

Mobile Phone Use Among Drivers in the UAE

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PRESENTATION OUTLINE

- Quantifying magnitude of mobile phone use violations in UAE
- A probabilistic analysis approach
- Identifying probabilities of frequent mobile use violators
- Joint probabilities combining mobile use with other violations



Humans do mistakes; they lose focus, using technology!



Majority of accidents are due to human errors?

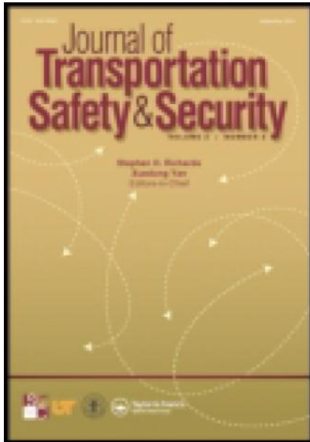
Is that reality in the UAE?

RESEARCH QUESTION

Can we design statistical procedures to quantify the magnitude of mobile use frequent violations in the UAE?

An important note: the police violation records show part of these violations but not all!





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Characterizing Driver Behaviors Relevant to Traffic Safety: A Multistage Approach

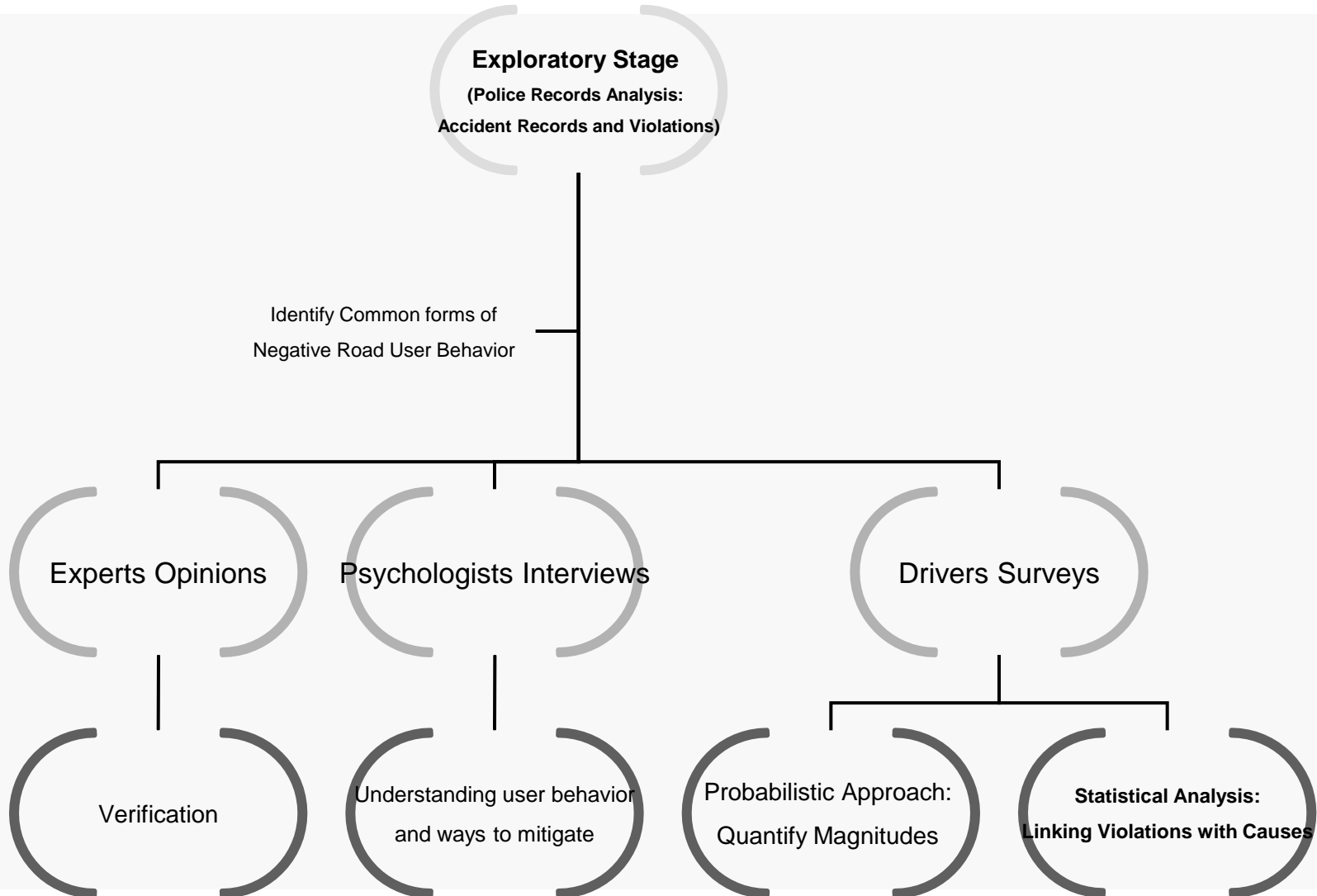
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DRIVER BEHAVIOR

FRAMEWORK FOR ASSESSING HUMAN BEHAVIORAL ASPECTS



METHODOLOGY AND TOOLS: ROAD USER SURVEY

Survey Design:

- *Method:*

Stated Preference Survey Method (a number of questions with pre-defined options were used, as well as some open ended questions. The survey consists of 51 questions (46 are single variable questions, and 5 are multiple variable ones).

- *Sample size:*

The number of samples at which the difference of the variable variance stabilizes is considered to be the minimum sample size .

Total of 1662 surveys were collected.



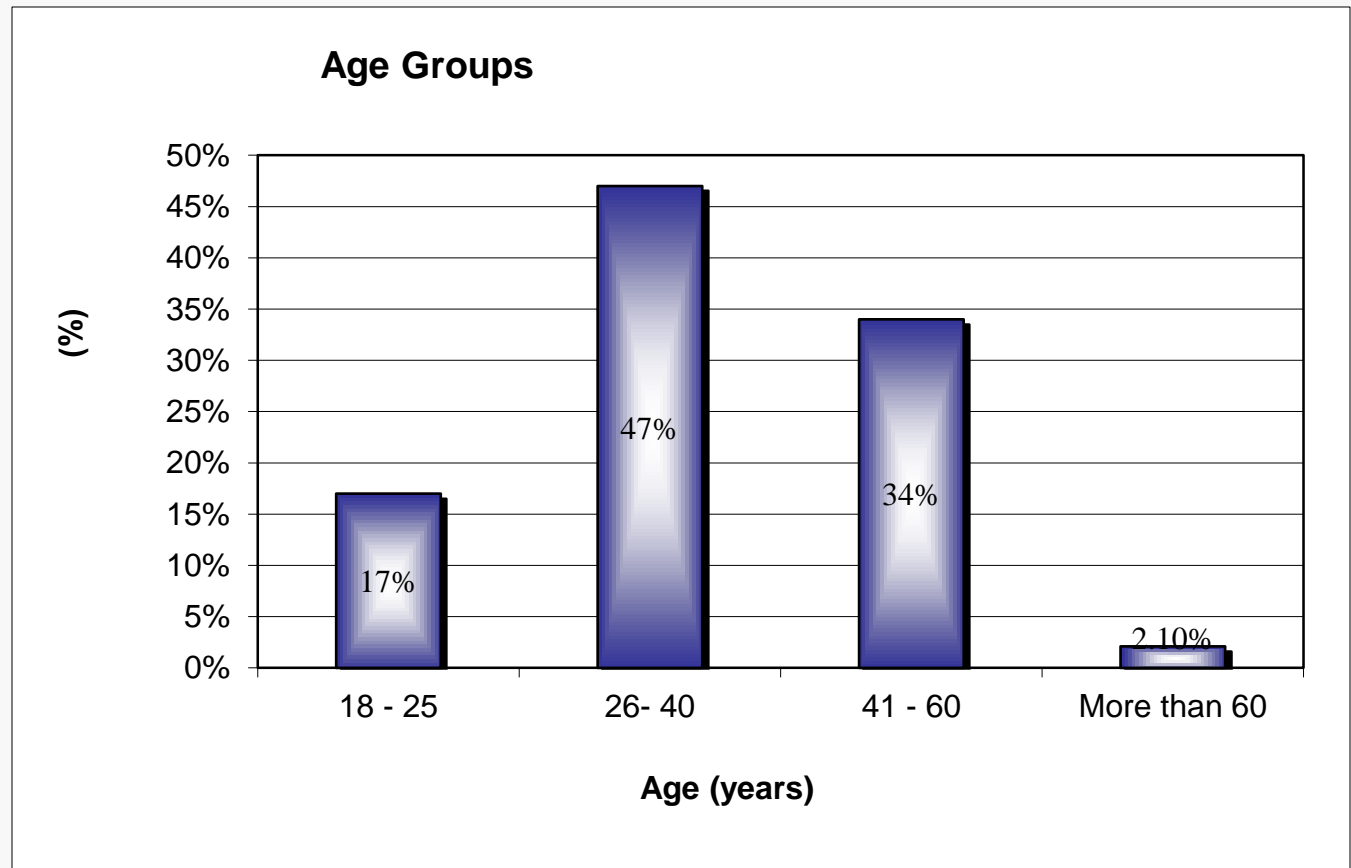


| Question | Mean / STDV | 50 | 100 | Diff. | 150 | Diff | 200 | Diff | 250 | Diff |
|--|-------------|-------|-------|--------|-------|--------|-------|--------|-------|--------|
| How often do you use your mobile phone while driving? | Mean | 2.75 | 2.53 | -0.22 | 2.59 | 0.06 | 2.78 | 0.19 | 2.71 | -0.07 |
| | STDV | 1.256 | 1.272 | 0.016 | 1.199 | -0.073 | 1.165 | -0.034 | 1.118 | -0.047 |
| How often do you drive without leaving sufficient distance with front vehicle? | Mean | 2.93 | 2.98 | 0.05 | 3.02 | 0.04 | 3.18 | 0.16 | 3.13 | -0.05 |
| | STDV | 1.047 | 1.018 | -0.029 | 0.996 | -0.022 | 0.966 | -0.03 | 0.953 | -0.013 |
| How often do you drive without using seat-belt? | Mean | 3.29 | 3.25 | -0.04 | 3.14 | -0.11 | 3.21 | 0.07 | 3.18 | -0.03 |
| | STDV | 1.019 | 0.999 | -0.02 | 1.055 | 0.056 | 1.025 | -0.03 | 1.017 | -0.008 |

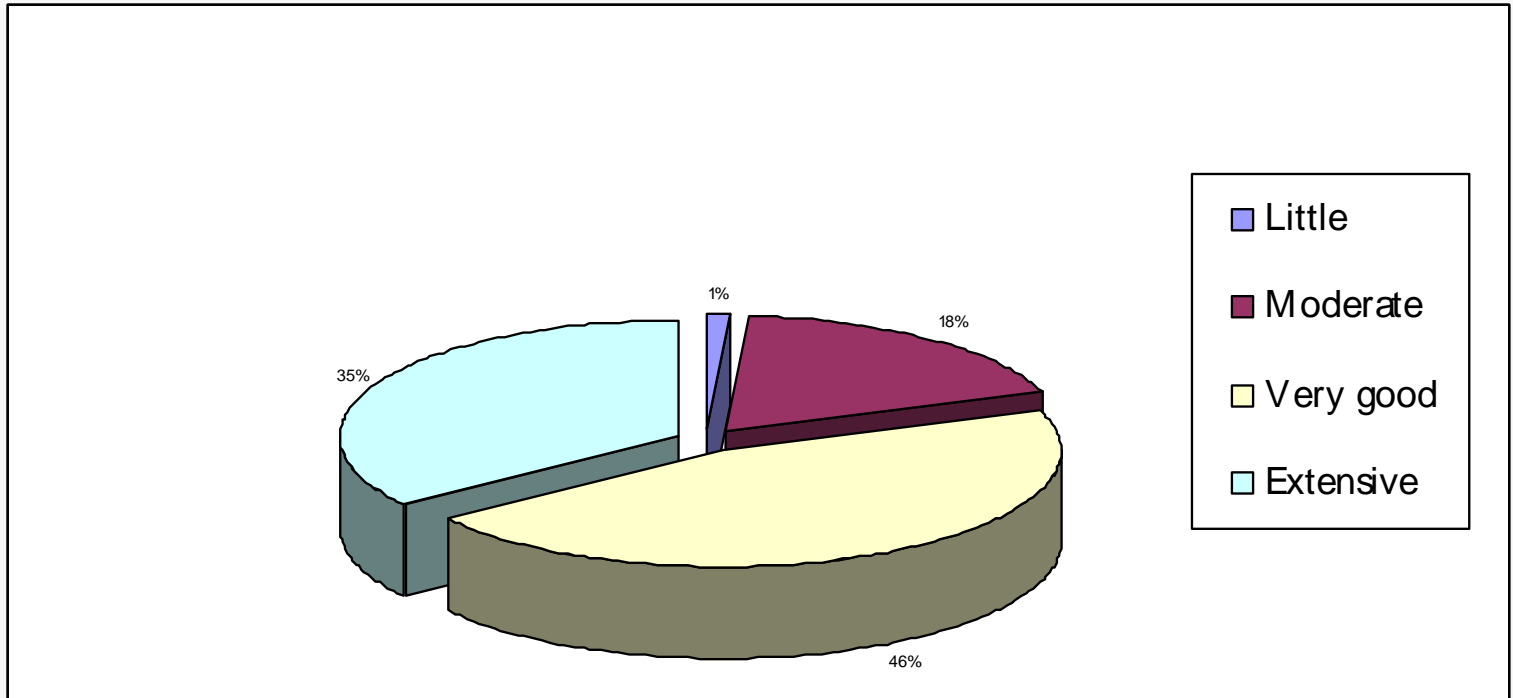


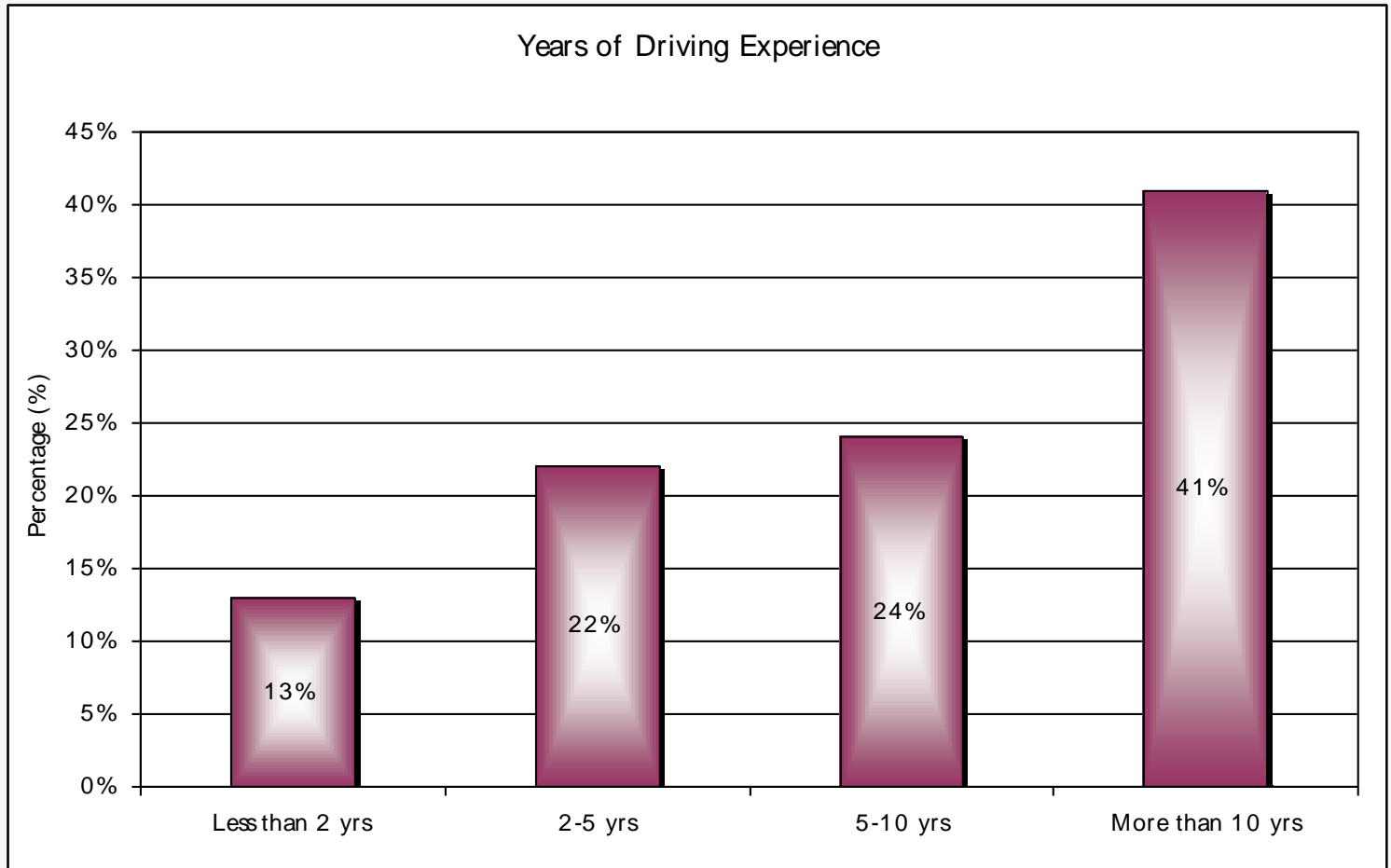
DESCRIPTIVE ANALYSIS OF SURVEY

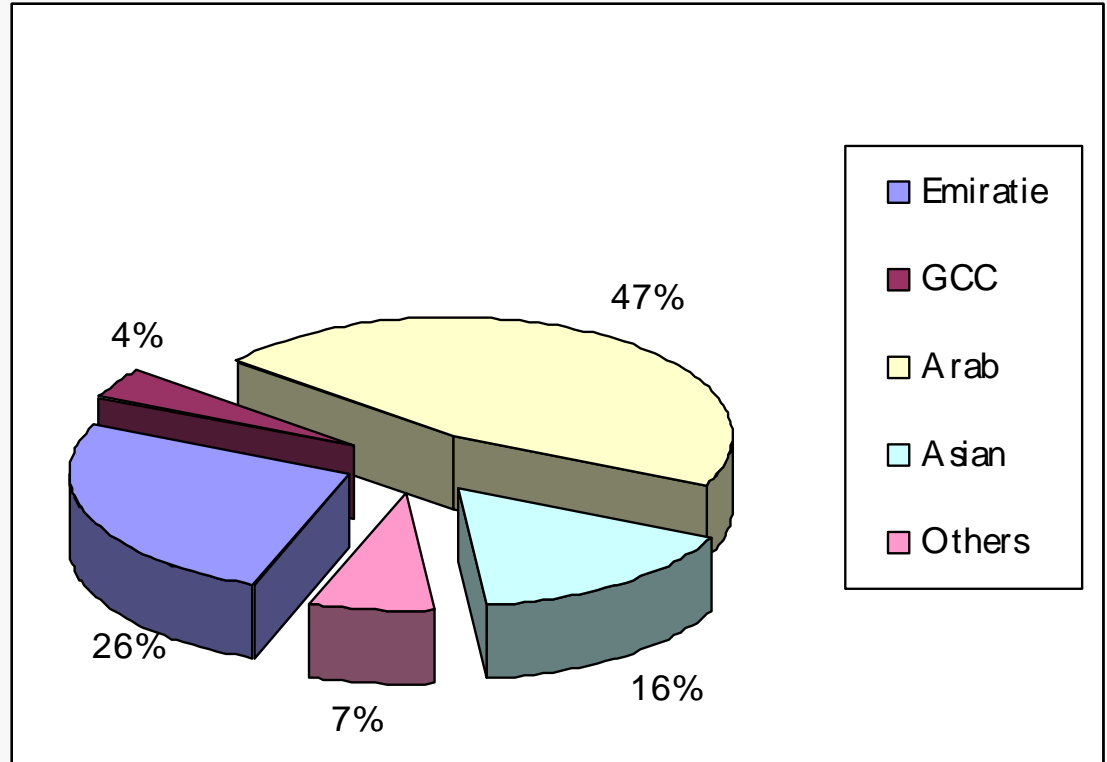
PARTICIPANTS AGE GROUPS

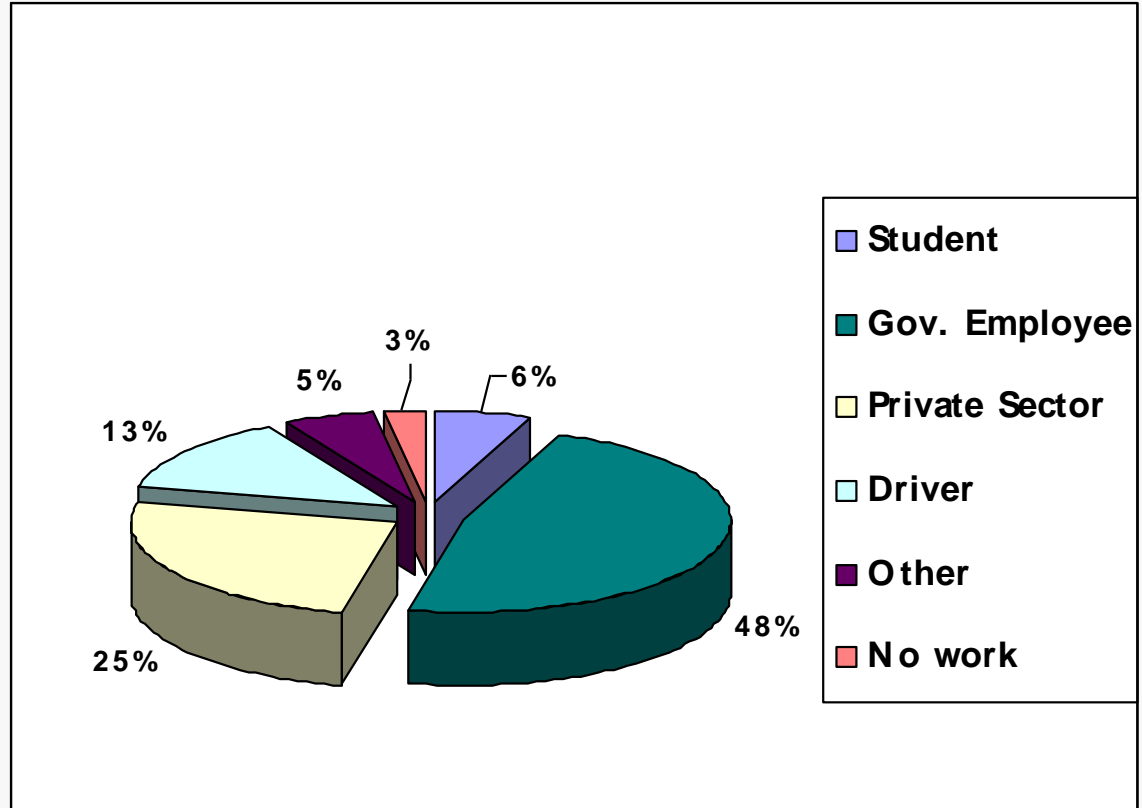


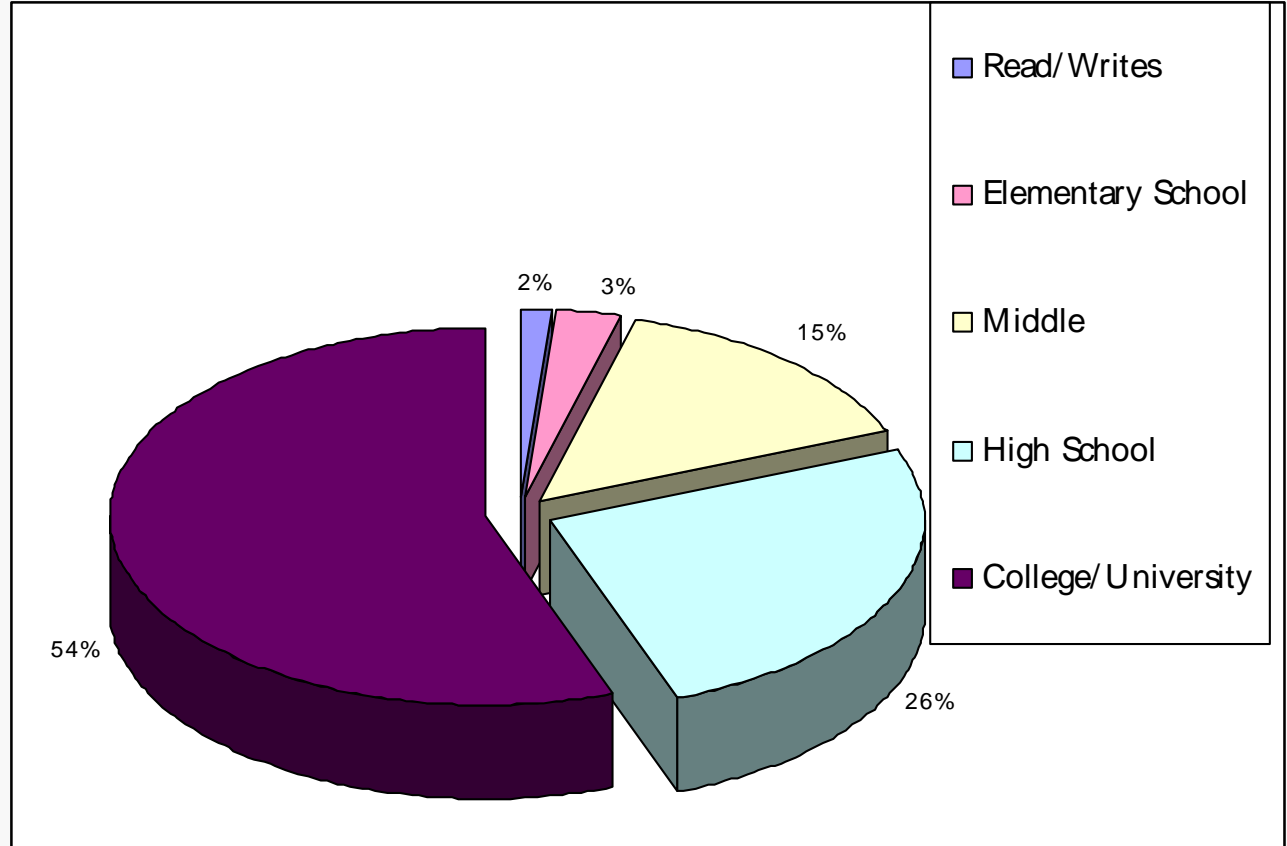
KNOWLEDGE OF TRAFFIC LAW AND REGULATIONS



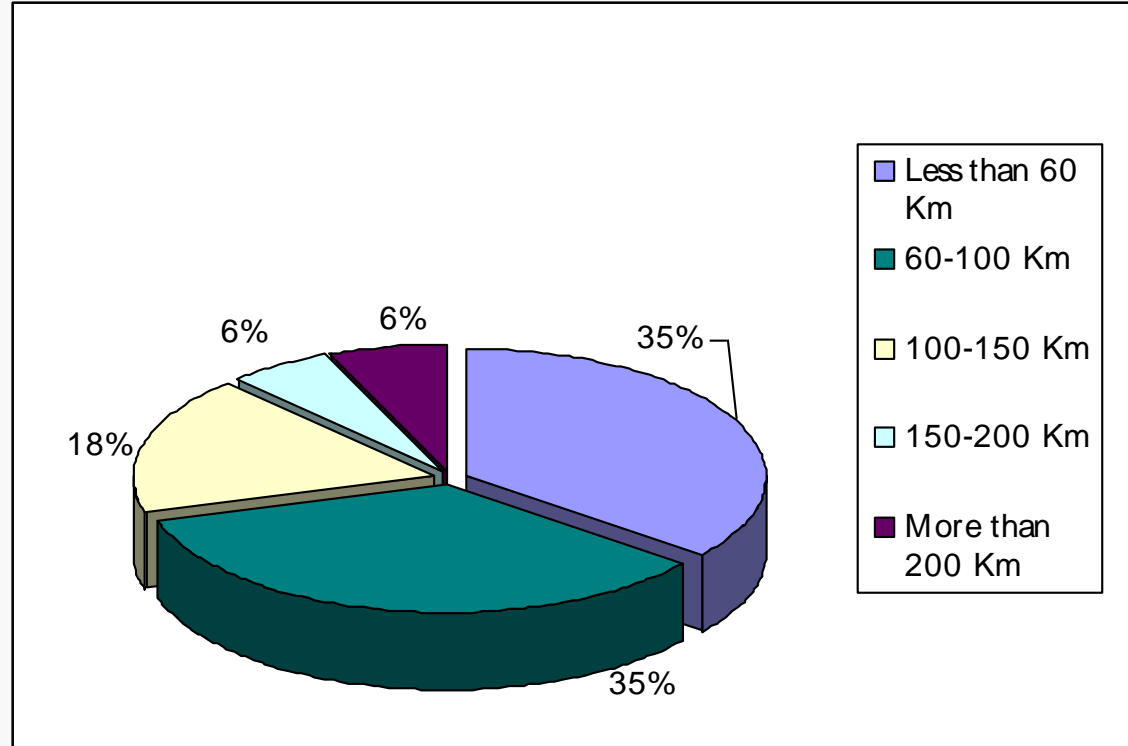




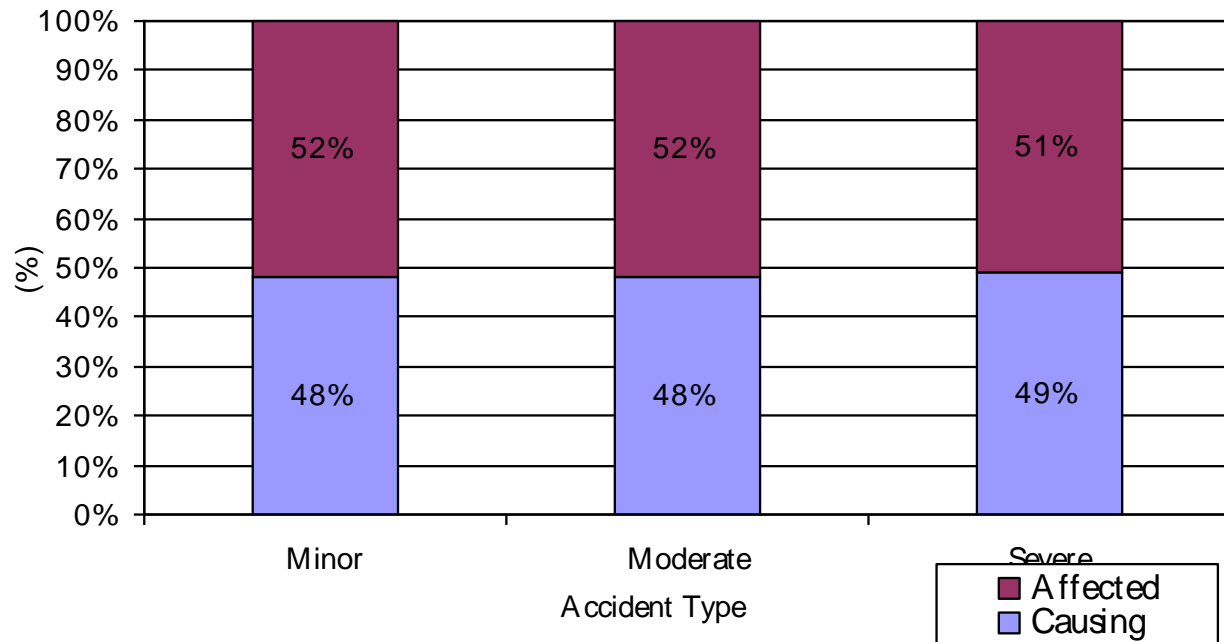




AVERAGE DISTANCE TRAVELLED DAILY BY CAR



PARTICIPANTS ACCIDENT RECORDS



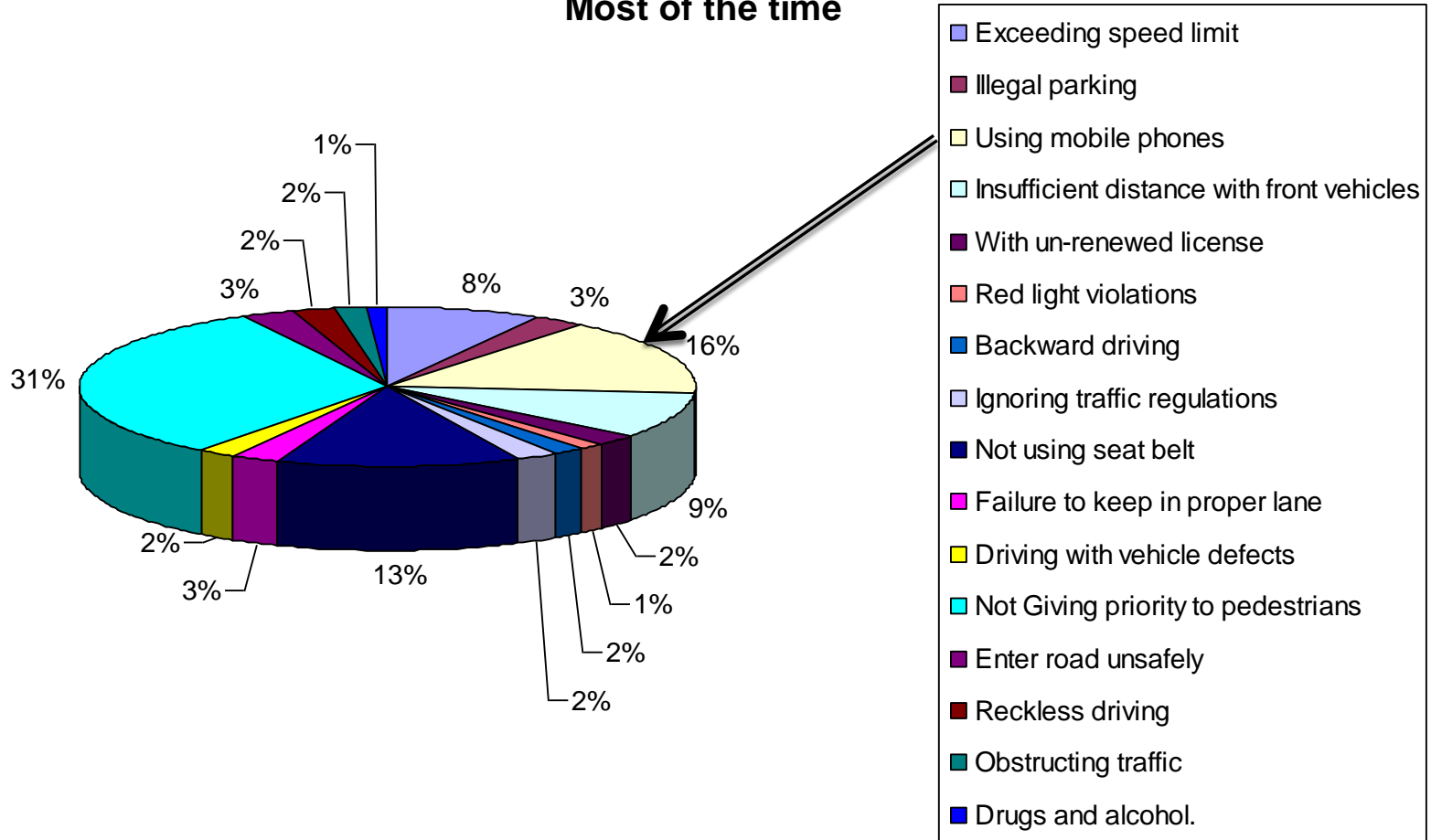
| Accident Type | Total |
|---------------|-------|
| Minor | 1029 |
| Moderate | 721 |
| Severe | 609 |



VIOLATIONS-MOST OF THE TIME



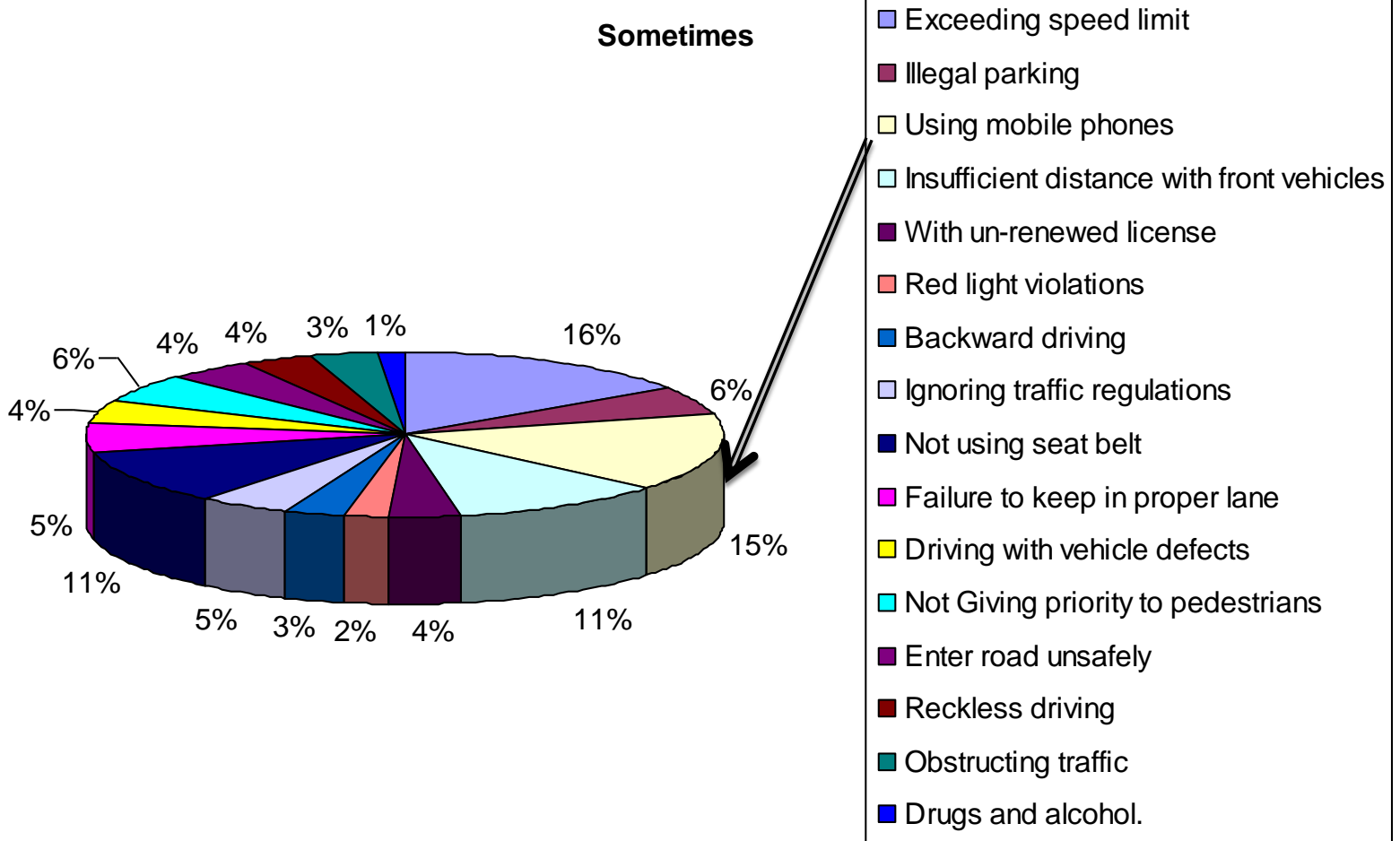
Most of the time



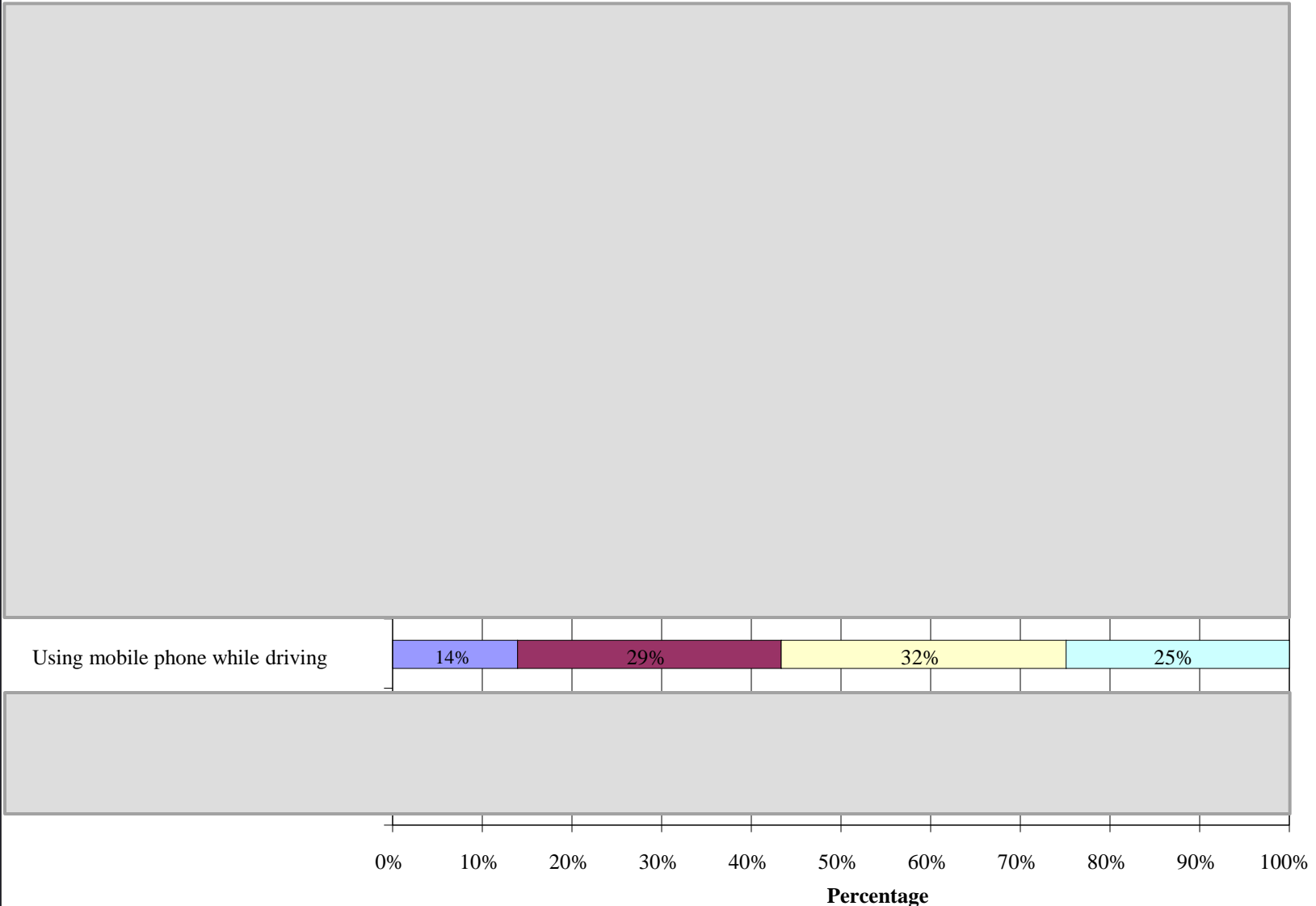
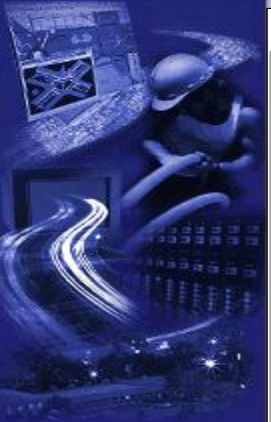
VIOLATIONS-SOMETIMES



Sometimes



FREQUENCY OF VIOLATIONS: ACCORDING TO RESPONSES NOT VIOLATION RECORDS



Most of the time

Sometimes

Rarely

Never

PROBABILISTIC ANALYSIS

PERCENTAGE OF RESPONSES INDICATING FREQUENT VIOLATIONS

$$P_r^v$$



Violation Type, v

| Violation Type, v | Exceeding speed limit | Illegal parking | Using mobile phone | Insufficient distance with front vehicles | With un-renewed license | Red light violations | Driving backward in a dangerous way | Ignoring traffic regulations | Not using seat belt | Failure to keep in proper lane | Driving with vehicle defects | Not Giving priority to pedestrians | Dangerous merging with the roadway traffic stream | Reckless driving | Obstructing traffic | Drugs and alcohol |
|---|-----------------------|-----------------|--------------------|---|-------------------------|----------------------|-------------------------------------|------------------------------|---------------------|--------------------------------|------------------------------|------------------------------------|---|------------------|---------------------|-------------------|
| % responses indicating "most of the time" (1) | 2.5 | 0.9 | 4.9 | 2.9 | 0.7 | 0.5 | 0.5 | 0.7 | 3.9 | 0.8 | 0.6 | 10.0 | 0.9 | 0.6 | 0.5 | 0.4 |
| % responses indicating "sometimes" (2) | 10.7 | 3.9 | 10.4 | 7.4 | 2.6 | 1.5 | 2.1 | 3.2 | 7.5 | 3.7 | 3.0 | 3.9 | 3.0 | 2.6 | 2.3 | 0.9 |
| % responses indicating "frequently" violating (3) = (1)+(2) | 13.2 | 4.7 | 15.3 | 10.3 | 3.3 | 2.0 | 2.6 | 3.9 | 11.4 | 4.6 | 3.6 | 13.9 | 3.9 | 3.2 | 2.8 | 1.3 |



Total number of responses indicating frequent violation is 4328 (reported "most of the times" or "sometimes"). The % in rows 1, 2 and 3 are the proportions of this total number of responses (4328).

PERCENTAGE OF RESPONSES INDICATING ($V=2$) FREQUENTLY USING MOBILE PHONE WHILE DRIVING (AND OTHER VIOLATION, V')

$$P_r^{2, v'}$$

Violation Type, v'

| Violation Type, v' | Exceeding speed limit | Illegal parking | Using mobile phone | Insufficient distance with front vehicles | With un-renewed license | Red light violations | Driving backward in a dangerous way | Ignoring traffic regulations | Not using seat belt | Failure to keep in proper lane | Driving with vehicle defects | Not Giving priority to pedestrians | Dangerous merging with the roadway traffic stream | Reckless driving | Obstructing traffic | Drugs and alcohol |
|---|-----------------------|-----------------|--------------------|---|-------------------------|----------------------|-------------------------------------|------------------------------|---------------------|--------------------------------|------------------------------|------------------------------------|---|------------------|---------------------|-------------------|
| % responses indicating "most of the time" (1) | 9.8 | 4.2 | <u>32.1</u> | 12.0 | 3.3 | 2.3 | 2.6 | 2.7 | 16.5 | 3.2 | 3.2 | 23.4 | 3.6 | 2.0 | 2.3 | 1.4 |
| % responses indicating "sometimes" (2) | 39.5 | 16.9 | <u>67.9</u> | 32.8 | 11.2 | 6.7 | 8.3 | 12.3 | 29.2 | 14.4 | 13.0 | 11.3 | 11.0 | 12.0 | 9.7 | 3.8 |
| % responses indicating "frequently" violating (3) = (1)+(2) | 49.3 | 21.2 | <u>100.0</u> | 44.8 | 14.5 | 8.9 | 10.9 | 15.0 | 45.7 | 17.5 | 16.2 | 34.8 | 14.7 | 13.9 | 12.0 | 5.1 |



Total number of responses indicating use of mobile phone while driving frequently is 661

THE OVERALL PROBABILITIES (IN PERCENT) OF DRIVERS BEING INVOLVED IN MORE THAN ONE VIOLATION

$$P_u^{v,v'}$$



| Violation v | Violation v' | | | | | | | | | | | | | | | |
|---|----------------|-----|-------------|------|-----|-----|-----|-----|------|-----|-----|------|-----|-----|-----|-----|
| Exceeding speed limit | | | | | | | | | | | | | | | | |
| Illegal parking | | | | | | | | | | | | | | | | |
| Using mobile phone | | | 43.3 | | | | | | | | | | | | | |
| Insufficient distance with front vehicles | | | | | | | | | | | | | | | | |
| With un-renewed license | | | | | | | | | | | | | | | | |
| Red light violations | | | | | | | | | | | | | | | | |
| Driving backward in a dangerous way | | | | | | | | | | | | | | | | |
| Ignoring traffic regulations | | | | | | | | | | | | | | | | |
| Not using seat belt | | | | | | | | | | | | | | | | |
| Failure to keep in proper lane | | | | | | | | | | | | | | | | |
| Driving with vehicle defects | | | | | | | | | | | | | | | | |
| Not Giving priority to pedestrians | | | | | | | | | | | | | | | | |
| Dangerous merging with the roadway traffic stream | | | | | | | | | | | | | | | | |
| Reckless driving | | | | | | | | | | | | | | | | |
| Obstructing traffic | | | | | | | | | | | | | | | | |
| Drugs and alcohol | | | | | | | | | | | | | | | | |
| Using mobile phone | 21.4 | 9.2 | 43.3 | 19.4 | 6.3 | 3.9 | 4.7 | 6.5 | 19.8 | 7.6 | 7.0 | 15.1 | 6.4 | 6.0 | 5.2 | 2.2 |

The percentage of drivers using mobile phone while driving frequently is 43.3%



CHI-SQUARE TEST ON RECORDED VIOLATION TYPES AND PROBABLE REASONS ($P < 0.05$)

| Violation Types | Participants' reasons of violations | | Tired and disoriented | Traffic congestion | Excessive self-confidence | Inadequate awareness of regulations | Influenced by other aggressive drivers |
|---------------------|-------------------------------------|--|-----------------------|--------------------|---------------------------|-------------------------------------|--|
| | In a hurry | | | | | | |
| Using mobile phones | 5.3 | | 12.2 | 16.7 | 26.7 | 12.7 ** | 5.9 |

Highlighted values is the most significant violation type (for various reasons of violations)





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A holistic approach for assessing traffic safety in the United Arab Emirates

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OVERALL ASSESSMENT OF FACTORS AFFECTING TRAFFIC SAFETY IN THE UAE



| Factors Item studied | Human | | | Engineering | | Enforcement | Institution | |
|--|-----------|------------------------|-------------------|----------------|---------|-------------|--------------|----------------------|
| | Awareness | Education and training | Driving behaviour | Infrastructure | Vehicle | | Coordination | Quality of resources |
| Traffic accidents and fatalities | | | ☒ | | ☒ | | ☒ | ☒ |
| Traffic violation | | | ☒ | | | | | |
| Traffic safety education and awareness | ⊕ | ⊕ | | | | | | ⊕ |
| Effectiveness of traffic law | ⊕ | | | | | ⊕ | ⊕ | |
| Vehicle safety | | | | | ⊕ | | | |
| Behavioural issue | | | ⊕ | | | | | |
| Road infrastructure | | | | ⊕ | | | | |
| Supporting institutions | | | | | | | | ⊕ |
| Emergency medical service | | | | ⊕ | | | | ⊕ |
| Coordination among stakeholders | | | | | | | ⊕ | |
| Accident and violation analysis | | | | | | | | ⊕ |
| Drivers' training and licensing | | ⊕ | | | | | | ⊕ |
| Deficiency in traffic safety* | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ |
| Overall deficiency | Moderate | Moderate | Major | Moderate | Minor | Moderate | Moderate | Moderate |

Data sources for evaluation:

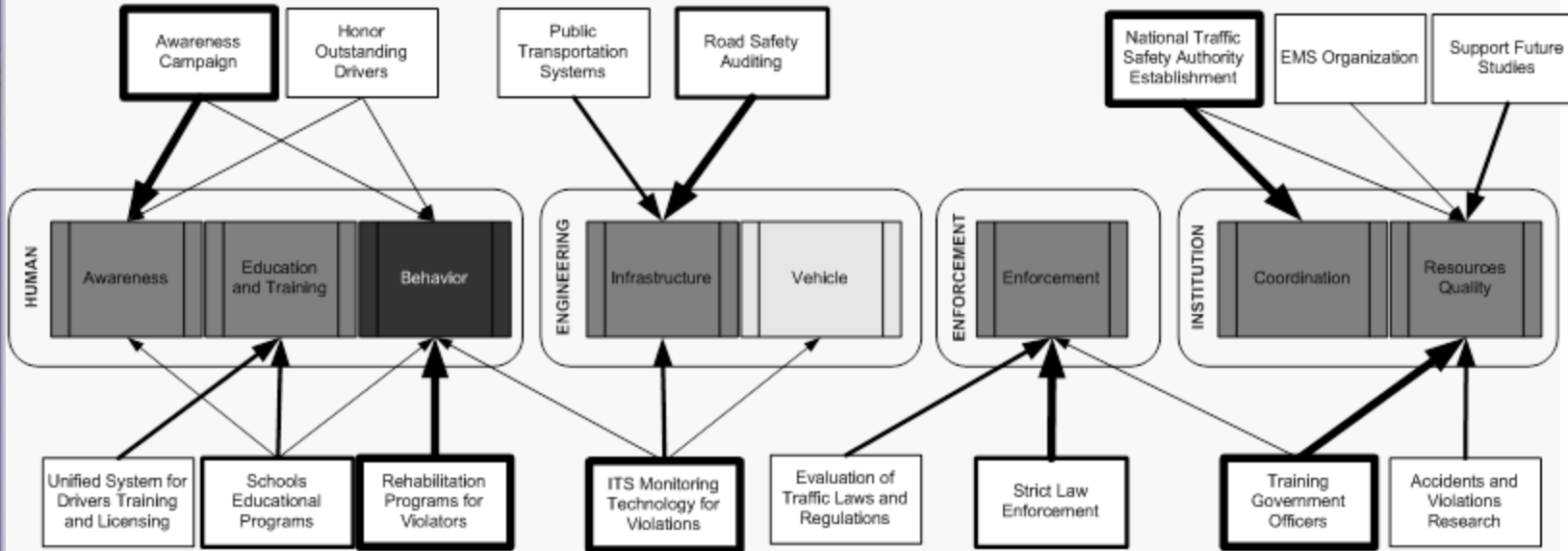
☒ Statistics, ⊕ Road-users Opinion, ⊕ Expert Opinion (shade represents deficiency)

* This assessment is based on the results presented in Section 3.2



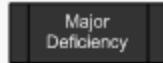
RECOMMENDATIONS TO IMPROVE TRAFFIC SAFETY IN THE UAE

IMPACTS ON TRAFFIC SAFETY FACTORS



LEGEND

DEFICIENCY LEVEL OF TRAFFIC SAFETY FACTOR



RECOMMENDATION PRIORITY OF DEPLOYMENT



EXPECTED IMPACT LEVEL OF RECOMMENDATION ON FACTOR



THANK YOU