Critical Factors of Safe Micromobility in Greece

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Abstract

Micromobility is rapidly emerging as a sustainable solution to urban congestion and environmental challenges. In recent years, electric scooters (e-scooters) have become particularly popular in Greek cities, yet their safety implications remain largely unexplored. This study investigates the critical factors influencing the self-reported behavior and safety practices of e-scooter users in Greece, using data from the third edition of the ESRA survey (E-Survey on Road Users' Attitudes). A sample of 63 e-scooter users was analyzed in terms of descriptive characteristics and through a series of nine binary logistic regression models. These models assessed variables linked to unsafe behaviors, perceived risk factors, and self-reported opinions about pedestrians' and drivers' behavior. Findings reveal that older users and those recognizing key dangers, such as speed and distraction, are more likely to adopt safe practices. Social norms and local peer pressure significantly influence compliance with traffic regulations, while female users tend to exhibit more responsible behavior. Alarmingly, despite helmet mandates, a large share of users neglects helmet use. The study concludes with policy recommendations including targeted education, enhanced enforcement, and infrastructure improvements to promote safer micromobility in Greece.

Keywords*: micromobility, e-scooters, safety, Greece, ESRA3*

1. Introduction

Over the past decade, micromobility, primarily electric scooters (e-scooters) has emerged as a sustainable and efficient solution for urban transportation, addressing challenges such as congestion, pollution, and limited parking spaces. E-scooters, typically operating below 25 km/h, are increasingly favored in urban areas due to their affordability, flexibility, and minimal environmental footprint compared to conventional vehicles.

Despite these benefits, increased e-scooter adoption has highlighted critical safety concerns associated with inadequate infrastructure, regulatory gaps, and inconsistent user behavior. International studies repeatedly document key risk factors, including speeding, distracted riding, alcohol impairment, and particularly low helmet compliance (Yang et al., 2020). A systematic review of e-scooter accidents indicated frequent incidents of severe head injuries, largely attributed to low helmet use and reckless behaviors.

Within the Greek context, e-scooters have rapidly proliferated in urban centers without adequate supporting infrastructure or comprehensive regulatory frameworks. Existing studies from Greece underline significant safety shortcomings, such as the notably low helmet usage rate, only around 5% among injured users, and high-risk interactions with pedestrians, especially in narrow or crowded spaces. Moreover, evidence points to alcohol use and violations of traffic regulations as prominent contributing factors to e-scooter-related incidents.

Given the limited empirical data and research specific to Greek urban conditions, there is an urgent need for localized studies to better understand user behaviors and perceptions regarding micromobility safety. Addressing this critical gap, the present study aims to identify and analyze the demographic, behavioral, and contextual factors influencing the safety practices of e-scooter users in Greece. Utilizing data from the third edition of the ESRA survey (E-Survey of Road Users' Attitudes), this study seeks to provide robust insights into the self-reported behaviors and attitudes of users. Ultimately, the findings aim to inform targeted policy interventions, educational campaigns, and infrastructure developments, facilitating safer integration of e-scooters into the urban mobility ecosystem in Greece.

2. Methodology

2.1 Data

Table 1 presents the questions that were used in both the descriptive and statistical analyses**.** Each item includes the original wording, the assigned abbreviation, the full response range, and the corresponding response grouping used in the modeling. Responses were recoded based on reference categories in order to ensure consistency across variables and facilitate binary logistic regression analysis.

Table 1*: ESRA3 questions used for descriptive and statistical analysis*

Question wording	Abbreviation	Response range	Response Grouping
Gender	Gender	1. Male 2. Female	0: Female 1: Male
How old are you (in years)?	Age_group	1. 18-24 2. 25-34 3. 35-44 4. 45-54 5. 55-64 6. 65-74	0:35-44 1:18-34
Are you currently enrolled in school or university?	Education_1	1. No 2. Yes	0: No 1: Yes
What is the highest qualification or educational certificate that you have obtained?	Education_2	1. Primary 2. Secondary 3. Bachelor's degree or similar 4. Master's degree or higher	0: Primary-Secondary 1: Bachelor's degree or similar- Master's degree or higher
How far do you live from the nearest stop of public transport?	Distance_PT_stop	1. < 500m 2. 500-1000m 3. >1000m	0: <500m 1: >500m
What is the frequency of your nearest public transport?	PT_Frequency	1. At least 3 times/hour 2. 1 or 2 times/hour 3. Less than 1 time/hour	0: Low (3) 1: High (1-2)
Which phrase best describes the area where you live?	Urbanization	1. Low 2. High	0: Low 1: High
Over the last 30 days, how often did you as RIDER OF AN E-SCOOTER, ride with more than 1 person on board	E_scooter_multiple_riders_30d	1. Never 2. At least once	0: Never 1: At least once

Over the last 30 days, how often did you as RIDER OF AN E-SCOOTER, ride when you think you may have had too much to drink	E_Scooter_Alcohol_Use_30d	1. Never 2. At least once	0: Never 1: At least once
Over the last 30 days, how often did you as RIDER OF AN E-SCOOTER, cross the road when a traffic light is red	E_Scooter_Red_Light_30d	1. Never 2. At least once	0: Never 1: At least once
Over the last 30 days, how often did you as RIDER OF AN E-SCOOTER, ride on pedestrian pavement/sidewalk	E_Scooter_On_Sidewalk_30d	1. Never 2. At least once	0: Never 1: At least once
Over the last 30 days, how often did you as RIDER OF AN E-SCOOTER, ride without a helmet	E_Scooter_No_Helmet_30d	1. Never 2. At least once	0: Never 1: At least once
Where you live, how acceptable would most other people say it is for a CAR DRIVER to drive when he/she may be over the legal limit for drinking and driving	Area_Alcohol_Overlimit_Acceptability	1: Unacceptable/ Neutral 2: Acceptable	0: Unacceptable/Neutral 1: Acceptable
Where you live, how acceptable would most other people say it is for a CAR DRIVER to talk on a hand-held mobile phone while driving	Area_Handheld_Phone_Use_Acceptability	1: Unacceptable/ Neutral 2: Acceptable	0: Unacceptable/Neutral 1: Acceptable
Where you live, how acceptable would most other people say it is for a CAR DRIVER to read a message or check social media/news while driving	Area_Message_Reading_Acceptability	1: Unacceptable/ Neutral 2: Acceptable	0: Unacceptable/Neutral 1: Acceptable
Motorized vehicles should always give way to pedestrians or cyclists	Priority_Rule_Acceptability	1: Unacceptable/ Neutral 2: Acceptable	0: Unacceptable/Neutral 1: Acceptable
I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer)	Trust_Self_Driving_Small_Alcohol	1: Unacceptable/ Neutral 2: Acceptable	0: Unacceptable/Neutral 1: Acceptable
How acceptable do you, personally, feel it is for a CAR DRIVER to drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)	Driver_Speeding_Unfavorable_Conditions	1: Unacceptable/ Neutral 2: Acceptable	0: Unacceptable/Neutral 1: Acceptable

How acceptable do you, personally, feel it is for a CAR DRIVER to read a message or check social media/news while driving	Driver_Reading_Message_While_Driving	1: Unacceptable/ Neutral 2: Acceptable	0: Unacceptable/Neutral 1: Acceptable
How acceptable do you, personally, feel it is for a PEDESTRIAN to walk down the street when he/she may have had too much to drink	Pedestrian_Alcohol_Walking	1: Unacceptable/ Neutral 2: Acceptable	0: Unacceptable/Neutral 1: Acceptable
How acceptable do you, personally, feel it is for a PEDESTRIAN to read a message or check social media/news while walking down the street	Pedestrian_Reading_Message_Walking	1: Unacceptable/ Neutral 2: Acceptable	0: Unacceptable/Neutral 1: Acceptable
How often do you think driving faster than the speed limit is the cause of a road crash involving a car?	Perceived_Car_Accident_Speeding	1: Rare 2: Frequently	0: Rare 1: Frequently
How often do you think inattentiveness or daydreaming while driving is the cause of a road crash involving a car?	Perceived_Car_Accident_Inattention	1: Rare 2: Frequently	0: Rare 1: Frequently
How often do you think driving while tired is the cause of a road crash involving a car?	Perceived_Car_Accident_Fatique	1: Rare 2: Frequently	0: Rare 1: Frequently
Do you oppose or support forbidding all drivers of motorized vehicles to drive with a blood alcohol concentration above 0.0 ‰ (zero tolerance)	Support_Zero_Tolerance_Motor_Alcohol	1: Disagree 2: Agree	0: Disagree 1: Agree
Do you oppose or support forbidding all drivers of motorized vehicles to use a hand-held mobile phone while driving	Support_Handheld_Phone_Ban_Motor_Drivers	1: Disagree 2: Agree	0: Disagree 1: Agree
Do you oppose or support limiting the speed limit to 30 km/h in all built-up areas (except on main thoroughfares)	Support_Speed_Limit_30_Buildup_Areas	1: Disagree 2: Agree	0: Disagree 1: Agree
Do you oppose or support requiring all cyclists to wear a helmet	Support_Helmet_Mandate_Cyclists	1: Disagree 2: Agree	0: Disagree 1: Agree
Do you oppose or support forbidding all cyclists to ride with a blood alcohol concentration above 0,0‰ (zero tolerance)	Support_Zero_Tolerance_Cyclist_Alcohol	1: Disagree 2: Agree	0: Disagree 1: Agree

2.2 Descriptive Analysis

This research used data derived from the third edition of the European Survey of Road Users' Attitudes (ESRA3). ESRA3 is an international initiative involving over 39 countries, aiming to systematically collect comparable data on road users' behaviors, attitudes, and perceptions regarding road safety. The survey covers multiple transport modes, including emerging forms such as micromobility, offering a robust source of self-reported safety behaviors and beliefs.

For the purposes of this study, a targeted subset of 63 Greek e-scooter users was selected from the ESRA3 dataset. Participants were included based on their declared use of e-scooters as a routine mode of transportation. Demographic variables such as age, gender, and educational level were also included. Data cleaning and recoding procedures were performed using Microsoft Excel to ensure consistency and prepare the dataset for statistical modeling.

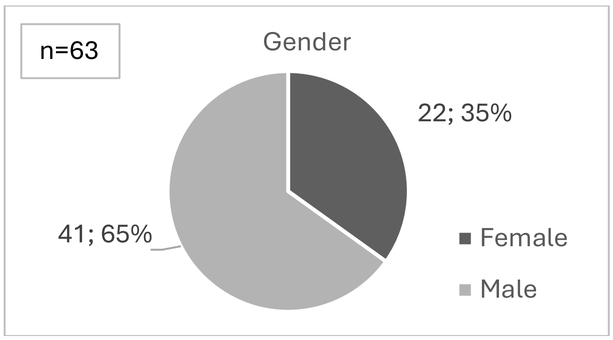

Figure 1: *Sample distribution per gender*

Based on Figure 1 and the sample of 63 individuals examined as e-scooter riders, it is observed that the majority are male, representing 65% (41 individuals), while females account for 35% (22 individuals). This distribution indicates that men significantly outnumber women in e-scooter use, highlighting a gender gap of approximately 30 percentage points.

Table 2: *Sample distribution per age*

Age group	Partcipants	Percentage
18-24	15	23.8%
25-34	16	25.4%
35-44	14	22.2%
45-54	9	14.3%
55-64	7	11.1%
65-74	2	3.2%
Total	**63**	**100.0%**

The age distribution of the 63 e-scooter users surveyed is presented in Table 2. The largest age groups were those aged 25–34 (25.4%) and 18–24 (23.8%), followed by 35–44 (22.2%) and 45–54 (14.3%). Smaller proportions were observed among participants aged 55–64 (11.1%) and 65–74 (3.2%). These findings suggest that the majority of e-scooter users belong to younger and early middle-aged cohorts, reflecting the strong adoption of micromobility solutions among individuals under the age of 45.

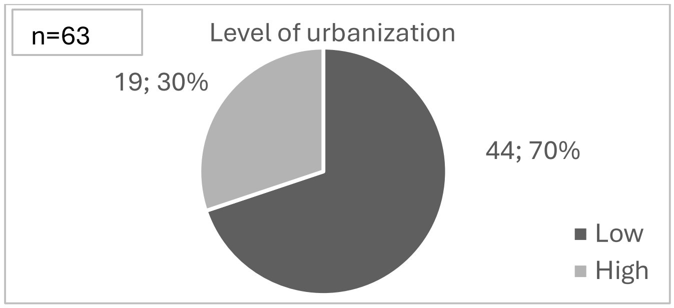

Figure 2: *Level of urbanization*

According to Figure 2, which illustrates the residential area size for the sample of 63 individuals (n=63), it is observed that 70% of participants (44 individuals) reside in small areas, while 30% (19 individuals) live in large areas. This distribution suggests that the majority of e-scooter users live in areas with lower density or urban development.

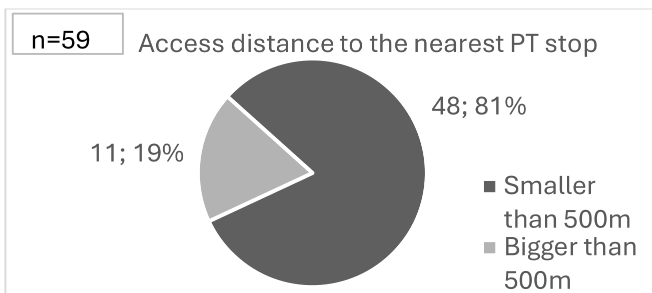

Figure 3: *Access distance to the nearest public transport (PT) stop*

Figure 3 analyzes the distance to the nearest public transport stop for the sample of 59 individuals (n=59). It is noted that 4 respondents from the initial sample of 63 did not provide an answer to this question and were therefore excluded from the analysis. The results showed that 81% of participants (48 individuals) live within 500 meters of the nearest stop, while 19% (11 individuals) live farther than 500 meters. This distribution indicates that most participants have easy access to public transport.

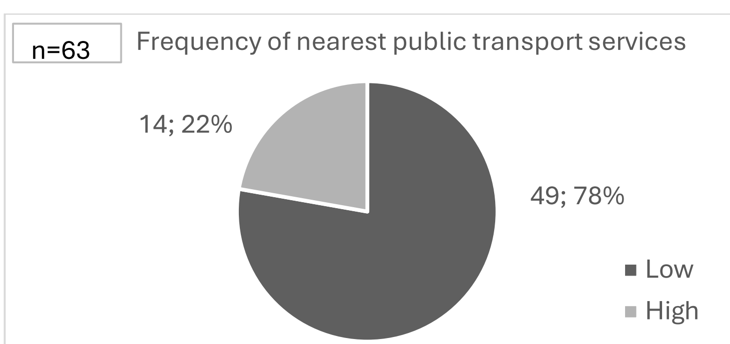

Figure 4: *Frequency of nearest public transport services*

According to Figure 4, which presents the frequency of nearby public transport for the sample of 63 individuals (n=63), 78% (49 individuals) reported low frequency, while 22% (14 individuals) reported high frequency. This distribution indicates that the majority of respondents live in areas with less frequent public transport availability.

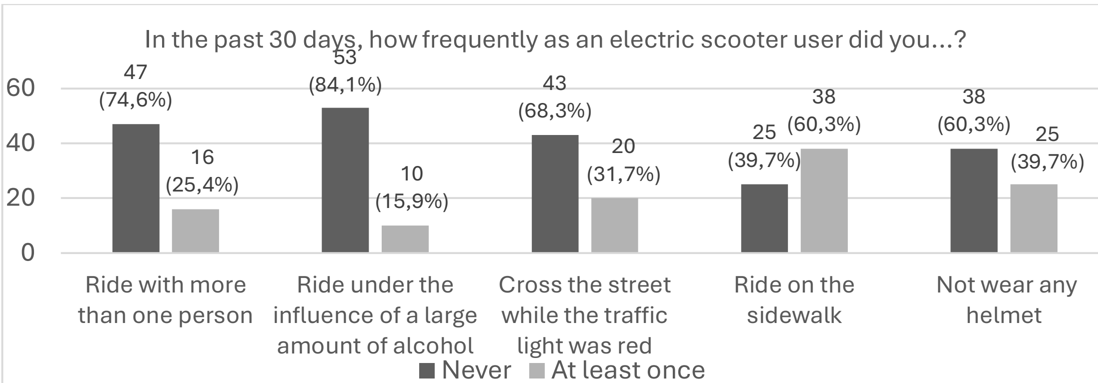

***Figure 5**: In the past 30 days, how frequently have you used an electric scooter...?*

Figure 5 presents the behavior of e-scooter users over the past 30 days, focusing on five specific conditions related to safety. Among respondents, 74,6% (47 individuals) stated that they never rode with more than one person on the scooter, while 25,4% (16 individuals) did so at least once. Regarding alcohol consumption, 84,1% (53 individuals) reported never riding after consuming a large amount of alcohol, while 15,9% (10 individuals) admitted doing so at least once.

Additionally, 68,3% (43 individuals) reported never crossing the street while the traffic light was red, whereas 31,7% (20 individuals) admitted to doing so at least once. As for riding on the sidewalk, 60,3% (38 individuals) stated they never did, while 39,7% (25 individuals) did at least once. Finally, the same percentage, 60,3% (38 individuals), reported never failing to wear a helmet, while 39,7% (25 individuals) admitted that they did not wear a helmet at least once.

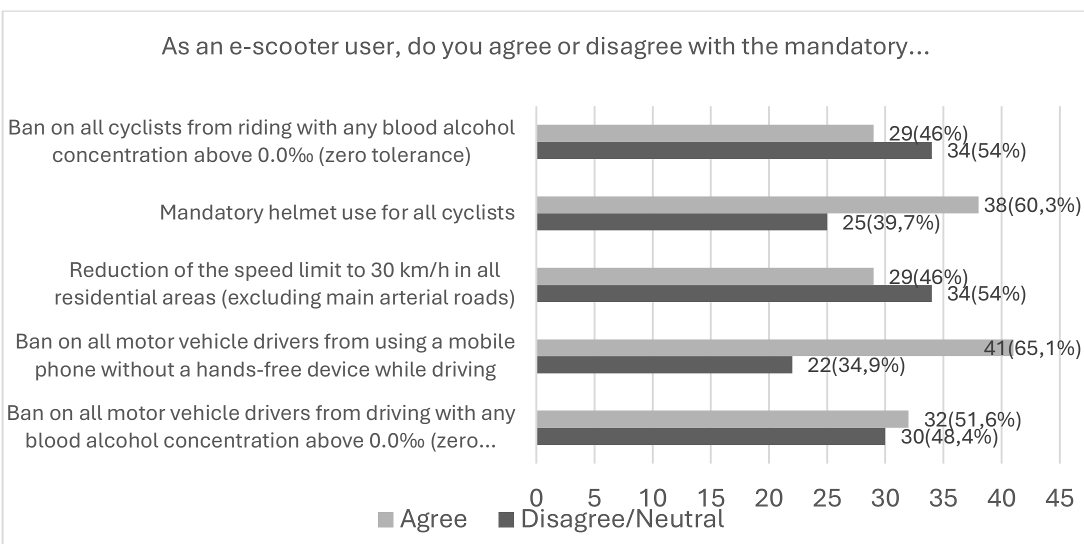

***Figure 6:** As an e-scooter user, do you agree or disagree with the mandatory...*

Figure 6 analyzes e-scooter users' attitudes towards various road safety measures. The questions addressed obligations such as helmet use, alcohol consumption, speed limits, and mobile phone use while driving.

Regarding the obligation for cyclists to ride with 0.0‰ blood alcohol concentration, 46% (29 individuals) agree that this should be mandatory, while 54% (34 individuals) disagree or are neutral. On the mandatory use of helmets, 60,3% (38 individuals) agree that all cyclists should wear helmets, while 39,7% (25 individuals) either disagree or are neutral.

In response to the proposal to reduce the speed limit to 30 km/h in residential areas, 46% (29 individuals) express a positive opinion, while 54% (34 individuals) are negative or neutral. Regarding the ban on using mobile phones without a hands-free device while driving, 65,1% (41 individuals) agree with the proposal, while 34,9% (22 individuals) disagree or are neutral. Lastly, on the ban of driving motor vehicles with blood alcohol concentration above 0.0‰, 51,6% (32 individuals) agree, while 48,4% (30 individuals) are negative or hold a neutral stance.

2.2 Statistical Analysis

The primary method of analysis was binary logistic regression, chosen due to its suitability for modeling binary outcomes (e.g., helmet use: yes/no). This statistical technique enabled the exploration of relationships between various safety behaviors and a range of explanatory variables, including sociodemographic factors, risk perception, and safety attitudes.

$$\log(P(Y=1)/(1-P(Y=1))) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n \quad \textbf{(1)}$$

where:
- Y represents the binary dependent variable,
- Xi are the independent predictors,
- βi are coefficients estimated through maximum likelihood.

Each model's performance was assessed using several metrics. The Hosmer-Lemeshow goodness-of-fit test assessed the agreement between observed and predicted outcomes. The Nagelkerke R^2 provided an indication of explanatory power. Predictor significance was tested via the Wald statistic, and Odds Ratios (ORs) were calculated to interpret the magnitude and direction of associations.

This analytical framework was chosen to ensure the generation of valid, interpretable, and policy-relevant insights regarding the determinants of safe and unsafe behaviors among e-scooter users.

Table 3 presents the individual outcomes of the nine binary logistic regression models that were constructed as part of the statistical analysis. Each model estimates the relationship between a specific binary response and a set of explanatory variables. The table reports the coefficients (B), significance levels (sig), and odds ratios (Exp(B)) for all predictors included in each model, enabling the interpretation of their relative effect on the likelihood of each behavioral outcome.

***Table 3**: Summary presentation of the model results*

Independent variables	Ride with more than one person			Riding under the influence of alcohol			Red light violation			Riding on the sidewalk			Riding without a helmet			Pedestrians under the influence of alcohol			Mobile phone use by pedestrians			Driving at inappropriate speed			Mobile phone use by drivers		
Dependent variables	**B**	**sig**	**Exp(B)**	**B**	**sig**	**Exp(B)**	**B**	**sig**	**Exp(B)**	**B**	**sig**	**Exp(B)**	**B**	**sig**	**Exp(B)**	**B**	**sig**	**Exp(B)**	**B**	**sig**	**Exp(B)**	**B**	**sig**	**Exp(B)**	**B**	**sig**	**Exp(B)**
Gender																											
Ref. category: Man							**-1.277**	**.062**	**.279**																		
Woman																											
Age group																											
Ref. category: 18-34 years old	**-1.496**	**.006**	**.224**	**-1.679**	**.013**	**.187**										**-1.157**	**.049**	**.314**									
35-74 years old																											
Education_2																											
Ref. category: University degree Postgraduate or higher degree				**-1.415**	**.068**	**.243**										**-2.020**	**.049**	**.133**	**-1.529**	**.055**	**.217**						
Primary-Secondary education																											
Urbanization																											
Ref. category: High							**1.683**	**.050**	**5.380**																		
Low																											
PT_Frequency																											
Ref. category: High													**1.077**	**.070**	**2.936**												
Low																											
Priority_rule_acceptability																											
Ref. category: Acceptable	**-1.621**	**.012**	**.198**	**-1.640**	**.065**	**.194**				**-2.260**	**.001**	**.104**	**-1.764**	**.011**	**.171**	**-1.454**	**.051**	**.234**									
Unacceptable/Neutral																											
Driving_after_some_alcohol																											
Ref. category: Acceptable													**-1.490**	**.031**	**.225**				**-2.211**	**.003**	**.110**						
Unacceptable/Neutral																											
Area_alcohol_overlimit_ acceptability																											
Ref. category: Acceptable																			**3.014**	**.042**	**20.362**	**-3.445**	**.024**	**.032**	**-2.683**	**.092**	**.068**
Unacceptable/Neutral																											
Area_handheld_phone_use_acceptability																											
Ref. category: Acceptable																			**-2.878**	**.030**	**.056**				**-3.205**	**.055**	**.041**
Unacceptable/Neutral																											
Area_message_reading_ acceptability																											
Ref. category: Acceptable																						**-3.393**	**.029**	**.034**			
Unacceptable/Neutral																											
Perceived_car_accident_ speeding	**1.210**	**.031**	**3.353**				**1.971**	**.088**	**7.180**				**1.299**	**.077**	**3.666**												
Ref. category: Frequent																											
Perceived_car_accident_ inattention										**2.405**	**.017**	**11.081**															
Ref. category: Frequent																											
Perceived_car_accident_ fatique							**-2.175**	**.066**	**.114**	**-2.122**	**.032**	**.120**															
Ref. category: Frequent																											

3. Results

3.1 Demographic and Behavioral Profile of E-Scooter Users

The sample is predominantly composed of male users (65%), with females accounting for 35%. Nearly half (49%) belong to the 18–34 age group, indicating that e-scooters are primarily used by younger adults. In terms of educational background, 46% of respondents hold a university degree, while 16% possess postgraduate qualifications or higher.

Geographically, 70% of participants reside in low-density or small urban areas, with the remaining 30% living in larger cities. Although 81% reported living within 500 meters of a public transport stop, 78% considered the frequency of service in their area to be insufficient, suggesting a partial reliance on micromobility as a compensatory mode.

From a safety behavior perspective, 75% stated they never ride with more than one person on the e-scooter. A large majority (84%) reported abstaining from riding under the influence of alcohol. Nonetheless, 40% admitted to inconsistent helmet use, and 32% had run a red light at least once revealing a gap between awareness and consistent application of safe riding practices.

Support for road safety measures varied: 60% favored mandatory helmet use, and 65% supported a ban on phone usage while riding without a headset. However, only 46% expressed agreement with reducing speed limits to 30 km/h in residential zones, indicating limited consensus on broader regulatory changes.

3.2 Determinants of Safer Riding Practices

Older users (aged 35–74) generally exhibited safer riding behavior than their younger counterparts. They were less likely to carry passengers or ride under the influence of alcohol, highlighting a correlation between age and personal responsibility in micromobility use.

Risk perception emerged as a key behavioral driver. Users who recognized the dangers of excessive speed, distraction, or fatigue were more likely to adopt precautionary measures—such as using helmets, obeying traffic signals, and avoiding sidewalk riding. In contrast, users with lower risk awareness engaged more frequently in risky behaviors.

Interestingly, those who did not expect priority to be given to pedestrians or cyclists often exhibited more cautious personal safety practices. This counterintuitive finding may reflect a defensive mindset, where perceived unpredictability in traffic dynamics motivates users to adopt stricter safety routines.

Gender was another significant factor. Female users were generally more compliant with traffic laws and less likely to engage in high-risk behaviors, such as running red lights, aligning with existing literature that associates women with more risk-averse mobility behavior.

Finally, users reporting poor public transportation access were less likely to use helmets regularly. This might indicate normalization of casual e-scooter use for daily commuting, leading to underestimation of the associated risks and decreased safety equipment use.

3.3 E-Scooter Users' Attitudes Toward the Risky Behavior of Pedestrians and Drivers

A deeper look at user attitudes revealed meaningful links between demographic traits and safety perceptions. Users aged 35–74 were 68,6% less likely to consider it acceptable for pedestrians to walk under the influence of alcohol, compared to those aged 18–34, underscoring the role of age in shaping safety-related social norms.

Users who disagreed or were neutral regarding the prioritization of pedestrians and cyclists were 76,6% less likely to tolerate pedestrian alcohol use. This suggests that even among those who downplay pedestrian priority, a strong safety ethic persists.

Similarly, users with only basic education showed greater intolerance for risky pedestrian behaviors. They were 86,7% less likely to accept walking under alcohol influence, and 78,3% less likely to condone mobile phone use by pedestrians, contrasting with higher-educated respondents who might downplay such risks.

Attitudes toward alcohol use further shaped perceptions of safety. Individuals opposed riding after consuming alcohol, or lacking confidence in their ability to ride safely after drinking, were also 89% less likely to tolerate mobile phone use by pedestrians, indicating consistent caution across contexts.

Social norms proved highly influential. Users residing in communities where alcohol-impaired driving or mobile phone use was broadly disapproved were 96,8% less likely to tolerate speeding, and 95,9% less likely to condone phone use by drivers. This highlights the role of collective attitudes in reinforcing personal compliance.

Interestingly, participants made a clear distinction between driver and pedestrian risk. While strongly disapproving of mobile phone use by drivers (94,4% lower acceptance), they were more lenient toward pedestrian distractions, with only a 20,4% decrease in acceptance of phone use by pedestrians in similar contexts. This reflects a differentiated risk framework based on perceived harm potential.

4. Discussion

4.1 Recommendations for Safer Micromobility

The results of this study highlight critical gaps in e-scooter safety that can be addressed through a combination of regulatory enforcement, user education, and infrastructure adaptation.

Despite legislation mandating helmet use, non-compliance remains widespread among e-scooter users. To address this, authorities should intensify enforcement through frequent checks and immediate penalties for violations, particularly concerning helmet use, red-light running, and alcohol-impaired riding. Consistent enforcement is likely to deter unsafe behaviors and reduce injury severity in the event of crashes.

Although only 46% of participants supported lowering residential speed limits to 30 km/h, expanding this measure, especially in areas with dense pedestrian and cyclist activity could reduce crash severity. Parallel investment in dedicated infrastructure, such as protected bike lanes and micromobility corridors, would reduce sidewalk use and conflicts with pedestrians, thereby improving safety for all road users.

Interestingly, participants with only basic education demonstrated more cautious behavior than those with higher academic backgrounds. This points to a need for comprehensive educational campaigns targeting all user groups. Programs should focus on traffic rule literacy, risk awareness, and the promotion of safe practices like helmet use and sober riding.

Offering tangible incentives, such as discounts on helmets or benefits for completing road safety training, can motivate safer practices. Rewarding users for active participation in safety campaigns could complement enforcement strategies and contribute to a culture of compliance.

4.2 Limitations of the Study

While this study offers valuable insights into e-scooter safety behaviors in Greece, several limitations must be acknowledged.

The relatively small sample of 63 users limits the generalizability of findings and reduces the statistical power to detect subtle effects or subgroup differences. With 65% of participants being male, gender-specific conclusions should be interpreted cautiously, as behavioral patterns may differ between men and women.

The sample size per age group was limited, making it difficult to draw strong inferences about how age affects behavior and perceptions. As 70% of users lived in low-density areas, the findings may not fully capture the challenges faced by e-scooter users in densely populated urban settings.

The use of self-reported survey data introduces potential bias, including the underreporting of risky behavior or overestimation of safety compliance due to social desirability.

4.3 Suggestions for Future Proposals

To build on the findings of this study, future research should explore several key dimensions.

The observed influence of social pressure on attitudes toward alcohol and phone use suggests that future studies could further investigate the role of collective norms in shaping user behavior and safety compliance.

Partnering with shared e-scooter platforms could unlock access to large-scale behavioral data (e.g., trip duration, routes, violation events), allowing for more objective and detailed safety analyses.

Dedicated research should assess how infrastructure designs, such as the presence of bike lanes or curb-separated paths, affects e-scooter use patterns, risk exposure, and compliance with rules.

Longitudinal studies could evaluate the impact of road safety education on behavior change over time.

Understanding which formats and messages work best across demographic groups would support the development of more effective public safety strategies.

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