DRIVE QUANT by FairConnect

Smartphone telematics: the insurers’ anti-distraction weapon?

2023

Introduction

The 2022 AXA Prevention barometer is clear: 80% of motorists use their smartphone while driving. Whether it is to call (52%), use a navigation app (45%) or send an SMS (34%), **the use of smartphones while driving is one of the main sources of distraction in the car**[1]**.**

Driver distraction manifests itself in several forms:

- A visual distraction because the driver takes his eyes off the road;
- An auditory distraction because the driver is no longer attentive to external noises that can warn him of a possible danger;
- A physical distraction because the driver no longer holds his steering wheel with both hands when he dials a number, writes a message or manipulates his phone.
- A cognitive distraction because the driver is not fully focused on driving.

The consequences of using a phone in the car can be dramatic according to the French organisation «Sécurité Routière» (Road Safety)[2]:

- **Using the phone while driving triples the risk of accidents;**
- **Reading an SMS multiplies the risk of an accident by 20;**
- At least 10% of car accidents resulting in personal injury are linked to the use of smartphones while driving. A statistic that is undoubtedly far from reality because it is difficult to quantify.

Several schemes have been deployed to try to stop the phenomenon. Sécurité Routière, through its often relevant and educational prevention campaigns, carries out essential quality work. However, these campaigns alone are no longer enough to change the trend, since the use of smartphones while driving continues to grow significantly (+11 points in 2022)[3].

1. www.axaprevention.fr/barometre-route-2022
2. www.securite-routiere.gouv.fr/dangers-de-la-route/le-telephone-et-la-conduite
3. https://prevention.cdn.axa-contento-118412.eu/prevention/2d5b860a-0770-46ba-9d60-4490a845e8f7_AXA+Prevention_Communique_presse_baro_route_2022.pdf

What about strengthening the criminal justice response and sanctions against the use of the phone while driving? Although the idea is appealing on paper, the sanctions in place are already highly punitive. We would remind you that in France, for example, a driver caught handling his phone while driving must pay a flat-rate fine of 135 euros, and is stripped of three points on his driving licence. If the use of the phone is combined with another offence, the motorist then risks the immediate retention of his driving licence, and an administrative suspension of the licence for a period of six months. **The room for manoeuvre to increase sanctions seems rather limited** and the 'tough-on-crime' approach will not solve the problem.

Can we expect technological advances in vehicles? While it's true that car manufacturers publicise a lot about voice assistants in vehicles or via Android Auto and Apple CarPlay mobile systems, this solution has certain limitations in the fight against distraction. Indeed, although voice assistants lead to a decrease in phone calls made by hand or messages written via the phone's keyboard, they do not supplant new uses such as video calls, or recording or viewing videos on apps such as Instagram and TikTok.

We also see that premium automakers are moving the problem by deploying increasingly sophisticated and incentive-based infotainment systems in their vehicles, with Mercedes and Tesla leading the pack. As an example, it is necessary to go through the central screen to unlock the glove compartment on a Tesla Model[4]. This manipulation requires taking your eyes off the road. As for Mercedes, the German manufacturer has announced the integration of a selfie camera in its next vehicles and direct access to TikTok via the dashboard[5].

These announcements indicate that **manufacturers are not planning to offer their customers a more sober driving experience focused solely on the road.** As for autonomous vehicles, the repeated promises of imminent commercialisation no longer deceive many people[6].

4. www.tesla.com/ownersmanual/model3/fr_ca/GUID-7F07443D-5107-4A5A-A9F1-E02FF14E4A9A.html#:~:text=Pour%20ouvrir%20la%20bo%C3%AEte%20%C3%A0,un%20d%C3%A9clic%20se%20fasse%20entendre.

5. www.lesnumeriques.com/voitures-co/tiktok-bientot-disponible-dans-les-voitures-mercedes-benz-n207642.html

6. www.usine-digitale.fr/article/vehicules-autonomes-fin-de-la-hype-et-retour-a-la-realite.N2079471

So, faced with the difficulties encountered in the fight against distracted driving, what should we do?

Do we have to admit defeat? Do we have to accept the use of the phone while driving and the resulting material damages as well as injuries to people? Is this a new norm?

Or should we try to approach the problem from a new angle and make the phone an answer to the problem?

This is the approach advocated by smartphone telematics providers, including DriveQuant.

As an insurtech, we propose to use the phone as a tool to measure distraction in order to make drivers more responsible. In other words, our goal is to encourage the driver to question the use of the phone while driving by confronting him with his own usage. This approach is complemented by gamification mechanisms to help drivers progress in the short term and lay the foundation for long-term behavioural change. How effective is this approach? We will try to find out throughout this white paper!

To begin with, we analysed the distraction indicators of two distinct communities of 4,000 drivers to determine their distraction profile and thus highlight the areas of progress for each community. Next, we assessed the impact of driving challenges, a new tool introduced by smartphone telematics with regard to distraction. In particular, we measured the progress over two months generated by participating in a challenge, and the progress generated by participating in a series of three challenges over twelve months.

How to measure distraction with a smartphone?

All smartphones incorporate a multitude of very precise sensors that measure their environment continuously. The data coming from these sensors constitute an infinite source of information, provided that they are collected and then interpreted. This is where DriveQuant comes into play, with its smartphone telematics services platform. Through the installation of a simple mobile app integrating our SDK, it is possible to:

- **Calculate the number of screen unlocks and therefore the frequency of smartphone manipulation;**
- **Determine if an audio call is made via a device authorised by the Highway Code or by a non-compliant device (microphone of the phone, speaker, headset or other Bluetooth device);**
- **Identify a change in orientation of the phone and the positions, indicating that it is being handled by the driver.**

The cross-referencing of this data makes it possible to assign a distraction score for each trip made. This score is calculated according to the frequency of smartphone manipulations and the duration of unauthorised calls, whether they are made or received.
After each trip, the driver is transparently confronted with his distraction score in the app. He is thus able to visualise each moment when he has been distracted, as well as the distance travelled in a state of distraction.

WHAT ARE THE DISTRACTION HABITS OF TWO DISTINCT GROUPS OF DRIVERS?

The analysis below is based on data from policy holders who have subscribed to connected car insurance offers. This data was collected by our solution for a period of 6 months.

Each of the two groups were made up of 4,000 drivers:

- Group A was made up of young drivers;
- Group B included a more homogeneous population in terms of age distribution.

FREQUENCY OF UNLOCKING

What is an unlock?

An unlock is an indicator of a manipulation of the phone to use a mobile app, to consult/write a message or to dial a phone number.

Repeated unlocking is symptomatic of a distracted driver.

The results presented below correspond to statistics calculated for all the drivers of groups A and B. Three representative benchmarks were used to express the frequency of unlocking:

- per hour of driving;
- per 100 km;
- per 10 trips.

The following table presents the number of unlocks per hour of driving for the first quartile, the median value, the third quartile and the average.

Number of unlocks per hour of driving

	Group A	Group B
Q25	1.3	4.4
Q50	3.5	6.7
Q75	6.8	9.5
Average	5	8

For the same driving time, Group A drivers unlocked their smartphone much less than Group B drivers. Comparison of the median value (Q50) of the two groups reveals, moreover, that the core group of the drivers of group B unlocked their phone approximately twice as many times as the core group of the drivers of group A.

We also noted in group A that 20% of drivers never unlocked their phone. Conversely, almost all drivers in group B unlocked their phone.

Number of unlocks per 100 km

	Group A	Group B
Q25	2.4	7.8
Q50	6.4	12.5
Q75	13.5	18.4

While **drivers in group A unlocked on average every 10 km, those in group B unlocked their phone on average every 7 km.**

By examining the frequency of unlocking per 10 trips, the difference between the two groups is validated.

Frequency of unlocking per 10 trips

	Group A	Group B
Q25	3.3	10.3
Q50	8.2	16.6
Q75	15.7	24.1

Only drivers belonging to the third quartile of group A unlocked their phone at least once per trip. In comparison, all drivers in group B unlocked their phone at least once per trip, with a peak of more than two unlocks per trip for individuals in the third quartile.

The disparities within the groups were also very strong, since the frequency of unlocking between the first and second quartiles increased by 170% for group A and 60% for group B.

Group A appeared to be less distracted overall, with more than 10% of drivers never handling their phone while driving. Conversely, only 2% of group B drivers never unlocked their smartphone.

Using the phone reduces emergency response time

Unlocking and glancing at the phone is considered an innocuous and fleeting act. However, staring at his phone for a few seconds distracts the driver and increases the risk of an accident. By way of illustration, the table below presents the progression of the distance travelled for 2 seconds as a function of the speed of movement. The distance travelled during this short period of time can have serious consequences in the event of an abrupt slowdown or unpredictable event.

Speed	Distance travelled in two seconds
20 km/h	11 metres
30 km/h	16 metres
50 km/h	28 metres
90 km/h	50 metres
110 km/h	61 metres
130 km/h	75 metres

FREQUENCY AND DURATION OF PHONE CALLS

How to detect a prohibited phone call?

Smartphone telematics are able to detect phone calls and determine whether they are authorised or prohibited by law. A phone call is considered ‘authorised’ only if the driver uses the hands-free system of his vehicle. All other calls are labelled ‘prohibited’.

Smartphone telematics also make it possible to identify the nature of the call (incoming or outgoing) and the audio device used:

- The microphone of the phone, which implies that the user has held his phone to his ear,
- The speaker, which indicates that the phone is in hands-free mode, but that it has been manipulated to dial a number or to pick up an incoming call,
- A wired or wireless headset, which indicates that the driver can no longer perceive his environment correctly.

The results presented below correspond to statistics compiled for all the drivers of groups A and B and expressed:

- in minutes of communication per hour of driving;
- in number of calls per 1,000 kilometres;
- as a percentage of the total number of trips.

Minutes of communication per hour of driving

	Group A	Group B
Average duration of telephone communication expressed in minutes per hour of driving	1 min/hr	3 min/hr
Average duration of telephone communication per hour of driving expressed in %	1.6%	5%

With regard to the duration of calls related to one hour of driving, we noted that drivers in group B spent on average three times more time in communication than their counterparts in group A.

Delving further into the comparison between groups A and B, we tried to understand if the discrepancy was caused by longer calls, or rather by more frequent calls.

The table below indicates that drivers in group A used their smartphone to make or receive a phone call every 90 kilometres, whereas drivers in group B tended to make or answer a call every 20 kilometres, a frequency 4 times higher.

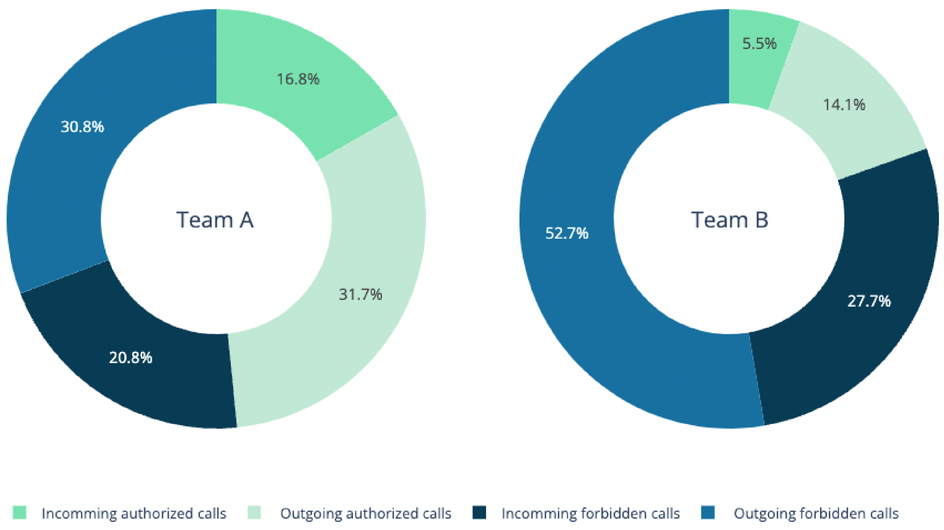
Number of calls per 1,000 kilometres

	Group A	Group B
Number of calls per 1,000 kilometres	11	52
Number of prohibited calls per 1,000 kilometres	6	41

This table also indicates that, in 45% of cases, drivers in group A used the hands-free system of their vehicle to phone, whereas only 20% of drivers in group B used it.

These observations are confirmed by the distribution diagrams below which combine incoming and outgoing calls with authorised and prohibited calls. These diagrams show for both groups the proportion of the 4 call categories in relation to all detected calls.

Breakdown diagram of incoming/outgoing and authorised/prohibited calls



Group A had a balanced profile, with a 50% distribution of prohibited calls. Group B, which was less principled, had around 80% of prohibited calls.

The data from both groups highlighted a surprising phenomenon: **the majority of prohibited calls were made at the initiative of the drivers.** The primary origin of the distraction therefore did not come from an external stimulation, which would consist in answering an incoming call but, on the contrary, from drivers initiating a phone call. It was therefore a deliberate decision that impacted their safety and that of other road users.

This behaviour is however avoidable, since the majority of vehicles have been equipped with Bluetooth devices for calls for many years, which do not require any specific skills to use. Insurers therefore have real work to do on prevention in this area.

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	Group A	Group B
Percentage of trips without a call	90.6%	64.4%
Percentage of trips with at least one call	9.4%	35.6%
Percentage of trips with at least one prohibited call	5.2%	29.2%

A core group of drivers was also observed - about 26.6% for group A and 6% for group B - who never made a call while they were driving.

Percentage of drivers who did not make a call

	Group A	Group B
Percentage of drivers who did not make a prohibited call	38.3%	7.6%
Percentage of drivers who did not make a call	26.6%	5.9 %

THE MOST CONDUCIVE TIME RANGE FOR PHONE CALLS

How to detect the hours most conducive to distraction?

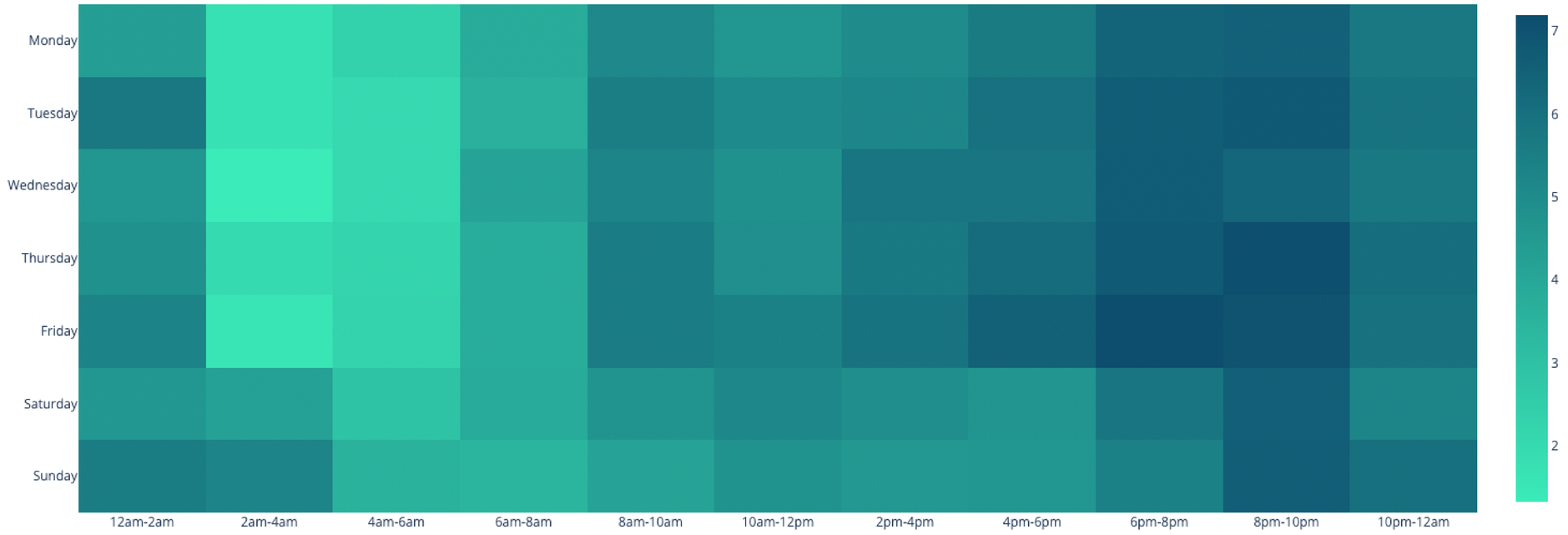
Smartphone telematics makes it possible to obtain the precise chronology of the most conducive moments for the use of the phone while driving. This can be seen by displaying the call intensities on a heat map in two-dimensions: the day of the week and the time of day.

The dark colours of the following heat maps correspond to the periods when the density of phone calls was the highest.

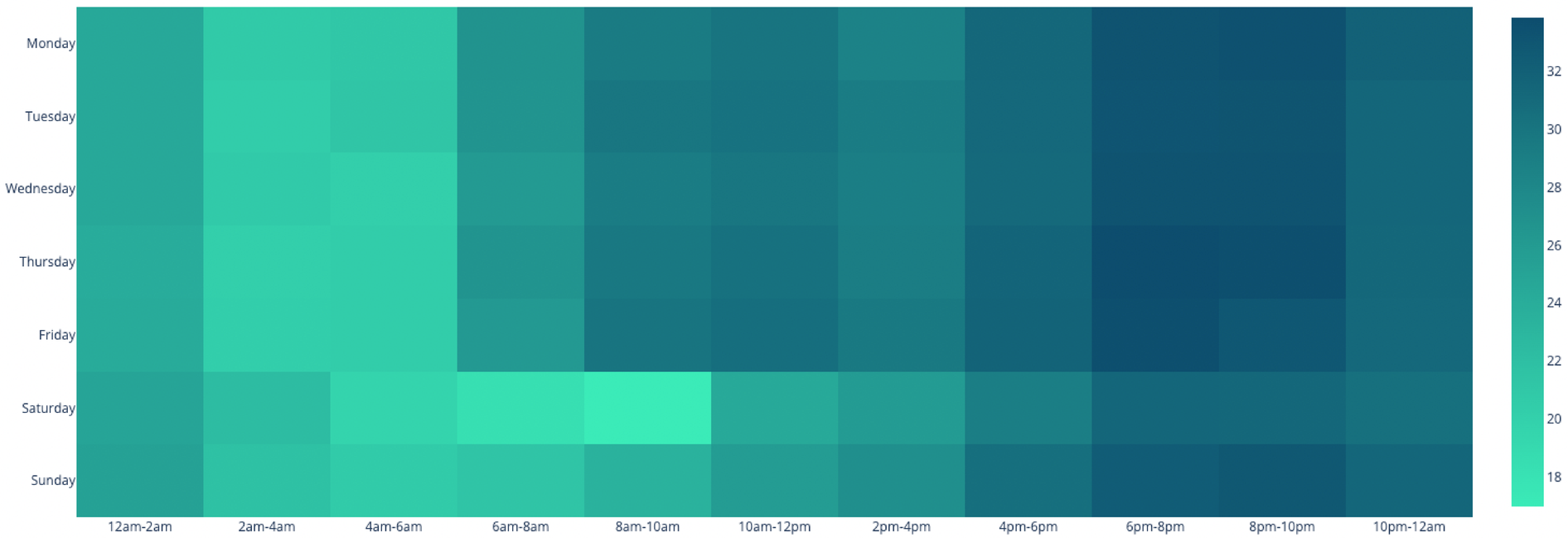
The heat maps did not reveal a fundamental difference between the two groups (see page 13 for the heatmaps). We noted that there were more calls on weekdays than at the weekend.

The time range where the intensity was maximum, which therefore corresponded to the peak of use of the phone, was between the end of the afternoon and the beginning of the evening, between 16:00 and 20:00. Finally, the most phone calls on these time slots were concentrated on

Heat Map of intensity of Group A calls



Heat Map of intensity of Group B calls

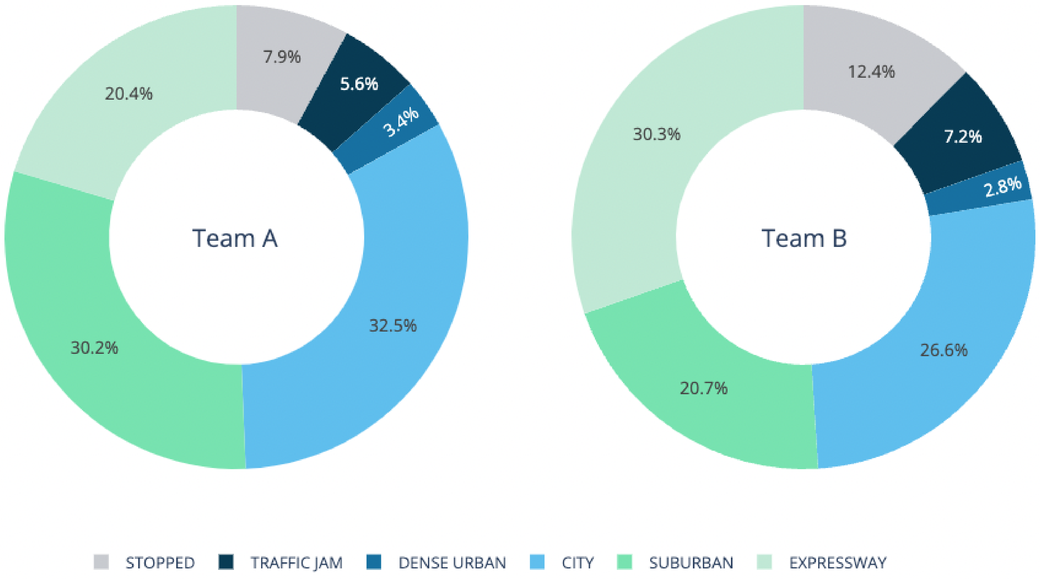


THE ROAD CONTEXT MOST CONDUCIVE TO DISTRACTION

Beyond the date and time, smartphone telematics makes it possible to accurately assess the distribution of the road contexts of the trips made. The contexts were determined according to the average speed of the movements measured during a trip.

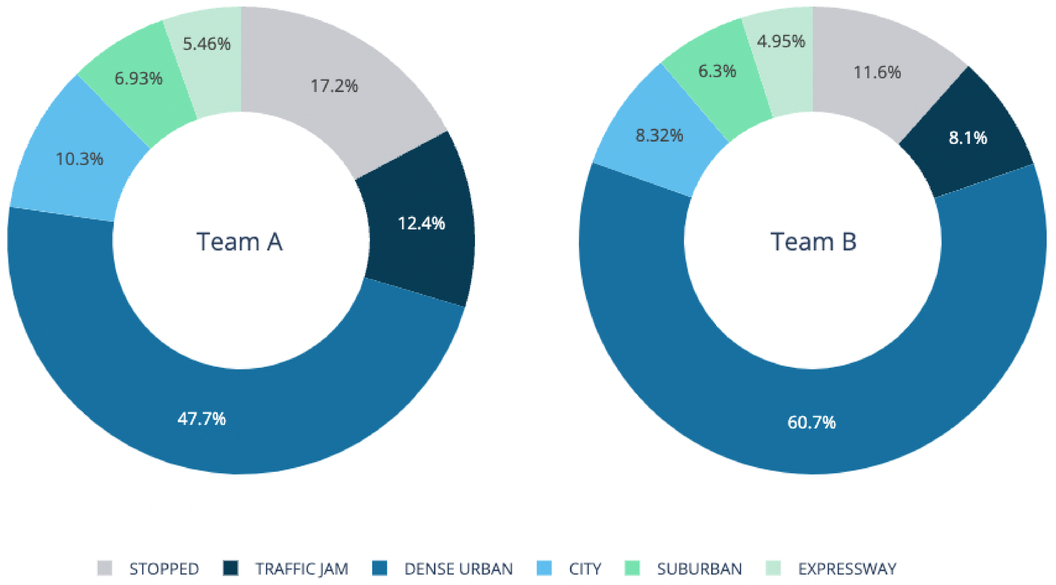
The graphs below represent the distributions of driving time by road context of drivers of groups A and B.

Percentages of distribution of road contexts by driving time

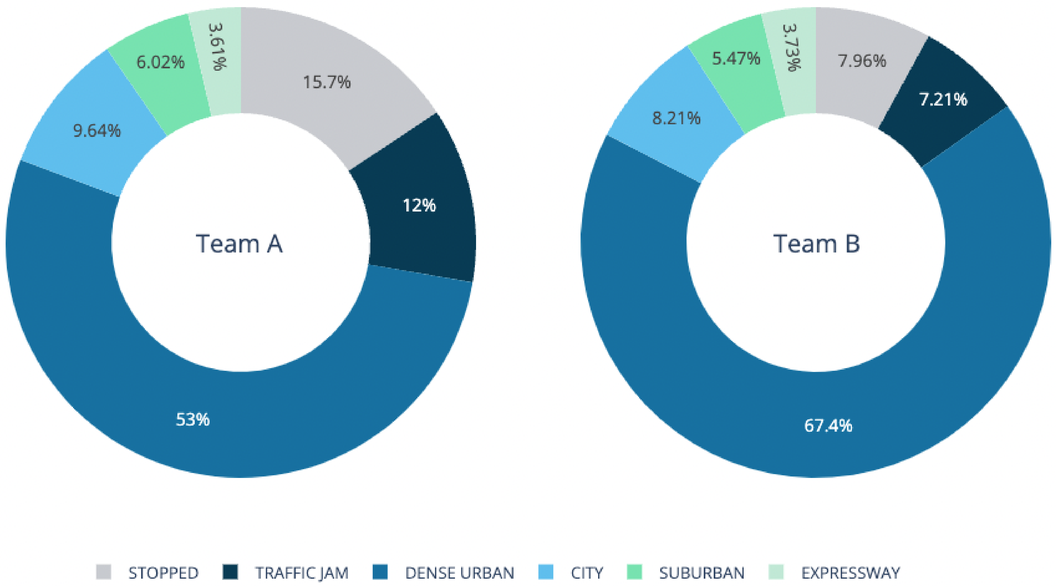


To compare the two groups, distraction events in relation to driving time in each road context were standardised. Thus, it was possible to compare the two groups in terms of frequency of unlocking and calls by road context, despite a different distribution of contexts.

Frequency of unlocking by road context



Frequency of calls by road context



The graphs indicate that the **use of the phone while driving was more common in urban areas and at speeds below 30 km/hr.** Although drivers of groups A and B spent about 50% of their travel time in non-urban areas, the use of the phone in these contexts was marginal.

On the other hand, in urban areas and at lower speeds, there was a relaxation of caution, probably because the perception of danger was lower. This impression is very relative though as, although the urban context minimises the potential injury for the driver and damage to the vehicle, it is particularly dangerous for other road users (pedestrians, bicycles, motorised two-wheelers). In fact, ¾ of road deaths occur in urban areas[7], and 74% of fatal accidents occur during daily or short trips[8].

Finally, **30% of the distraction events in group A and 20% of the distraction events in group B occurred when the vehicle was stationary** (stops, traffic lights), or in traffic jams. However, the law is unambiguous: it is forbidden to handle a mobile phone even when stationary, as it creates an attention deficit.

By giving insurers the opportunity to segment their customer portfolio very precisely according to their distraction profile, smartphone telematics is positioning itself as a formidable toolbox. Among the new tools it brings, prevention has a prominent place because it gives insurers the means to adopt a proactive stance by encouraging their customers to progress through gamification mechanisms. Of all these mechanisms, driving challenges seem to be the most effective solution to impact driving behaviour. Does this impression stand up to close and thorough scrutiny? How effective are these challenges? To what extent do they affect driver behaviour? We will now clarify this.

7. www.onisr.securite-routiere.gouv.fr/etat-de-l-insecurite-routiere/bilans-annuels-de-la-securite-routiere/bilan-2021-de-la-securite-routiere

8. www.ornikar.com/code/cours/securite/prevention-routiere/trajets-quotidien

DRIVING CHALLENGES: AN ANTI-DISTRACTION WEAPON?

As a first step, we analysed the effectiveness of a driving challenge on the distraction of drivers who participated, both during the challenge and the month following the challenge. Next, we assessed the twelve-month impact of a series of three challenges on the driving behaviour of participating drivers.

Why introduce gamification elements?

Numerous studies have demonstrated the benefits and effectiveness of introducing game mechanics in various environments[9]. In addition, several studies specifically dedicated to the impact of gamification on improving road safety have demonstrated its effectiveness.[10]

WHAT WERE THE RESULTS OBSERVED WITH RESPECT TO A CHALLENGE?

To measure the impact of a challenge on the behaviour of a group of drivers, we examined the results of a challenge organised over four weeks by an insurer using our smartphone telematics solution.

The relevant population consisted of 20,000 drivers of all ages and with varied experience. Of all these drivers who used our app, 25% (i.e. 5,000 drivers) participated in the challenge on a voluntary basis to try to win

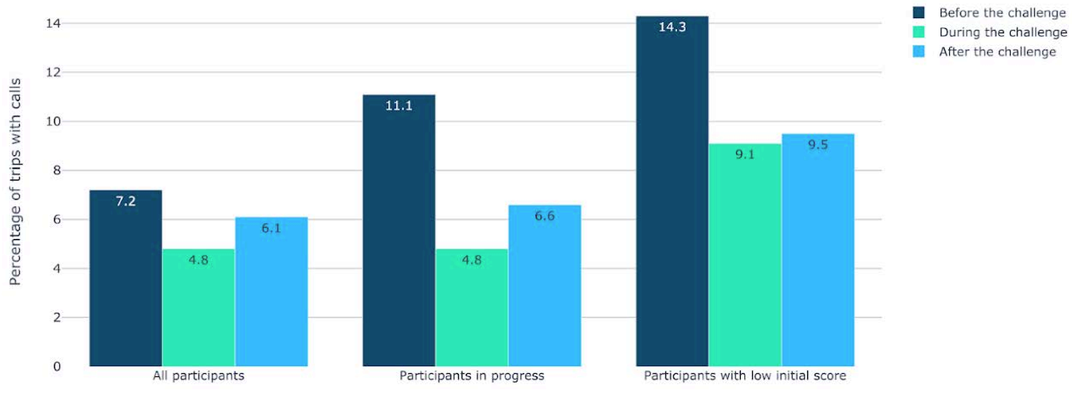
9. https://ieeexplore.ieee.org/document/6758978 or www.researchgate.net/publication/261416642_Do_Persuasive_Technologies_Persuade_-_A_Review_of_Empirical_Studies
10. https://eprints.qut.edu.au/76134/19/Schroeter_auto_ui_2014_paper_v6_camera_rs.pdf and https://eprints.qut.edu.au/84799/128/84799%28a%29.pdf

The results of the challenge were measured over three distinct periods:

- Before the challenge (the month before the challenge) to measure the driver's natural behaviour;
- During the challenge (the month of the challenge) to check its influence on their behaviour;
- After the challenge (the month after the end of the challenge) to assess the persistence of the behavioural change.

CHANGE IN PARTICIPANT BEHAVIOUR

Percentages of trips with calls before/during/after the challenge



Comparing the rate of trips with calls for all participants, we noted a decrease of two points before and during the challenge, since the rate went from about 7% to 5%. We saw a slight increase after the challenge, with a rate of trips with calls stabilising at around 6%. For all participants, the challenge had the effect of reducing their trips with calls by 1 point.

By only examining the change for drivers whose behaviour progressed, we can see that the impact of the challenge was greater. The trips with calls for these drivers were reduced by about half before and after the challenge, from 11% to about 6% (-5 points).

The increase was certainly less pronounced but not less impactful among participants who used their phones more frequently, since their proportion of trips with calls, which exceeded 14% before the challenge, only just reached 10% a month after the end of the challenge, a decrease of about 4 points.

These results show that a challenge generated an immediate change in behaviour among participating drivers, since they called less during the challenge. Thus, an unusually innocuous and acceptable thing to do became a real issue for drivers, who tried and succeeded in minimising the use of the phone.

While the challenge had the effect of modifying the behaviour of drivers during the challenge, we also noted that **this change in behaviour continued more than a month after the challenge.** Admittedly, trips with calls went up by one point for all participants a month after the end of the challenge. However, we also found that the most distracted population had a much lower rate of trips with calls after the challenge than before (-4 points). This means that the population composed of the most distracted drivers, and therefore the participants most at risk, called less and were therefore less likely to be involved in or cause an accident. Driving challenges were therefore an effective tool to reduce the frequency of phone calls during the challenge and the following month.

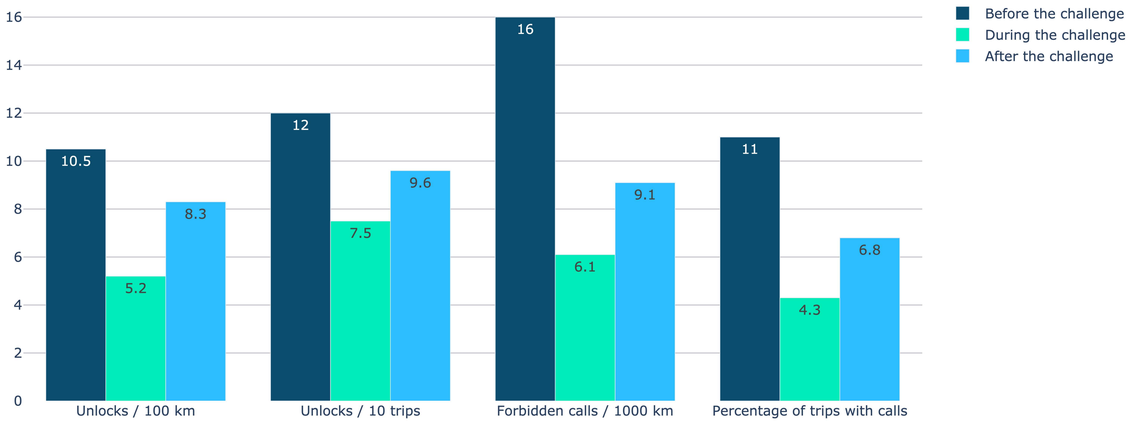
Reminder

These results were observed as part of a voluntary prevention programme. The positive selection of participants must therefore be taken into account. The impact of a challenge will be greater in a population at greater risk.

CHANGE IN DISTRACTION EVENTS

Now that we have seen the positive effects of a challenge on calling while driving, we will look in detail at the change in other distraction indicators. We specifically targeted the change in the indicators of the population of participants in progress in order to identify the indicators with the greatest potential for improvement.

Distraction indicators from the population of participants in progress



The number of prohibited calls per 1,000 kilometres recorded the most significant drop, since it fell by more than half (-10 points) before and during the challenge. This shows that if they were motivated, it was not unthinkable for participants to drastically reduce their number of calls while driving, even though the number of prohibited calls rose a little after the challenge (-7 points).

The number of unlocks per 100 km was halved during the challenge compared to the level observed during the period preceding this. We therefore went from an unlock every 10 km before the challenge to an unlock every 20 km during the challenge, i.e. **the distance without any use of the phone doubled.**

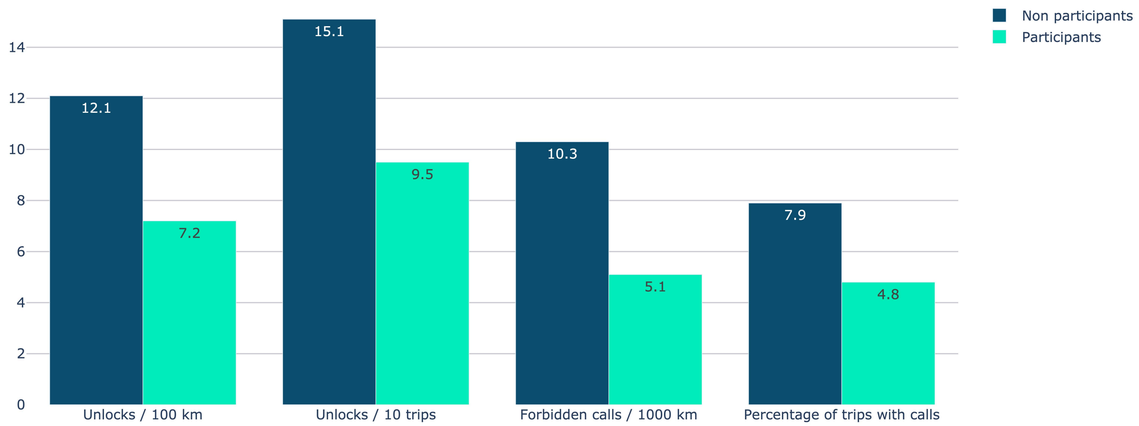
The last indicator, namely the unlocks per 10 trips, also decreased, since it went from 12 before the challenge to 8 during the challenge, stabilising at less than 10 in the period after the end of the challenge. We therefore went from more than one call per 10 trips before the challenge to less than one call per 10 trips after the challenge.

In analysing these four indicators, the number of prohibited calls per 1,000 kilometres showed the greatest variation. Drivers called half as often while driving during the challenge. It also appears that the effort made during the challenge continued in the period after the challenge. Participants were therefore aware that these calls were not essential, could generate distracted driving, and should therefore be avoided.

COMPARISON BETWEEN PARTICIPANTS AND

To complete our analysis, we compared the performance of participants with that of drivers who used the mobile app but did not take part in the challenge.

Distraction indicators from participants and non-participants



It appears that drivers who did not participate in the challenge were much more distracted than participants. This phenomenon was observed both on phone calls and on the number of unlocks. For the population of non-participating drivers, we observed:

- 5 more unlocks per 100 km
- 6 more unlocks per 10 trips
- 5 more prohibited calls per 1,000 km

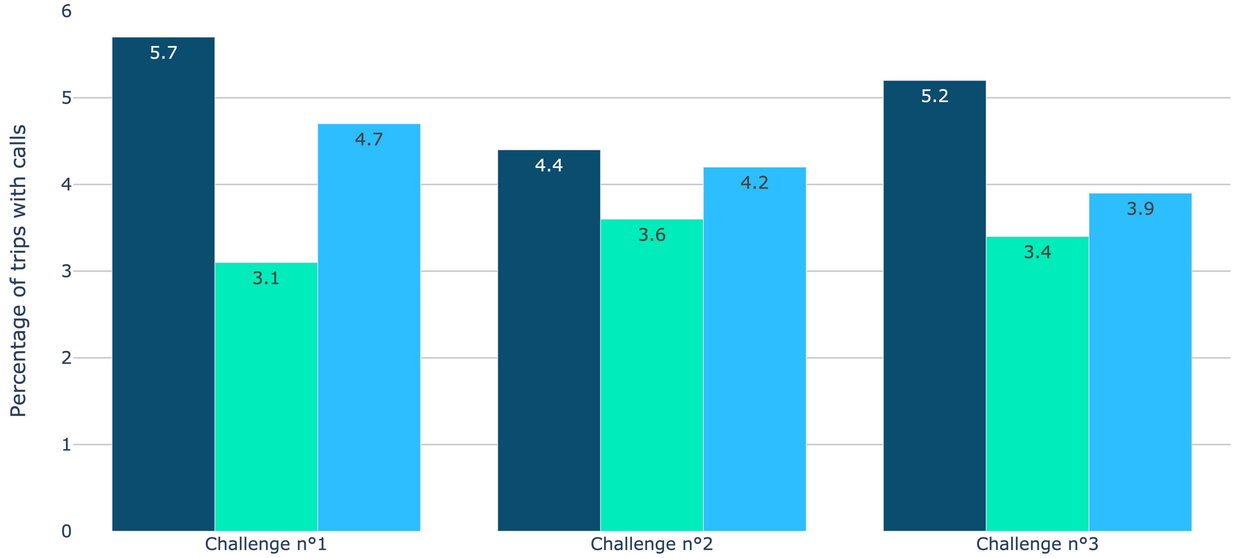
These results confirm that a driving challenge had a measurable impact on driver behaviour. It also indicates that there is a need to give consideration to the preventive actions to be taken for drivers at risk, who do not seem to be receptive to the challenges, or who do not wish to participate in them.

The analysis of the results above offers a measure of the real effectiveness of a challenge in the fight against distracted driving. The main lessons are: (1) the immediate positive effects of the challenge from its launch in all drivers who participated, and (2) a significant reduction in distraction in the weeks following the challenge for the drivers most at risk before the start of the challenge. We also detected an awareness of the distraction caused by prohibited calls, since their proportion decreased by half during the challenge and remained much lower even after the challenge.

WHAT ARE THE RESULTS OBSERVED IN DRIVERS WHO PARTICIPATED IN A SERIES

The three challenges we examined were organised during the months of February, July and December. Of the 5,000 participants in the February challenge, 5% participated in the next two challenges, i.e. about 250 people. The performance of these drivers is presented below.

Percentages of trips with calls for the three challenges



Reading the graph, it appears that the performance of drivers during challenges was constantly improving. It went from 4.4% of trips with calls for the first challenge to 3.6% for the second, finishing at 3.4% for the third challenge. This means that drivers who participated in several challenges improved their performance from one challenge to the next, and reduced their number of trips with calls even further. The challenge mechanics still proved effective even after three challenges, and the drivers' motivation to improve their previous performance remained intact.

We also found that the number of trips with calls between the end of the first challenge and before the start of the second challenge decreased from 5.2 to 4.4. This is exactly the same percentage as the performance of the drivers during the first challenge.

It is true that this observation was not verified between the second and the third challenge, since we went from 4.2 after the second challenge to 5.2 before the third challenge, i.e. +1 point. However, we noted that 5.2% corresponds to the performance of the drivers after the first challenge. This meant that the performance of drivers following the first challenge was the new threshold for trips with calls for the year ahead. The raising of awareness observed in the first part of our analysis was therefore further confirmed.

But that's not all. Comparing the percentage of trips with calls after the three challenges, it appears that this indicator was constantly decreasing:

- -1 point between the end of the first challenge and the end of the second challenge (5.2 to 4.2)
- -0.3 points between the end of the second challenge and the end of the third challenge (4.2 to 3.9)

Specifically, the data showed that the percentage of trips with calls decreased by more than one point (-1.3) over the year thanks to the challenges. Beyond the immediate and short-term effectiveness of a challenge to reduce distraction (see the first part of our study), the results showed that organising challenges at regular intervals, three times a year, leads to a reduction in distracted driving in the medium term (4 months) and long term (1 year).

CONCLUSION

Reading this white paper, it appears that the phenomenon of acceptance or normalisation of the use of the phone while driving is not irreversible. Above all, our study shows that insurers have a real role to play in the fight against distracted driving, alongside other dedicated organisations such as Sécurité Routière. To recap:

- By adopting smartphone telematics, insurers are first of all equipped with a tool to draw up the distraction profile of their customer portfolio, and to individualise the measurement of risk;
- By segmenting their customer portfolio with unprecedented precision, insurers are giving themselves the means to take an active part in the fight against distraction;
- The organisation of driving challenges - one of the new tools provided by smartphone telematics - is proving very effective. Challenges impact driving behaviour in the short, medium and long term, as demonstrated by the results presented. By reducing distraction, they help reduce accidents and therefore the costs borne by insurers.

Smartphone telematics must therefore be seen as a toolbox that gives insurers the power to measure and act against distracted driving. Whether through the launch of connected insurance products such as behavioural insurance (Pay-How-You-Drive), or through prevention programmes, insurers have every interest in embracing this technology. All the more so because, beyond being a solution of the here and now, smartphone telematics is also a solution for the future, since no alternative offers as many possibilities as this technology.

Visit our website, contact us if you have any questions, and let’s roll out your project together!

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