

ECTRI TG Safety Meeting 30 November 2020



Impact of COVID-19 on traffic safety behavior in Greece and worldwide

George Yannis, Christos Katrakazas, Eva Michelaraki, Marios Sekadakis, Apostolos Ziakopoulos, Armira Kontaxi



Department of Transportation Planning and Engineering, National Technical University of Athens

Presentation Outline

- 1. Introduction
- 2. Literature Review
- 3. Data Collection
- 4. Results

5. Conclusions





Introduction

- COVID-19 initially diagnosed in patients in Wuhan, China in December 2019 (Zhu et al., 2020).
- Declared as a pandemic on the beginning of March 2020 (WHO, 2020).
- The majority of countries in a "lockdown" restricting everyday life activities to only the most essential.
- As a result road traffic volumes and mobility activities in general have immensely dropped (Clarke, 2020; Google LLC, 2020).





Literature Review

- During the lockdown period in Spain, a 62% reduction in road deaths as well as a 65% decrease of traffic volume was observed.
- Fixed safety cameras detected that speed violations have been increased by 39%.
- A 37% decrease of driving days per week as well as a 35% reduction in vehicle miles driven among adolescents was identified.
- Reduced traffic volumes due to lockdown, led to a slight increase in average driving speed by 6–11%, and to more frequent harsh accelerations and harsh brakings per 100km (up to 12%).





Data Collection (1/4)

- OSeven has provided a representative subset of trips from its database for Greece, KSA (Kingdom of Saudi Arabia), Cyprus and Brazil for a 4-month timeframe from 29/12/2019 to 03/05/2020.
- The data from the smartphone sensors (e.g. GPS, accelerometer data, and gyroscope data) are collected using the smartphone applications technology that has been developed by OSeven.
- This data are processed by OSeven using filtering, signal processing, machine learning algorithms and safety/eco scoring models.

Data Collection (2/4)

Driving indicators of the analyzed data

Indicator	Unit
Total duration	sec
Total distance	km
Driving duration	sec
Risky hours driving	km
Harsh acceleration	-
Harsh braking	-
Speeding duration	Sec
Average speeding	km/h
Average total speed	km/h
Average driving speed	km/h
Mobile phone usage duration	sec

George Yannis, Covid-19 and traffic safety behaviour - November(Scource: OSeven)

Data Collection (3/4)

Evolution of total deaths and cases due to COVID-19 in Cyprus and Greece

George Yannis, Covid-19 and traffic safety behaviour - November 2020

(Sources: Cyprus and Greek Governments)

Data Collection (4/4)

Evolution of total deaths and cases due to COVID-19 in Brazil and the KSA

(Sources: Brazilian and KSA Governments)

Driving and Walking Frequencies (1/2)

Greece: From the beginning of March and especially after the initiation of the lockdown in the middle of the month, a 62% reduction of people driving and a 58% reduction of people walking was observed. After the end of the first lockdown, driving and walking volumes were increased at a steady rate.

Difference in Driving and Walking Frequencies due to closure measures from COVID-19 (Greece)

> Cyprus: No available data

(Source: Apple)

Driving and Walking Frequencies (2/2)

- Brazil: During the lockdown period, a 50% reduction of people driving, a 62% reduction of people walking and a 77% decrease on people taking public transit was observed compared to the baseline. Afterwards, driving, walking and public transit volumes were increased at a steady rate.
- KSA: A 56% and 47% reduction for driving and walking respectively, was observed. After the lockdown, people walking and driving adapted immediately to baseline frequencies.

Average Speeding (1/2)

- Greece: In March a 2% spike in average speeding compared to a normal period in February and a 7% increase was found in April.
- Cyprus: A 1% increase in average speeding was found in March compared to February, while a 4% increase in April.

Date

(Source: OSeven) George Yannis, Covid-19 and traffic safety behaviour - November 2020

Average Speeding (2/2)

- Brazil: In March a 3% reduction in average speeding compared to a normal period in February and a 2% decrease was found in April.
- KSA: A 4% increase in average speeding was found in March compared to February, while a 5% increase in April.

Ratio of speeding duration/ driving duration (1/2)

- Greece: In March a 7% increase was observed and an 18% increase in April.
- Cyprus: A 24% increase in March compared to February was identified, while a 50% spike was found in April.

(Source: OSeven) George Yannis, Covid-19 and traffic safety behaviour - November 2020

Ratio of speeding duration/ driving duration (2/2)

- Brazil: In March a 20% decrease was observed and a minor 7% increase was identified in April compared to February.
- KSA: A 14% increase in March compared to February, while a 36% in April.

(Source: OSeven)

Harsh Braking/100km (1/2)

- Greece: Data showed a minor decrease of 3% during March but a 12% increase in April, compared to February.
- Cyprus: Data showed a minor decrease of 3.5% during April compared to February, while a change of -3% was identified in March compared to the previous months.

(Source: OSeven)

Harsh Braking/100km (2/2)

- Brazil: Data showed a great increase of 41% during April compared to February, while a change of 36% was identified in March compared to the previous months.
- KSA: Only a 0.31% increase was found in March compared to February, while a 10% increase in April.

Results Summary (1/3)

Magauramant	Change compared to February						
measurement —		March	April				
Greece							
Average speeding	1	2%	7%				
Speeding duration/driving duration	1	7%	18%				
Average total speed	1	6%	11%				
Average driving speed	1	4%	6%				
Harsh accelerations /100km	-	-6%	5%				
Harsh braking /100km	-	-3%	12%				
Total duration	Ļ	-33%	-68%				
Driving duration	\downarrow	-31%	-74%				
Total distance	\downarrow	-29%	-65%				
Mobile phone usage duration/driving duration	-	-1%	21%				
	Cyprus						
Average speeding	1	2%	4%				
Speeding duration/driving duration	1	23%	50%				
Average total speed	1	8%	14%				
Average driving speed	1	3%	8%				
Harsh accelerations /100km	Ļ	-9%	-9%				
Harsh braking /100km	Ļ	-3%	-4%				
Total duration	↓ ↓	-43%	-76%				
Driving duration	\downarrow	-41%	-74%				
Total distance	\downarrow	-39%	-73%				
Mobile phone usage duration/driving duration	1	5%	5%				

Results Summary (2/3)

Magauramant	Change compared to February			
MedSurement		March	April	
	Brazil			
Average speeding	Ļ	-3%	-2%	
Speeding duration/driving duration	Ļ	-20%	-7%	
Average total speed	Ļ	-2%	-3%	
Average driving speed	Ļ	-3%	-5%	
Harsh accelerations /100km	1	52%	59%	
Harsh braking /100km	1	36%	41%	
Total duration		-19%	-48%	
Driving duration	Ú.	-19%	-47%	
Total distance	Ļ	-23%	-49%	
Mobile phone usage duration/driving duration	1	11%	51%	
	KSA			
Average speeding	1	4%	5%	
Speeding duration/driving duration	1	14%	36%	
Average total speed	↑	5%	8%	
Average driving speed	1	4%	7%	
Harsh accelerations /100km	1	3%	11%	
Harsh braking /100km	↑	0.31%	10%	
Total duration	\downarrow	-33%	-75%	
Driving duration	\downarrow	-32%	-75%	
Total distance	\downarrow	-30%	-73%	
Mobile phone usage duration/driving duration	1	11%	42%	

Results Summary (3/3)

Measurement	Greece	Cyprus	KSA	Brazil
Average speeding	1	1	1	\downarrow
Speeding duration/driving duration	1	↑	1	\downarrow
Average total speed	1	1	1	\downarrow
Average driving speed	1	1	1	\downarrow
Harsh accelerations /100km	1	\downarrow	1	1
Harsh braking /100km	1	\downarrow	1	1
Total duration	\downarrow	\downarrow	\downarrow	\downarrow
Driving duration	\downarrow	\downarrow	\downarrow	\downarrow
Total distance	\downarrow	\downarrow	\downarrow	\downarrow
Mobile phone usage duration/driving duration	1	\uparrow	\uparrow	1

Quantifying the impact of COVID-19 using time-series models (1/2)

- Comparison between normal evolution and COVID-19 period data
- Higher speed values up to 7.5 km/h more than the "normal" time-series evolution
- Increased speeding during March, but gradual decrease until the end of lockdown

Quantifying the impact of COVID-19 using time-series models (2/2)

Comparison between normal evolution and COVID-19 period data

Values for harsh brakings/100km were much higher than the forecasted values

(Source: OSeven)

Road Traffic Accidents in Greece

- A significant reduction was found in road traffic accidents in Greece after the COVID-19 pandemic, compared to 2019.
- > No available data for road traffic accidents in other countries.

	Road Traffic Accidents							
	January	February	March	April	May	June	July	August
2019	676	693	839	856	978	1.024	1.073	969
2020*	788	858	507	326	751	894	978	872
Change	17%	24%	-40%	-62%	-23%	-13%	-9%	-10%

* Provisional Data

(Source: ELSTAT)

Conclusions (1/2)

- A reduction was found in Traffic Volume and People Walking in each country.
- Comparing time-series models of the normal evolution of driving indicators with actual COVID-19 data, higher speeds and more frequent harsh events were demonstrated in Greece.

Conclusions (2/2)

- Average Speed, ratio of Speeding Duration per Driving Duration and Speeding were increased (except for Brazil). This indicates that with fewer vehicles on city streets, slightly more drivers are blowing the speed limit.
- Mobile usage duration during driving was increased during lockdown in most countries.

Proposals

Focus should specifically be given by policymakers to the major traffic killers (speeding being the most important) and to measures bringing results quickly. For instance, these measures could concern:

- New speed limits applying to all roads horizontally (with important benefits also for the environment):
 - o 30 km/h in urban areas (50 km/h in major urban axes), similar to the practices applies in major European cities (ETSC, 2020; ITF, 2020)
 - o 50 km/h at rural roads
 - o 80 km/h at major interurban roads
 - o 100 km/h on motorways

Proposals

- Speeding enforcement should be massively implemented through cameras (always on) and fines.
- Intensification of enforcement of mobile-phone use and non-use of seat belts and helmets.
- Implementation of massive campaigns raising public awareness on speeding and the other major traffic accidents factors.
- Policymakers should also seek out alternatives to public transport, allocating road space to bicycles and pedestrians, and reducing the space available for cars (ITF 2020).

"Safer road traffic and no accidents should be the first priority during and after the COVID-19 pandemic."

Open issues

- A more in-depth understanding of how the pandemic has affected road safety, and how a gradual re-opening and possible subsequent restrictions may affect driver behaviors is still to be determined.
- Close attention must be paid to these indicators to determine if there is a continued effect of pandemic restrictions on road safety.
- The impetus that COVID-19 is placing on installations of temporary or permanent infrastructure to facilitate more pedestrians and cyclists (to meet physical distancing recommendations), is yet another positive result of this crisis.
- Safer road traffic and no accidents during and after the COVID-19 pandemic consist the first priority and perhaps the COVID-19 crisis can be the trigger also for a new and serious behavior of the Authorities and the citizens for safer roads for all, everywhere in the world.

ECTRI TG Safety Meeting 30 November 2020

Impact of COVID-19 on traffic safety behavior in Greece and worldwide

George Yannis, Christos Katrakazas, Eva Michelaraki, Marios Sekadakis, Apostolos Ziakopoulos, Armira Kontaxi

Department of Transportation Planning and Engineering, National Technical University of Athens