ROAD SAFETY AND THE USE OF PORTABLE ELECTRONIC DEVICES

BOOKLET

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PROURB Programa de Pós-Graduação em Urbanismo

UERJ Universidade do Estado do Rio de Janeiro
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SUMÁRIO

PREFACE

A TIME AND PLACE FOR EVERYTHING

The printing press, the steam engine, the train, the automobile, the internet and, last but not least, the cell phone, all share the common feat of having changed how people and societies live and communicate. In the vast majority of cases, all of these revolutions, so to speak, have brought about tremendous breakthroughs and benefits, while also having caused a number of harmful effects that were initially unforeseeable.

Among these negative effects, especially in the case of automobiles, one can point to greenhouse gases, air pollution and traffic casualties. However, on the other side of that scale—the oft-forgotten positive side of things—the list is probably much longer, starting with the social and economic development over the previous century, an unheard-of level of accessibility until the advent of the automobile or the availability of emergency services that, in a matter of minutes, are able to provide vital assistance, much needed in countless extreme situations. On the other hand, the path toward sustainability for motorized vehicles (automobiles, motorcycles, vans, buses and trucks, mainly) has already been mapped out and the current focus is on quickening that pace, solving technological issues and, above all, updating the fleet with safe, non-polluting vehicles.

In the aforementioned process, rationing the use of internal combustion vehicles and, above all, promoting and prioritizing, wherever possible, active modes of transportation and providing quality public transport that is both safe and accessible for the population as a whole, are some of the fundamental elements for returning to the essential path towards sustainable and humane development.

For a significant part of the world's population, especially younger individuals, mobile communication devices (cell phones) are not just yet another piece of tech or household appliance. They constitute the very essence of the modern way of life: one could even say that "we live in our phones and experience through them". We no longer look at people, man-made monuments, paintings or natural wonders directly with our eyes, as we always did before—we take pictures of them with our cell phones, perhaps a selfie, in order to share it instantly on social media. We no longer use maps made of paper, and even our memories, our payment methods, our favorite books or shows... everything is often behind this screen, merely 4 inches wide.

In recent years, Fundación MAPFRE has paid close attention to cell phones from different perspectives. For instance, a 2021 study showed that drivers who talked on their cell phones using the hands-free system (that is, without holding their phones) committed serious traffic offenses two to four times more often than drivers who did not talk on their phones. A different study by Fundación MAPFRE in 2022 on lifestyles, psychological well-being and smartphone use in Spain's university community found that 29.5% of university students used their cell phones for over 5 hours a day during the week and 34% on weekends, and that students used their cell phones an average of 4.5 hours a day.

This study is carried out by Fundación MAPFRE in partnership with the company Fresta, the Federal University of Rio de Janeiro (UFRJ), the State University of Rio de Janeiro (UERJ) and the Technical University of Denmark (DTU) providing new insight into the use of mobile devices by different groups of road users (pedestrians, cyclists, motorcyclists and car drivers). This is, without a doubt, innovative work that should contribute to reducing road risks in our societies.

Today, distractions represent one of the main or even the most important cause of serious and fatal injuries in traffic, while, within these distractions, mobile devices pose one of the greatest threats to traffic safety. It is clear that we're still at the stage of learning how to use cell phones safely while on the move. Pedestrians, for example, no longer look at the ground or sidewalk to check for pitfalls or falling hazards: instead, we look directly at our cell phones or walk absent-mindedly while talking or listening to music. Drivers often switch on their hands-free devices as soon as they get in the car in order to get connected with the office, their family or friends and get out of the vehicle after reaching their destination with no recollection whatsoever of the drive they just did and, of course, without having paid enough attention or without the focus and awareness required to drive.

It is without question that mobile devices have radically transformed our lives and are bringing about enormous social benefits: services for geolocation, navigation, real-time connectivity with emergency services, peace of mind in knowing that notifications will pop up in the event of any relevant circumstance, as well as countless apps related to health, travel, leisure, work... **but misusing these devices, as with all new technology, especially in traffic, can have irreparable consequences. And that's exactly why we hope this work will serve to improve mobility and prevent traffic injuries.**

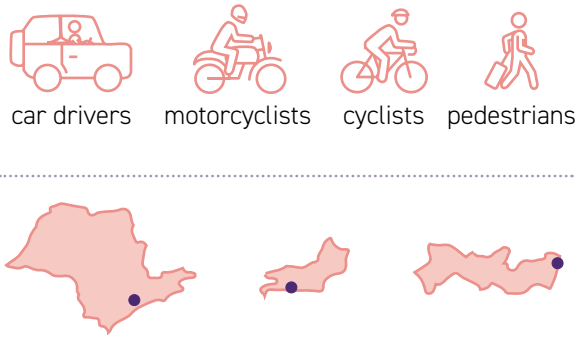
Jesús Monclús
Director, Road Safety & Prevention at
Fundación MAPFRE

INTRODUCTION

This booklet presents, in a summarized form, **a first-of-its-kind study in Brazil** of the use of portable electronic devices—cell phones such as smartphones, as well as headphones, by users of the road systems in Brazilian urban centers: looking at pedestrians, cyclists, motorists (of passenger and utility vehicles) and motorcyclists, shedding light on its relation with road safety.

STUDY OBJECTIVES

→ To investigate **user behavior** and views in three **great urban centers in Brazil**.



→ To find **best practices** and actions by distinct players (public, private, academy) towards **preventing traffic casualties, injuries and deaths related to portable electronic device use**, in both Brazilian and international scenarios.

This study is part of a **context of global action for road safety** that considers a set of political and strategic measures for mitigating traffic casualties and achieving Vision Zero within urban planning. **The four key pillars supporting this study are the following:**

1. Traffic fatalities and serious injuries are preventable and unacceptable;
2. The responsibility for road safety is a shared one;
3. Human beings make mistakes, and so this demands actions that are both proactive, for prevention, as well as reactive, for mitigation;
4. Human beings are vulnerable, which is why it is necessary to readjust the speed of road users, especially that of automobiles.

This study is carried out by Fundación MAPFRE in partnership with the company Fresta, the Federal University of Rio de Janeiro (UFRJ), the State University of Rio de Janeiro (UERJ) and the Technical University of Denmark (DTU).

This publication presents in a summarized and informative way the main highlights found in the research and development process, considering a global conjecture, as well as looking at the data collected for the Brazilian cities studied. The full technical report, with more detailed and in-depth information, will be published subsequently.

Source: Organization 2023.

THE DESIGN OF THIS STUDY

The goal is to investigate the relation between road safety and the use of portable electronic devices (cell phones, such as smartphones, as well as headphones) by observing the behavior of various parties in the road traffic environment—pedestrians, cyclists, motorcyclists and car drivers (of passenger and utility vehicles)—in Brazilian urban centers or, more specifically, in selected locations in the cities of São Paulo, Rio de Janeiro and Recife.

The **target population** for this study are **road system users in urban centers, including pedestrians, cyclists, motorcyclists and car drivers** (of passenger and utility vehicles). The reason for this segmentation—which does not include bus and truck drivers—is due to the different dynamics in management and operation of the public transport and freight transport sectors, respectively. Regarding cyclists and motorcyclists, the field research showed limitations as to how many people could effectively be reached, since interviews were carried out during business hours and on the sidewalk, a factor that reduced the proportional presence of these modes of travel in this study. Beyond motorized transport, special consideration is given to active modes of transportation (i.e. cyclists and pedestrians), since these groups are more vulnerable to injuries resulting from traffic casualties. Finally, it is worth pointing out that this field research is exploratory in nature and operates much like a snapshot of a particular moment—which is to say, it pertains to a specific context, providing data that is not generalizable.

METHODOLOGY DEVELOPMENT

The methodology adopted for data collection is split in **three main stages:**

→ **FIRST STAGE:** selection of publicly accessible data via literature review, encompassing benchmark studies from relevant works, such as articles, reports and scientific publications on topics related to urban mobility, road safety and portable electronic device use in traffic.

→ **SECOND STAGE:** primary data collection, including behavioral observation in all three cities. This approach was carried out with a survey model performed in-person in São Paulo, and with additional semi-structured interviews performed remotely and in-depth in all three cities.

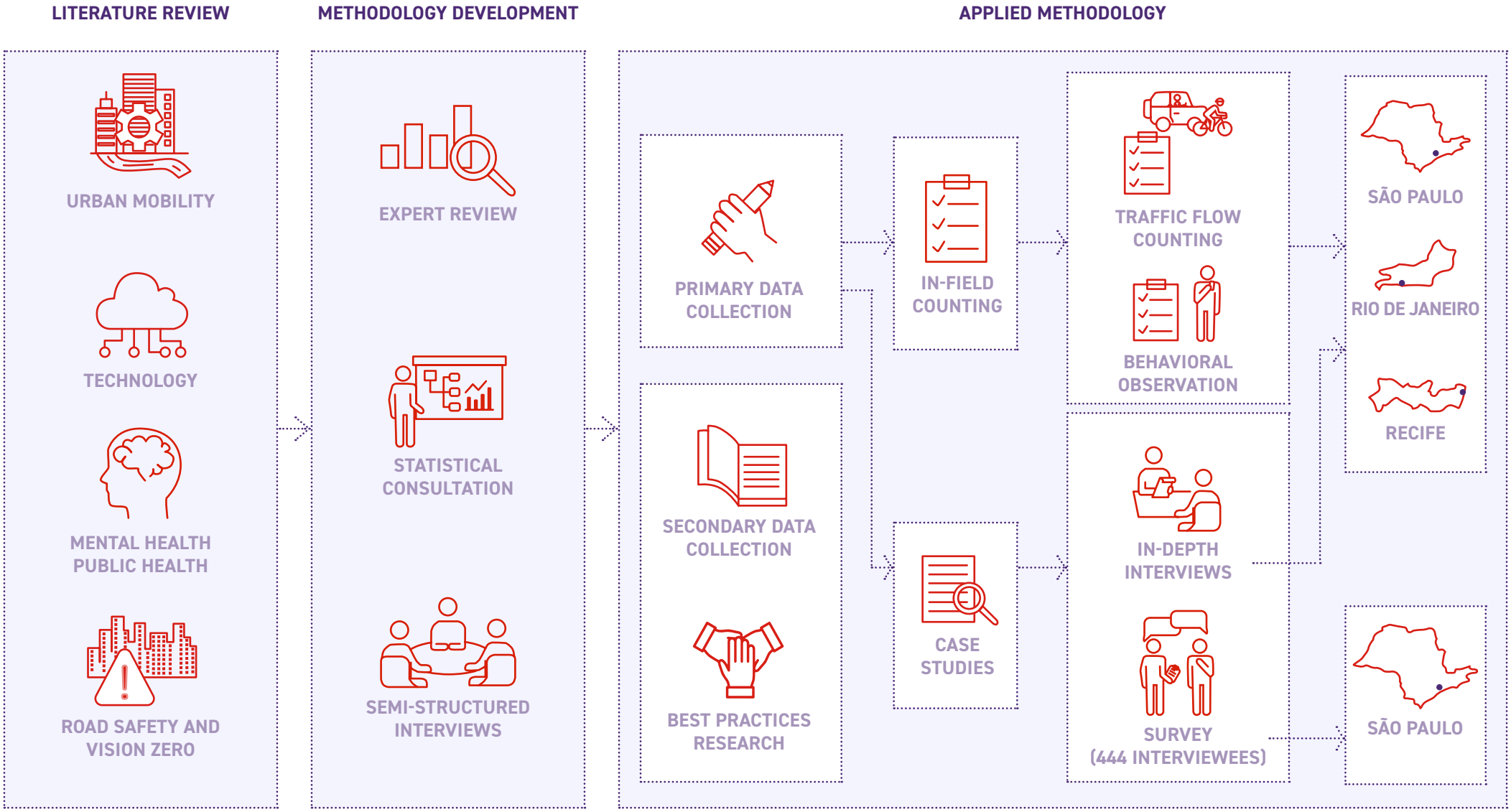
→ **THIRD STAGE:** collection of secondary data, complementary to this study, and compilation of best practices observed in national and international contexts, supported by insights from experts in the field.

São Paulo field record.

Rio de Janeiro field record.

Recife field record.

RESEARCH METHODOLOGY FLOWCHART



METHODOLOGY STAGES OUTLINE:

1 LITERATURE REVIEW AND BENCHMARK STUDIES

Performed digitally, via tracking and analysis of publications related to this study's central topics, following criteria established to delve into the three main topics closest to road safety and portable electronic devices:

Urban Mobility and Road Safety:
This topic is approached in context for both global and national scenarios, considering strategies and views from the perspective of public policy measures for road safety and urban mobility, as well as the analysis of behavior and habits of its users, such as: car drivers, motorcyclists, cyclists and pedestrians.

Mental Health and Public Health:
Mental and physical health, behavioral psychology or similar, and risk factors related to traffic casualties.

Technology and Behavior:
Trends in the use of mobile devices such as mobile phones, headsets, smartwatches, and their relation with time spent with mobile phones, centralization of various services and daily activities, etc. Trends in the use of mobile devices when in transit, specifically—such as traffic apps, delivery apps, apps for entertainment, weather information and urban mobility apps in general.

2 METHODOLOGY DEVELOPMENT

Expert review:
Experts in this field of study reviewed the developed content, contributing to the building and consolidation of the method and thus confirming the submission of the full report.

Consultation with statistical team:
A senior experts was involved in elaborating and verifying the field methodology and sampling, as well as analyzing all of the collected data.

Semi-structured interview with experts:
Performed both in-person and remotely from a basic pre-defined script, which allowed some room for longer exchanges on the subject.

3 APPLIED METHODOLOGY

In-field counting:
Counting teams were assembled in the three cities analyzed (São Paulo, Rio de Janeiro and Recife). The selected locations, considered to be representative of the Brazilian scenario, have similar traffic attributes, in neighborhoods with similar urban and socioeconomical profiles. Traffic flow counts and observation of commuter behavior—pedestrians, cyclists, motorcyclists and car drivers (7,271 people observed in total)—were performed at an intersection (cross-shaped, between two roads) in intervals, through 9 total hours, on a weekday.

Survey:
Method of approach and questionnaire application, producing quali-quantitative data on views and habits among users of different modes of transportation (car drivers, motorcyclists, cyclists and pedestrians). Applied only in the city of São Paulo, on roads with an intense flow and diversity of people distributed throughout the capital, totaling 444 respondents.

In-depth interviews:
Qualitative method of approach, aiming to complement this study's analysis, applied on the three cities analyzed in both in-person and online conversations—using a pre-established, albeit flexible, agenda—with distinct road user profiles, featuring diversity regarding modes of transport, age and gender. In each city 4 people were interviewed, totaling 12 in-depth interviews.

OVERVIEW AND PREVIOUS STUDIES

REASONS FOR DISCUSSING ROAD SAFETY AND CELL PHONE USE

Global actions for road safety have drawn attention to challenges related to advancing technologies, densification of urban center populations and the emergence of new forms of urban transport, with the availability of new services linked to this emerging digital economy (WHO, 2021). Data from the World Health Organization (2021) on fatal victims of traffic casualties worldwide—approximately 1.35 million lives—also point to the fact that this high mortality rate mainly affects children and the younger population.

Over the last decade, mobile electronic devices have become increasingly present in urban life. The portability and interface of smartphone-type cell phones allow users to be one touch away from any piece of information and communication available within the digital and connected universe.

The presence of smartphones in people's daily activities makes them essential for a wide range of activities, be it for work, personal use, services or leisure. According to survey data, approximately 96% of young North Americans (aged 18-29) own at least one smartphone, making them the most representative group for smartphone use (GONÇALVES; CORREIA, 2020). The same study also points to the fact that excess smartphone use may affect people physically, psychologically, behaviorally and socially.

A WHO report (2015) on Road Safety highlighted best practices adopted in various countries around the world to reduce traffic casualties. Implementing a system of traffic safety laws has contributed to positive changes in road user behavior, due to it being followed by a widespread promotion of this law system to the public, emphasizing the impacts and reasons behind the new laws.

According to the report, progress was observed in 17 countries that had revised their laws in line with policies addressing the main risks related to user behavior in traffic casualties:

Maximum speed

Alcohol use

Low visibility

Protection equipment: lack of helmet use for motorcyclists, lack of use of seatbelts and child restraint devices

Distracted driving: has also been included as an important behavioral risk factor in traffic (LIPOVAC et al., 2017)

According to the WHO, increased cell phone ownership and use, as well as in-vehicle technologies, should be considered in policies for traffic casualty mitigation.

"Telephone use while driving (whether hand-held or hands-free) increases the likelihood of being involved in a crash by a factor of four, while texting increases crash risk by around 23 times."
(OMS, 2018 apud DREWS; PASUPATHI; STRAYER, 2008)

The National Highway Traffic Safety Administration (NHTSA) in the United States defines distracted driving as a specific type of inattentiveness from drivers that happens when their attention is diverted from driving to focus on any other activity. In addition to cell phone use, the NHTSA also counts as distracted driving actions such as eating, talking to passengers, making adjustments on the dashboard, etc. This hazardous behavior led to more than 3,500 traffic-related deaths in the United States in 2021, with 644 of the victims being non-vehicle occupants, such as pedestrians and cyclists (NHTSA, 2021).

The importance of tackling distracted driving as related to the use of mobile and in-vehicle devices is once more addressed in a 2018 WHO publication on road safety. The negative externalities of cell phone use while driving have been growing, especially among young people and motorcyclists, groups ranking among the main victims of traffic casualties according to the latest research data from the Cordial Institute (2023).

A study performed by Fundación MAPFRE (2021) on "Cell phones, tiredness, drowsiness and distractions at the wheel", conducted in Spain, shows considerable results related to cell phone use and behavior that can affect road safety. For example:

- **Using cell phones hands-free while driving drastically reduces driving focus** by 36% while in a "relaxed" call, 40% in a "stressful" call and 53% in a WhatsApp conversation.

- **Any form of cell phone use doubles the likelihood of aggressive driving** (such as not respecting the safe distance to the vehicle in front), lane departure, collision with another vehicle or hitting a pedestrian.

What about Brazil? How are we addressing this issue? Despite the Brazilian Traffic Code (CTB) prohibiting mobile phone use at the wheel—subject to an "extremely serious violation" fine[2]—, national data on traffic violations in the federal highway system shows an approximate **40% increase in the number of fines for mobile phone use while driving**, from 2015 to 2018 (BASTOS et al., 2020).

In addition to the fact that cell phones are increasingly ubiquitous in people's daily lives, there is a growing number of delivery and passenger transportation services based on smartphone use and mobile app-based work systems. This scenario renders cell phones use in traffic essential, practically a must.

The Technical Report released by Fundación MAPFRE in partnership with LABMOB in 2022 points to new urban dynamics linked to cyclelogistics within the Brazilian context, which explores the problems related to road safety considering the increase in the number of cyclists working in the traffic environment. The data collected in this study shows that **35% of delivery cyclists have been involved in traffic casualties**, which signals a need for looking more closely at this unsafe outlook for this category of users. It should also be considered that **smartphones are used as work equipment within this group**.

It must be remarked that the primary responsibility for safety still lies with users themselves. Using cell phones safely while driving, whether in motor vehicles, on bicycles or on foot, requires further in-depth analysis and attentive regulation efforts, as well as a comprehensive vision of public policy in line with the road safety guidelines of the Safe System and Vision Zero.


Source: Organization 2023.


Source: Organization 2023.


Source: Organization 2023.

RECOMMENDED GUIDELINES AND BEST PRACTICES

When it comes to the development of new technologies and the emergence of associated economic activities, how can road safety be promoted in cities around the world?

Although national agendas are to a certain extent keeping pace with global proposals to reduce traffic deaths and injuries, some of the key actions (such as the strategy of reducing speeds) remain tied to a paradigm that prioritizes the flow of automobiles, as opposed to non-motorized and more vulnerable modes of travel, such as walking and cycling.

According to Fundación MAPFRE's actions in 2015, **Vision Zero** should be more than a declaration of intent. Therefore, **this concept of road safety must become a real and achievable goal by 2030 in urban areas**. It is necessary to consider measures spanning design, legislation, enforcement and education, in an integrated approach so as to guarantee the safety of all public users of the mobility system.

Given the existence of many different urban mobility services, including passenger transportation, parcel and food delivery, among others, and the use of cell phones and smartphones as a work tool, one may observe the potential inadequacy of established laws to meet the new social demands and operation of these activities. **What actions may safely address the practices that have already been consolidated in recent years, with the advancement of new technologies in the field of urban mobility?**

Certainly, policies for reducing road speeds and including passive methods of life protection (helmets, seatbelts, etc.) are basic prerogatives for advancing the sustainable development of urban mobility. However, it is worth noting that **pedestrians and cyclists share the public traffic environment, which highlights the need to include these users as protagonists in studies**, assessments and, consequently, in political and strategic initiatives.

Key players identified:

- **Companies in the transportation/mobility industry:** automobiles, motorcycles, bicycles, and others;
- **Public authorities:** at all levels with regards to local authorities, including municipalities such as the Traffic Engineering Company (CET) in São Paulo;
- ***Big Techs***[1] **— services and technology:** companies such as iFood, Waze, Uber, etc.;
- **Organized civil society** and the general population.

ACTIONS BY COMPANIES IN THE TRANSPORTATION/MOBILITY SECTOR

- **Taking into account risk factors** related to motorized vehicles and their impact on road safety.
- **Prioritizing actions for mitigating casualties**, especially for the most vulnerable user groups: pedestrians and cyclists.
- **Including integrated systems** that address users needs safely — voice-operated systems, reduction of excessive and distracting sights and sounds, speed alerts, etc.
- **Implementation of safety sensors** and preventative technologies such as proximity sensors and reduction of "blind spots".
- **Extensive training** aligned with best practices, new technologies and updated legislation.

BEST PRACTICES

Honda Lane Watch Blind Spot Monitor: Automobile companies Honda and Toyota provide a system that displays an image of the adjacent lane on the middle and lateral displays, helping to reduce "blind spots".

LIVALL: This company manufactures smart helmets for cyclists that include signal lights, a Bluetooth communication system, and collision detection that triggers an emergency alert in the event of a traffic casualty.

1.Big Techs are tech companies that dominate the economic market and influence people's daily lives.

ACTIONS BY PUBLIC AUTHORITIES

MANAGEMENT, PUBLIC POLICY AND REGULATION

- **Developing urban mobility policies** anchored in the concepts of Vision Zero and Safe Systems;
- **Reformulating traffic laws** in light of the new technologies available and the behavior and use of portable and integrated electronic devices;
- **Establishing new criteria** for monitoring, enforcing and analyzing traffic casualties linked to distracted driving and the use of electronic devices;
- **Producing data and evidence** to contribute to drafting effective public policies and educational traffic campaigns for various audiences;
- **Regulating economic activities** aimed at offering services and passenger transportation and deliveries via digital platforms and apps, including the regulation of workers in this sector (considering aspects such as driver training, minimum wages and regulation of working hours).

BEST PRACTICES

Buenos Aires Road Safety Plan (AR):
Since 2016, the city has implemented its Road Safety Plan, incorporating the Vision Zero and Safe Systems guidelines. In addition to encouraging active mobility, various actions have contributed to a 33% reduction in traffic fatalities in the city, which also features a Road Safety Observatory that evaluates the program over the years.

Programa de Gestión de la Velocidad de Bogotá (CO):
Since 2019, with the support of international experts, the city has implemented a new road design, road safety checkpoints and mass communication campaigns with the aim of ensuring that there are no victims of traffic casualties. Bogotá has also invested in consolidating data on traffic victims from different sources of information, including the Police, the National Institute of Legal Medicine and the Ministry of Public Health.

Vision Zero for London (UK):
Implemented since 2019, the continued publication of data from the program suggests that London's Vision Zero action plan is delivering a safer road environment, especially due to its proactive approach to risk management. Protecting pedestrians and cyclists in places where active mobility rates are currently low is also part of this approach.

"Vida no Trânsito" Program (BR):
This program is coordinated by the Ministry of Health, in technical cooperation with the Pan-American Health Organization (PAHO) and is part of the global agenda to reduce road traffic injuries and deaths.

URBAN AND ROAD INFRASTRUCTURE

- **Implementing urban planning and road design** that adequately contemplates all modes of travel, prioritizing active modes (walking and cycling) and public transport.
- **Promoting accessibility** through adequate sidewalks, street furniture, active facades, bicycle lanes, vertical and horizontal road signs—urban elements that enable safe travel for pedestrians and cyclists.
- **Activating free public spaces and leisure areas** by designing friendly streets and ensuring access to parks and squares for public use.

BEST PRACTICES

The São Paulo Urban Design and Roadworks Manual:
This work is part of the strategic actions of the "Vida Segura" Plan, bringing together guidelines that prioritize active mobility and public transport, establishing technical parameters for the development of projects for the traffic environment, covering not only urban design itself but also legal, regulatory and governance requirements.

Bloomberg Philanthropies Initiative for Global Road Safety (BIGRS) in Fortaleza:
With support from Bloomberg Philanthropies, the city of Fortaleza focused on enacting change on speeding culture with actions aimed at behavioral change through road redesign. Among the measures implemented were traffic calming measures, bicycle lane networks, new pedestrian crossings, exclusive bus lanes and a reduction in the speed limit on arterial roads, in addition to an extensive educational campaign and road safety monitoring.

ACTIONS BY BIG TECHS

- **Taking responsibility for the impacts of the use of new technologies** linked to navigation (GPS), services (transport, food, deliveries, etc.), work, entertainment, information, etc;
- **Taking into account behavioral factors:** anxiety from cell phone use, excessive information or sights and sounds;
- **Questioning and tackling problems related to the working methods employed:** reward systems and incentives for risky behavior in traffic;
- **Offering support and labor regulation to employees**, especially cyclists and motorcyclists who work with app-based services (training/educational programs, provision of safety equipment, life insurance programs, equipment insurance, etc.);
- **Implementing safety systems and alerts in mobile applications**, including preventative limitation of cell phone use while driving the vehicle (a cause of distracted driving).

BEST PRACTICES

Evidence-based new technologies that favor road safety:
According to the National Safety Council (NSC), technology can reduce distraction caused by cell phone use while driving. The most basic technologies stop calls or text messages while a vehicle is in motion. More advanced systems are able to block audio features and track speed and abrupt stops.

Vía Segura:
In partnership with the International Road Assessment Program (iRAP), the Inter-American Development Bank (IDB) has developed a digital initiative to assess the safety of road infrastructure, which is intended to increase the efficiency of the early fault detection process.

ANALYZING THE USE OF PORTABLE ELECTRONIC DEVICES IN BRAZILIAN ROADS

UNDERSTANDING PEOPLE'S BEHAVIOR WHILE ON THE MOVE: FIELD RESEARCH RESULTS

The following methods were used to investigate people's behavior regarding the use of cell phones and headphones while on the move:

- Observation for counting traffic flows and behaviors;
- Survey application.

The results of the counts are presented here. First, the aggregate data that compiles the **behaviors observed in the three cities** and, following that, **the highlights in each of the cities**: São Paulo, Rio de Janeiro and Recife.

For the counts and observations on the field, teams of 4 observers were organized in the selected locations of the 3 cities analyzed. The site was mapped and the field team was provided with forms for both activities.

Data collection was carried out on a weekday between 8 AM and 6 PM. Flow rates were counted in 10-minute intervals and behavioral observations were made in 20-minute intervals during each hour of the day. All the data collected during the field research was compiled into tables for later analysis by the technical and statistical teams responsible.

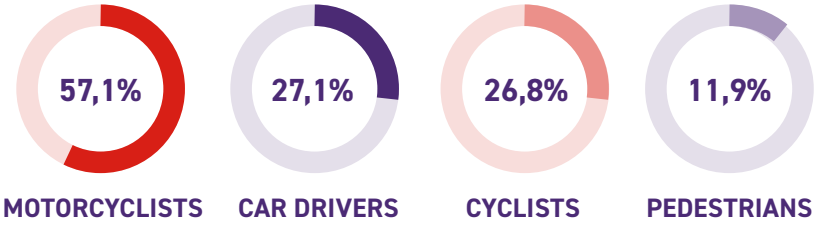
The next section presents quali and quantitative data obtained by **applying a survey at six locations in São Paulo**, where data was collected on the behavior of respondents regarding cell phone and headphone use. The survey also looked at the motivations behind cell phone use and the experiences derived from it. To complete the analysis, **in-depth interviews were conducted in the three cities (São Paulo, Rio de Janeiro, Recife)**, the highlights of which are presented through quotes alongside the survey results.

OBSERVING CELL PHONE AND HEADPHONE USE IN THREE CITIES: SÃO PAULO, RIO DE JANEIRO AND RECIFE — AGGREGATE DATA

A piece of insight that stood out from the data was the fact that **the modes of travel that reach the highest speeds** (motorcycles and cars), and therefore carry the **greatest risk of traffic casualties**, are also those in which we found the highest frequency of mobile device use among the people who use them: **motorcyclists and car drivers topped the statistics for the cell phone and headphone use**. It's worth noting that these two modes of travel were observed both when moving and when stationary, waiting for traffic lights.

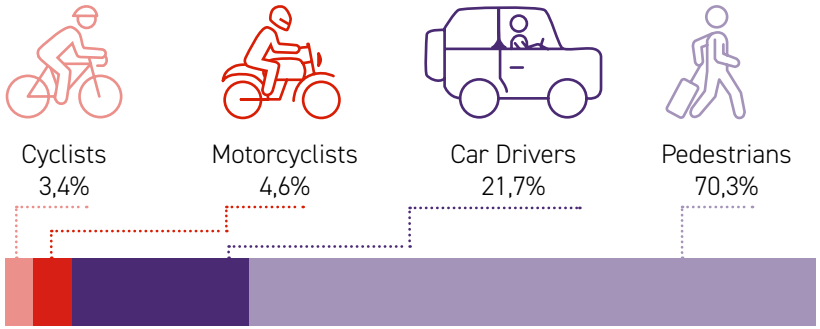
HIGHLIGHTED DATA BY MODE OF TRAVEL:

Adding up the value counts for behavioral observation in the three capitals, the following absolute and proportional amounts were observed regarding **cell phone and headphone use**:



TRAFFIC FLOW COUNTS:

The aggregate data for the three capitals shows the following proportion between flow counts for each **travel mode**:



SÃO PAULO

CONTEXT:

Population: 12.469.663 (IBGE, 2022)
Population Density: 7.527,76 hab/km2 (IBGE, 2022)
Urban Area: 914,56 km2 (IBGE, 2019)
GDP per Capita: R$60.750,09 (IBGE, 2020)

LOCAL TRAFFIC CASUALTY DATA:

According to the National Traffic Department (*Secretaria Nacional de Trânsito*), in 2022, in the city of São Paulo, the recorded incidents were:
45,199 traffic casualties, of which:
38,967 injuries | 721 deaths

COUNTING LOCATION:

Santa Cecília Neighborhood — Downtown area
83,717 inhabitants | 222 hab./Ha

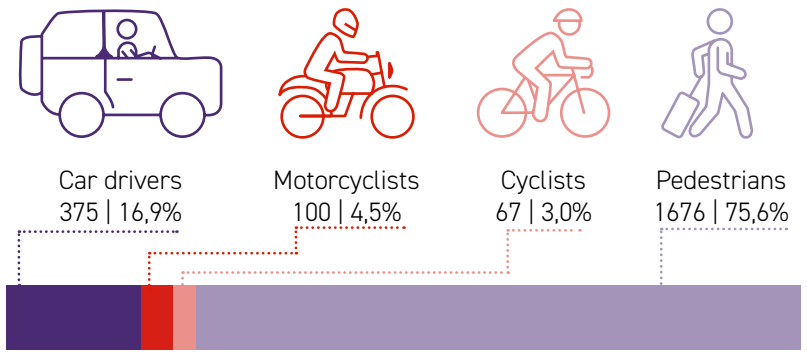
Traffic light intersection between two collector roads: Frederico Abranches street × Dona Veridiana street/ Largo Santa Cecília;

Near public transportation (subway and bus)
Mixed-use occupancy;

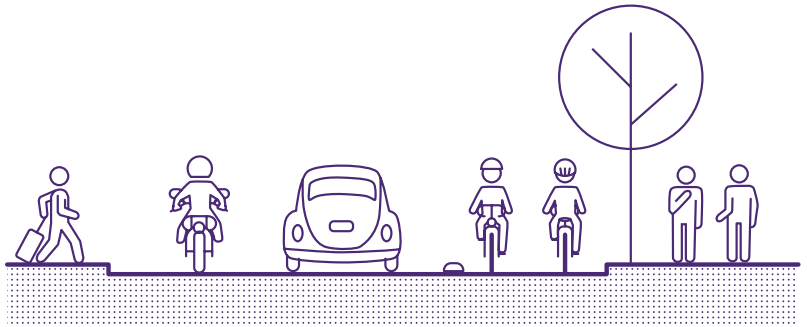
Dedicated bicycle lane (2-way);
2 vehicle lanes (1-way);
Sidewalks on both sides;
Data was collected on a weekday.

TRAFFIC FLOW COUNTS:

During the field research day, the following absolute numbers and percentages in relation to the total number of road users were observed:



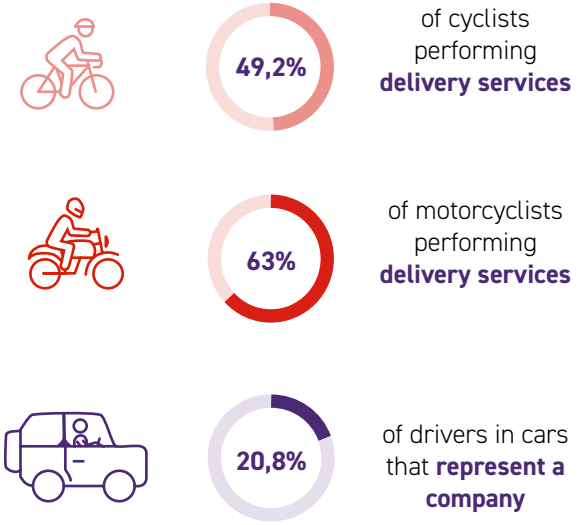
CROSS SECTION FREDERICO ABRANCHES STREET



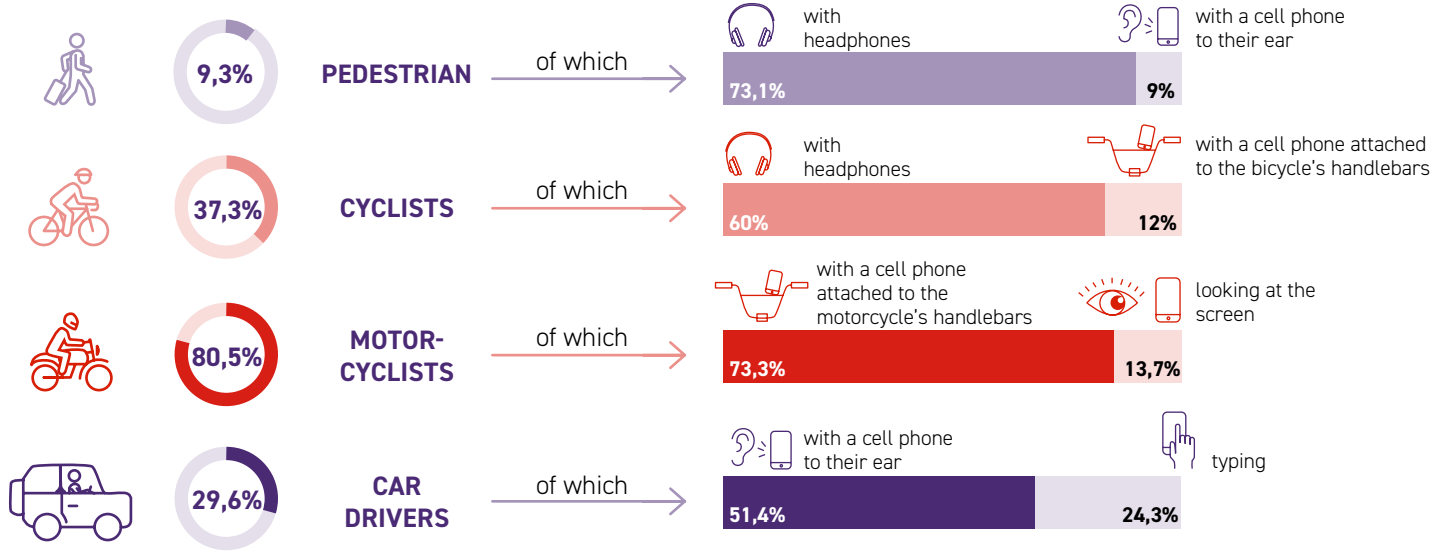

Source: Organization 2023.

SÃO PAULO

WORK ACTIVITIES:
Within each category, the following proportion of users was observed using their mode of travel for work activities:



OBSERVED BEHAVIOR COUNTS:
Percentage per mode observed using cell phones or headphones:



HIGHLIGHTED DATA BY MODE OF TRAVEL:
This data shows the two most common behaviors observed in the field regarding the use of portable electronic devices (cell phones and headphones).

It is worth mentioning that this method has limitations with regards to people whose vehicles do not show professional identification—such as ride app drivers, or those with other forms of employment relationship with no distinction in terms of accessories, apparel or vehicles.

It is worth pointing out that many of the motorcyclists had their cell phones fixed to the handlebars of their motorcycles. This factor greatly increased the proportion of use for this category in the city of São Paulo, although this situation does not necessarily correspond to an active use of the device.

When aggregating the data obtained regarding the behavior of users in the city of São Paulo, **the data points that stand out** in terms of portable electronic device use are **headphone use (35.2% of total device use) and the behavior of looking at the mobile screen (20.1% of total device use)**.

By examining the key data points obtained for each mode of travel, a few impressions can be inferred: **among non-motorized users (pedestrians and cyclists), headphones were the most used devices**, far beyond any other. As for car drivers and motorcyclists, it is particularly noteworthy that the predominant active use was related to looking at the cell phone screen.

One of the behaviors observed among motorcyclists was that the vast majority had their cell phones attached to the vehicle's handlebars — **it's interesting to relate this information to another datapoint, that 63% of the motorcyclists were identified as app delivery drivers.**

RIO DE JANEIRO

CONTEXT

Population: 6.862.137 (IBGE, 2022)
Population Density: 5.174,77 hab/km2 (IBGE, 2022)
Urban Area: 640,34 km2 (IBGE, 2019)
GDP per Capita: R$49.094,40 (IBGE, 2020)

LOCAL TRAFFIC CASUALTY DATA:

Department (*Secretaria Nacional de Trânsito*), in 2022, in the city of Rio de Janeiro, the recorded incidents were:
7,619 traffic casualties, of which:
7,104 injuries | 502 deaths

COUNTING LOCATION:

Copacabana Neighborhood — South Zone
161,191 inhabitants | 441 hab./Ha (IBGE, 2010)

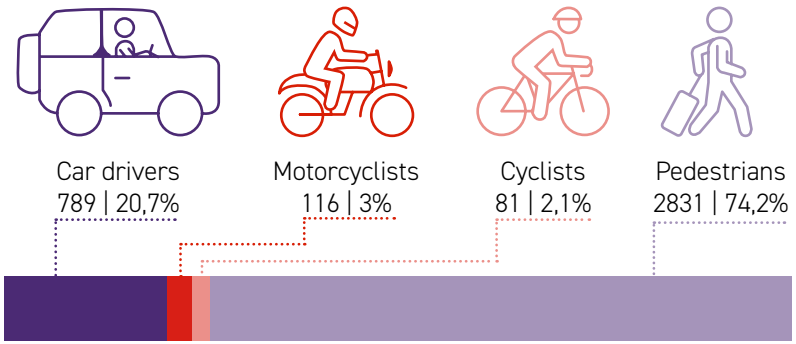
Traffic light intersection between two collector roads: Xavier da Silveira street × Nossa Sra. de Copacabana Avenue;

Near public transportation (subway and bus)
Mixed-use occupancy;

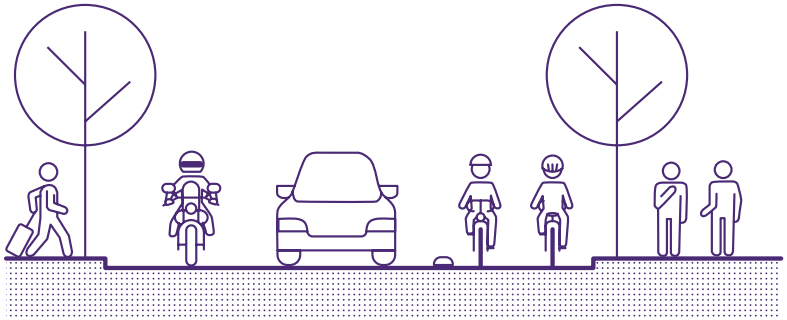
Dedicated bicycle lane (2-way);
2 vehicle lanes (1-way);
Sidewalks on both sides;
Data was collected on a weekday.

TRAFFIC FLOW COUNTS:

During the field research day, the following absolute numbers and percentages in relation to the total number of road users were observed:



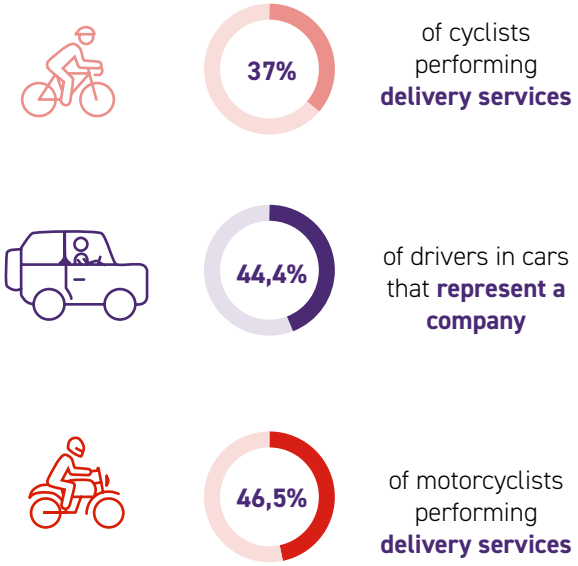
CROSS SECTION XAVIER DA SILVEIRA STREET



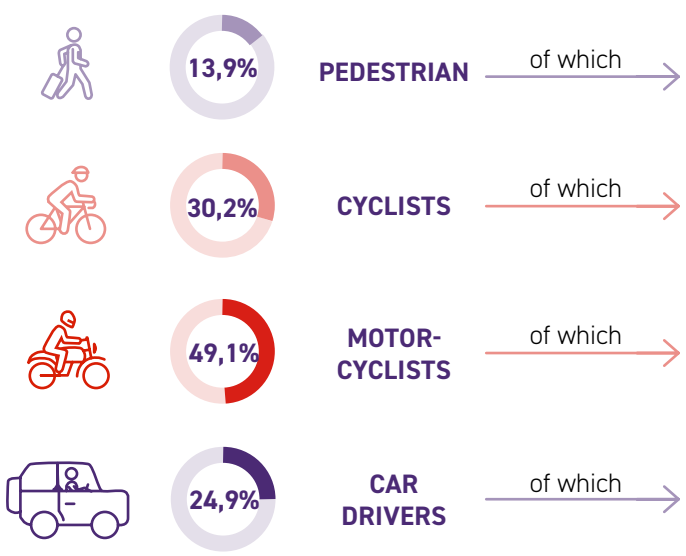

Source: Organization 2023.

RIO DE JANEIRO

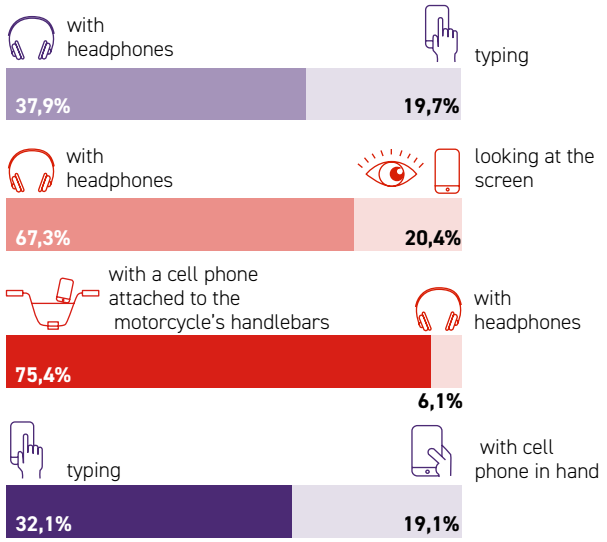
WORK ACTIVITIES:
Within each category, the following proportion of users was observed using their mode of travel for work activities:



OBSERVED BEHAVIOR COUNTS:
Percentage per modes observed using cell phones or headphones.



HIGHLIGHTED DATA BY MODE OF TRAVEL:
This data shows the two most common behaviors observed in the field regarding the use of portable electronic devices (cell phones and headphones).



It is worth mentioning that this method has limitations with regards to people whose vehicles do not show professional identification — such as ride app drivers, or those with other forms of employment relationship with no distinction in terms of accessories, apparel or vehicles.

It is worth pointing out that many of the motorcyclists had their cell phones fixed to the handlebars of their motorcycles. This factor greatly increased the proportion of use for this category in the city of São Paulo, although this situation does not necessarily correspond to an active use of the device.

When aggregating the data obtained regarding the behavior of users in the city of Rio de Janeiro, **the data points that stand out** in terms of portable electronic device use are **headphone use (30.7% of total device use) and typing on the cell phone (21.1% of total device use)**.

By examining the key data points obtained for each mode of travel, a few impressions can be inferred: among non-motorized users (pedestrians and cyclists), headphones were the most used devices, far beyond any other. As for car drivers, it is particularly noteworthy that the predominant active use was related to typing (cell phone use). For motorcyclists, headphone use was the category that showed the most active device use. One of the behaviors observed among motorcyclists was that the vast majority had their cell phones attached to the vehicle's handlebars—it's interesting to relate this information to another datapoint, that 46.5% of motorcyclists were working as app delivery drivers.

RECIFE

CONTEXT

Population: 1.669.172 (IBGE, 2022)
Population Density: 6.803,60 hab/km2 (IBGE, 2022)
Urban Area: 142,99 km2 (IBGE, 2019)
GDP per Capita: R$30.427,69 (IBGE, 2020)

LOCAL TRAFFIC CASUALTY DATA:

According to the National Traffic Department (*Secretaria Nacional de Trânsito*), in 2022, in the city of Recife, the recorded incidents were:
12,882 traffic casualties, of which:
13,313 injuries | 539 deaths

COUNTING LOCATION:

Santo Amaro Neighborhood — Downtown area
2,495 inhabitants | 7,706 hab./Ha(IBGE, 2010)

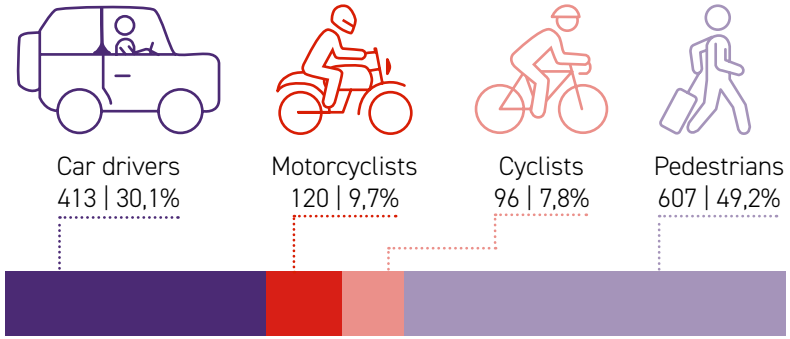
Unsignalized intersection between two collector roads:
Bispo Cardoso Ayres street × Príncipe street;

Near public transportation (bus)
Mixed-use occupancy;

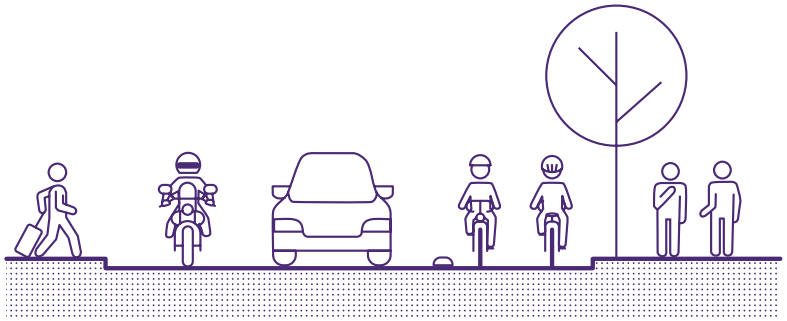
Dedicated bicycle lane (2-way);
2 vehicle lanes (1-way);
Sidewalks on both sides;
Data was collected on a weekday.

TRAFFIC FLOW COUNTS:

During the field research day, the following absolute numbers and percentages in relation to the total number of road users were observed:



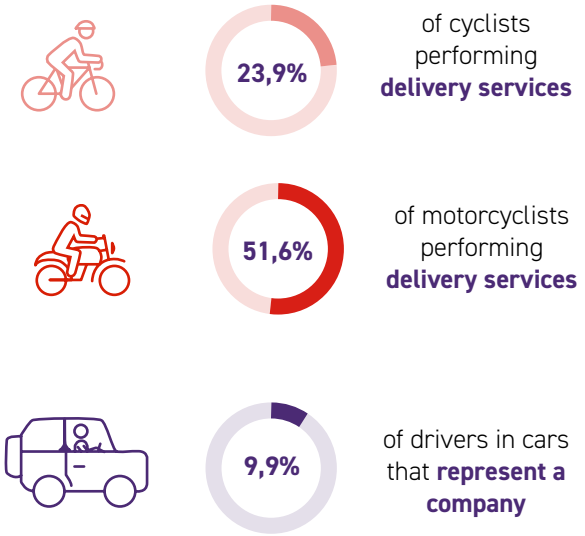
CROSS SECTION BISPO CARDOSO AYRES STREET




Source: Organization 2023.

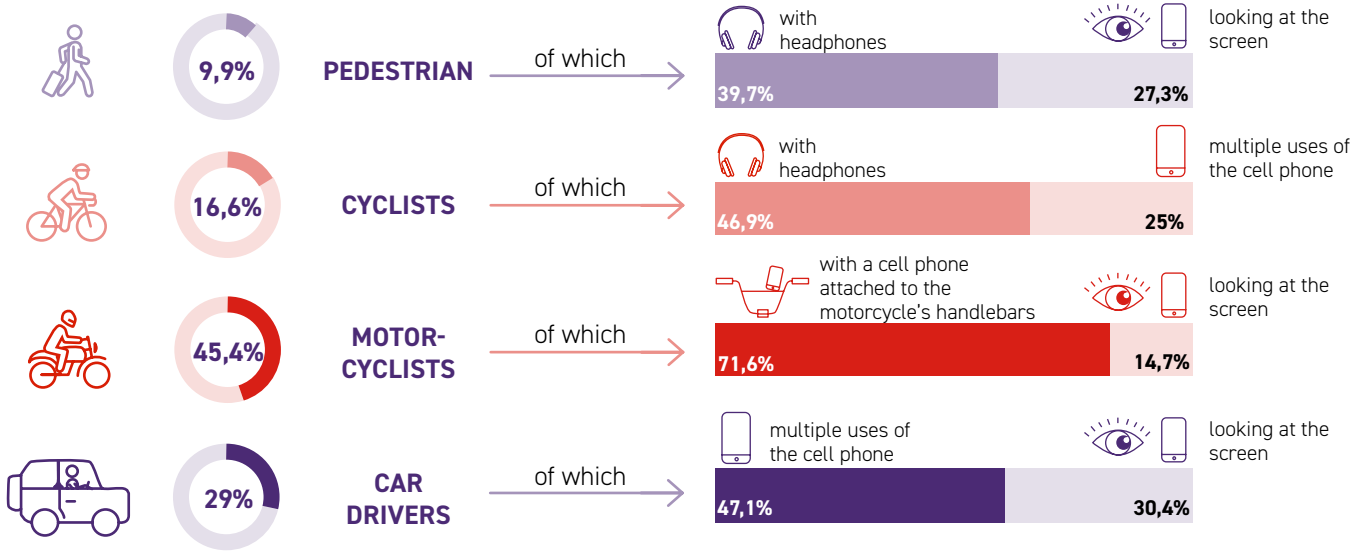
RECIFE

WORK ACTIVITIES:
Within each category, the following proportion of users was observed using their mode of travel for work activities:



OBSERVED BEHAVIOR COUNTS:
Percentage per modes observed using cell phones or headphones.

HIGHLIGHTED DATA BY MODE OF TRAVEL:
This data shows the two most common behaviors observed in the field regarding the use of portable electronic devices (cell phones and headphones).



It is worth mentioning that this method has limitations with regards to people whose vehicles do not show professional identification — such as ride app drivers, or those with other forms of employment relationship with no distinction in terms of accessories, apparel or vehicles.

It is worth pointing out that many of the motorcyclists had their cell phones fixed to the handlebars of their motorcycles. This factor greatly increased the proportion of use for this category in the city of São Paulo, although this situation does not necessarily correspond to an active use of the device.

When aggregating the data obtained regarding the behavior of users in the city of São Paulo, **the data points that stand out** in terms of portable electronic device use are **multiple uses of the cell phone (28.1% of total device use) and looking at the cell phone screen (24.5% of total device use).**

By examining the key data points obtained for each mode of travel, a few impressions can be inferred: among non-motorized users (pedestrians and cyclists), headphones were the most used devices, far beyond any other. As for car drivers, multiple uses of the cell phone were observed as the highest use category. For motorcyclists, it is particularly noteworthy that the predominant active use was related to looking at the cell phone screen. One factor observed among motorcyclists was that the vast majority had their cell phones attached to the vehicle's handlebars, which is interesting to observe in the face of the majority of motorcyclists having been identified as app delivery drivers (51.6%).

1. **Multiple uses of the cell phone:** represents more than one category of use observed from the user. For example: holding a cell phone in hand and sending a voice message, typing and looking at the screen, etc.

WHAT ARE THE BEHAVIORS AND VIEWS ACCORDING TO ROAD USERS?

Here are the highlights of **the results of the survey** carried out in the city of São Paulo.

PROFILE OF THE 444 RESPONDENTS

51.1% identify as male and 48.4% as female

The vast majority live in the capital of São Paulo (86%), followed by 8.6% who live in the Metropolitan Region of São Paulo (RMSP); 4.5% live outside the RMSP.

Predominantly white people (43.5%), followed by brown people (33.3%), black people (18.6%) and yellow people (3.6%).

With regard to age groups, **46.6% of respondents were adults aged 30–59**, 42.3% were young people aged 16–29 and 11.0% were elderly people aged over 60.

The vast majority of respondents (75.5%) are in the monthly income bracket of up to 5 minimum wages (of these, 26.8% earn up to 1 minimum wage per month). Respondents earning between 5 and 10 minimum wages account for 8.3% and those earning over 10 minimum wages account for 2.3% of the sample.

In terms of respondents' commuting habits, **the vast majority use public transport (70.5%)**, 14.6% use motorized modes (of which 12.4% use cars and 2.3% use motorcycles) and 11.5% use active modes (of which 7.9% walk and 3.6% use bicycles).

ROAD CELL PHONE USE (ALL 444 RESPONDENTS)

77,8% have used their cell phones at least once while on the move — be it walking, cycling or driving a motorcycle or car.

36.2% stated that they use their cell phone frequently or very frequently while on the move;

48.6% stated that they feel the need to use their cell phone while on the move (walking/pedaling/driving)

What follows is a descriptive analysis of the data for each of the users studied (pedestrians, cyclists, motorcyclists and car drivers). **In the next sections, the responses have been matched to the most frequent mode of travel**—that is, the mode of travel in the city used most often by that person — to ensure greater reliability in the responses. It is important to make clear that respondents who do most of their commuting by public transport (subway, train, bus) or app-based transport (apps such as Uber, 99 or others) have been redirected to the pedestrian section — since they were approached while walking, and public or app-based transport is outside the scope of this study.

The sample size calculation, determined by the statistical team, assigns the interview collection as a "floating population", considering the infinite population equation and with a higher proportion of elements in the sample that carry an attribute of interest. Therefore, the following calculation is applied (Equation for Calculating Infinite Sample Size, COCHRAN, 1977):

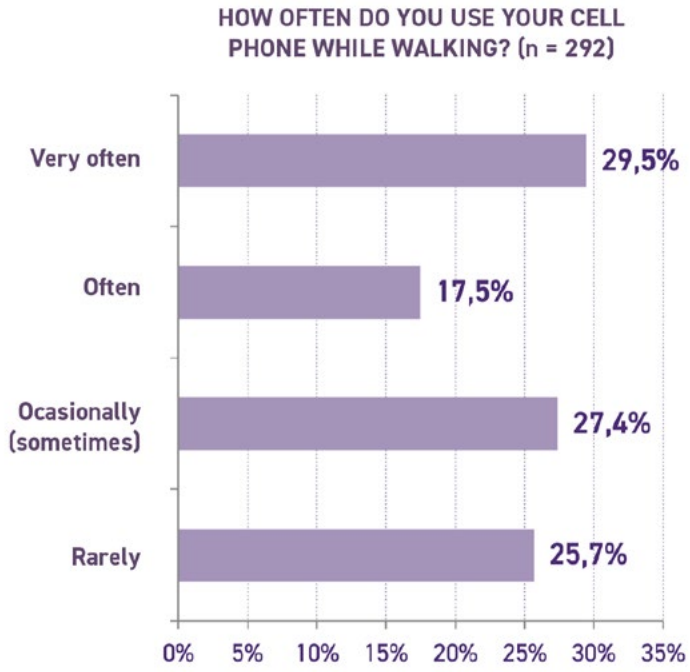
$$n = (p \cdot q \cdot Z2)/E2$$

Where: p = 0.5 (proportion of elements in the sample that carry an attribute of interest); q = 1–p; Z = 1.96 (95% confidence level); E = 0.0491 (sampling error). The result was an n value (sample size) = 444 respondents

PEDESTRIANS

363 pedestrians provided responses about their behavior while walking; among them, **80.4% have used a cell phone while walking and 63.4% said they feel the need to use their cell phones while walking**.

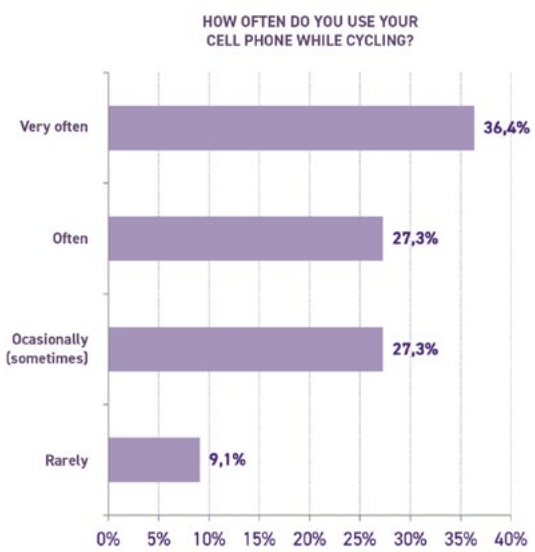
Among the 292 pedestrians who have used a cell phone while on the move, **47% said that they often or very often use this device while walking**.



CYCLISTS

16 cyclists provided responses about their behavior while cycling; among them, **68.8% have used a cell phone while cycling** and 72.7% said they feel they need to use their cell phones while cycling.

Among the 11 cyclists who have used a cell phone while on the move, **63.7% said that they often or very often use this device while cycling**.



"I use headphones a lot while cycling, even if it's just on one side"

White female, 27, gardener São Paulo

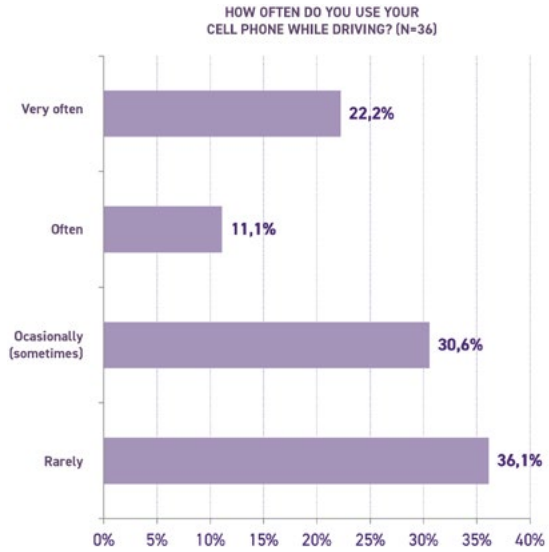
"Always. You can't not use it. The phone rings, then you answer it and go on cycling one-handed."

Black male, 32, delivery cyclist. Recife:

CAR DRIVERS

55 car drivers provided responses about their behavior while driving; among them, **65.5% have used a cell phone while driving** and 50% said they feel they need to use their cell phones while driving.

Among the 36 car drivers who have used a cell phone while on the move, **33.3% said that they often or very often use this device while driving**.



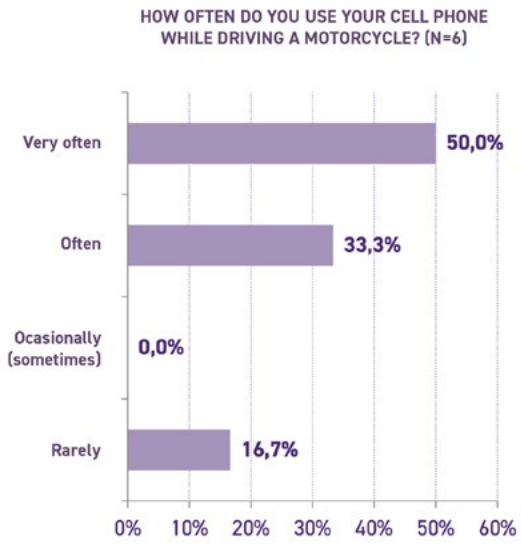
"I work using apps, so the Táxi Rio app is always turned on. I put it on support mode and I don't fiddle with my phone."

White male, 26, taxi driver. Rio de Janeiro

MOTORCYCLISTS

10 motorcyclists provided responses about their behavior while driving; among them, **60.0% have used a cell phone while driving** and 83.3% said they feel they need to use their cell phones while driving.

Among the 6 motorcyclists who have used a cell phone while on the move, **83.3% said that they often or very often use this device while driving**.



"If whoever's driving is using their cell phone, I'll complain or get out of the car, because I know that the risk is extremely high."

White female, 62, teacher. Recife

"Every time I'm on my bike I use my cell phone: Waze for directions and warning me of speed detectors and potholes. I use the helmet-integrated Bluetooth system to answer urgent calls."

White male, 62, merchant. São Paulo

MOST SOUGHT AFTER CATEGORIES OF CELL PHONE USE

Among the 216 users (throughout all modes of travel) who said they felt they needed to use their cell phones while on the move, the following categories stood out in terms of mobile device use:

63,4%
Text Messages
(SMS, *Whatsapp*)

46,3%
Audio Media Playback
(radio, *Spotify*, and others)

44,9%
GPS Navigation
(various apps)

It's interesting to note that among the 216 respondents who feel the need to use their cell phone while on the move, **60.2% said they use headphones with their cell phone while moving**.

"Always listening to music, replying to messages, going on Google to check for shortcuts — that's how I live. It's very difficult, it's a tool that everyone needs at all times in their life."

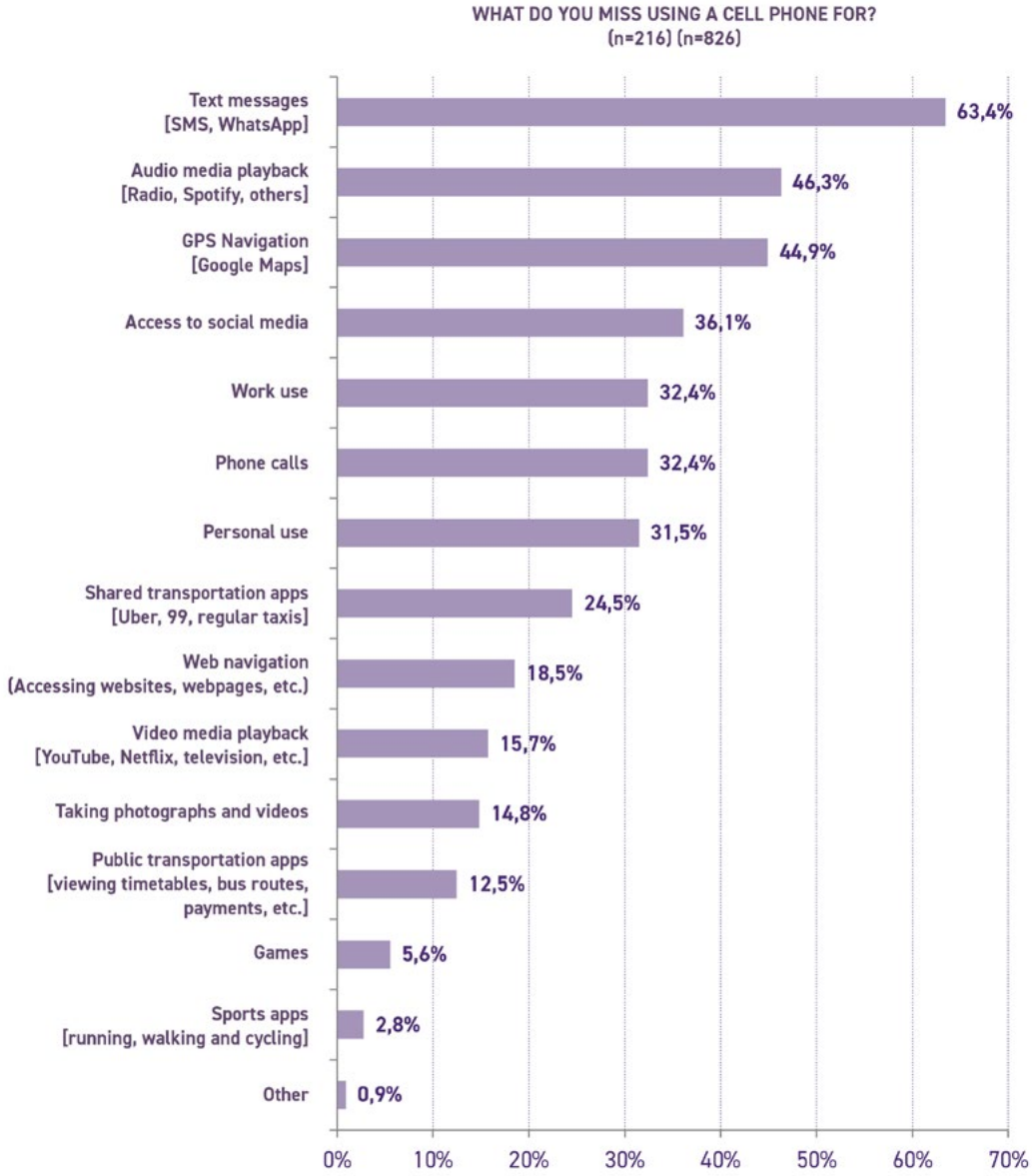
Black female,
32, janitor.
Rio de Janeiro

"I miss not checking on apps, answering calls, replying to messages."

Black male, 27,
delivery motorcyclist.
Recife

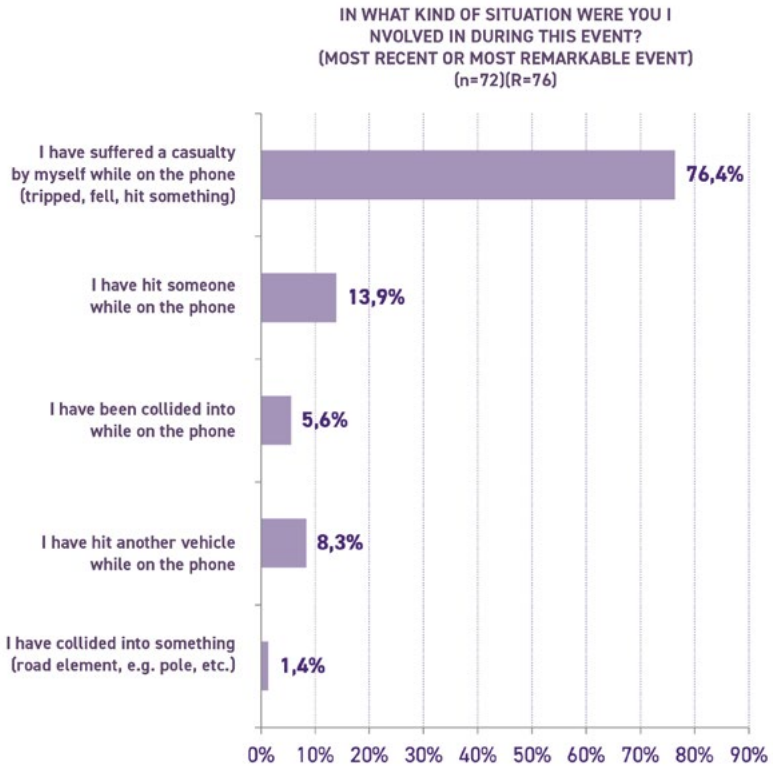
"I miss it. I use my cell phone for everything. For example, if I'm going to the market, I use my cell phone to see the shopping list. I have a mother who's sick, so I always need to be able to receive news from her throughout the day, and any work-related issue I'll solve through the cell phone."

White female,
62, teacher.
Recife



INVOLVEMENT IN ROAD CASUALTIES INVOLVING CELL PHONE USE

Among all respondents, 444 people, 16.3% have fallen, collided with something or someone and/or been collided into while using their cell phone on the streets of São Paulo — whether driving, walking or cycling. Of these 72 people, a large portion (76.4%) suffered a casualty by themselves.

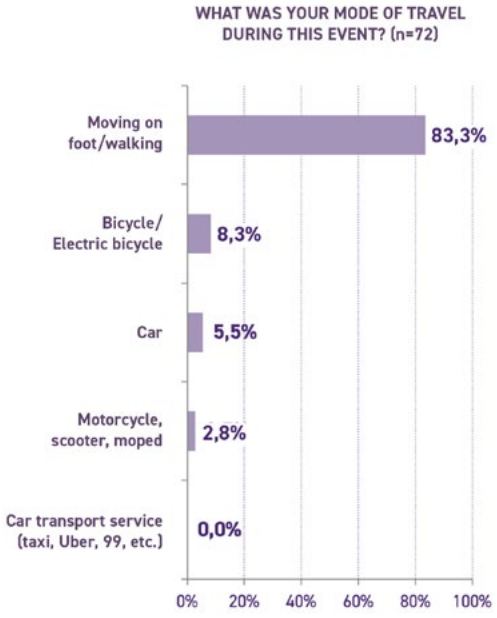


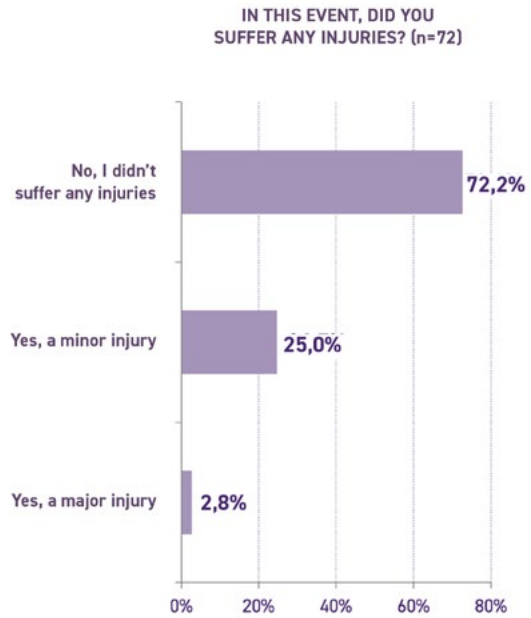
Source: Organization 2023.

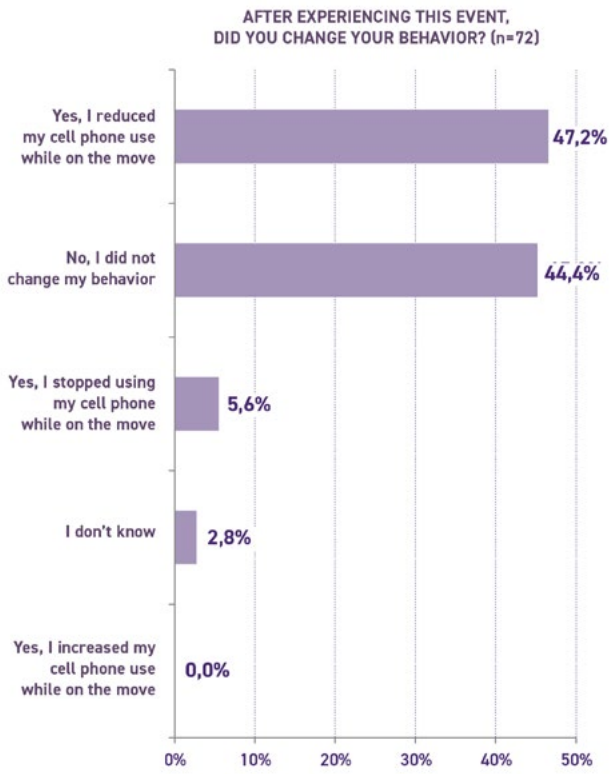
Among those who experienced dangerous incidents while on the move, **83.3% were walking, 8.3% were cycling and 8.4% were driving** (of which 5.5% were driving cars and 2.8% were driving motorcycles).

Still within this group, **27.8% suffered an injury at the time**, of which 25% suffered a minor injury and 2.8% suffered a serious injury.

Finally, it's noteworthy that **44.4% of respondents did not change their behavior** regarding cell phone use after the event. Another **47.2% said they had reduced their use of cell phones** and a much smaller percentage (5.6%) said they had stopped using cell phones after the event.







"I was cycling, and when I tried to use my phone, I crashed into the rearview mirror of a stationary car, breaking it"

Black male, 32, delivery cyclist. Recife

"Both people weren't paying attention. I was replying to a message, the other person too, and both bumped into each other. But it wasn't anything serious, we just apologized to each other"

Black female, 32, janitor. Rio de Janeiro

VIEWS ON RISKS OF CELL PHONE USE DURING TRAFFIC

For this question, respondents gave their views on the risks of using a cell phone for each mode of travel on a scale of 1 (very low) to 5 (very high). For views that regarded the risk as very high, the answers were as follows:

79.5% view the risk of using cell phones as very high for motorcyclists;
74.8% view the risk of using cell phones as very high for car drivers;
68.9% view the risk of using cell phones as very high for cyclists;
50.7% view the risk of using cell phones as very high for pedestrians.

"I think that especially the ones who drive are the most dangerous of all, because in just a microsecond they can get distracted and be unaware of the hundreds of factors that are happening on the road. After that, motorbikes and bicycles"

White female, 46, translator. Rio de Janeiro

"A car may be the cause of an accident, but the people who are not in the car that will suffer more from that accident"

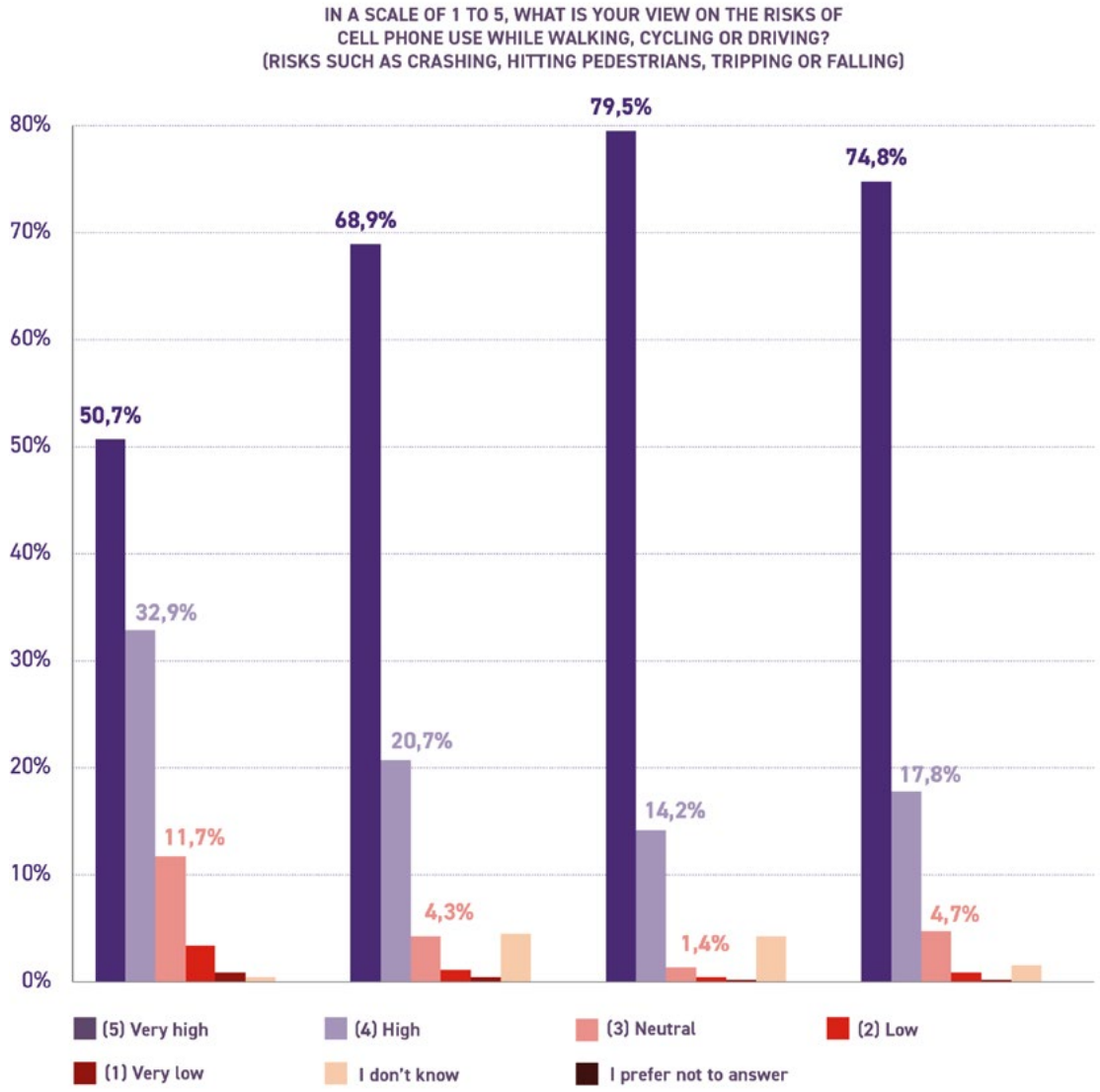
White female, 27, gardener. São Paulo

""For me, it's motorbikes that carry the most risk. After that, it's cars. But for cars you have protection from the structure of the vehicle. For motorbikes, the reaction time is smaller and you're more exposed"

Black male, 27, delivery motorcyclist. Recife

Black male, 32, delivery cyclis. Recife

"For me, all of them have risks, but car drivers cause more damage. Car drivers can hit a cyclist, or a pedestrian, and kill them. Cyclists, on the other hand, may cause a mild injury, not a major one"



CLOSING REMARKS

This exploratory study investigated the relationship between road safety and the use of mobile devices (particularly cell phones and headphones) by road users in urban centers such as pedestrians, cyclists, car drivers and motorcyclists.

Based on observation of these users, this study provides information on the use of cell phones and headphones in different modes of travel; among respondents, **77.8% have used a cell phone at least once while on the move, whether walking, cycling, driving a motorcycle or car**. As for frequency of use, **36.2% of respondents said they used their cell phones frequently or very frequently while on the move** and almost half of the sample **(48.6%) said they felt they needed to use their cell phones while on the move**. The reasons for using a cell phone are many, but the most common response among those who feel they need to use a cell phone on the move is for text messaging.

With technological advances and the importance of connectivity, cell phones and headphones have an impact on the daily lives of many users of the road system, where the degree of use of these devices varied between modes of transportation. With regard to the data collected by counting in the three cities, **11.9% of pedestrians, 26.8% of cyclists, 27.1% of car drivers and 57.1% of motorcyclists were observed using a cell phone or headphones while on the move**. Another noteworthy observation was the fact that motorcyclists and car drivers stood out both in terms of behavior (a higher proportion of use of portable electronic devices compared to other modes) and in terms of perceived risk **(respondents saw higher risks in cell phone use by motorcyclists and car drivers)**. It is important to stress that field research provides a perception at the time of counting, a snapshot—in other words, the data refers to a specific time and place, and it is not possible to infer generalizations about the observed behaviors.

It is also worth highlighting the data collected through the survey interviews in the city of São Paulo and relating them directly to the problems faced in terms of road safety and the cell phone use: **while on their cell phones, 16.3% of respondents have fallen, collided with something or someone and/or been run over while on their cell phones on the streets of São Paulo, whether driving, walking or cycling**.

Beyond just cell phone and headphone use, it's important to understand what leads people to behave in this way while on the move, even when most of them clearly recognize the risks of using these devices. **It is essential to point out that the responsibility for road safety is a shared one** — not limited to users of these roads, but also extending to various players across society—such as different areas of public authority, the big tech industry related to services and the use of technology, companies in the transportation and mobility industry, as well as organized civil society and the general population; therefore, a set of political and strategic actions is necessary for a safe road environment.

Source: Organization 2023.

ROAD SAFETY AND THE USE OF PORTABLE ELECTRONIC DEVICES

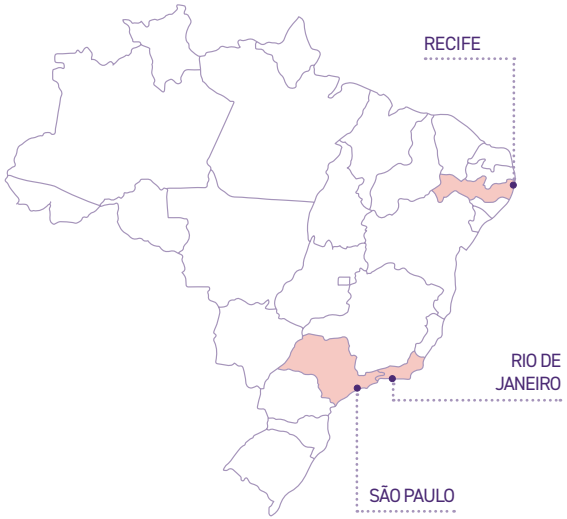
This study investigated how road system users in Brazilian urban centers use portable electronic devices (cell phones and headphones) while on the move throughout the city.

RESEARCH METHODS

Literature review:
Selection of benchmark studies around urban mobility, road safety, mental health, public health, technology and behavior.

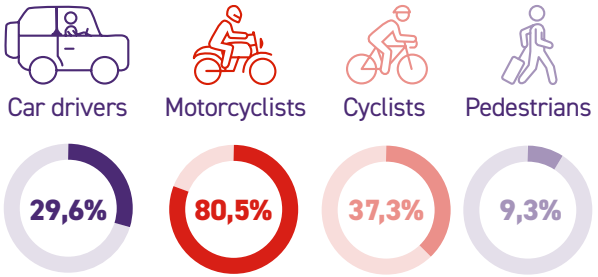
Secondary data collection:
Documentary analysis and compilation of best practices nationally and internationally.

Primary data collection:
Behavioral observation in São Paulo, Rio de Janeiro and Recife, application of a survey in São Paulo and semi-structured in-depth interviews.

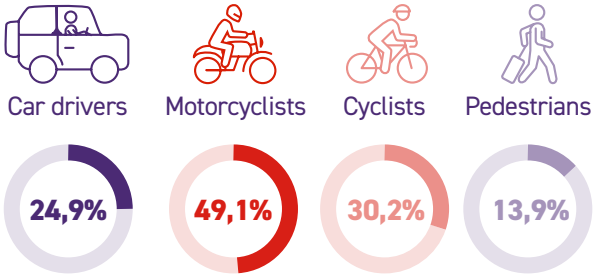


CELL PHONE AND HEADPHONE USE WHILE ON THE MOVE

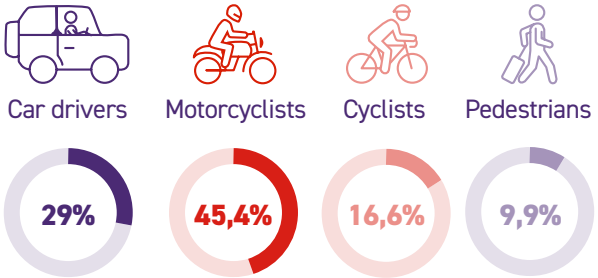
SÃO PAULO



RIO DE JANEIRO



RECIFE

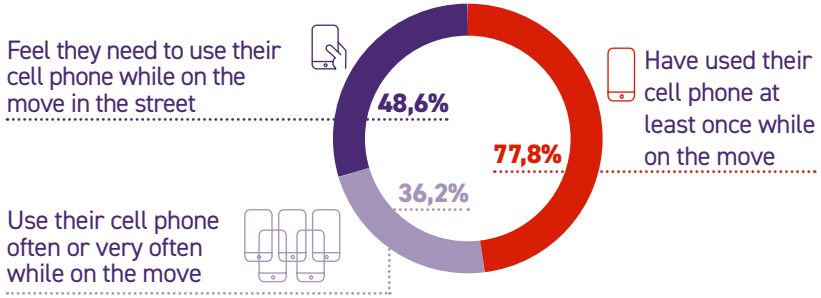


of respondents **have fallen, collided with something or someone and/or been collided into while using their cell phone on the streets** of São Paulo — whether driving, walking or cycling.

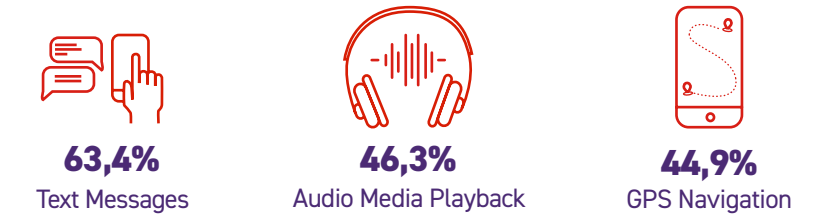
KEY SURVEY RESULTS

BEHAVIOR AND VIEWS ON CELL PHONE USE

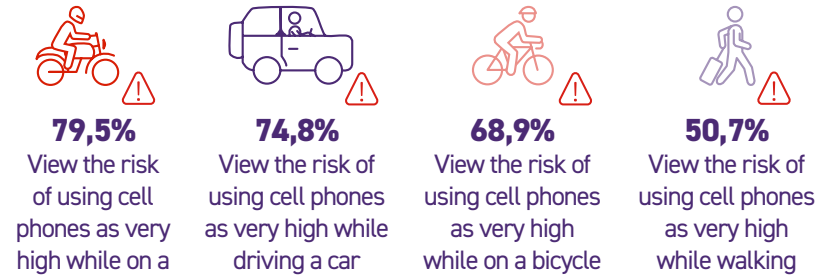
444 people were interviewed about their transportation on foot, by bicycle, motorcycle or car.



MAIN REASONS FOR USING CELL PHONES ON THE STREET



VIEWS ON TRAFFIC RISKS FROM CELL PHONE USE



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TERM GLOSSARY

Car drivers
Term used in this study to describe drivers of motorized passenger and utility vehicles.

Cyclelogistics
A relatively emerging concept used to define delivery services using bicycles or tricycles as a mode of transport.
Source: Fundación MAPFRE; LABMOB (2022).

Crossings
Crossings are defined as motorized intersections adjacent to the pedestrian network, and can also appear in the middle of a city block. Motorized crossings are typically found at the junction between sidewalk segments.

Crossings play an essential role in ensuring the safety of pedestrians, as they provide connections between sidewalks. They can occur at road level, when access to the crosswalk is required by lowering the sidewalk, or at sidewalk level, by means of a raised crosswalk.
Source:[1] ITDP (2016). Índice de Caminhabilidade - Ferramenta. [2] Manual de Desenho Urbano e Obras Viárias.

Decade of Action for Road Safety
Currently on its second edition, the Decade of Action for Road Safety 2021-2030 is resolution 74/299 of the United Nations (UN) General Assembly, carried out in an action by the World Health Organization (WHO) with the ambitious goal of preventing at least 50% of traffic deaths and injuries by 2030.
Source: ONU (2021)

Intersection
A road intersection can be understood as the space in the roadway where two or more roads meet.
Source: NOVASKI, M.; MEYER, L. F. V.; SCOTONI, C. Cruzamentos de São Paulo: aprofundando as análises de distribuição de sinistros. São Paulo, Brasil: Instituto Cordial.

Motorcyclists
Term used in this study to describe drivers of motorcycles, scooters or mopeds.

Motorists
Term used in this study to describe drivers of motorized passenger and utility vehicles.

Road Safety
Road safety refers to the set of rules and regulations that ensure the flow of people, buses, automobiles, bicycles and micro-modes on streets, avenues and highways, the main goal of which is to prevent traffic casualties, based on a harmonious relationship between people, vehicles and roads.
Source: Fundación MAPFRE; LABMOB, 2022

Safe Systems
The Safe Systems Approach, a key feature of the Decade of Action, recognizes that traffic is a complex system and places safety as a priority. It also acknowledges that people, vehicles and road infrastructure must interact in a way that ensures a high level of safety.
Source: UN (2021). Global Plan for the Decade of Action for Road Safety 2021-2030.
Source: ONU (2021). Plano Global - Década de Ação pela Segurança no Trânsito 2021-2030.

Vision Zero
Vision Zero is a road safety concept aimed at reducing traffic deaths for which the main premise is that no traffic death is acceptable. According to this concept, human life is the top priority in transportation planning and reducing casualties is possible through proper urban planning.
Source: Fundación MAPFRE; LABMOB, 2022

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