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Periurban areas: the barriers that hinder the use of bike and the practice of multimobility bicycle/train for utilitarian travels

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Abstract:

While there is a large need of decreasing the greenhouse gas emissions to limit the effects of climate change, the periurban areas (characterised by a low density and large distances to cover for utilitarian travels) involve a great dependency to the car, for the inhabitants. In this context, we asked ourselves why cycling is not more considered by the inhabitants, to make their utilitarian travels. To answer this question, interviews were conducted in different municipalities around the city of Tours, using a qualitative methodology. This approach allowed to define different profiles of users, depending on their familial situation, travel needs and work schedules. The barriers for the use of bike considering utilitarian travels, or for the practice of multimobility with bicycle and train were different for each group profile of participants. The research project allowed to conclude that the barriers dependent on the profile of the users: bicycle and multimobility bike/train are not suitable for every profile of periurban inhabitants.

Keywords:

Utilitarian bike, periurban areas, multi-mobility, train, greenhouse gas, air pollution

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Introduction

While there is a large necessity to reduce the greenhouse gas emissions, the development of sustainable travels is very slow. It has been years since the scientists denounce the urgency to reduce the emissions and limit the increase of the temperature, but the car is still the main mean of transport in France.

In parallel, since the years 1970, a large phenomenon of periurbanisation has been observed: people leave the urban centers to choose the space, the quietness and the proximity with nature. They are also attracted by these spaces because the real property costs are lower than in the urban centres. Due to the distance from the metropolis and the jobs (generally concentrated in urban poles), inhabitants of periurban areas must travel a lot and cover big distances in their daily life. As the public transport offer is limited in these spaces, inhabitants are dependent to the car.

Taking into account these two phenomenon, we can measure that there will be soon a dilemma between the necessity of this population to use their car and the development of public policies to limit it, going with the progressive shortage of fuel.

In this context, why is cycling not more considered for utilitarian purposes, as well as a transfer to other alternative means of transport such as the train in periurban zones? That is what is going to be studied and discussed in this research project.

First, the subject of climate change and main sources of greenhouse gas emissions will be developed, and the characteristics of the periurban zones will be given. The second part will be devoted to explain the choice of the methodology, of the recruitment of participants for the interviews and of the spaces studied. The finish with, the analysis of the interviews and barriers for the use of cycling as a utilitarian mean of transport will be given.

- I. Climate change and periurbanisation
 - A. A necessary reduction of gas emissions
 - 1. Climate change in the world

The Intergovernmental Panel on Climate Change (IPCC) published a report in November 2014, explaining that the Climate change is clear and is now certified by the increase of the average temperatures of the air and ocean, widespread melting of snow and ice and average rising of the sea level". The average temperature at the earth's surface has increased by + 1 °C between 1901 and 2012.

The conclusion of the report is clear: human activities, notably the use of fossil energies created an exceptional rise of the concentration of greenhouse gas, which changes the climate at a rhythm that was never saw before.

In this report, the IPCC explains that the increase of the sea level could be more important than what was predicted in previous reports. This fifth report anticipates an increase of the sea level between 29 and 82 cm until the end of the 21st century (2081-2100). Even if this can seem very abstract, a rise in the sea level of 1 meter would have a direct impact on one person out of ten, which represents 600 to 700 millions of people.

Extreme climate events will be more intense and more frequent. The fifth report anticipates that in average, the rainfalls will be more frequent at a world scale, by the end of the 21st century. The wetlands will be globally more humid and the dry lands will become drier. The experts also expect that the global warming creates more intense extreme meteorological events, such as more frequent drought, torrential rain and hurricane.

Only a decrease of greenhouse gas scenario could allow to maintain the rise of temperature under 2°C. This scenario could limit the extent of the climate change. To do so, the IPCC estimates that it is necessary to decrease the CO₂ emissions by 70 % by 2050 in comparison with 2010, to finally have a worldwide emissions equal to 3 billion tonnes of carbon equivalent.

Climate change is a global problem as the emissions of each actor have repercussions on all other actors of the planet. A worldwide cooperation is necessary to reduce the greenhouse gas emissions. This collaboration and the reduction of the emissions present several benefits which could motivate the interest in developing significant politics regarding climate change. Indeed, these politics could have a positive impact and could influence the achievement of the objectives linked to public health, food security, biodiversity, life quality, energy access...

2. The specific case of France: transport sector

According to a report called "The key figure of the climate" (*"Les chiffres clés du climat"*, *Ministère de l'environnement, de l'énergie et de la mer, 2015*), in France, as in the whole of Europe, the use of energy is the main source of greenhouse gas emission (71 %). However, in France, inside this energy part, the most emitter sector is the one of transport (28 %), whereas the energy industry is a relatively low emitter (11 %), because of the importance of nuclear electricity production.

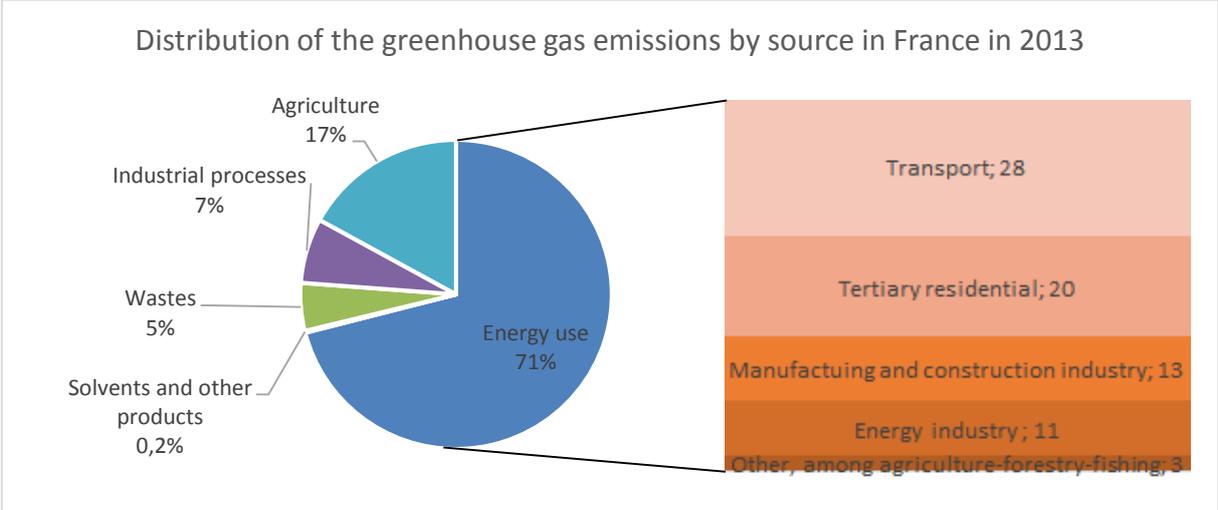


Figure 1: Distribution of greenhouse gas emissions by source in France in 2013 (Citepa, Climate Plan, Kyoto perimeter, 2015)

As showed in the previous chart, the transport sector is responsible for almost on third of the country emissions, with 28 % of total emissions in 2013. Inside this figure, it is necessary to distinguish the different means of transport, that is to say the road, air, maritime and rail. Indeed, the responsibility of the transport emissions are largely carried by the road. The stakes are particularly important for the road transport which represents, it only, 95 % of the

transport sector emissions as showed in the following graph. As a comparison, the rail-road transport is only responsible for 0.4 % of the transport sector emissions and the air transport for 3.4 % of its sector emissions.

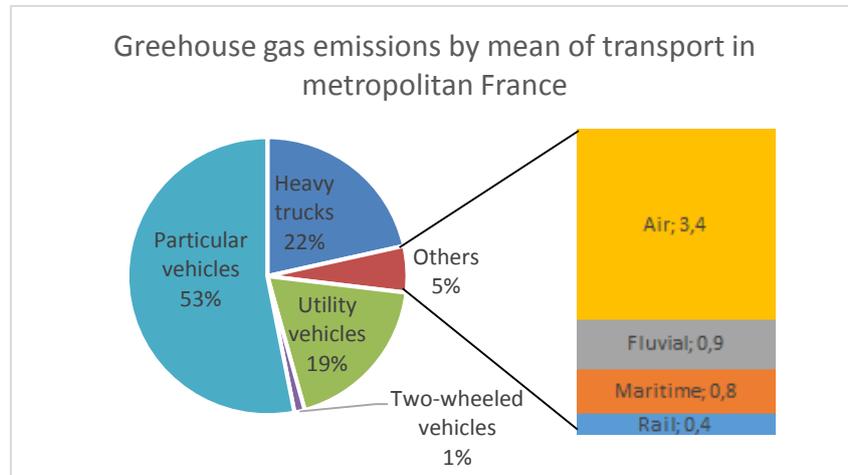


Figure 2: Greenhouse gas emissions by mean of transport in metropolitan France (Citepa 2014)

Inside the road transport, it is quite obvious, looking at the graph above, that passenger cars are responsible for the most part of road transport emissions, with 53.1 % of the transport sector emissions! These emissions are slightly decreasing, partly because of the efforts of the car manufacturers. This dynamic should be reinforced with the measures taken at the European level in order to prolong the effort of decreasing the emissions.

The heavy trucks generate 21.5 % of transports emissions, and utility vehicles 18.8 %. These ones' emissions are increasing year after year.

The importance of the greenhouse gas emissions generated by the road traffic is the reason why the State wants to set up different kind of measures:

- encourage the development of vehicles that generate low emissions (electrical and hybrid vehicles for example)
- develop substitution fuels
- favour the modal shifting towards less emitting means of transport such as the train and the bike

For the period 2013-2020, France made a commitment with the other states of European Union, to decrease its greenhouse gas emissions by 20 % compared with the emissions in 1990. The law regarding the energy transition for the green growth sets as 40% the

objectives of greenhouse gas emissions by 2030 and 75 % by 2050, compared with the level in 1990. To reach this objective, the government set supplementary measures in all the emitting sectors.

After the Grenelle laws 1 and 2 for the environment, the law regarding the energy transition for the green growth, enacted in August 18th, 2015, constitutes the new framework in the fight against the effects of climate change.

This law for energy transition presents several main parts:

- The stakes
- The objectives
- Renovate buildings
- Develop clean transport
- Fight against wastes and promote circular economy
- Favour renewable energies
- Reinforce nuclear safety and citizens information
- Simplify and clarify procedures
- Give to citizens, companies, territories and to the State the power to act together
- Finance and accompany energy transition

Among all these themes, the field of mobility is one of the levers of this transition.

The part concerning the development of clean transport presents several objectives in order to improve air quality and protect the health of French people:

- Reinforce the means of combating air pollution
- Reduce the dependence on hydrocarbon
- Speed up the replacement of the fleet of cars, trucks, coach and buses by vehicles with low emissions
- Install 7 million charge stations for battery-driven vehicles by 2030

In addition to recalling numerical targets, the law provides for the creation of a national plan to reduce air pollutant emissions and a strategy for the development of clean mobility. The proportion of low emissions vehicles in the car fleet of the state and local authorities will

have to be greatly increased. It is the same for the car fleet of urban public transport services, scheduled or on demand.

Moreover, the law provides some measures in favour of sustainable mobility, including the deployment of electric charging infrastructure for vehicles, the increase of bicycle parking spaces, the creation of zones with restricted circulation, and the implementation of a bicycle mileage allowance.

The text proposes to facilitate the flow and parking of clean vehicles, bicycles and non-motorized mobility. The mobility plan becomes mandatory for companies with more than 100 employees on the same site.

The article 9B of the law stipulates that the development and deployment of public transports with low emissions of greenhouse gas and air pollutants are a priority regarding the requirements of the energy transition law and the need to improve networking and territorial accessibility. The same article states that for the transport of persons, the State encourages the modal shift of private vehicles from road to rail transport, road public transports and non-motorized transports.

Soon lanes dedicated to public transport on road?

In a period of one year from the enactment of this Act, the Government shall submit to the Parliament a report assessing the opportunity to keep a lane for public transport, taxis, carsharing, and carpooling when the vehicle is occupied by three people at least. This could be done on motorways and national roads having at least three-lanes and crossing over or leading to a metropolis.

The report should assess the impact that such a measure is likely to produce as regards the relief of congestion of the roads according to the hours of the day.

Measures in favour of the use of bicycles:

The development of the use of bikes and non-motorized mobility involve the deployment of a policy for dedicated infrastructure.

In order to allow as many people as possible to use these mobilities, France set a massive deployment target, before 2030, of traffic lanes and parking spaces reserved for non-motorized mobility, especially secure bike parking.

Companies which are subject to a corporation tax may benefit from a tax reduction equal to the costs generated by the free provision of a bike fleet to their employees. The bikes should be used only for the journeys between home and the workplace and the tax reduction should be limited to 25% of the purchase price of that bike fleet.

A mileage allowance is set: the employer pays all or part of the costs incurred by its employees moving with a classical bicycle or with an electric power assisted bike between their residence and the workplace, whose amount is fixed by decree. This support can be combined with the refund of transport subscription when dealing with a feeder travel to a train station or when the employee lives outside the perimeter of urban transport. This subscription is exempt from national insurance contribution, within the limit of an amount defined by decree.

The mileage allowance already have been tested out by 18 companies. The 15th September 2015, after 6 months of experiment, a positive assessment has been notices: the use of bikes for the home-work trips increased by 50 %.

A mobility plan is mandatory for companies with more than 100 employees

Within the framework of an urban mobility plan, every company involving at least one hundred workers on the same site as of January 1st, 2018 will have to develop a mobility plan to improve the mobility of its staff and encourage the use of public transport and carpooling. This mobility plan sets a long-term strategy to contribute to the reduction of greenhouse gas emissions of the transport sector and to change the behaviour of the company's staff. It may include teleworking measures, flexibility in working hours and development of parking spaces for bicycles.

The law regarding the energy transition for the green growth stipulates that there will be penalties in case of non-compliance. Companies which do not respect the obligation will be

subject to a warning from the organizing authority of the urban transport plan and will not receive technical and financial support from the Ministry of Environment and Energy. Furthermore, companies that do not meet the obligation as of January 1st, 2019 will not be able to tender for public contracts.

The creation of a rural mobility plan

The rural mobility plans explain in detail the regional framework of multi-modality, taking into account the specificities of low density territories in order to improve complementarity between public transport, users of motorized vehicles and non-motorized modes of transport. The rural mobility plan is developed on initiative of a public institution or, failing that, by a territorial and rural balance pole. It takes into account mobility plans of companies, public entities and educational institutions on the territory it covers.

B. Peri-urban's characteristics and peri-urbanisation phenomenon

1. Spaces less dense and less served by public services

The definition of peri-urban areas studied in this project, given by the INSEE is: "an urban area is a set of municipalities, in one piece and without any enclave, composed of an urban centre (urban unity) of more than 10,000 jobs and of rural communes or urban unities (peri-urban belt), of which at least 40 % of the resident population in active employment works in the centre or in the communes attracted to it.

Peri-urban areas are zones of low density, with a high polarization to the centre, where inhabitants have to go outside their municipality to work, and where public services are less developed. This last point is due to the low density of these areas. Indeed, it is difficult to operate frequent public services if there is not enough inhabitants to use them and to make it profitable for the municipality. Furthermore, the distribution journey, done by auto-buses for example, is hard to define as the inhabitants are more spread on the territory: the buses have to do many detours to serve the majority of inhabitants and the trip takes much more time than by car in this case.

2. Periurbanisation phenomenon

Peri-urban areas are defined by the structure resulting from the process of peri-urbanisation. It can be described as the landscape interface between town and country, or also as the rural-urban transition zone where urban and rural uses mix.

Over the past four decades, the peri-urban belts of French cities have both expanded and became denser. The Île-de-France region has played a pioneering role, as these two phenomena have emerged in the late 1960s. In most regions, the spatial expansion of cities has been particularly important in the early 1970s. It is this rural exodus phenomenon that preceded and led the peri-urbanization. Indeed, with the speeding up of the rural exodus, the population fastened heavily in urban centers because that was where we offered the most jobs. Soon, these cities have become repulsive because of the lack of space, the costs of living, the high rents, the noise, the pollution...

The development of a residential housing, on the outskirts of major cities, called "periurban", began in the 1960s. It accelerated in the late 1970s and early 1980s: at that time, the periurban belts saw their population increase by more than 2 % on average per year, while the city centers stagnated. After that, the movement slowed down between +1% and +1.5 %. The suburbanization have been coming back for ten years, with varying rates from one region to another. Part of agricultural or natural areas in urban peripheries became known as "artificial" zones, mainly due to the construction of individual housing.

Two phenomena have contributed to suburbanization: the increase of price per square meter in the city centers and the widespread use of private cars, combined with the improvement of road network. Suburbanization has been possible thanks to the generalization of mobility. The means of transport became more numerous, fast and capable of covering big distances, allowing suburban areas to enroll in the dynamics of cities.

This lifestyle matches a strong aspiration: owning an individual house and having green spaces nearby. The antithesis of the "big sets": more space, less noise, a garden... The desire

for ownership also plays a role: at a time when the future is more fragile, owning its house reassures. This became impossible for many in big cities because of the prices.

Urban populations, especially the middle classes, have therefore installed in periurban areas, where the living environment is better. These population wanted to keep close by the benefits offered by the city. Indeed, periurban people live twenty, thirty... fifty kilometers from the cities and in these areas, the dominant activities are farming and landscaping. The campaigns remain on average slightly poorer than the cities. The median standard of living (after taxes and social benefits) of urban space is 19,200 euros per year for a single person, against 18,800 euros for rural areas, or 2% difference (INSEE 2009). However, if the city is richer on average, the rand is wider than in rural areas, and disadvantaged populations are much poorer.

It is in urban periphery where the satisfaction of the living environment is the strongest and the sense of security is the most developed. However, this lifestyle depends heavily on the car and it suffers the consequences of rising fuel prices.

This periurbanization phenomenon has many consequences:

- a very important supply of working population in rural areas.
- the implementation of a new lifestyle in an environment which is originally rural
- the modification of landscapes
- soil sealing which creates an imbalance of the natural systems that regulate bad weather (fast thaw and heavy rains)
- conflicts between agricultural and urban activities
- sociological conflicts between "old rural" and "rurban" people
- the revitalization of rural areas, accessible from the cities, regarding the travel time
- the re-energization of very remote and rural areas which remained traditional country
- the intensification of the pendulum transport phenomenon

As explained previously, the periurban is by definition a space of mobility. Sparsely populated, with a low offer of jobs, equipment and services, and depending on one or several urban centers, it is an appreciated living environment thanks to its housing comfort. However, living in peri-urban areas requests to broad daily movements. The population living in peri-urban areas and concerned by the heavy pendulum transport phenomenon mentioned before, which characterize the link between peri-urban municipalities and the city center, are called the “commuters”.

C. A high dependency to the car

According to the INSEE, in 2010, 70 % of the working population in France were using their car to go to work. This proportion fell down of one and a half point between 1999 and 2010. The part of work trips made by public transport has increased by 3 points and represented 15 % of commuting in 2015. The 15 % of the remaining working population walk or travel with two-wheeled vehicles.

The use of the car significantly decreases only in large cities, while it maintains stable or increase in the areas poorly served by public transport. The share of car trips increased by 6 points from 1999 to 2010 in the spaces outside urban areas, at the expense of walk and two-wheeled vehicles. In these areas, travels by public transport represent an insignificant share of the trips, due to the low supply. However, in urban areas, the share of car use decreased by 3 points in favour of public transport.

The dependency to the car is particularly important in periurban areas because of the distances and the poor offer of public transport. This habit is slightly to change for several reasons:

- the public policies, as explained previously, which tend to fight against climate change and clearly want to modify the habits of mobility towards less pollutants means of transport
- the fuel rarefaction, which will certainly involve an increase of the prices. This would increase the mobility-budget of the people living in peri-urban areas: it will have an impact on the mobility conditions and more widely on the way of life of modest means' people. This could create a real isolation of low income population living in periurban spaces.

For the moment, the cycling represent in France a tiny part of shiftings: less than 5 % of the travels according to a study from ADEME. The main mean of transport in France for home-work trips is the car (73 %), followed by the public transport (14.9 %), the walk (7.9 %) and then the bike and powered two-wheelers (4.2 %) (ADEME, *“Les déplacements domicile-travail en 2009: résultats nationaux”*)

To conclude, peri-urban areas are dependent from an urban centre for work, so they have to travel a lot (it is what is called the pendulum shifting). These numerous travels represent a lot of fuel and a lot of greenhouse gas emissions. Yet the necessity to decrease these emissions and to develop clean mobility goes against the use of individual vehicles. Furthermore, the fuel rarefaction which could create a rise of the prices and therefore some difficulties for people with low incomes to travel is another reason to think about other means of transport.

In this case, it seems clear that the car use isn't a long term solution for mobility. The bike could be a solution for the trips in peri-urban areas. It has been years since the CO2 emissions have been mentioned and the necessity to change our way of mobility. But the bike hasn't been developed so much during all these years: why? The use of bike could reduce greenhouse gas emissions, the accidents, the traffic congestions, the noise, and increase public health due to the physical practise that it represents.

D. What barriers hinder the use of bike for utilitarian purposes?

The stakes and dissatisfactions explained in the previous part bring the following questions: what are the brakes for the use of utilitarian bike in peri-urban areas? And what could be done to increase the modal share of bikes in these areas, compared with car and public services?

As explained previously, the distances to cover, for example to go to work in the metropolis, from peri-urban areas are quite important. Therefore it may be quite difficult to only consider the bike, as a unique mean of transport from a point A to a point B. For that reason the study also focuses on the bike as a feeder mode of transport for multi-modality. Using two means of transport, the users could be able to cover the big distances between their

home and work. The question raised here is: what are the barriers for the use and development of bike as a full mean of transport or as a feeder travel mode for inter-mobility, concerning utilitarian purposes?

For this project the possibility of multi-modality with bike and train, or bike and public services will be studied. The choice was made not to study carsharing or the bike as a transfer mean of transport towards carpooling areas for several reasons. First of all, because the carpooling areas are outside the village whereas the train stations are generally inside the market town. Also because even if carsharing is better than using the car alone, it remains the use of the car which is a mean of transport with more gas emissions than the train. To finish with, we want to avoid the study of car use because one of the reasons why this project concerning bikes in periurban areas has been chosen was to answer the question of insulation. People of modest means who live in peri-urban areas to have a lower rent don't necessarily have a car, or at least use it as little as possible to reduce their petrol bills. The idea with the use of bike, or bike and train was to lower the gas emissions and the financial limitations. For the same reasons, the transport on request, available in certain peri-urban municipalities will not be studied in this project.

We make the hypothesis that the barriers for the development of utilitarian bike or for the use of multi-mobility bike/train depend on the travelling profiles of the users living in periurban spaces. That is to say that we expect bike or multi-mobility bike/train not to be adapted for all the profiles of users in peri-urban areas.

Answering the questions mentioned above, the study will highlight the factors that hinder the development of this active mean of transport and eventually find solutions to lift these breaks and make the development of this mode of transport possible. As mentioned in the previous part, the standardization and enhancement of bike use as a utilitarian mean of transport could have various positive effects. On the one hand it would decrease the gas emissions, noise pollutions, accidents, congestion, and public road network maintenance costs. On the other hand, it would better public health: less early death and less car spending. Even if the accident risk is higher than for a travel by car, it is widely compensated by the health benefits.

II. Research methodology and study panel

A. How to choose the methodology and to recruit the participants?

1. Qualitative or quantitative methodology?

To answer the research questions, two ways of study are possible:

- focus on the “offer”, which means think in terms of public policies, choices made by the elected people, place given to the use of bikes in new planning projects and maintenance projects. Besides studying public policies, this methodology involves data collection and analysis regarding the use of bikes and multi-mobility.
- focus on the “demand”, represented by the peri-urban population, which has to commute and travel every day. This approach involves qualitative surveys and questionnaire to understand the transport habits of one another, their perception of bike and their brakes and motivations to use it.

The second approach is selected as it is focusing on the population, its needs and apprehensions. Interviewing the population directly, instead of questioning elected representatives (who are less available), is more adapted to highlight the actual point of view of the concerned population.

To take into full consideration the travel needs of periurbans, a qualitative approach is chosen. It helps to understand the population practices, to give meaning to their mobility choices and to produce afterwards interpretative analysis.

A psychological and sociological approach for the interviews was preferred, compared with a quantitative approach raising statistics, because the use of bike could depend on the travel habits of the interviewees and also because some questions required a discussion, an explication, or the description of a feeling, which couldn't be given during a quantitative survey. Choosing a qualitative methodology, consisting on a discussion with the inhabitants and not on check boxes, the interviews gave more information about the perception and the feelings of the inhabitants. Qualitative interviews took more time than quantitative questionnaires, but the results are closer to the reality and the feelings of the inhabitants.

In order to collect the necessary data for the periurban mobility analysis, a field study has been made. Twenty-five interviews were made with inhabitants living in different periurban municipalities. This methodology is quite old and traditional in qualitative research projects which are meant for understanding and interpreting the habits and thoughts of the concerned population. These interviews consist on the dialogue between the researcher who is investigating and one or two persons who explain their habits in terms of mobility and give their point of view regarding the bike and the reason why they use it or not. The questionnaires were made up of two different types of questions:

- simple and direct questions (for example the kilometres they cover to go to work or for other regular activities, the places they spend time in every week...)
- open and more complex questions, which required the interviewee to think and ask himself/herself about his/her habits.

Through this methodology and these interviews, the work and research were always done at the individual level, understanding the day to day life of the interviewee. This approach helped to perceive the sociocultural reality of periurban inhabitants. The qualitative approach to the peri-urban inhabitants' daily experience also allowed to take into account every scenario, even the specific cases. These exceptions usually don't appear into a quantitative work because they are swallowed by the majority, whereas they are interesting situations.

The objective of this comprehensive study wasn't to come out with a quantitative generalization of the results to the whole of peri-urban spaces or inhabitants. The conclusion of this project are related to a specific sample of interviewees, living in peri-urban spaces with their characteristics and specificities.

It is possible that the participants had different speeches about their habits as they were feeling observed by the researcher. Furthermore they knew about the subject of the study and the interests of the experimentation. In a qualitative approach, the question of the results validity, of the reality which is observed, understood and interpreted can be asked. It is possible that the speeches given by interviewees on their daily life is in fact an image they

allow to give, which is a subjective representation of their daily practices. Knowing this, is it better to consider all the raw words or to qualify them?

The topic of mobility can especially be subject to speeches non representative to the reality. People adapt their words because they know what “shouldn't be said” or what is disapproved. For example during the discussions, some participants punctuated their speeches with “I used my car to go there because I had to buy something close by”, or “I use my car for this trip but I know I shouldn't”. An over-justification about the habits and the use of car and a feeling of guiltiness emerged, because they felt guilty using it, especially with regard to the car's image nowadays. Some participants declared that for now on they would do a particular trip by bike. It is difficult to know if they will really change their habits and behaviour or if they just said that in front of the researcher. About the feeling of guiltiness, it is also hard to determine whether it is real or just to submit to what people want to hear and what is popular to say and do. Hopefully, during the interviews, after a reminder that there were no judgement and no wish to sermon, interviewee felt more comfortable and the answers seemed sincere.

On the basis of psychological and sociological interviews, people were asked their travel habits, whatever the mean of transport, and then their perception of the bike (for example if they considered bike as a leisure, a sport or a mode of transport) and what as the first words to come to their mind when thinking about the bike. The question of the necessary conditions which should be combined to make them use their bike more often was asked, and also the reason why they used their bike, for cyclists. This part was to know better about the motivations and the brakes for the use of bike: why does people use it or not? The notion of eco-mobility and sustainable travel was also raised to understand if people have a sensitivity towards it, and if it was or not the major driver for people already using their bike.

2. Recruitment of the interviewees: a traditional method and the online fishing, through a cyclists' association

The 25 interviews realized made think about the way of recruiting peri-urban inhabitants. Two methodologies emerged.

The first one is quite traditional and consist in the solicitation of the personal network (friends, family and teachers) in order to identify persons that correspond to the criteria requested for the survey. After each interview, the person was asked about a reference of one or two other peri-urban inhabitants who could be opened to the survey, among their personal network.

This method using networks is useful because it allows to identify quickly and easily the majority of the inhabitants to interview, but it presents a major disadvantage. Indeed, with this way of recruiting people, the majority has the same way of living and similar socio-economical environments. For example if a person gives reference to a colleague or a friend, he or she is most likely to have similar way of life and to belong to the same social class. With this recruitment methodology, the panel isn't always diversified and this can put out of the study some profiles. For example it was impossible to find isolated people or workers in this survey. The contacts that were tried to be made with organisations working on the reintegration into the workplace were left without answer.

With this methodology, another important disadvantage is the fact that the majority of the interviewed people don't use their bike. Even if it was expected to have less people using their bike for utilitarian purposes than people not using it - because it is the trend and because the bike in periurban spaces is generally forgotten for utilitarian trips - it was important to interview some persons using their bike as a mean of transport.

For all these reasons, another recruitment had to be used, in order to complete the panel of participants and to make it closer to the reality.

The second methodology which was selected consists on contacting an association of cyclists. This kind of association has members with an interest for the bike, whether it is for sport, leisure or transport. Among all these people, it could be easier to find the persons who were missing in the panel of interviewees: people using their bike as a mean of transport, regularly, for utilitarian purposes. In order to reach these people, a short message was written on the online newsletter, explaining the project and the need of volunteers to realize the study. As the previous one, this method presents advantages and drawbacks.

The advantage of this methodology is to be able to reach various people, with different social status, which the networks method couldn't have allowed. Furthermore it allows to reach people having an interest for the bike, whereas the persons recruited by the chain of personal networks were sometimes forcing themselves to talk about the bike and show a real and deep interest for it. The major weakness of this recruitment method was the answer rate. Indeed, among 7,000 members of the association contacted, even if not everybody registered for the newsletter, only three of them answered. For sure they were the three best persons to interview! Let's say that with this method, the quality was preferred, over the quantity. This manner to reach people using the newsletter of a cyclist association also has the disadvantage to limit the access to persons who don't have access to the internet.

It is important to highlight that even if this "online" methodology allowed to reach persons using internet, all the interviews were done face to face, like for the traditional method. The use of the internet tool with the online newsletter was only to get in contact with the interested persons.

3. Think about the recruitment of different profiles of persons to have a relevant group

The objective for the study was to interview between 15 and 25 persons. It was essential to work on a sample as realistic as possible, composed with various individuals, as regards the types of mobilities. To do so, it was necessary to reach a certain variety in terms of place of residence and workplace, but also in terms of family situation, habits and constraints of mobility, and stage of life. Indeed, students for example have a daily mobility, with a regular timetable and they rarely have access to a car. They are often depending on other means of transport such as public service, train, bike or they travel with their parents if these ones can take them to school or leisure activities. Retired people have less fixed shifting, with a more unpredictable timetable, without being less full regarding the number of trips. From their part, the working population often have pendulum shifting every day, and often have access to a car. Even here, it will be possible to distinguish the working population with dependent child, to the effect that the child isn't autonomous and lives in the family home, with his parents, from the working population without dependent child.

The access to a bike wasn't a problematic question because 71 % of French periurban inhabitants (*Observatoire des mobilités actives, 2013*). During the interviews, it appeared that all of them had a personal bike. For the persons who don't have a bike it is often possible to rent one, whether it is for a long period of time or for a short trip, like "Vélib'" in Paris for example.

However, as explained previously, it was important in the study and in the panel of participants, to reach people using their bike often, for utilitarian purposes. We didn't expect to have 50 % people using their bike as a mean of transport of course, as it is not the trend and as the modal share of bike among other means of transport isn't even close from that percentage. The objective was to reach at least 15-20 % in order to be able to qualify the different points of view, between cyclists and non-cyclists. Of course, the points of view is different depending on the experience. People who don't use their bike often are usually scared, they are not used to the road and they often have prejudices. That is the reason why having both points of view was necessary.

4. How to analyse the data collected?

The 25 interviews conducted for this project represent many information, explanations, and the necessity to deal with the case by case situations. How to advisedly use these hours of recording, in an efficient way, to bring out relevant information which could allow to understand better the mobilities of peri-urban spaces and the place of bike in these trips? How is it possible, using qualitative interviews, discussions and case by case situations, to bring out perception tendency towards the bike, and barriers to its use?

In order to analyse the interviews properly, it was decided to translate some qualitative information into quantitative data. Even if the panel of interviewees is small, it could be possible to bring out some general ideas and recurrent points of view as regards the use of bike in peri-urban areas. As specified sooner in the report, the results of the study are only true for this specific group and in the area selected: Tours' region. It wouldn't be true to generalise these results and information to any place in France.

Furthermore, it is evident that interviewing only 25 persons doesn't create a representative group and cannot be the mirror of the reality of all French population living in peri-urban areas. However, within the allotted time for the project and the fixed objectives, this panel is important enough to bring out significant results, at the scale of the group. The study gives an idea of the brakes for the use of bike in the peri-urban spaces around the city of Tours.

As regards the process of quantification of the qualitative information, some data were translated from “text information” to a quantified data. For example, the first part of the questionnaire allowed the interviewee to talk about the movements he does in a week, or in a month for lower frequency. The goal of this first part is to understand the mobility of the person in order to bring out profiles of inhabitants. The distance and purpose of each trip were asked, as well as the mean of transport used and the possibility of multi-mobility (using two or more modes of transport for one trip, or deciding to change the mode of transport depending on the day of the week or the time granted for the trip, or other reasons). This information ended up in tables which were studied to define different shifting profiles of users.

Furthermore, during the interviews, some questions about the image of the bike, the motivation to use it and the reason why it was let in the garage (when it was the case) were asked. This ended with several points of view, of which positive and negative ideas concerning the bike and multimobility. All the interviews were analysed and the positive and negative points mentioned were grouped in different categories (cycle line status, theft, loads to carry or material to bring along...). This allowed to get out numerical data and percentages from the qualitative interviews.

B. Presentation of the territories and panel of study

1. Peri-urban spaces around the city of Tours

The peri-urban spaces are difficult to define and especially to delimit. Finding clear frontiers for these areas, situated between the urban centre and the rural spaces is not possible. As explained previously, we focus on what is called “polarized peri-urban” territories, which are under the influence of the nearest urban centre.

The following map shows the urban pole of Tours the periurban belt and the rest of the department (green-coloured).

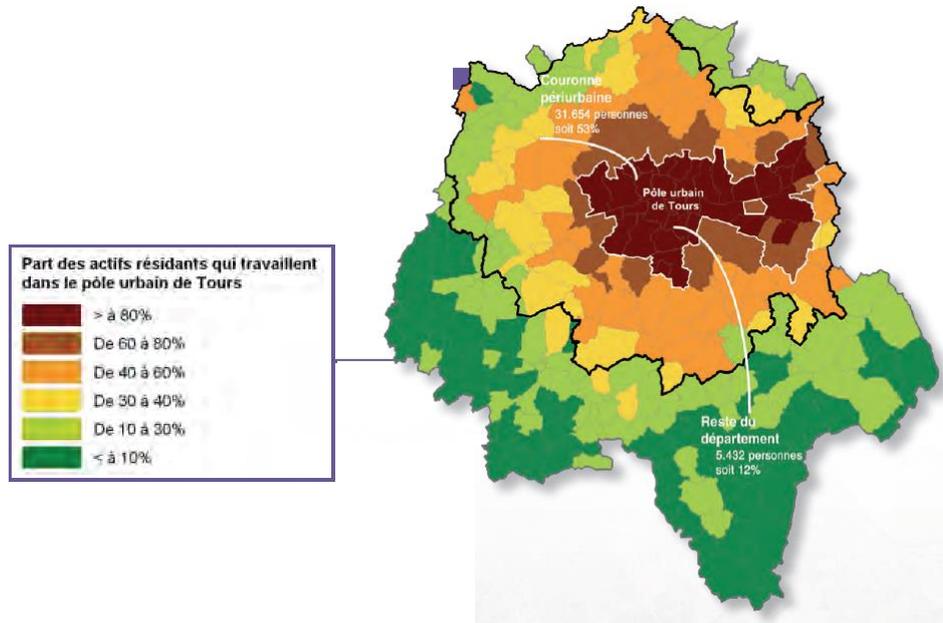


Figure 3: Map of the active population 's proportion in the department Indre-et-Loire's (Vues d'agglomération 2012)

To choose the studied sites, it was decided to take into account several criteria. The first one, which was explained in the first part of this report concerns the density of population and the dependency in terms of jobs, towards the urban centre. This definition brought out possible municipalities around the city of Tours. As it was difficult to make a difference between rural and peri-urban spaces with this definition, other criteria were used.

The public service network was used as a reference to be able to choose wisely the peri-urban spaces to study. This networks reveals the status of the municipality or site and the demand and the needs of the inhabitants. For example in the centre of the studied city, Tours, the network of public services, provided by “Fil Bleu” is very dense and the frequency is very high. In the centre there is the tram, which links the North of Tours, beginning in “Vaucanson”, to the south of city, in Joué-les-Tours, till “Lycée Jean Monnet”. The tramway has a very high frequency, especially during the peak hours. It is completed by several bus lines which cover the city centre with a high frequency, principally linking the North and the South, but also connecting West and East places. As we can see on the following map representing the Fil Bleu network in Tours and the area, it is really concentrated in the city

centre. From Tours-Nord and Saint-Cyr-sur-Loire to Joué-les-Tours and Saint-Avertin in the South, the network is dense and the frequency is high or quite high, depending on the time. Moving from the centre to outer municipalities, it is clear that the number of possible lines to move to or from the centre is much lower. Added to this, the frequency of the bus is lower, approximately every hour or half hour. We could define the municipalities receiving offer of public transport as such a frequency “close periurban”. It means that public services are proposed but the frequency is low and the tour possibilities are very poor. Are concerned by this reality several municipalities around Tours, such as Fondettes, Ballan-Miré, La-Ville-aux-Dames, Mettray, Rochecorbon, La Riche (which could be considered as being part of the urban centre, due to its high density of population), and Saint-Genouph for example.

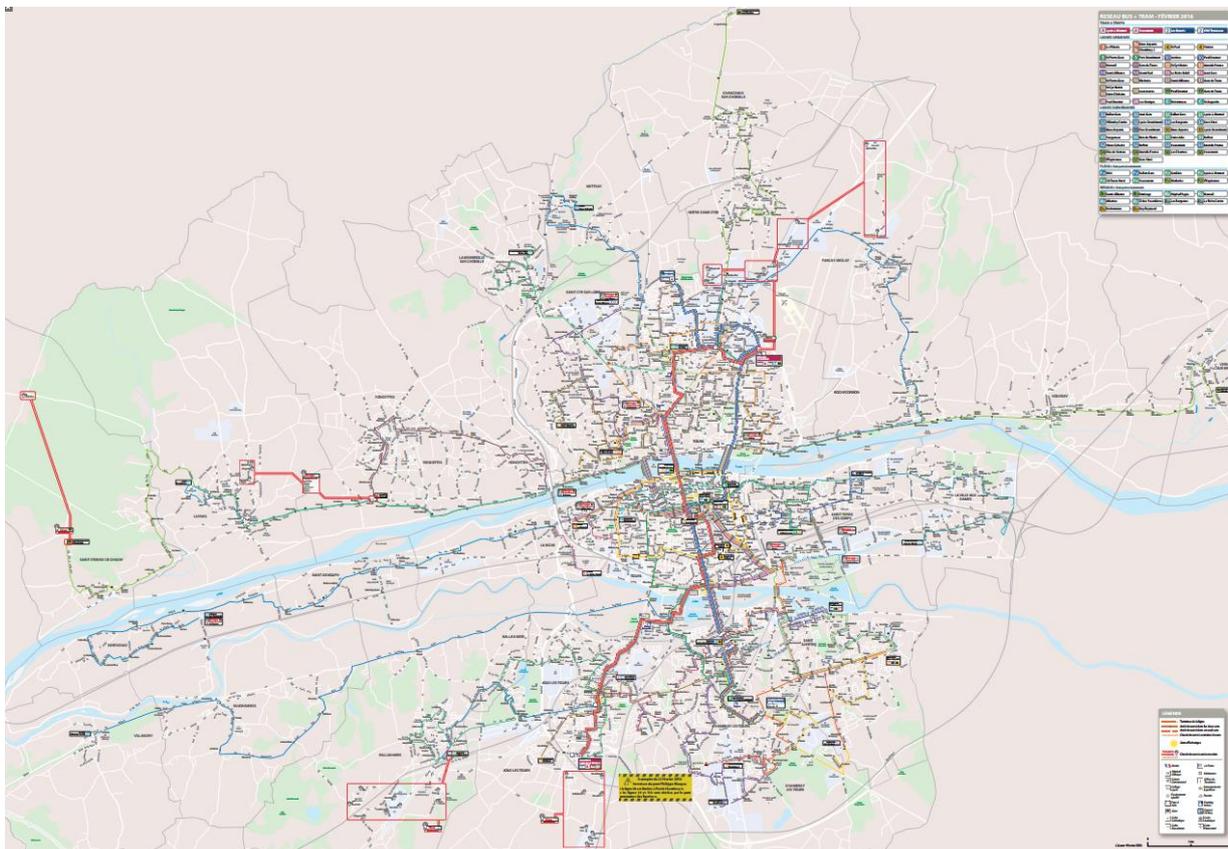


Figure 4: Map of the public transport in Tours (Fil bleu, 2016)

Of course, even if the public services propose a tour offer, it is also important to take into account the distance to cover. A municipality where there is a line bus, with low frequency but close to 15 km or more from the city centre will not be considered “close-periurban”. Therefore, in the study, Berthenay was considered “distant-periurban” as it is separated by

15 km from the centre of Tours city, even if there is one bus to reach there, and the “transport on request”, which is not studied in this project.

When the Fil Bleu network stops, it is “Fil Vert”'s turn to take over. With this network, it is possible to travel from Tours to many municipalities in the whole department of Indre-et-Loire. It covers all the directions and proposes a bus network which looks like a star with trips from the centre of Tours mostly. The distances covered by this web are much higher than the ones covered by Fil Bleu: they are up to 100 km, till the limit of the department. In many municipalities where Fil Vert stops, it is also possible to reach the train network (TER). Some municipalities covered by Fil Vert are interesting for the project. Of course not all the communes are eligible because in this network there are also rural spaces. As mentioned before, it is difficult to delimit and accurately draw the limit between peri-urban and rural spaces. In this study, the difference will be define taking into account the factor of distance. Cities covered by the Fil Vert network and within a distance of 20 km maximum from the city of Tours could be eligible. This distance is still manageable by bike for people who are used to it and have the physical ability to cover it. If it is not the case, the possibilities of using the train or the bus will be explored.

It is interesting to highlight the fact that according to the INSEE, these towns are divided the same way, under two different appellations:

- the “urban area”, considering Amboise, Ballan-Miré, La Riche, Fondettes, Mettray, Montlouis-sur-Loire, Rochecorbon, Saint-Genouph and La-Ville-aux-Dames for exemple
- the “single-polarized periurban communes”, such as Azay-sur-Cher, Berthenay, Cinq-Mars-la-Pile, Esvres, Savonnières, Veretz

This classification takes into account the number of inhabitants, dependence on the city centre and density of population. As mentioned before, the city of Amboise, although it is fare from the city centre of Tours (25 km), is considered as inside the urban area. This is because the eastern part of Tours is very dynamic and attractive. There are jobs in this area so the commune is less dependent on the city of Tours. Actually the city of Amboise welcomes 25% of the jobs of the territory. Regarding these characteristics, this city is not considered as peri-urban zone in this study.

At this stage it was necessary to choose some interesting municipalities which corresponded to the criteria fixed for “distant-periurban” spaces. After defining the centre and the close and distant peri-urban, three belts of possible communes were drawn. On the following map the areas which are not green represent the urban pole, urban city of Tours (comporting Saint-Cyr-sur-Loire, La Riche, Saint-Pierre-des-Corps, Joué-les-Tours and Saint-Avertin). The next belt in light green is the close-periurban, between the city-centre and big distances from Tours. The distant-periurban is represented in dark green. We explained sooner that it is difficult to delimit the spaces and make the difference between the centre, periurban and rural. So this maps gives an idea of the spaces that where considered.

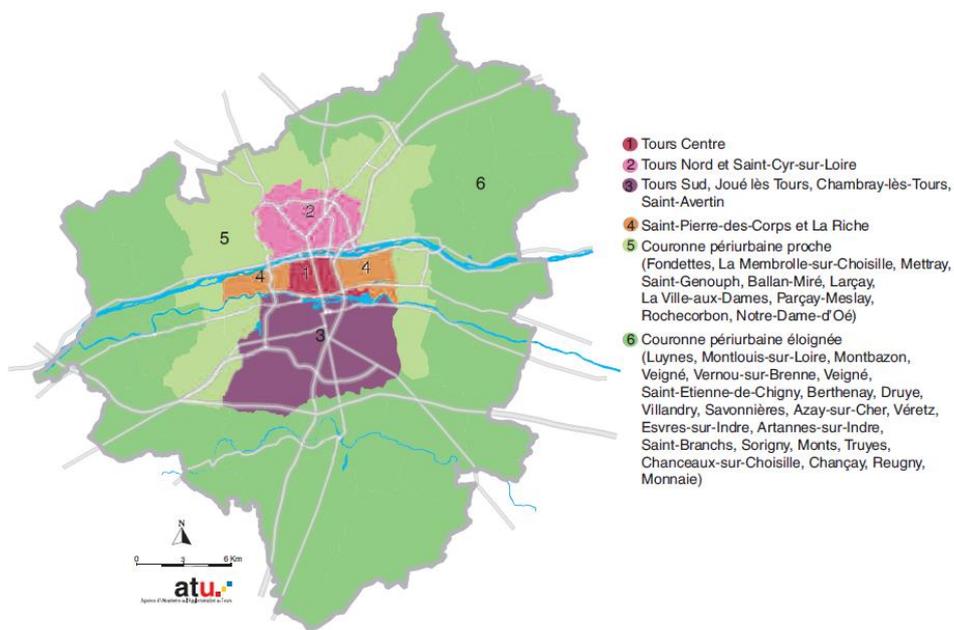


Figure 5: Belts of urbanisation around Tours (ATU, *Questions mobilité n°8*)

The interest of defining close and distant-periurban was to study the effect of distance from Tours, on the different spaces. Considering these belts and analysing the differences between the sites, the choice of the spaces to study was done looking at different axis from Tours to outside territories. For the selection, it was important to be able to compare the different municipalities according to several criteria: the distance from Tours and the access to a train station, to have a link with the metropolis city centre or to other peri-urban districts. Of course, the possibility to travel by bike was taken into account. Some roads are very dangerous to be used by bike around Tours: for example the D751 road to come from Azay-le-Rideau. We chose axis were the municipalities corresponded to the criteria of density, approximate distance from Tours and potential use of bike.

The chosen axis are the followings:

- to the East of Tours, the axis La Ville-aux-Dames / Montlouis-sur-Loire is interesting because these two towns have access to what is called “La Loire à vélo”. It is a bicycle itinerary laid out for easy cycling. Mostly thoughts for holidays and leisure, it is interesting to discuss the impact on the inhabitants’ mobility from or to Tours, on this axis.
- to the South-East of Tours, the axis Larçay, Veretz, Azay-sur-Cher is selected. Along the Cher River, there is a path, which is not laid out all along so it is interesting to know if the inhabitants think it is possible to use it for utilitarian purposes or if it is only passable enough for leisure and slow rides.
- to the South-West: Ballan-Miré, which is connected by “La Loire à Vélo”, as La Ville-aux-Dames. And it is also served by the train and there is access to the train station in the centre of the commune.
- to the West, there is La Riche, which is very close and almost considered as inside the urban pole, and getting around from Tours, the municipalities of Saint-Genouph, Berthenay and Cinq-Mars-la-Pile are interesting to cover for the interviews.
- just above the Loire River, the commune of Fondettes is also selected for the interviews. It is quite the same distance from Tours as Ballan-Miré but it is not served by the train. As mentioned sooner, Fondettes is served by three Fil bleu bus lines, of which two are passing along the Loire River, in the lower part (in terms of geography and in difference in height) of Fondettes, and the third one in the upper part, inside the most dense part of the municipality. Without the train, Fondettes' inhabitants, if they don't want to take the car or the bus, have to use their bike for the entire trip, as the multi-modality bike/bus isn't possible (or just by going to the bus stop by bike and then find a place to park the bike where it is possible, as there is not secured bike parking over there).

The train station criteria was considered thinking about the possibility of multi-mobility. Indeed, with a train station in the municipality, it is possible for the inhabitants to reach it by bike, which generally represents a short distance, and then to let their bike in the train

station or to put it in the train and finish their trip by bike in the centre of Tours or in another periurban commune.

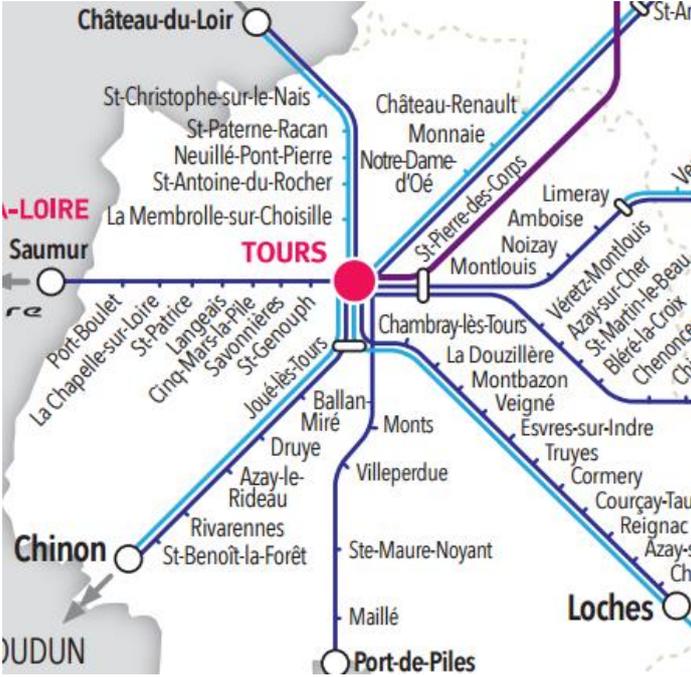


Figure 6: Map of the rail network around Tours (SNCF, TER, 2016)

About multi-mobility bike and train, another criteria was taken into account in the research for communes to study. Up to now, the research only focused on periurban communes around Tours. So we talk here about interviewing people living outside the metropolis and commuting to Tours regularly. Another possibility is to consider people living in the centre of tours and working outside. Of course it is less common considering little periurban municipalities. In general people living in periurban spaces have to go to the urban pole to work because there isn't a lot of work in their commune. It is the dependency of the periurban areas to the urban centre, as explained sooner in this report. This means that it is rare to have people living in the urban centre and working in small villages of the periurban belt. However, it is common to have people living in the urban centre and working in another urban centre, that is to say in another town of the same size or bigger, or in municipalities running on from the centre of Tours, such as Amboise. In the case of Tours, it is quite common to count inhabitants of the city centre working in the city of Blois. This city is about 60 km from Tours, it has a lower number of inhabitants (around 46,000 against 135,000 in Tours), and a lower density of population (1,220 inh/km² against 3,900 inh/km² in Tours). One of the interviewees lives in the centre of Tours and works in Blois, putting his bike in the train to use it again once he has got there. Another interviewee lives in Fondettes

at the limit with Luynes and he also works in Blois. He lets his bike in the train station of Tours and goes to Blois by train, finishing walking from the train station of Blois to his workplace.

Considering the axis mentioned before, an analysis was done on the possibility of comparing the potential cities. Several levels of comparison are contemplated:

- Berthenay and La Ville-aux-Dames are both quite far from Tours and both alongside the river, which means that the level is flat to go to the centre of the urban pole. The difference is that Berthenay's inhabitants, further than Gynepolitains compared with Tours, have the possibility to take the train in Savonnières' train station.
- Fondettes and Ballan-Miré, as mentioned. Both are situated at the same distance from Tours and both are at the top of a slop. Of course it is not the Everest but it can discourage more than one. The difference between these two communes is the access to the train services: Ballan-Miré being the most fortunate of both with the train passing quite in its centre.
- as explained previously, the other chosen axis aim is to see if the distance has an effect on the usage of bike.



Figure 7: Topographic map of Tours' region (topographic-map.com)

As a table is better than a long speech, here are the selected communes, after the study of several criteria: their density of population, distance from Tours, integration in Fil Bleu or Fil Vert services in order to define whether they are in the close or distant-periurban, and their access to the train.

	Density (inh/km ²)	Distance from Tours (km)	Fil Bleu services	Close-periurban	Fil Vert services	Distant-periurban	Train station access
La Riche	1258	5	X	X			
Saint-Genouph	222	8	X	X			X
Berthenay	102	15	X			X	X (train station of the commune of Savonnières, 2,5 km from Berthenay)
Cinq-Mars-la-Pile	170	20			X	X	X
Ballan-Miré	305	11	X	X			X
Larçay	217	10			X	X	
Azay-sur-Cher	133	19			X	X	X
Veretz	317	15			X	X	X
La-Ville-aux-Dames	633	9	X	X			
Fondettes	318	8	X	X			

Figure 8: Table of the characteristics of the chosen cities

The following map represents the place of residence of the interviewees with their travel to go to work. In green the trips done by bike and/or train (alternative means of transport). The triangles without arrow represent retired interviewees (four in Azay-sur-Cher, two in Ballan-Miré and one in Fondettes). As mentioned before, the one living in the centre of Tours is considered in this study as he works in Blois. The person living in La Riche is closer to Saint-Genouph than to Tours and she was using her bike quite often so her profile was interesting in this project.

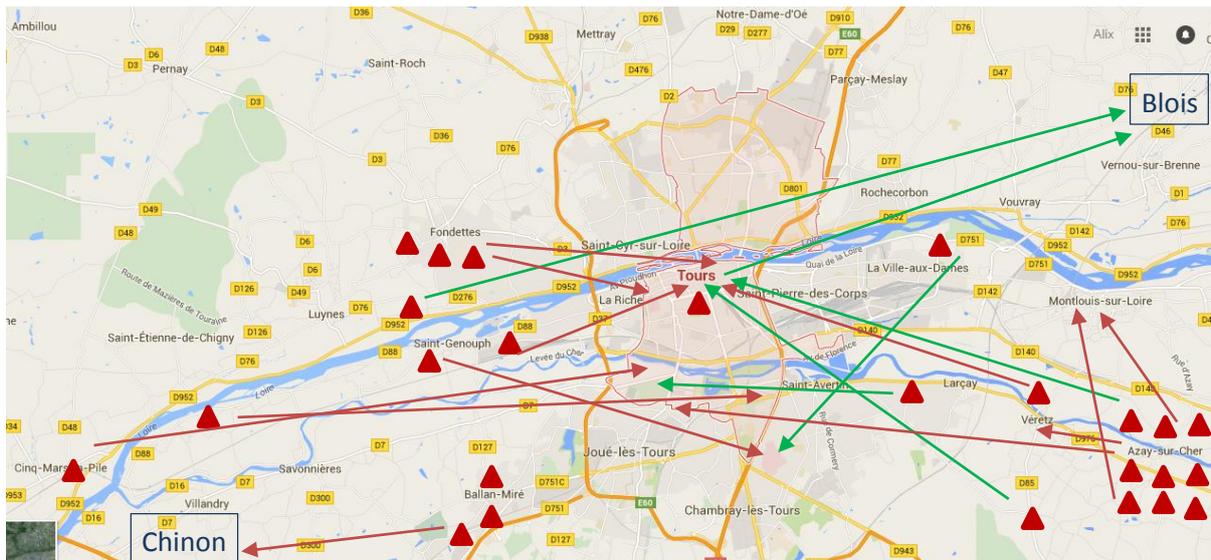


Figure 9: Map of the places of residence of the interviewees (red triangles) and their trip to their workplace (red arrows when using the car, green arrows when using alternative mean of transport)

As explained previously, two types of territories are represented in the interviewees. The 25 interviews were conducted among the following repartition in terms of place of residence.

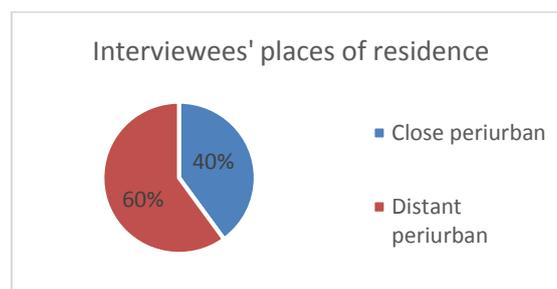


Figure 10: Distribution of interviewees by place of residence

The analysis of the sample shows that the representation of people living in distant-periurban zones is a little bigger than close-periurban areas. As the sample is quite small, it is only a difference of five persons. This can be explained by the fact that the traditional method was partly used: use the personal network and ask to each interviewee to propose one or two names of persons who could accept to be part of the study.

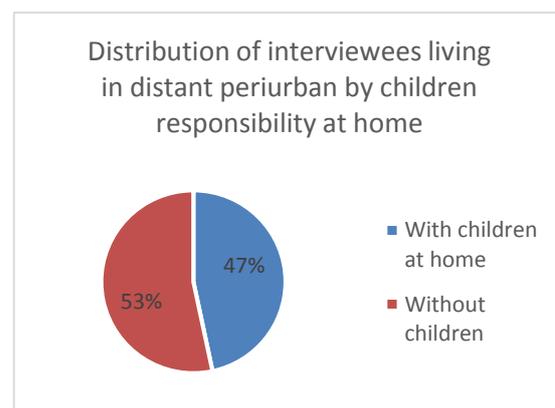
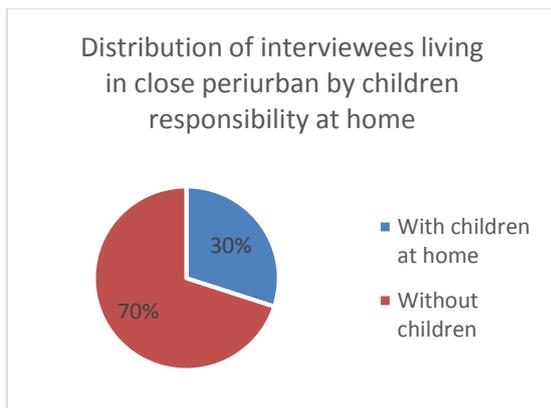
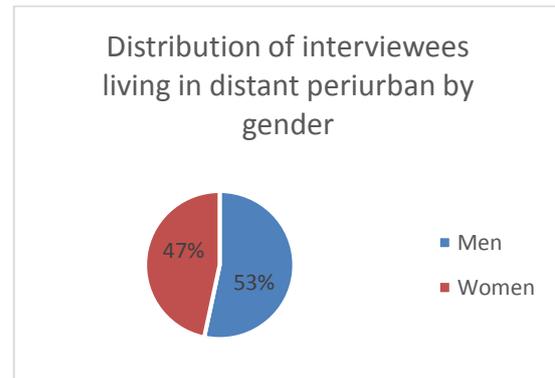
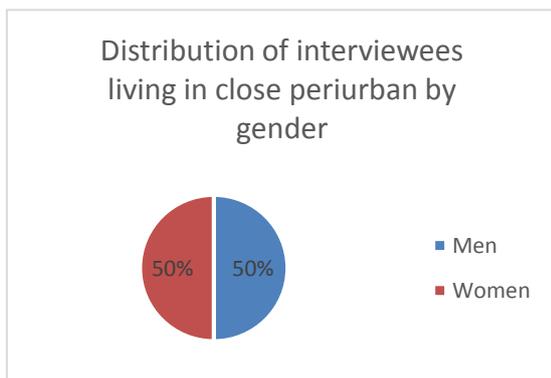
However, as showed on the map of geographical repartition of participants, various and spread communes where studied around Tours. There was quite a densification of interviewees around Azay-sur-Cher which will be lessened by the fact that the inhabitants where working in different zones.

2. Characteristics of the panel of participants

a. Socio-demographic distribution of the panel

If the objective in terms of number of participants was reached for the study (25 when the objective was between 15 and 25), the difficulties encountered during the recruitment of participants didn't allow to obtain a perfect balance of the interviewees in terms of socio-demographic characteristics. For example, the balance between men and women is very good, but the distribution between persons with children at home and participants without child at home is quite unbalanced, especially in close periurban communes.

The distribution of participants, by gender, family situation, age and professional situation is the following. Each characteristic is divided between close and distant-periurban.



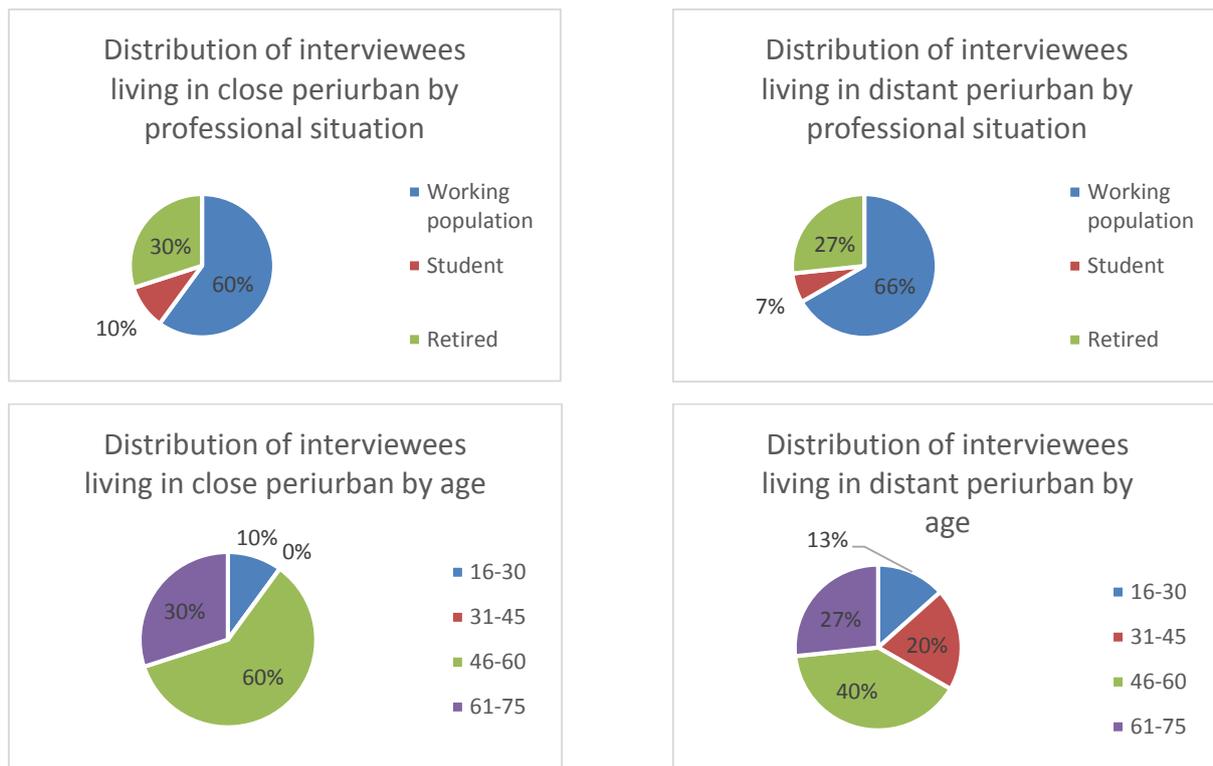


Figure 11: Sociodemographic characteristics of the panel

As the distribution of the interviewees isn't always balanced considering the age, this items won't be deeply studied for the analysis of the interviews. Other criteria will be taken into account in order to be more realistic.

b. Profiles of participants

During the interviews, it was always asked as a first part, the trips habits of the person, however the mean of transport used. After compiling and analysing all the interviews, it appeared that three profiles (inspired from the Synthèse INRETS n°33 Mai 1999, "Indicateurs de qualité de service et faits marquants sur 22 réseaux de transport urbain en Europe", page 29") could stand out:

- People unquestioning the use of car: they cannot consider another mean of transport that correspond to their needs. This category doesn't necessarily rejects other means of transport but they show a disinterest created by the representation they have of the shifting. In general, people of this group make many different transport shifts in the week, for their work for example, sometimes they have children to take to their activities and to school, and they don't want to spend too much time in transport. In

this case, only the car is conceivable to respond to their demand. Furthermore, this group adds that he got into the habit of using the car and that the reflex of the car is stronger than the thought of using public services or train or bike.

- People questioning the use of the car: they usually use their car but for some different reasons, they question their habits and try to organise themselves to move with other means of transport. These persons take information about train timetable if there is one in their commune, or about bus services, or they think about reorganising their week to use the bike during one day. The reasons why they question the use of car can be different for each person: sometimes it is the awareness for necessity to reduce the air pollution and to adopt sustainable means of transports, sometimes it is the will to exercise more often as the bike is always considered as a good way to improve health, and it can also be the displeasure to the use of car. Even if these persons won't totally forget their car overnight, it is possible to expect their modal transfer on other means of transport. They want to begin with multimobility in the sense that they could use another mean of transport once or twice a week. 100 % of retired people interviewed for this project are considered as "questioning the use of the car". They have sometimes more time, and often consider the walk for short distances.
- People using alternative means of transport: in the case of periurban they use their bike or the train (putting the bike in the train or not). This group is smaller than the two others, as the bike isn't used a lot in periurban areas and the distances covered are big. In the whole panel of participants, six persons correspond to this profile. Three of them are using multimobility bike/train or walk/train, of which two are taking the train until Blois (65km). The three others use their bike even for long distances, as one of them has been riding 15 km twice a day for work, for 20 years. In this case, their motivation is either the physical activity that it represents or the wish to do sustainable travels. Depending on the person, it is one of these motivations, or the other that is predominant.

The profiles of the interviewees are shared like this:

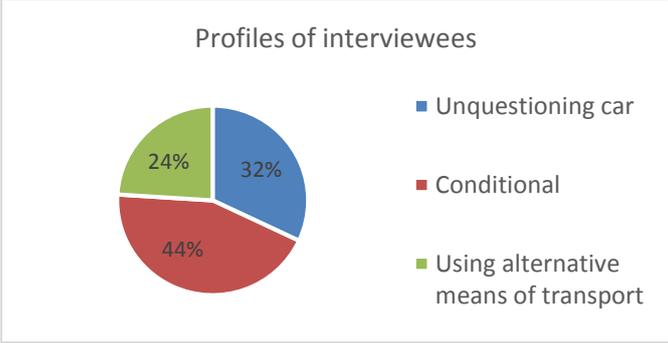


Figure 12: Distribution of the profiles of participants in the panel

It is sometimes difficult to define a strict profile for each person, as it is difficult to put people in boxes. For example, among the interviewees, there were 5 people biking for sport, riding more than 3,000 km each year. In this study they will be called racing cyclists. Among these people, two of them were already using their bike to go to work, and for the three others two couldn't consider to go to work by bike for professional reasons (many trips) or for the time they wanted to dedicate to their transport in the daily life. The last one, Mr V was ready to use his bike to go to work if it was 20km from his house (it is 35km at the present time). The racing cyclists are spread this way in the three profiles mentioned before:

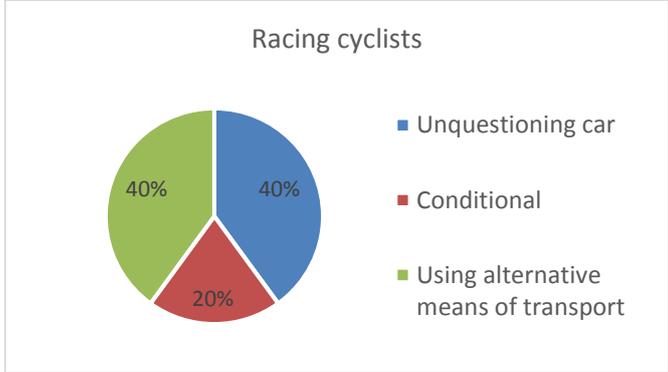


Figure 13: Distribution of the people cycling for sport in the panel

When recruiting people for the interviewees, there was a high wish to have a various panel with people using their bike and people not using it. Indeed, it was expected that the opinions and brakes for the use of bike would be different between people used to the bike and people who rarely ride, or use the bike as a leisure in the countryside.

Fortunately, the panel was various at this level and it has been possible to interview:

- People using bike as a mean of transport, every day of the working week, or at least more than 3 times a week: this group has a great experience of the “road” and they have removed some brakes already
- People using their bike once a week: in general, in the panel studied, they use it as a sport activity. Once a week, they take their bike to ride for 80-100 km. These persons have a good knowledge of the road and they have an experience of the relations between motorists and cyclists. However, they don’t necessarily consider their bike as a mean of transport for the daily life. Some of them could change their mind and be opened to let their car and favour the bike to go to work for example.
- People rarely using their bike, sometimes to buy some bread in the commune. These persons have really different points of view regarding the use of bike as a regular mean of transport. They have a priori that bike users don’t consider anymore.

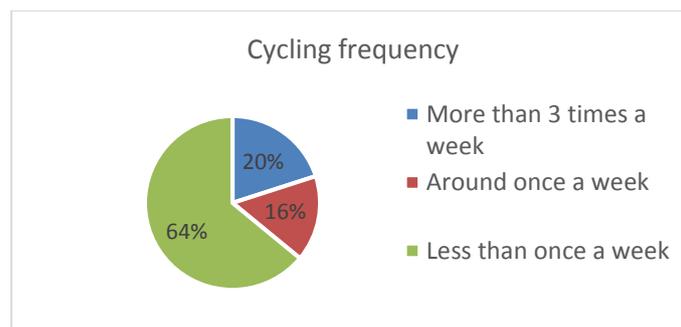


Figure 14: Cycling frequency by the interviewed persons

In the panel, there was a majority of persons not using their bike, or in a punctual way, which is representative of the reality. As mentioned before, the modal part of bike use is around 4 %. In this panel, the number of people with a certain custom of the road (utilitarian or racing cyclists) is bigger than in the reality and it is interesting because it allows to compare their point of view with the ideas of the non-cyclists.

Considering all this data on the profiles and types of interviewees, several comparisons were possible to highlight the barriers for the use of bike for utilitarian purposes in peri-urban areas. The interviews will be analysed in the next part.

III. Mobility in peri-urban areas: understand the brakes for the use of bike

The interviewees allowed to highlight 8 main categories of brakes for the use of bike in peri-urban areas or for the choice of multimobility (with train):

- Cycle lines and cycle itinerary
- Weather
- Loads to carry
- Time required for the transport because of the long distances
- Effort that bike represents
- Responsibility of young children to bring to school and activities
- Thief and lack of secured bike parks
- Multimobility train inappropriate

Each criteria will be developed and explained in detail in the following parts. Indeed, for each brake, the differences of points of view between the 3 profiles will be explained.

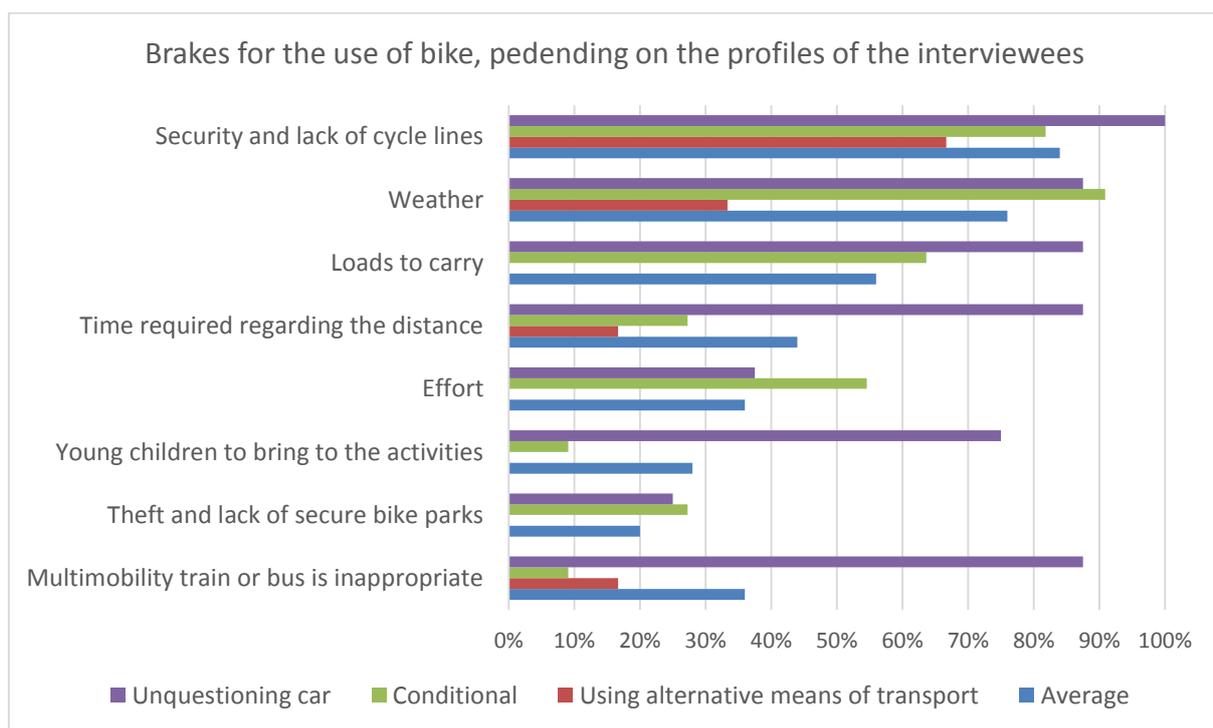


Figure 15: Distribution of the brakes according to the profiles of interviewees

This general graph shows at first site a difference of point of view between each profile, as people already using bike as a mean of transport removed a lot of barriers. French people living in communes of less than 2,000 inhabitants often quote weather (59 %), distances

(55%), security and accidents (36 %), relief (36 %), loads (23%) as the main brakes for the use of bike (Observatoire des mobilités actives 2012)

The analysis of the interviews brings quite to the same results, as the most quoted brakes are the same (even if the percentages are difference): lack of security and cycle lanes (84 %), weather (76 %), loads to carry (56 %), the time required to cover the long distances (44 %) and effort (36 %). We can notice that the security was much more quoted during the interviews than in the national study.

Before explaining in detail the different brakes mentioned above, the perception of people towards bike is highlighted. For some years, cycling practice has been growing in France, and notably in Tours. Contrary to popular belief, this mean of transport is no longer considered only for leisure or by people without the financial means to travel by car. Cycling is more and more used to go to work, make groceries, accompany the child to school ... and people with comfortable incomes are not the least followers (23% for managers against 14% for workers). Employees represent the most part with 33%, and professionals 27% (ATU, *Etude Ménages et Déplacements*, Tours, 2008).

The participants of the interviews were more numerous to consider bike as a mean of transport (48 %). Some of them even made a difference between working time and holidays' time because they had the habit to travel only by bike during holidays. In this period, the percentage was rising to 56%, as showed in the following chart:



Figure 16: Participants' point of view about bicycle use

- A. The brakes for the use of bike can be divided in 8 categories
 - 1. An obvious lack of infrastructure such as cycle lines and coherent cycle itinerary

The bike is struggling to find its place in urban units planned by and for the automobile. It would be inappropriate for the current French cities. Indeed, the first item to note is the lack of infrastructure in terms of cycle lines. Besides, this type of development is claimed by 90 % of French people (SOFRES, quoted by the ADEME, 2004). This lack of cycling infrastructure is a barrier to widespread cycling as a daily mean of transport since it affects the potential risk of accidents. Yet, one critic regarding the cycling practice is the accident-prone nature of this mode of transport. Currently, bicycle trips represent 4 % of trips in France, for 4 % of serious injuries and 4 % of persons killed in a road accident (Certu and Onsir 2000). The cyclist accident risk is equivalent to the risk of pedestrian accidents. If this percentage appears to decrease with the practice of cycling (see following diagram), it nevertheless remains a deterrent element.

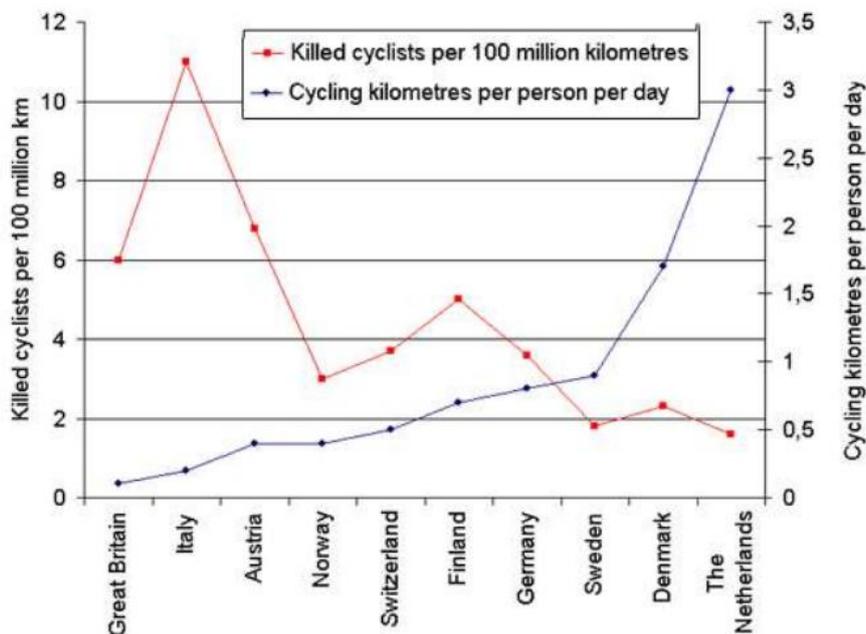


Figure 17: Relation between the number of kilometres rode by bike, per person and per day, and the number of killed cyclists for 100 million kilometres covered (APPA Nord-Pas-de-Calais, 2007, p. 7)

However, the risk of accidents for two-wheeled vehicles is up to 20 times the risk of bicycle accidents. Similarly, according to studies conducted in European, the probability of a serious accident (head injury, death) is much lower for cyclists than for pedestrians or motorcyclists

(ECF 1998). However, it is important to note that the risk of serious accident by bicycle is higher in conditions of reduced visibility, on roads with a fast flow of vehicles, at intersections and tends to increase with the age of the rider (Carré, 1995).

The peri-urban areas are exactly concerned by the roads of high velocity of vehicles. That is why the interviewees often quoted the security and the lack of cycle lines as a major barrier for the use of bike. For example, Mrs E., Mrs J. and Mr F., living in Azay-sur-Cher, denounce the high dangerousness of the road linking the centre of the village and the train station. It is the same for Mrs. G, living in Azay-sur-Cher and working in Montlouis-sur-Loire, who is scared to use her bike because of the lack of cycle line in the journey, the high speed of cars and the density of traffic in peak hours. In Fondettes, Mr Q., Mr R. and Mrs S agree to denounce the fact that the La Motte Bridge isn't planned for cyclists at all. People riding have to go to the Napoleon Bridge which creates a large detour, even if they want to go to La Riche. Mrs S., living in Fondettes and working at the hospital of Bretonneau was particularly denouncing the barrier that creates the La Motte Bridge because taking this way, it would be more direct for her to go to Bretonneau. Mrs T. and Mr Y., which have to cross Saint-Avertin both quoted the Arcole Bridge as a dangerous fragment of their trip they have to pass every day to go to work. Both use their bike every day, so this parameter don't stop them.

In general, people using their bike as an utilitarian mean of transport are not bothered by the lack of cycle lines. They mention it but it doesn't stop them. However, they, and the people who practice the racing cycling often mention the quality of the cycle lines. That explains the fact that 27 % of people using "other means of transport than car" mentioned this barrier: indeed, in this category, people using alternative means of transport mention the obvious lack of cycle lines (without being really bothered), the necessity to renovate some of them (because the roots destroyed them), the importance to separate the cycle lines from the pavement as pedestrians don't pay attention when they walk on the cycle lines and the need to better the signs of cycle lines.

Indeed, this last point is shared by all the profiles: the cycle lines are not signed enough, people who are not used to ride (and sometimes even those who cycle every day) don't know where they should be (right or left side of the road considering the position of the

cycle line which is not always visible, road or pavement) and the persons who ride for sport explain that it is very common to lose the way because the signs stop.

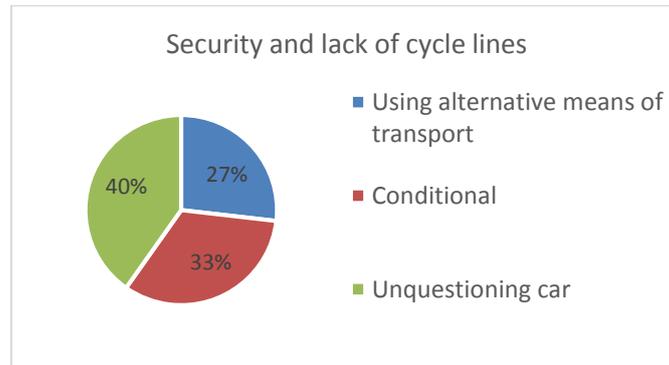


Figure 18: Distribution of the factor "security and lack of cycling itinerary" among the difference profiles

2. The impact of the weather on people's use of bike

Weather conditions are often mentioned as an important barrier for the use of bike. However, it should be noted that the point of view regarding this parameter very fluctuates depending on the profile of the person. "The more the practice is frequent, the less weather conditions matter." (*Observatoire des mobilités actives, « Les Français et le vélo en 2012 », 2013*).

Frequent bike users (at least a few days per week) are less sensitive to climatic conditions, and 22.4 % take the bike as often as possible, regardless of the time, while more casual people are only 2.6 % to have the same enthusiasm. Casual people are even 69 % to completely give up on the bike in case of rain or cold (31% of the frequent users)

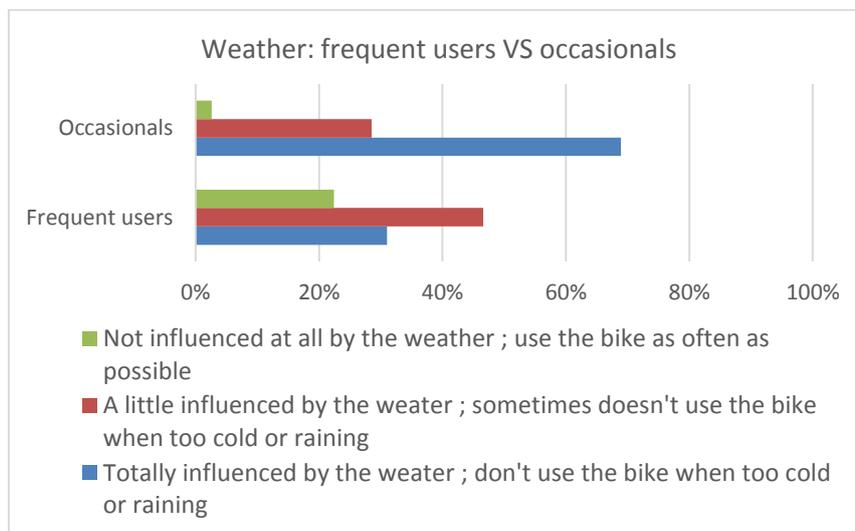


Figure 19: Influence of the weather on occasional and frequent bicycle users (*Observatoire des mobilités actives, "Les Français et le Vélo en 2012", 2013*)

Are weather conditions so annoying? The table below shows the number of days of annual rain in several European cities.

Berlin	68	Rennes	77
Toulouse	69	Lyon	77
London	70	Strasbourg	81
Amsterdam	73	Rome	82
Paris	75	Lille	83

Figure 20: Table of the number of rainy days in some European cities (Météo France)

These rainy days represent 18 to 23% of the days in a year. But even in these shower days, it does not rain continuously. In reality, we find that those who regularly practice the bike do it in summer and winter. It is a matter of habits and equipment.

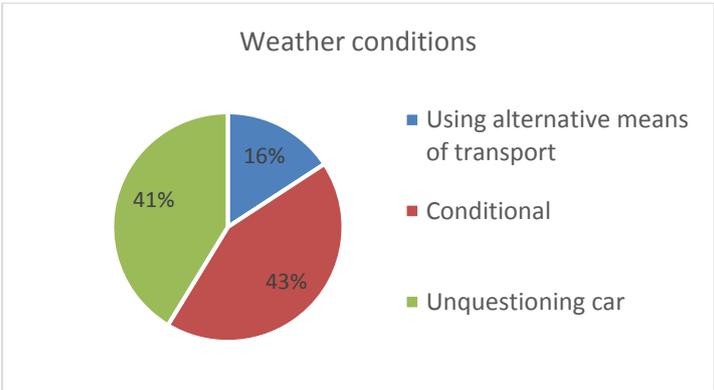


Figure 21: Distribution of the factor "weather conditions" among the difference profiles

Indeed, among the interviewees, it is clear that the proportion of people shrinking from the rain are not accustomed to ride a bike. The profile of people using alternative means of transport is generally less affected: only two of them were bothered by the rain, whom one was actually using the train, not the bike.

3. Loads to carry, an important factor that hinder the use of bike

It appeared during the interviews that the loads to carry where a barrier for people unquestioning car and conditionals (bag for the class, suitcase for work, groceries). Indeed,

this argument was never mentioned by people using alternative means of transport as they found solutions for it.

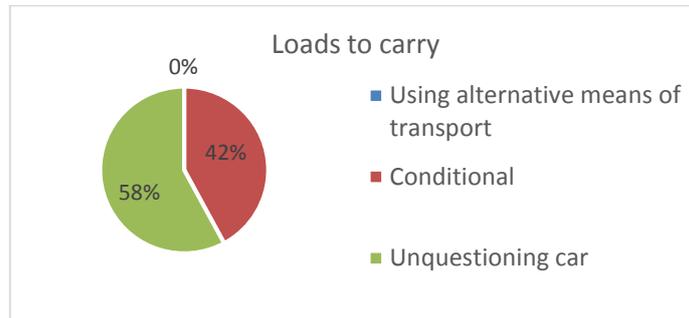


Figure 22: Distribution of the factor "loads to carry" among the difference profiles

4. The distances to cover represent a long time spent in transports

The periurban areas are characterised by long distances to cover as they are quite far from the centre, by a low density and a spreading of places of interest. If bike is faster than cars in the city centre, this reality doesn't concern the periurban spaces. Inhabitants of periurban areas cover 4 times as many kilometres per day than persons living in the centre of Tours. Also, the travels of periurban inhabitants emit 3 to 4 times as many greenhouse gas than inhabitants of the pole centre (ATU, *Etude Ménages et Déplacements*, 2008)

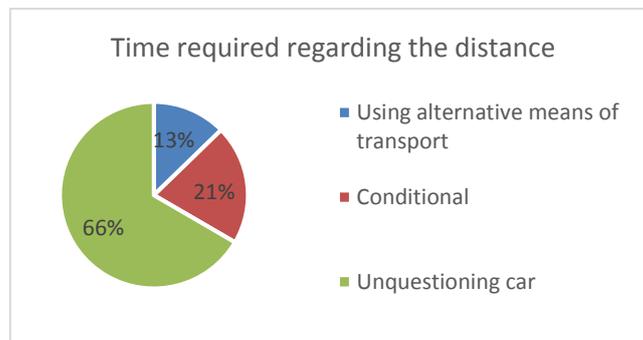


Figure 23: Distribution of the factor "distance" among the difference profiles

For this barrier, it wasn't so much the distance in terms of kilometres and in terms of tiredness which was mentioned. It was the time needed to cover it by bike or train. Among all the interviewees, 44 % mentioned it. Knowing this, it becomes a choice for the user, either he agrees to spend more time in the transports are not. Also, it can be mentioned that the barrier of the distance is only mentioned by one person among the panel of people using alternative means of transport: Mr F., using the train to go from Azay-sur-Cher to the city

centre. The five other don't mention it because they made the choice to cover the distance by bike and with the habit they don't need much time to cover the distances.

It is the influence of this parameter that even bring racing bikers, who like to ride, to still chose car instead of bike to go to work as they don't want to spend more time in the transport than they actually do.

The electrical assisted bike could be a real solution for this problem as it allows to ride until 25km/h. It could really change the approach regarding the long distances. When the maximum distance contemplated by the interviewees to go to work is 8 km, this data could be much higher with an electrical assisted bike! In fact, it has been mentioned quite often by the participants, with the regret that the price is still discouraging. Often cited, it could really change the approach to the distances.

5. The effort to mobilize when riding a bike can dissuade

Whether it is because of a slope in the journey, or because of a lack of training, the effort that bike riding represents put off 36 % of the interviewees. Indeed, the persons using alternative means of transport didn't mentioned it at all, as they are trained so they have the physical strength, and as it is in general one of the reasons why they choose the bike (challenge, push their limits, take some air, make a physical activity while going to work as they don't necessarily have the time to do it otherwise). One of the participant, Mrs M., who has one folding bike and a mountain bike, and who prefers to invest in bikes rather than in cars, mentioned the fact that in general people don't have the good material. In her opinion, people make heavy weather of the use of bike because they have old bicycles, heavy, with no brakes, not maintained.

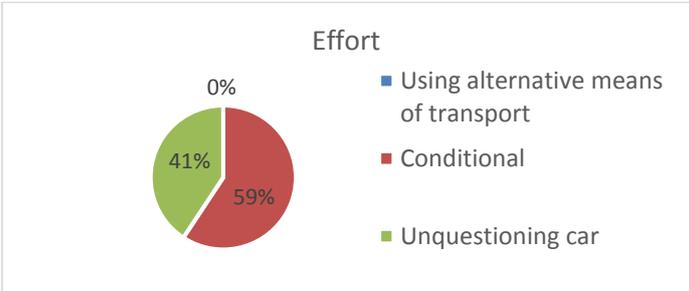


Figure 24: Distribution of the factor "effort to make" among the difference profiles

6. Bike is difficult to combine with children

28 % of the participants mentioned the difficulty they have to consider bike as a mean of transport for their everyday life as they have non autonomous children to bring to school or to their activities (sport or music). This goes with the fact that people want to gain time and to mutualise the trips (make groceries while the child is at his/her sport training for example). 90 % of the people unquestioning car made this comment because they have many trips to do in the week and they need to save time and mutualise the trips. As mentioned before, the distances to cover are long, so it is not possible to bring the children to their leisure activities by bike (buses and train are not conceivable as the timetable doesn't correspond are the trip isn't proposed).

However, this "children parameter" doesn't matter anymore in holidays periods. For example, Mrs G. and Mr H., who have the profile of unquestioning car in the daily life notably because they have two young children and many trips to make, don't hesitate to travel only by bike during holidays, and even to make road trip by bike with them.

This wasn't mentioned by people using alternative means of transport as only one of them has children at home. Actually this one, Mr A. is working in Blois, living in the centre of Tours: he goes to the train station by bike, put his bike in the train (which is always full of people with their bike), and then has 8 km from the train station of Blois to the company where he works. He explains that taking the train to go back home actually make him stop working and coming back home at reasonable hours (even if he still have to work at home sometimes, as he is a manager).

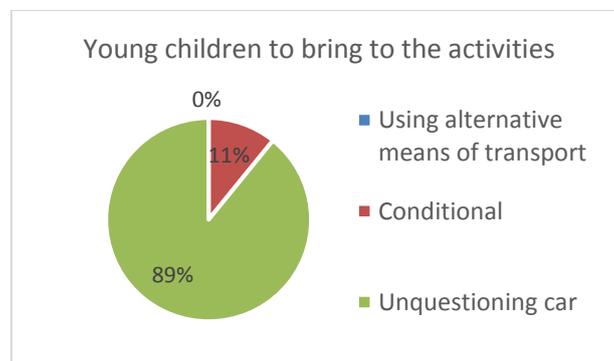


Figure 25: Distribution of the factor "dependent children at home" among the difference profiles

7. The lack of secure bike parks and theft can discourage

Several studies have shown that the theft risk is the second barrier to the use of bicycles after insecurity. It is true that 57 % of French cyclists have been robbed, and among them, 23 % would give up the idea of buying a new bike (Heran, 2003a). However in the Netherlands, cycling country by excellence (29 % of urban trips are made by bicycle, against 4 % in France), theft accounts for 6 % of the park each year (against 1.9 % in France). But that does not seem to discourage Dutch people.

There are many ways to prevent theft. First, it is notices that in almost 23 % of thefts, the bikes were not locked. It is also important to attach the bike to a fixed point, which was not the case in about 30 % of thefts. This must be done even in private places, half of the theft taking place in these spaces. Furthermore, 95 % of cyclists use a poor quality padlock. Let's recall that the U-shaped lock remains the most effective (approximately 30 euros). It is therefore highly recommended, although it can sometimes exceed the price of the bike! (*Fédération Française des usagers de la bicyclette*)

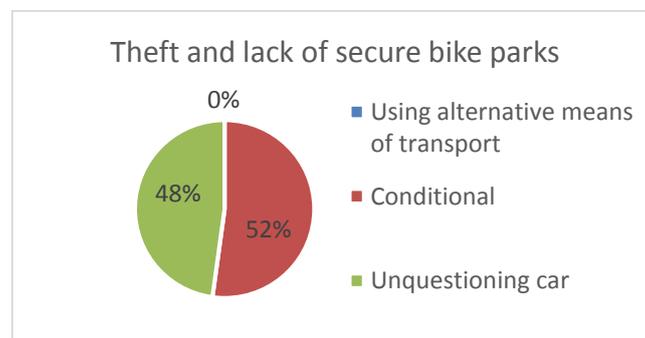


Figure 26: Distribution of the factor "theft and lack of secure bike parks" among the difference profiles

20 % of the interviewees for the research project are reluctant to use their bike because they are afraid of the theft and because they cannot park their bike safely next to the places they spend time in (work, groceries, leisure activities, shopping...). We will see with the example of the car that when it is easy to park, people are inclined to take their car, and conversely.

The car is king to join the workplace: it is for the home-work commuting that the car is the most used by the inhabitants of Tours region (73 %). Even the inhabitants of Tours Centre mainly use their car to get to work. This is explained in part by the easy access to a parking at

the place of work or study: 79 % of the working population and students of the SCoT territory easily park their vehicles at their place of work or study (ATU, *Etude Ménages et Déplacements*, 2008).

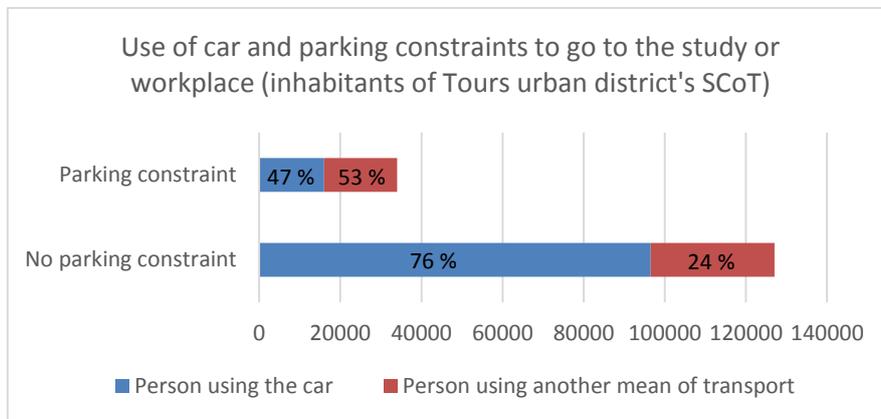


Figure 27: Use of car VS parking constraints, to go to the study or workplace, by the inhabitants of the SCoT of Tours (ATU, *Etude Ménages et Déplacements*, 2008)

8. When multimobility is inappropriate

Multimodal travel creates a "transshipment", that is to say at least one step in the trip, essential to change the mean of transport. This step is seen as a constraint by the user because it results in the extension of the transport duration (and often of the distance covered). Considering this, favour direct travels by a single mean becomes attractive. However, this would amount to predominantly favour automobile, whose flexibility is the major asset. (ATU, *Questions mobilité n°6*, 2010)

Favour intermodality involves to contain the use of cars. Consequently, various actions are possible to make travels using several means interesting:

- Limit the waiting time of connexions between two public transport services (more feasible when the public transport networks are clocked, which is difficult in peri-urban zones)
- Develop changing infrastructures in order to create the "proximity" between means of transport (where possible, the "platform to platform")
- Inform travellers about timetables, services, hazards ...

- Offer combined rates (one ticket for several public transport networks, a combined fare with car parking and transport ticket...) sizing the cheapest car parking supply to stations and park and ride
- Secure bicycle parks and develop bike itineraries stations, car parks and neighbouring districts

Indeed, for this last criteria, many of the interviewees couldn't use the train because there was no bike racks next to the station.

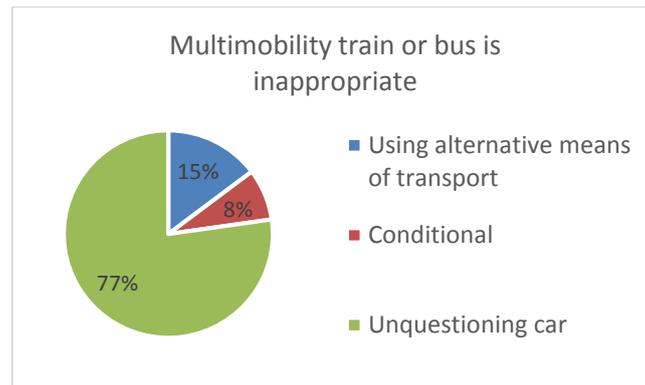


Figure 28: Distribution of the factor "multimobility is inappropriate" among the difference profiles

Public services don't answer the need of travels in periurban areas: train have low frequency and the service is not provided during the evening which prevent people to take it if they want to go to the cinema in the centre of Tours when it lasts late. Only one person, Mr F., living in Azay-sur-Cher, among all the participants is using it in a daily basis to go to class in Tours, close to the train station. Besides, he mentioned that there are often hazards on the train line which obliged him to find another mean of transport to go to school. Furthermore in Azay-sur-Cher, almost every interviewed inhabitants mentioned that the road to access the train station is very dangerous, especially in peak hours

Multimobility is an illusion in periurban areas of France as in the majority of the cases the service proposed doesn't correspond to the needs (circuits, timetable and information). In the majority of the cases, people mentioned a lack of information and awareness regarding the public transport and train services. This is an important barrier for people who could take the train but who don't know how to find the information (for example retired people who are not used to internet).

In Tours, there is a system to borrow bike but it is for a long last, not as the Velib' in Paris where it is possible to take a bike from a point A to a point B and to let it to a bike station. This choice made by the town isn't approved by the majority of the interviewees as they have no need for a long last rental.

B. Distribution of the brakes among the different profiles of persons

1. People unquestioning cars

As mentioned previously, the brakes depend on the profile of the persons, and the use of bike or the practice of multimobility isn't suitable for some profiles of people. Indeed, the brakes of the people considered as unquestioning car use are tightly linked with their way of living and their needs in terms of transport. The persons concerned can have staggered and changing working hours, it means sometimes begging very soon in the morning or ending late in the evening. Mrs C., Mrs L. and Mrs S. were concerned by this changing timetable, respectively living in Saint-Genouph, Azay-sur-Cher and Fondettes, and working in Trousseau hospital (Joué-les-Tours), Clocheville (Tours centre) and Bretonneau hospital (West of Tours). These persons also want to shorten their time spent in the transport. Other people for whom the bike isn't appropriate are people with young children who have many leisure activities, far from the house. In this cases, parents such as Mrs C. (Saint-Genouph), or Mrs G. and Mr H. (Azay-sur-Cher), want to optimize travels as often as possible, for example coupling groceries with a travel that they have to make. Another scenario make people unquestioning the car: cyclists that have the habit to use the bike as a sport, riding many kilometres each year, who use the car for utilitarian trips as they don't want to spend much time in the transports in their everyday life. These persons prefer spending their time for other activities.

As shown in the following chart, the barriers for the use of bike or multimobility are quite numerous for this profile of population, as the bike and the offer of public services and train don't meet their demand and transport needs. All the barriers have an equivalent burden at around 15 %, except for the theft risk and the effort that riding represent.

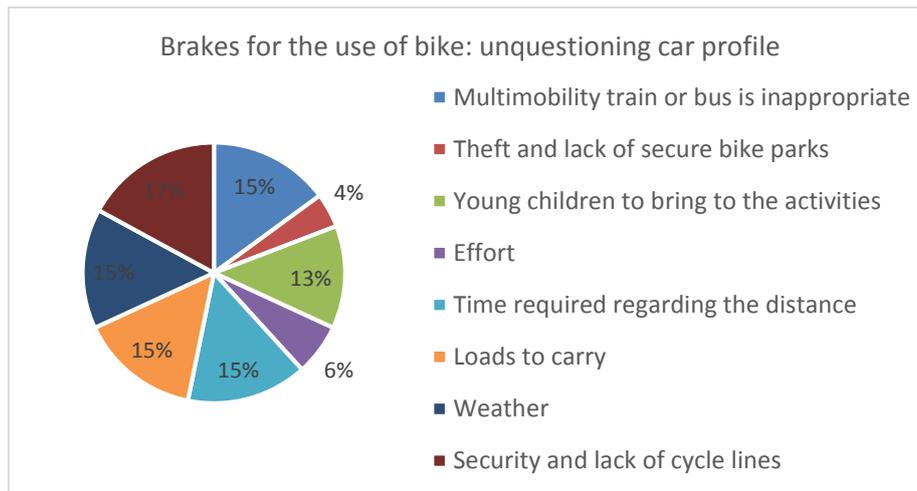


Figure 29: Distribution of the barriers among the "unquestioning car" profile of interviewees

2. Conditional people

With contrasts to the profile of people unquestioning cars, the characteristics of conditional people allow them to choose other means of transport from time to time. Here the scenarios are very various: retired people, who generally have flexible and lighter (in terms of transport) timetable, except for two couples, Mr D. and Mrs E., Mr I. and Mrs J., living in Azay-sur-Cher, who have many travels for association implication at a high level, physical activities and cultural activities. These persons are ready to transfer their use of car mostly on walk, as they already proceed because they have a higher pleasure in walking than in riding the bike. The transfer on other means of transport than car can also be contemplated for Mr V., working for himself as a tradesman, who lives in Ballan-Miré and works in Chinon (35km). He rides the bike as a sport, every Sunday or more if possible, so he considers the bike as a sport, but he wants to push his use of bike until the utilitarian side. As a sportsman, he would like a work at 20 km from his house to be able to make the trip by bike (it is a distant very accessible distance for him). In the same vein, Mrs W. living in Berthenay and working in the East of Joué-les-Tours would like to exercise more often and see the bike as a solution: working in the professions, she organised her timetable to work less in Fridays and to take the time to go to work by bike (15 km).

To conclude, it is possible to expect a modal transfer on other means of transport than car from retired people who don't have the working hour's constraints, from students who can

use public transports some time to times or from people who choose their timetable as working for themselves.

In contrast to the unquestioning car profile, the conditional consider the effort as important barriers. The theft risks is also more important and the loads to carry represent quite the same percentage, not to mention the weather which is a barrier in both profiles.

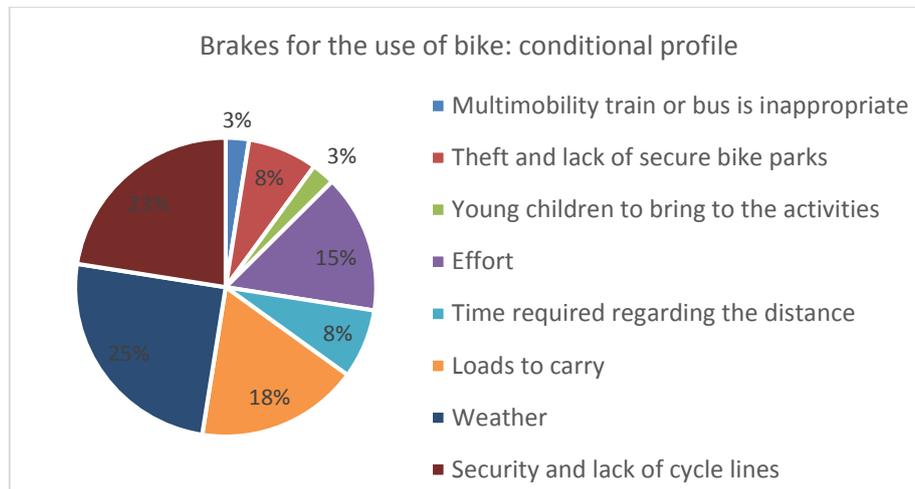


Figure 30: Distribution of the barriers among the "conditional people" profile of interviewees

3. People using alternative means of transport

People using alternative means of transport made this choice for several reasons:

- Will for physical activity, necessity to take some air after work, which is mentioned by 100 % of the interviewees representing this profile
- To go any further, two of them are even challenge-taker, wanting to push their limits and to self-surpass, riding under the snow and freeze
- The will to do sustainable travels: this idea wasn't general. Indeed, among 6 persons using alternative means of transport, only one was doing it especially and principally for the protection of the environment and the will not to pollute. The 5 others were of course aware and not neutral to the cause, but it wasn't they motor. In their cases, the motivation was already there, they began their practice before the concept of sustainable travel and it was mostly a life philosophy
- The autonomy and liberty: no dependency for public transport schedules, no need to wait

The majority of participants using alternative means of transport could associate their choice to a change in their life:

- For Mr A. it was when he moved to Tours, coming from Paris, to work in Blois. He directly decided to use multimobility with the train, bringing his bike with him to cover the 8 km from the train station of Blois to his workplace
- Mr F. moved to the use of train when he first went to school in Tours centre, living in Azay-sur-Cher. He doesn't have the driving license and don't have the utility of a car. Train is faster than car in peak hours and he can study during the trip
- Mrs M. began to use her bike when she left the farm where she was living. She used to have a physical activity during the day so no special need for the bike, and when moving to town and working in an office, she felt the need to take some air and make some physical activity. It became a life philosophy and the whole family rides the bike
- Mrs T., living in La-Ville-aux-Dames and working in Trousseau hospital in Joué-les-Tours had kind of a revelation at 53 years old regarding her use of car and the pollution generated, so she decided to use her bike for almost all her trips since then.
- Mr Y., living in Azay-sur-Cher and working at Tours' prefecture, changed his habits 20 years from now. During a strike, the private car park of the prefecture was blocked so this particular week, he used his bike. This was the beginning of many kilometres in bike and many tonnes of CO2 avoided.

As shown in the following graph, people using alternative means of transport removed the majority of the possible barriers. They found some solutions or got used to the risks of the road:

- As mentioned before, the less people use bikes, the more insecure they feel. People used to ride developed a new sense and they are very vigilant. Security and cycle lanes isn't a serious barrier for them anymore
- The weather can be disturbing but they are well equipped and some of them find different solutions in the rare cases of heavy rains
- Multimobility is unappropriated for three persons out of the 6 so they only use the bike
- Effort, theft, loads to carry, children schedule are not mentioned in this group as people developed the physical strength to deal with the effort (in general they look

for it), they use efficient padlocks (2 in general) to avoid theft, for 5 persons out of 6 they don't have dependent children at home and they use saddlebags to carry the loads (groceries for a two persons for example)

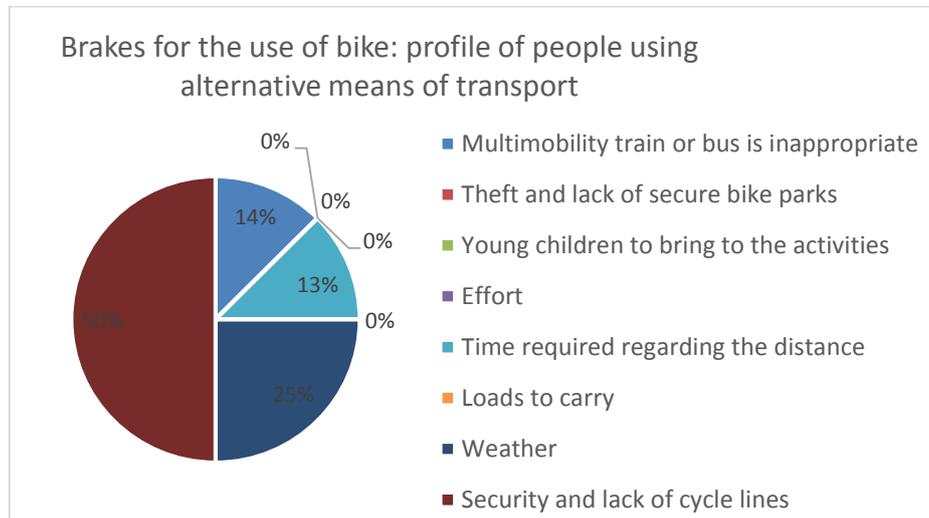


Figure 31: Distribution of the barriers among the "using alternative means of transport" profile of interviewees

To conclude, the alternative means of transport can be used for people who began with a strong personal will, personal motivation, which resulted in the organisation of the time and the remove of the barriers.

C. The use of bike and multimobility depend on the profiles of the inhabitants

As explained previously, the barriers for sustainable travels such as the use of bike as a main mean of transport, or as a transfer solution to take the train are numerous. It has been observed that they depend on the transport habits of the persons. Three profiles of persons have been determined in order to see either they were all equal in front of the use of alternative means of transport. It appeared that the offer of public transport and train is not sufficient to meet the need of some profiles: the frequency is not high enough, the circuits don't correspond to the path of these people and the timetable is inappropriate. Furthermore, the bike himself as a main mean of transport cannot be considered neither for this category of persons, who has many travels in the daily life, with long distances to cover and little time. However, a certain profile of people can actually use the bike as a main mean

of transport, or coupled with the train. We are talking here about people without dependent child for the majority, or people whose trips' way are match with an existing public transport.

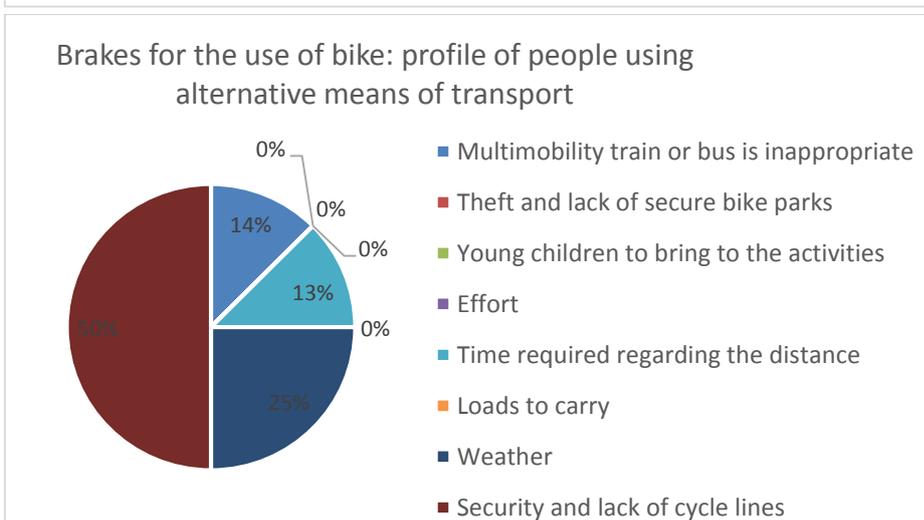
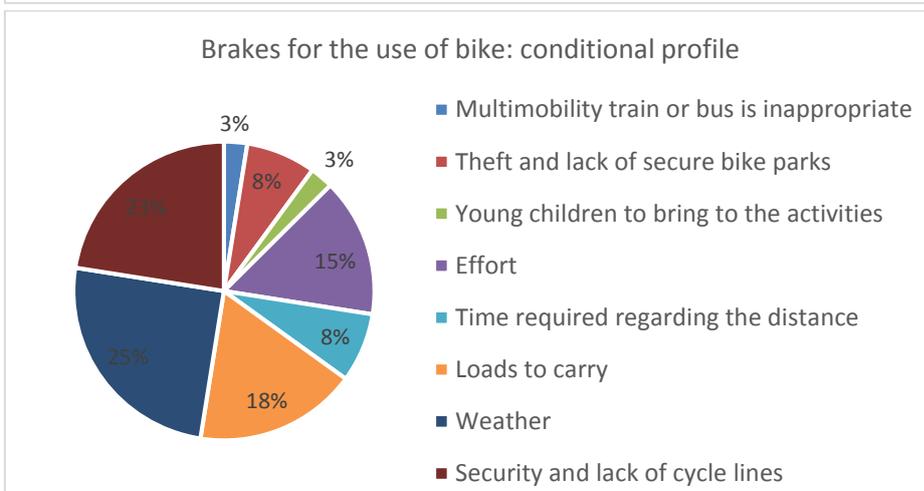
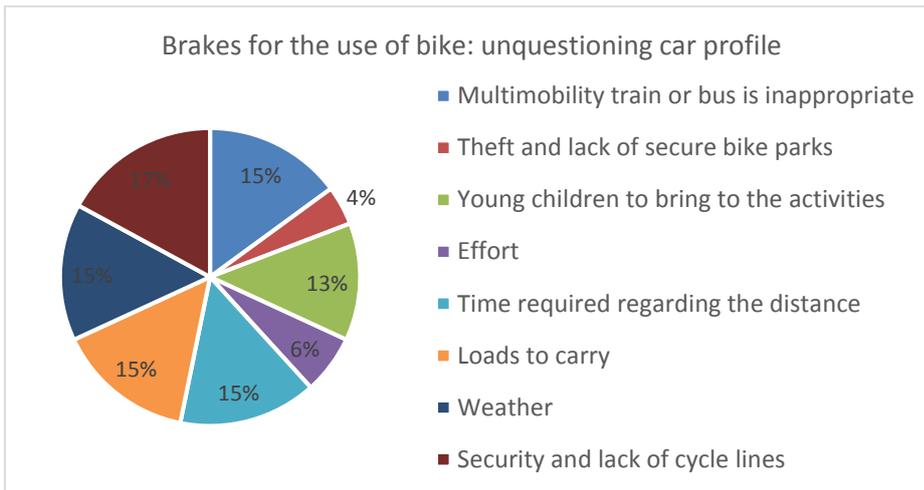
To conclude, the hypothesis is verified: the barriers for the development of utilitarian bike or for the practice of multi-mobility bike/train depend on the travelling profiles of the users living in periurban spaces. The use bike or multimobility bike/train are not adapted for all the profiles of users in peri-urban areas, regarding utilitarian trips.

The study could be carried on with different approaches and ideas:

- Consider the impact of an important awareness campaign to inform the population on the alternatives to the use of car: visibility regarding train and public transport timetable, communication on the cycling circuits...
- Consider a public campaign explaining the interests and the arguments in favour of cycling, for municipalities (necessity to develop infrastructure, savings regarding public health and infrastructure maintenance, decrease of the air pollution) and for the population (increase of the health, autonomy, savings on fuel...)
- Create incentive measures of infrastructure development could have a real impact on the use of sustainable means of transport
- Study and follow the effects of the cycling mileage allowance: the experimentation proposed by the ministry of ecology, sustainable development and energy, realised in 2014 with some volunteer companies was very promising. Indeed, after 6 months of tests, the bike modal share had increased by 50% in these testing companies. A second experimental phase, conducted by the ADEME shows that the effect of the measure become amplified with time, as the increase of the modal share of bike reach 125% after 1 year of experimentation. Furthermore, this second phase shows that the cycling mileage allowance benefits from a very positive perception of the employees, whether they are cyclists or non-cyclists. To be followed...
- As mentioned in this study, the development of electric power cycles could be a real solutions for peri-urban inhabitants as it allows to cover long distances. For the time being they are expensive and not within everyone's means, but their generalization and development could have a huge impact on periurban inhabitants' mobility.

- Being slowly integrated in the planning projects, the cycling highways could also have a huge impact on the periurban inhabitants' mobility. Indeed, they allow a high velocity, keeping safe because separated from the car road, so in this case, the bicycle can really compete with the car.

Reminder of the three charts of barriers, regarding the profiles of users:



Conclusion

In the context of fuel stock depletion and of the necessity to decrease the greenhouse gas emissions in order to limit the climate change effects, the bicycle appears as a good solution to travel. In this research project, the focus was on the periurban areas because they could be more impacted by the rise of fuel prices and the policies that encourage the slightest use of car. Furthermore, these spaces, characterised by a low density, benefit from a low frequency and a poor diversity of public transport travels. Could cycling or the practice of multimobility bike/train be a solution for the periurban areas' inhabitants? The hypothesis considered was that the barriers depend on the profiles of the users, and that cycling and multimobility bike/train are not a suitable solution for every profile of inhabitant.

To verify the hypothesis, a qualitative approach was chosen, consisting in interviewing persons living in periurban areas of Tours. A particular attention was devoted to choose different profiles of participants, regarding their travel needs, their work schedules and their familial situation. We ended with people unquestioning car, who have a high travel need, conditional people who could from time to time change their habits, and people already using sustainable means of transport. The spaces to study were also chosen in order to be able to compare them regarding their axis from Tours, their access to a train station, the danger of the roads and the distance from Tours.

After analysing the interviews, it was highlighted that the use of bike and the practice of multimobility is not suitable for every profile of inhabitant. Indeed, the persons with high needs of travels and changing work schedules cannot use their bicycle, and the public transport offer doesn't correspond to their needs. However, the bicycle could be a solution for conditional people who have more time and less time constraints. People already traveling by bike or practicing multimobility train/cycle already found solutions and have working schedules that allow them to use these means of transport.

To go further, it would be interesting to analyse and consider the impact of the following policies, inventions and planning development strategies: bicycle mileage allowance establishment, power electric bikes development, cycling highways construction, policies in favour of sustainable travels development and public awareness campaign implementation.

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Appendix 1: Questionnaire for the interviews

I. Travel habits

Travel goal (work, leisure activity, groceries, show, theatre, cinema...)	Mean of transport (car, train, walk, tram, bike, carsharing, bus)	Distance covered (km)	Travel duration	Frequency

II. Perception of cycling

A. General open questions

1. What is your perception of the bike use? (mean of transport, sport, leisure)
2. What do you association cycling with (example: liberty, no timetable, speed, contact with nature, physical activity, danger, risk, effort...)?
3. Why do you like / dislike cycling? What are the reasons why you use / don't use your bike
4. What conditions should be combined to allow you to use your bike more often?
5. What is the maximum distance you would accept to cover by bike :
 - a. To go to work or to your place of study?
 - b. To do small groceries?
 - c. For sport?
 - d. To go for a ride?
6. How do you contemplate multimobility? Would it be possible for you? If you already use it, what means of transport do you use and what do you think about it?

B. Specific questions for the regular cyclists

7. Since when do you regularly use your bike for utilitarian purposes?
8. Why did you decide to pass to cycling for utilitarian purposes? On what occasion did you change your habits?
9. What type of bike do you use (classical, folded, electric power bicycle) :
 - a. For utilitarian travels?
 - b. For sport
 - c. For a ride?
10. Do you encounter problems:
 - a. During the trip (levels, cut of cycle lines, works...)?
 - b. At the departure/arrival (bike parks, shower...)?

III. Contribution to sustainable travels

11. What is a sustainable travel?
12. What is your contribution to sustainable development considering travel? Do you see yourself doing sustainable travels?
13. What place do you give to bike towards environment protection, health and sustainable travels?

IV. Presentation of the interviewee:

15. Name, gender, age
16. Commune of residence
17. Activity and work place or place of study
18. Number of dependent children

Appendix 2: Characteristics of the interviewees

Code	Female (F) Male (M)	Age	Place of residence	Workplace	Distance home-work	Number of children at home (age)	Bike for sport	Working (W) or Student (S)	Retired	Unquestioning car	Conditional	Using alternative means of transport
A	M	49	Tours	Blois	65	4 (more than 12)		W				Bike/Train
B	F	16	La Riche	Tours (Paul Louis Courier)	7			S			X	
C	F	57	Saint-Genouph	Tours (Trousseau)	16	1 (16)		W		X		
D	M	67	Azay-sur-Cher	/	/				X		X	
E	F	67	Azay-sur-Cher	/	/				X		X	
F	M	21	Azay-sur-Cher	Tours (Descartes)	15			S				Bike/Train
G	F	42	Azay-sur-Cher	Montlouis sur Loire	8	2 (less than 10)		W		X		
H	M	45	Azay-sur-Cher	Joué les Tours	16	2 (less than 10)		W		X		
I	M	66	Azay-sur-Cher	/	/				X		X	
J	F	65	Azay-sur-Cher	/	/				X		X	
K	F	49	Azay-sur-Cher	Veretz	3	2 (more than 20)		W		X		
L	F	53	Veretz	Tours (Clocheville)	20	3 (more than 16)		W		X		
M	F	58	Larçay	Joué les Tours	6	1 (16)	X	W				Bike
N	M	44	Cinq-mars-la-pile	Joué les Tours	18	2	X	W		X		
O	F	64	Ballan-Miré	/	/				X		X	
P	M	69	Ballan-Miré	/	/				X		X	
Q	M	60	Fondettes	/	/				X		X	
R	M	58	Fondettes	Tours	9	1 (16)		W			X	
S	F	62	Fondettes	Tours (Bretonneau)	7	1 (16)		W		X		
T	F	60	La Ville aux Dames	Tours (Trousseau)	10			W				Bike
U	M	55	Azay-sur-Cher	Montlouis sur Loire	9		X	W		X		
V	M	52	Ballan-Miré	Chinon	35		X	W			X	
W	F	26	Berthenay	Joué les Tours (Les Fontaines)	18			W			X	
X	M	56	Fondettes	Blois	65			W				Bike/Train
Y	M	58	Azay-sur-Cher	Tours (Préfecture)	15		X	W				Bike