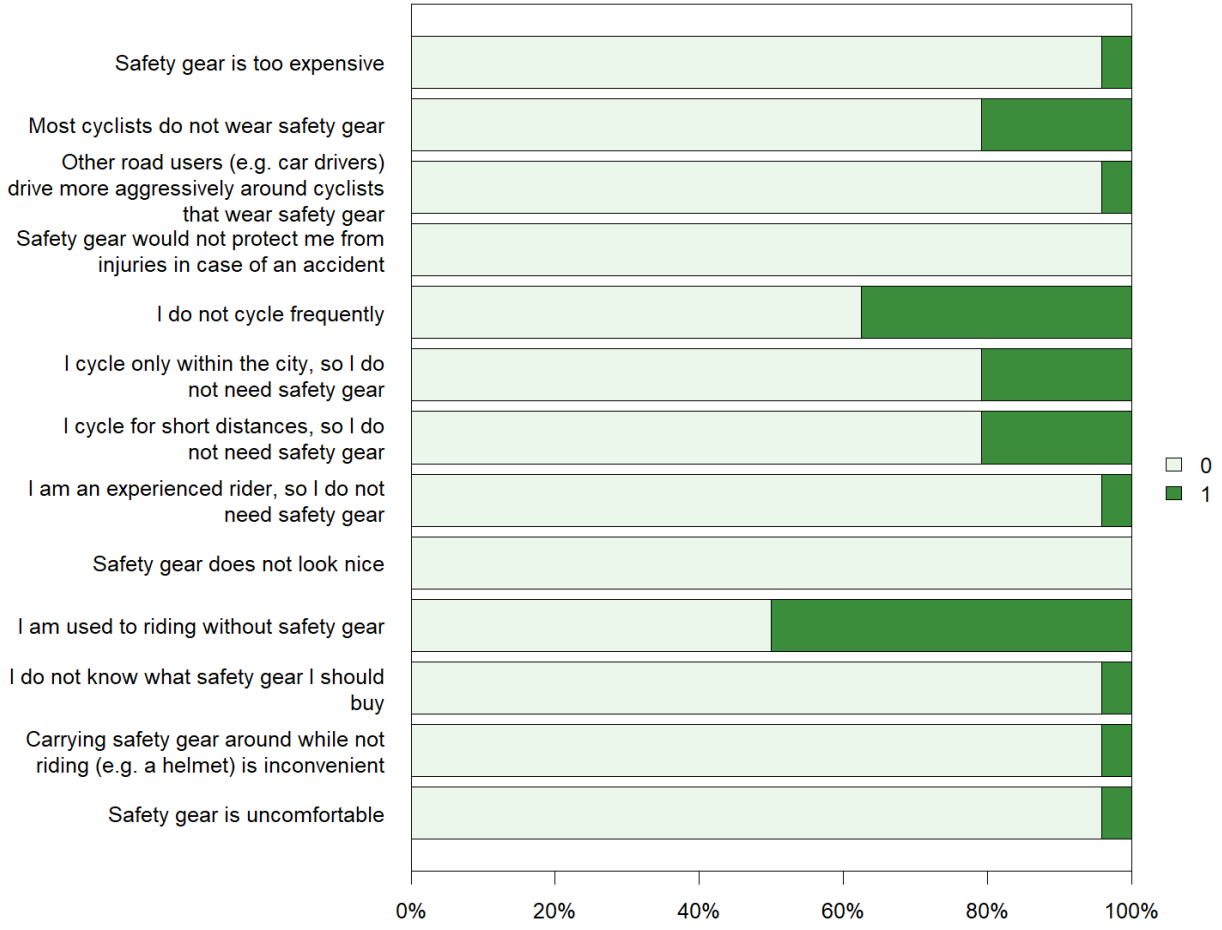
Reasons given for not owning any type of PPE among motorcyclists (n=14)

Survey results – Cyclists

	Number of users (N=1261)
Helmet	914 (72.5%)
Jacket with protection (visibility or padded)	411 (32.6%)
None of the above	290 (23.0%)



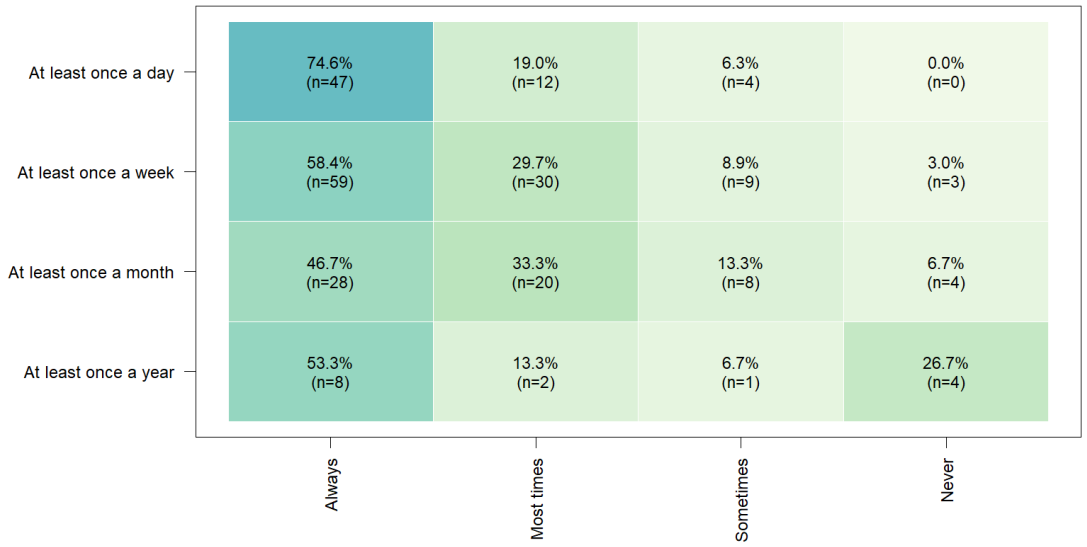
Frequency of riding by frequency of use of a helmet (n=914)



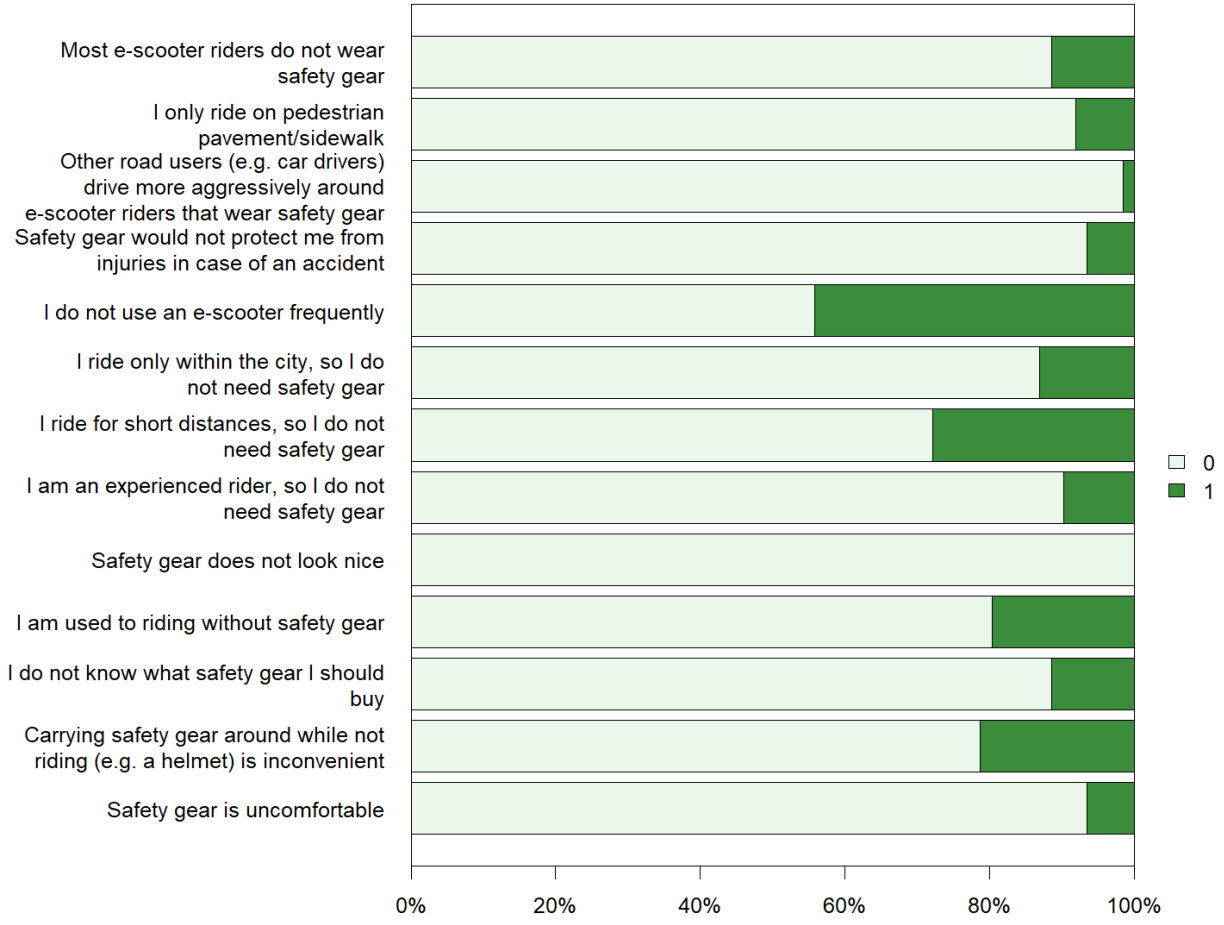
Reasons given for not owning any type of PPE among cyclists (n=290)

Survey results – E-scooter riders

	Number of users (N=334)
Helmet	239 (71.6%)
Jacket with protection (visibility or padded)	149 (44.6%)
None of the above	61 (18.3%)



Frequency of riding by frequency of use of a helmet (n=239)



Reasons given for now owning any type of PPE among riders (n=61)

Conclusions (1/2)

- The combined evidence confirms that PPE ownership is relatively high among motorcyclists but more limited among cyclists and e-scooter riders
- There is a systematic gap between owning PPE and using it consistently
- Despite this generally high availability of helmets, many cyclists and e-scooter riders reported using them only occasionally or never, especially on short or low-speed urban trips and when riding infrequently

Conclusions (2/2)

Across VRU groups, the main barriers to PPE adoption and consistent use align with the three components of the COM-B model:

- Capability
  - Physical discomfort (e.g. heat)
  - Effort of carrying PPE
- Opportunity
  - High purchase cost
  - Lack of convenient storage
  - Social norms discouraging use
- Motivation
  - Perception PPE is unnecessary for short/urban trips
  - Habit of non-use
  - Aesthetic concerns

Recommendations for PPE use

- **Behaviour change interventions:** Communication campaigns, social modelling, and education to highlight PPE benefits and address knowledge gaps
- **Nudges & enablement measures:** Default options (e.g. helmet included), try-before-you-buy schemes, and improved accessibility
- **Environmental & infrastructure support:** Helmet storage solutions and integration into parking or mobility systems
- **Product innovation & policy support:** More comfortable PPE (lightweight, breathable, foldable) and targeted regulation/enforcement for high-risk users

Future research

- Integrate behavioural insights with injury risk and long-term consequence (LTC) data
- Estimate effectiveness of PPE measures and prioritise interventions at EU and national levels
- Explore subgroup differences (e.g. age, gender, socio-economic factors, trip purpose)
- Support co-design of interventions with stakeholders (cities, industry, road safety organisations, users)
- Translate findings into policy and practical guidelines for increasing PPE adoption across Europe

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