Influence of the infrastructure over the cycling gender gap in Barcelona

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Abstract

In cities with low cycling rates, and in particular in Barcelona, the share of males among cyclists is much higher than the share of females. Research has shown that the quality and level of segregation of the cycling infrastructure has an influence over the gender gap. The purpose of this study is to see whether the different kinds of cycling infrastructure in Barcelona have different gender gaps and if so, try to determine which characteristics influence the cycling gender gap.

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1. Executive summary

Studies have found that the share of male cyclists in Barcelona is twice as high as the share of female cyclists. The cycling gender gap found in Barcelona is similar to gender gaps found in other cities with low overall cycling rates. However, there are ways to reduce this gender gap: countries where there is a higher modal share for cycling have little to no gender gap among cyclists.

It has been demonstrated that the infrastructure has an influence over the cycling gender gap in general. Moreover, the type, quality and level of protection from motorized traffic provided by the infrastructure has an influence over gender gap related concerns such as mobility of care and conflicts with other users.

Protected and segregated infrastructure such as segregated bike lanes create better conditions to avoid conflicts with other users, both pedestrians and car drivers. Traffic calmed shared spaces such as Superilles create better conditions for the mobility of care, which is most of the time the responsibility of women, and favor the inclusion of vulnerable social groups: these are the locations with the higher share of children.

Overall, the infrastructure in Barcelona is insufficient both to provide good conditions for the mobility of care and to avoid conflicts, as illustrated by the low percentage of seniors, people with disability, children, people carrying children and people using cargo bikes.

This has to do with several problems with the build environment: the lack of protected bike infrastructure, the lack of connection between the protected infrastructure, but also the confusing signalisation and lack of secure parking facilities. This has also to do with other elements than the built environment: lack of cycling culture and gender perspective, lack of respect of cycling facilities by other users and lack of respect for car speed limitations.

2. Introduction

Politicians and urban planners from cities all over the world have developed an increasing interest in cycling as a form of urban mobility during the last decade. Indeed, urban cycling has the potential to solve many problems urban areas are facing, and in particular motorized traffic related problems, such as congestion, noise pollution and deadly traffic accidents (Steinbach et al., 2011 ; Goel et al. 2021)

Moreover, cycling, as other forms of active mobility, has demonstrated health benefits which could appear as a potential solution for the negative consequences of increased sedentarity and the "obesity epidemic" in developed countries (Aldred et al., 2016). Besides, there is an increasing public concern regarding greenhouse gas emissions and global warming. Cycling is perceived as an environmentally responsible behaviour, which has also participated in its increased social acceptance and supports the continuous growth of the number of cyclists all over the world (Marqués et al., 2015).

In particular in Barcelona, there is an emerging cycling culture in Barcelona as the number of cyclists and micro mobility users keeps growing. The continuous development of cycling requires active support from the municipality, for example in the form of new cycling infrastructure, in order to accommodate the new users (Marqués et al., 2015). The development of other types of micro mobility further increases the need for adequate cycling infrastructure, but also creates tensions that need to be studied and solved, with other types of active mobilities and micro mobilities. (AMB, 2019)

The municipality has massively invested in cycling as a form of urban transport during the last decade, in particular with an ambitious bike-sharing system: the Bicing system, and claim they will continue to do so in the coming years (Ajuntament de Barcelona, 2020). Moreover, the municipality of Barcelona seems interested in adopting a gender perspective when it comes to municipal policies. Indeed, for the first time in the history of the city, the same number of men and women are holding decision-making positions among the local

government (Angulo, 2019). All these recent changes in Barcelona provide a unique opportunity to study urban cycling from a gender perspective.

3. Problem formulation

The ongoing Covid-19 crisis has had an important impact on urban mobility over the course of last year. Indeed, the need for social distancing has driven many people away from public transportation and forced cities to plan for the sudden rise of individual mobility whether in the form of increased car traffic or increase in the number of bicycle users (Buehler & Pucher, 2021). Moreover, lockdown and curfews have restrained people's freedom of movement and in particular in Barcelona, the comarcal lockdown prevented people from going in and out of the city. For health and well-being reasons, the municipality was forced to invente new ways to move and exercise in an already very dense city. (Ajuntament de Barcelona, n.d.)

For many cities across Europe, the pandemic has been the opportunity to give some space back to their residents for outdoor activities and active mobility. Many cities from Paris to Barcelona have taken action to increase the share of public space dedicated to walking and cycling. In Barcelona these measures involve extension of sidewalks, creation of new bicycle lanes and open-street programs which means closing streets to traffic during weekends. (Cole et al., 2020, van der Drift et al., 2021, Ajuntament de Barcelona, n.d.)

Before the pandemic cycling was already becoming more and more popular among Barcelona's residents: indeed, the modal share of cycling in Barcelona went from 1.5% in 2011 to 2.5% in 2018 (Ajuntament de Barcelona, 2020). These specific Covid-19 measures are likely to have further increased cycling practice in Barcelona and in the surrounding municipalities. Moreover, it is stated in the newly approved Mobility Plan from Barcelona that the municipality's objective is to keep supporting the development of cycling through targeted measures and traffic calming. (Ajuntament de Barcelona, 2020)

However, mobility in general and cycling in particular is highly influenced by gender norms. This results in cycling being a highly inequitable practice. Indeed, according to a study conducted in 2018, the cycling gender gap in Barcelona is 2:1, meaning that 34,5% of cyclists are women and 65,5% of cyclists are men. (Lind et al., 2018)

Another survey, conducted by the Generalitat de Catalunya (Region of Catalonia), in 2019 found that young males with higher education are overrepresented among cyclists in Catalonia. The report from the Generalitat de Catalunya found that 63.4% of cyclists were men and 36.6% were women in total, including both daily and occasional users, and both utilitarian and recreational users. When considering only daily users the gender gap is even more important with 70% of men and 30% of women among daily cyclists. (Generalitat de Catalunya, 2019)

These numbers are quite consistent across countries with low cycling rates. Several reasons have been suggested to explain this gender gap: first women are more risk-averse than men (Mitra & Nash, 2019) and thus more afraid to bike in an urban environment. Furthermore, feminist scholars have shown for decades that women are disproportionately involved in the "care" reproductive work compared to men. This causes them to make multi-purpose trips or chained-trips, often carrying goods or accompanied by children or elderly people. Scholars have suggested that this kind of trips are sometimes incompatible with the use of bicycles or at least make cycling less accessible to women. (Heim LaFrombois, 2019)

However, evidence from countries with high cycling rates such as Denmark or the Netherlands show that in these contexts "care responsibilities" and cycling are far from being incompatible. Indeed, the gender norms in Denmark and in the Netherlands are generally similar to the rest of European countries, women are also responsible for most of the "care" work in Denmark and in the Netherlands, but there is almost no gender gap in cycling in Denmark and women are cycling more than men in the Netherlands (Aldred et al., 2016 ; Goel et al., 2021)

To explain the higher rates of utilitarian cycling among women in the Netherlands, Garrad et al. (Garrard et al., 2012) have highlighted that the Netherlands has a better cycling infrastructure than the rest of European countries, meaning a more connected network, more separated cycle lanes, more direct routes, wider cycle paths and a better coordination between bikes and public transportation. Other papers have underscored the importance of cycling infrastructure in reducing the cycling gender gap (Heim LaFrombois, 2019) and

some studies suggest that the presence of adequate cycle infrastructure is associated with increased perception of safety and higher cycling rates among women (Damant-Sirois and El-Geneidy 2015).

The municipality of Barcelona is anticipating the number of bike trips to increase by at least 40% between 2018 and 2024 (Ajuntament de Barcelona, 2020). To achieve that the municipality is taking a number of measures to improve cycling infrastructure in the coming years, but as research has shown, an increase in the number of cyclists and micromobility users does not always mean a greater diversity of users, which rises the question: what kind of infrastructural changes could have a positive influence on the cycling gender gap in Barcelona?

4. Theoretical Framework

4.1 The feminist city

Gender roles and gender norms affect every sphere of society. To this day women are still considered more emotional and men considered more reasonable and rational. These gender stereotypes and the patriarchal structure of society has led women to be systematically excluded from spheres of influence and decision-making. On the contrary, white, middle class, able-bodied male are perceived as more legitimate "knowledge-holders" and are overrepresented in positions of power and decision-making such as politicians or planners. Consequently, the needs of more vulnerable social groups are often ignored and overlooked in urban planning. (Sheller, 2018 and Ravensbergen-Hodgins, 2020)

In particular gender power relations affect the way cities are planned. For centuries, cities have been planned by men and for men. In the last decades, there has been proficient research showing that cities are not planned in a gender neutral way but rather planned from a male perspective and that the urban environment plays a key role in replicating and perpetuating gender inequities. (Law, 1999)

A striking example of the gendered way cities are planned is found in urban land use structure. Indeed, during the twentieth century, the development of the capitalist industrial society in developed countries has caused an increasing separation between public and private spaces, with on the one hand suburban residential areas and on the other hand factories and city centers. This has increased spatial separation between "productive" labour and "reproductive" labour. (Law, 1999)

As a consequence of this clear separation between public and private, productive and reproductive spaces, gender norms were upheld and bodies were strongly regulated in the urban environments. As a woman, being in a public place that was not that was not socially considered appropriate for your gender or class could come with serious social or legal consequences. For example a woman who stands alone in the public space at night takes the

risk of being considered a sex-worker or being considered careless and being held responsible if she suffers sexual harrasment or assault. (Boyer et al., 2017 and Heim LaFrombois, 2019)

This patriarchal way of planning cities often causes women to feel unsafe and not welcome in the public space. As cities and public spaces do not fit their needs, women are effectively pushed out of the public space and back into the private sphere (Fenster, 2005).

However, historically, cities are not only places where gender norms are enforced, but also places where they can be challenged and reshaped (Bondi, 2005). Urban development can offer the opportunity to reduce inequalities through the development of adequate policies and planning or on the contrary reinforce them (Gauvin et al. 2020)

Urban planners have begun to re-examine urban planning policies and practices with a feminist lens, and in particular increased attention has been shown to men and women different mobility patterns.

4.2 Gender & Mobility

When it comes to mobility, men and women have different experiences. “Men” and “women” are not to be considered as two monolithic concepts and each individual’s perception is influenced by his or her own past experiences. However, when considered as a social group men and women have often been socialized differently and as a consequence they behave differently in the public space.

Feminist scholars have highlighted two main reasons for these differences in mobility patterns between men and women. Radical feminists have focused on the fear of harassment and sexual abuse, causing women to adopt precautionary behaviors and preventing them from moving around the city as they please. Marxists feminists have focused on the social division of labor between “productive labor”, referring to paid work, which used to be mostly performed by men even though women are now gradually entering the workforce,

and "reproductive labor" which refers to the care of relatives, maintenance of the household, which used to be and still is mostly performed by women (Law, 1999 and Bondi, 2005)

Having to perform most of the unpaid "reproductive labor" influences women's mobility patterns in more than one-way: for example women are more likely to travel during non-peak hours, to make trips with more than one stop, to travel overall shorter distances, to travel accompanied by vulnerable people: children, disabled or elderly relatives, or to have to carry things such as groceries. (Whitzman et al., 2013)

Moreover, most women have been socialized from a young age to feel like they don't belong in the public space and that when they do use it they should take as little space as possible, they should not bother other people (Sheller, 2018 ; Heim LaFrombois, 2019). Iris Marion Young's work has shown how women's lack of entitlement for the public space limits their mobility at the bodily scale and that whether they walk, cycle, use public transportation or carry things, women tend to use up less space than men. (Ravensbergen-Hodgins, 2020)

This feeling of not belonging in the public space also causes women to be more conflict-averse than men and to change their behaviour in an attempt not to bother other users. As a result, conflicts with other users, whether they are motorists or pedestrians, can cause women to change their itinerary to try and avoid them (Heesch et al., 2012). Moreover, conflicts have a negative influence on women's perceived safety, which is a decisive factor for them in their mobility choices (Ravensbergen-Hodgins, 2020).

At the urban scale, feminists scholars from the beginning of the 1980s have started to reject the assumption that transport planning was gender neutral and that men and women had the same need and constraints in terms of mobility, laying the ground for a body of research focusing on women's mobility patterns. (Law, 1999)

This research has shown that gender has a great influence over mobility choices and studies have found that men and women prioritize different factors when it comes to their choice of itinerary and travel modes. Indeed, while men mostly base their decision on travel speed

and to some extent travel cost, women's determining choice factor is safety (Whitzman et al., 2013). Fear, and in particular fear of harassment, prevents women from fulfilling their right to use the public space. (Fenster, 2005)

Scholars also underline that the public space has mostly been designed from a male perspective, with little to no regard for female's experiences of the public space. Many streets have been designed to maximize speed and efficiency of the motorized traffic, which is mostly a male mode of transport, without taking into account the experiences of those walking or cycling. (Fenster, 2005)

More and more studies are produced about the specific mobility needs and constraints of women, however, very few municipalities actually take those needs into account when planning for daily mobility (Gauvin et al. 2020). Better access to mobility is associated with a wider range of opportunities in terms of work, education, healthcare, leisure and other activities: mobility is critical to the empowerment of women in many areas. (Hanson, 2010)

4.3 Mobility Justice

Transportation and movement has always been a focus of social science research and especially geography. However, the way it has been studied has evolved over time. Lately, scholars have embraced a "New Mobility Paradigm" which refers to a new way of considering transport and mobility (Kronlid, 2008 and Martens, 2012). Instead of just focusing on the practical aspects of transport such as speed, efficiency, or how to physically enable someone to go from one place to another, scholars engaging with the "New Mobility Paradigm" have a more comprehensive definition of mobility.

Under the "New Mobility Paradigm", mobility refers to the physical movement of going from one location to another, but also the social representation of mobility and individual's embodied experiences of mobility. The last two aspects are indissociable from the physical movement from A to B, as they have a decisive experience on who has access to mobility resources and who is mobile. (Cresswell, 2010)

There are two possible understandings of mobility: either potential movement or realised movement. As this study is based on on-site observations, our understanding of mobility will be realised movement. Due to this choice this study will not cover the latent demand for none-realised trips (Whitzman et al., 2013 and Gauvin et al., 2020)

As it has been mentioned in previous sections, mobility patterns differ based on gender and mobility resources are unequally distributed between men and women. These differences have been extensively studied during the last decades and referred to as "**gender gap in mobility**". (Law, 1999 ; Ravensbergen-Hodgins, 2020 ; Gauvin et al. 2020). More broadly, mobility patterns and the distribution of mobility ressources are influenced by a number of factors such as race, class, gender, sexual orientation, ability…

These socio-demographic factors result in complex relations of power that cannot be understood separately from one another. On the contrary, to understand the power structure that influences mobility and society in general, social science scholars have developed the "intersectionality" concept. "**Intersectionality**" provides framework to understand how different power relations intersect, add to one another, and in the end how the mobility constraints and experience of black woman, disabled woman, lesbian woman or senior woman can differ from those of a white, able, heterosexual, middle-age woman. (Heim LaFrombois, 2019)

4.4 The cycling gender gap

In particular, cycling patterns differ between men and women: except in countries with high cycling rates such as Denmark, Germany and the Netherlands, women cycle less than men.

Reducing the cycling gender gap is crucial in terms of Mobility Justice. Indeed, making cycling more accessible for women would enable them to benefit from the positive health consequences of active mobility. They would also have access to a form of mobility which is often cheaper and faster than most other modes of transportation. And finally, increased access to cycling may expand their mobility possibilities, for example through

multimodality, by making accessible public transportation stations that would not be reachable within a reasonable amount of time otherwise. (Sheller, 2018)

Many factors have an influence on the difference in cycling patterns. Indeed, while some articles have pointed out that women might be more motivated to cycle than men due to environmental concerns (Ravensbergen-Hodgins, 2020), women have many constraints that might prevent them from cycling.

As mentioned above women have to perform most of the "reproductive labor", which involves carrying things and travelling with other people. These activities might be harder to do by bicycle than using other modes: walking, using public transportation or driving. (Ravensbergen-Hodgins, 2020)

Another factors could be the need to perform gender norms: women wear clothes that are less adapted to cycling and have more pressure than men to maintain a certain "feminine" appearance, which may result difficult when performing a physical activity such as cycling (Gulsah et al., 2013, Ravensbergen-Hodgins, 2020). Other deterring factors can also have an influence such as exposure to traffic noise and traffic fumes or weather conditions. (Heesch et al., 2012)

Studies have found that the build environment, and in particular the quality of cycling infrastructure is determining factor influencing the cycling gender gap (Garrard et al., 2008 ; Aldred et al., 2016 ; Mitra & Nash, 2019)

Consequently, there are questions and concerns about whether investments in cycling infrastructure and the types of cycle lane designs may disproportionately benefit men. Mimi Sheller, who has done extensive work about Mobility Justice, argues that Mobility Justice and in particular Bicycle Equity, the equal access of disadvantaged social groups to cycling, requires public commitment to build more inclusive infrastructure. (Sheller, 2018)

5. Research design

This research takes its point of departure in previous projects conducted in Barcelona that have sought to analyse the cycling gender gap: a research article written by Adam Lind (Lind et al., 2018) and a report written by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019). (see *Chapter 6*: *Methods*, for further details about these papers)

Lind et al. (Lind et al., 2018) found that in Barcelona the cycling gender gap was 2:1, meaning that there were two male cyclists for every female cyclist. However, this study was only conducted in one type of infrastructure: cycle lanes protected from traffic on the Eixample[1] grid. One objective of this research project is to see if this gender gap varies depending on the type of infrastructure.

The study conducted by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019), based on stated preferences, has shown that women's comfort when cycling varies a lot depending on the type of infrastructure. An objective of this study is to expand on the Col·lectiu Punt 6 stated preferences study with data from on-site observations.

Based on the results from Lind et al. (Lind et al., 2018) and Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019), and on previous studies showing women dislike proximity to motorized traffic in other cities, this study seeks to verify the following hypothesis:

A more connected network of segregated bike infrastructure would encourage women to cycle more and help reduce the cycling gender gap in Barcelona.

[1] *The Eixample grid refers to a neighbourhood in Barcelona characterized by its square blocks of buildings and its straight avenues and streets, most of which are one-way. The Eixample grid was built at the end of the 19th century to connect the Old City of Barcelona with the surrounding towns.*

The main research question this study will answer is:

How does the type of cycling infrastructure influence the cycling gender gap in Barcelona?

What is the context in Barcelona, and in particular at the 12 observation sites, regarding gender and cycling?

The aim of this subquestion is to provide context for the analysis that will be conducted in the following subquestions.

In cities with a low cycling rate, and in particular in Barcelona, important cycling gender gaps have been observed. The variation of this gender gap depending on the site and time of the day will be analysed in order to understand the influence of the infrastructure over female cycling rates. Besides, in recent years there has been a drastic increase in the use of micromobility devices and in particular e-scooters. The results will provide data on whether the split of each device varies depending on the site and whether there is a correlation with the gender gap observed at each site.

What type of infrastructure can create better conditions to include all potential users and support the use of bicycles for the mobility of care?

To this day, women tend to be responsible for most of the care "reproductive labour" (see *Chapter 4*: Theoretical Framework), which means that they are more likely than men to be responsible for the care of vulnerable people such as children, elderly or disabled relatives. The ability of these vulnerable populations to use bicycle infrastructure thus directly impacts women's ability to use a bicycle or another micromobility device while travelling with them. Making bicycle lanes accessible for vulnerable users is crucial to reduce the cycling gender gap.

Moreover, from an intersectional feminist perspective, making bicycle infrastructure more accessible for senior or disabled women would also be important in terms of Mobility Justice, as these women have usually less mobility options than other social groups.

How can infrastructural design create conflicts between female cyclists and micromobility users and other users in shared spaces?

Research has shown that women are more conflict-averse than men (see *Chapter 3:* Theoretical Framework) and that they would change their itinerary for a more time-consuming one, or even stop cycling to avoid conflicts with other users (Sersli et al., 2021). Reducing this added time-burden that falls on women because of inadequate infrastructure is crucial from a Mobility Justice perspective.

Building cycling infrastructure that helps reduce conflicts between users is also important in terms of female access to cycling and reduction of the gender gap. Indeed, women's mobility choices are more influenced by perceived safety than men's and conflicts with other users have a negative impact over the feeling of safety.

6. Methods

The methods used to gather knowledge for this thesis are both quantitative and qualitative. In this mixed-methods approach, the observation of cyclists and micromobility users at different locations in Barcelona (quantitative method) has been complemented with interviews with experts and stakeholders (qualitative method) and with the participation in local events and workshops relevant to the subject of women and cycling (documented with qualitative methods).

Previous research has been conducted regarding cycling infrastructure in Barcelona. In particular, two projects related to gender and cycling: *Dones i persones no binàries en bici. Estudi de Mobilitat Ciclista a Barcelona des d'una perspectiva feminista* (Women and non-binary people by bike. Cycling Mobility Study in Barcelona from a feminist perspective), a report on a mixed-methods study by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019), a group of architects, sociologists and urban planners from Barcelona, and an academic article *Rule compliance and desire lines in Barcelona's cycling network,* by Lind et al. (Lind et al., 2018)

The mixed-methods study by Col·lectiu Punt 6 is based on an online survey that was carried out in 2019 with 537 respondents among women and non-binary people from Barcelona and several participatory workshops with 32 women. The aim of this project was to identify the profile of female cyclists, the barriers to female cycling in Barcelona and the type of infrastructure preferred by female cyclists. This thesis expands on the Col·lectiu Punt 6 study by using other research methods.

The article by Lind et al. was based on a study conducted in 2018 in Barcelona. This project consisted in measurements in 5 different locations of the Eixample grid with separated bike infrastructure, with the objective of studying rule compliance at intersections. The result of this study were dissagregated by sex and the gender gap that was found was consistent independently of the day, time and location: two male were cycling for every female cycling. However, this study was only conducted in the Eixample grid, in locations with similar cycling infrastructure: one-way or two-way cycle lanes separated from the cars by rubber

bullets (see *Figure 6.8*). One of the objectives of this study is thus to evaluate the gender gap using similar quantitative methods but at different locations with different types of cycling infrastructure or street layout. For the sake of comparability, two of the sites studied for this thesis have been studied by Lind et al. in 2018: Compte d'Urgell at Diputació and Diputació at Girona (see *Subsection 6.1 Quantitative material: on-site observation of different type of infrastructure*)

6.1 Quantitative material: on-site observation of different type of infrastructure

Objective

The objective of this part of the thesis is to collect quantitative data on the use of different types of cycle infrastructure. This data collected by direct observations will complement the study conducted by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019) which was based on stated preferences surveys and workshops. On-site observations would constitute a good complement for this survey as it has been shown that self-reported preferences may sometimes be associated with bias such as social desirability bias, which refers to the tendency of survey responder to answer the questions in a way that they think will please their interlocutor, or recall bias which refers to biased memories (Garrard et al., 2008 and Debnath et al., 2021).

Conducting on-site observation would enable us to answer the same question about the cycling gender gap with a different method and to be able to observe cyclists and micro mobility users' actual behaviour (Prato et al., 2018). Results will also provide a basis for discussion with the different stakeholders and in particular people from the municipality.

Pilot observations:

Before *Phase 1* and *2* observations, 10 minutes pilot observations have been conducted at each location from the 22nd to the 28th of February. These preliminary results have been used to test the data sheet, determine whether the location was adequate for observation and whether it would provide a sample that is large enough to be representative.

Categories: vocabulary and delimitations

The following categories were featured in the data sheet to provide observations according to the research questions:

Gender

During the pilot observations three gender categories "male", "female" and "non-binary/other" were used. The "non-binary/other" category had several objectives: first of all previous feminist research on cycling and in particular the work of Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019) does not only focus on women but also on gender minorities, the idea was to keep including gender minorities in this research project. Second, there was a concern that the researcher might not be able to identify the gender of the subject, especially during the Covid pandemic: even though the use of face masks is not mandatory when riding a bicycle in Barcelona, many cyclists keep it on.

However, after pilot observations, we realised that this category would not make sense in the context of on-site observations relying on gender attribution based on people's gender expression. In addition, research has shown that gender attribution in the context of utilitarian physical activity observation is generally reliable (Garrard et al., 2008).

Finally, the "other" category was not used in the work of Lind et al. (Lind et al., 2018) so only two categories were kept: "male" and "female", which would allow for better comparability of the two studies.

Mode

Separate categories were created for the modes that presented a specific interest for the study, for example modes related to the mobility of care, which is generally associated with women's mobility, or modes that seemed particularly popular during pilot observations.

Privately owned bicycle

During pilot observations the privately owned bicycle appeared to be the most popular vehicles used in bicycle lanes in Barcelona

Bicing

The city of Barcelona has a bike sharing system called Bicing, this category represents 33% of the bicycles used in Barcelona (Bici Vici, 2017).

E-scooters

This category was included because the pilot observation have shown this is a very popular mode of transportation in Barcelona and in many cities where this mode of transportation arrived suddenly, in an unplanned manner, a few years ago, it often creates conflict with other users (Irfan, 2018) and especially women (see *Appendix 2: Online workshop*).

This category only refers to e-scooters without seats, as different regulations apply to e-scooters with seats, they are faster (see *Appendix 4: interview with Ferran Rodriguez*), they are not allowed on the cycle lanes and fall into another category (see subsection *Other micro mobility)*

Figure 6.1: e-scooter (Ajuntament de Barcelona b, 2021)

Foldable bicycles

A lot of foldable bicycles can be seen in Barcelona: a study conducted by *Copenhagenize Barcelona* in 2017 has concluded that 25% of private bicycles are foldable (Bici Vici, 2017).

People seem to often take their foldable bicycle with them in their apartment for two main reasons: even though the number of parking spaces has been continuously increasing for the last 20 years in Barcelona, there is still not enough parking spaces to meet the demand and when parking spaces do exist, the risk of theft in the city of Barcelona has proven to be very high. (Generalitat de Catalunya, 2019)
However, from the pilot observations we have seen that the use of foldable bikes was not linked to gender so we chose to include the foldable bikes into the bike category.

Cargo Bikes

A study from *Copenhagenize Barcelona* from 2017 has found that only 0,7% of the private bicycle fleet in Barcelona were cargo bikes (Bici Vici, 2017). Cargo bike use in Barcelona is not very developed, most likely due to the lack of adequate parking space and the high risk of theft (see *Chapter 9: Conclusion & Discussion*). However, as the cargo bikes are closely linked to the "care" reproductive work performed mostly by women, a decision was taken to still count them as a separate category from conventional bicycles.

Disability devices

From an intersectionnal feminist point of view, it was though useful to explore the opportunity of using the cycle infrastructure to improve mobility for disabled people and especially disabled women. This is why we included the category "wheelchairs, electric wheelchairs and other disability devices'' in our analysis. The other disability device refers to adapted cycles for disabled people such as tricycles.

Other micromobility

In this study, micromobility refers to what regulations from the municipality of Barcelona calls "Vehículos de Movilidad Personal" (Personal Mobility Vehicles) of category A and B: scooters, e-scooters, unicycles and hoverboards. This does not include bicycles, foldable bicycles and cargo bikes which are called by the municipality of Barcelona "cicles" (cycles). What was considered "other micromobility" were the micromobility devices that did not

fall into previously defined categories: Segways, electric platform with two wheels (hoverboards) and e-scooters with seats (see Figure xx: *Other micro mobility devices*). (Ajuntament de Barcelona b, 2021).

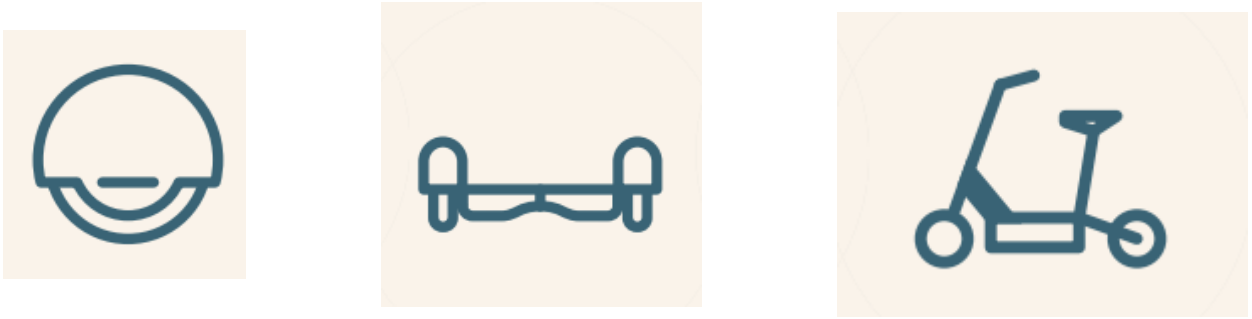

Figure 6.2: Other micro mobility devices

From left to right: Segway, two-wheeled electric platform, electric scooter with a seat (Ajuntament de Barcelona b, 2021)

Delivery Category

Delivery messenger is a male dominated profession which is closely related to micro mobility devices and bicycles (Ferguson, 2017). As it is a category with special characteristics that might influence the results, a special field has been added to describe this in the spreadsheet.

Child

In the data collection spreadsheet the field "age=child" refers to a child cycling or using a micromobility device on its own (usually in pedestrianized typologies). When the child is in a cargo bike, in a saddle or accompanied by an adult riding a bike or a micromobility device, this is described by "carrying a child=yes" for the adult rider. A difference is made between the two situations because the fact of carrying or accompanying a child has been found to have an influence on the adult choice of route (Col·lectiu Punt 6, 2019 ; Sersli et al., 2020).

Observation sites and typologies

Due to time constraints a choice had to be made between studying multiple locations for each typology or being able to study more typologies by studying fewer sites for each. For this reason and to be able to study the main different street typologies that exist in

Barcelona, only 2 sites for each typology were studied, except for type 5 and 6, which will be explained later on. In total, 12 sites were studied (see *Table 6.1* and *Appendix 1: Map*)

	Site	Typology	Direction
1	**Balmes at Diputació**	**Type 0**: 50 km/h zone shared with motorized vehicles	None (no cycle infrastructure)
2	**Via Laietana at Princesa**		Widened sidewalks
3	**Superilla Poblenou: Sancho de Avila at Roc Boronat**	**Type 1**: Traffic calming zone (10km/h) shared with pedestrians	Two-way
4	**Superilla Sant Antoni: Parlament at Compte del Borrell**		Two-way
5	**Riera Alta at Aurelia Capmany**	**Type 2:** 30 km/h zone shared with cars	One-way
6	**Madrazo at Alfons XII**		One-way
7	**Diputació at Girona**	**Type 3:** Cycle path on the side of the road, separated from the road with rubber bullets	One-way
8	**Compte Urgell at Diputació**		Two-way
9	**Passeig Sant Joan at Diputació**	**Type 4:** Cycle path in the middle of the road, separated from the road with concrete	Two-way
10	**Parallel at Parlament**		Two-way
11	**Aragó at Passeig de Gràcia**	**Type 5:** Cycle path on the side of the road, separated from the road by parked vehicles	One-way
12	**Creu Coberta at Rector Triado**	**Type 6:** Lane shared with buses and taxis	One-way

Table 6.1: different typologies of cycling infrastructure

Type 0: 50 km/h zone shared with motorized vehicles

Carrer de Balmes (Balmes street) is our control site, chosen to test our hypothesis that the absence of any kind of bike infrastructure is a deterrent to cycling in general and female

cycling in particular. Carrer de Balmes is a typical one-way street from the Eixample district with no cycling infrastructure, connecting the Eixample district with the city center.

Figure 6.3: Balmes at Diputacio (self made)

Via Laietana is another connection from the Eixample district to the city center. This street has been chosen because its future is a matter of debate among the municipality of Barcelona. Indeed, the street has no cycle infrastructure *per se* and cyclists are supposed to share the main road with cars that have a speed limit of 50 kmph, however, during the pandemic, Via Laietana has been one of the locations where the municipality of Barcelona has use tactical urbanism to expand the sidewalks and take space back from the cars. The lanes that are painted in yellow along the sidewalks (see *Figure 6.4*) are supposed to be dedicated to pedestrians only, but it would be interesting to determine whether they are used as cycle lanes and whether this measure increases bike traffic in Via Laietana compared to other 50 kmph streets such as Balmes.

Figure 6.4: Via Laietana at Princesa (on the left side of the photo we can see the tactical yellow extension of the sidewalk that was created during the Covid-19 pandemic) (self made)

Type 1: Traffic calming zone (10 kmph) shared with pedestrians

Superilles (in Catalan, also called Supermanzanas in Spanish or Superblocks in English) is a unique type of traffic calming infrastructure that has been implemented in Barcelona over the last years. Superilles have different objectives: creating better conditions for active mobility such as walking and cycling, but also create a better environment to develop public life, people sitting, children playing… As can be seen on *Figure 6.6*, the center of the intersection is dedicated to these kinds of activities, painted and features tactical urban elements such as pots and benches. The cars can still use the intersection but they have to turn around the painted area at a low speed.

The municipality has announced that they want to develop the "Superilla concept" in several other locations of the Eixample district (Ajuntament de Barcelona *c*, 2021), it is thus

highly interesting to determine whether this type of traffic calming measure is encouraging female cycling.

Two sites were chosen: Sant Antoni and Poblenou. Superilla Sant Antoni is more recent while Superilla Poblenou has been installed for longer (see *Appendix 4: interview with Ferran Rodriguez*) and the fact that the residents had time to get used to the infrastructure may explain some differences in the results of the two Superilles, as will be discussed later.

Figure 6.5: Superilla Poblenou, Sancho de Avila at Roc Boronat (self made)

Figure 6.6: Superilla Sant Antoni, Parlament at Compte del Borrell (self made)

Type 2: 30 km/h zone shared with cars

For this typology, two streets were chosen with both the 30 kmph speed limitation and the bike sign painted on the ground (see *Figure 6.7*). There are also streets in Barcelona that have a 30 kmph speed limit but have no bike painted on the ground: these streets were not part of the study, as it is not clear for cyclists and car drivers whether cars are invited to share the street with cyclists or not.

Figure 6.7: 30 kmph street with the bike logo (self made)

For this typology we chose two streets: Carrer de la Riera Alta and Carrer de Madrazo. These streets were particularly interesting because the municipality of Barcelona is planning on developing this type of infrastructure (shared traffic-calmed roads) to encourage sustainable active mobility in the city in the future, together with developing cycle lanes (Ajuntament de Barcelona, 2020). It is thus interesting to determine whether they are beneficial in terms of cycling in general and of female cycling in particular.

Type 3: Cycle path on the side of the road, separated from the road with rubber bullets

For this typology we chose to study two sites: Diputació at Girona and Compte Urgell at Diputació. The main difference between these two sites is that Diputació street has a one-way cycle lane while Compte Urgell street has a two-way cycle lane. Studies have shown differences in attractiveness of one-way and two-way cycle lanes. For example, in the study conducted by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019), women have reported fear of collision with people coming in front of them in bidirectional cycle lanes. It would be interesting to see if the results from on-site observations reflect this and if women use unidirectional cycle lanes more than they do bidirectional ones.

Figure 6.8: Diputació at Girona (self made)

Figure 6.9: Compte d'Urgell at Diputacio (self made)

Type 4: Cycle path in the middle of the road, separated from the road with concrete

Studies have shown that cycle lanes located in the middle of the street are not as attractive to cyclists as cycle lanes located on the side of the road (see *Appendix 6: interview with Silvia Casorran*), this is why Type 4 bike infrastructure was studied separately from Type 3 and Type 5. Two sites were chosen: Passeig Sant Joan and Parallel, which are two major, very busy, avenues in Barcelona. Even though they have a similar bike infrastructure: two-way cycle lanes in the middle of the road, they are long avenues serving two different areas of Barcelona: Passeig Sant Joan connects the Eixample district to the waterfront while cyclists in Parallel may have different socio-demographic characteristics.

Figure 6.10: Passeig de Sant Joan at Diputació (self made)

Figure 6.11: Parallel at Parlament (self made)

Type 5: Cycle path on the side of the road, separated from the road by park vehicles

Type 5 cycling infrastructure from Aragó street was studied separately from the Type 3 as it is way more protected from motorized vehicles, being separated from the main road by parked cars. To the best of our knowledge this type of infrastructure has not been implemented in other locations in Barcelona: it would be interesting to see whether this kind of separation creates more favorable conditions for female cycling than the more traditional separation (rubber bullets) and whether this kind of infrastructure would be worth using elsewhere in Barcelona.

Figure 6.12: Aragó a Passeig de Gràcia: cycle lane separated from the car lanes by parked motorcycles (self made)

Type 6: Road lane shared with buses and taxis

Type 6 cycling infrastructure is not dedicated to cycling but shared with buses and taxis. It is a type of infrastructure applied in Barcelona during the Covid-19 pandemic (see *Appendix 4: interview with Ferran Rodriguez*) to avoid having to choose between having a cycle lane and having a bus lane, as there is not enough space to build both (see *Appendix 6: interview with Silvia Casorran*).

To the best of our knowledge this kind of infrastructure has not been implemented in other locations in Barcelona. It has been chosen to study it to try and explore whether when there is not enough space for both a cycle lane and a bus lane this type of combined lane could provide a good alternative.

Figure 6.13: Creu Coberta at Rector Triado, lane shared between busses, bikes and taxis (self made)

Data collection:

The observations took place during weekdays. It has been found that rain, even in small amounts, causes important variations on the amount of people cycling in Barcelona (Col·lectiu Punt 6, 2019), and research has shown that rain influences male and female cycling patterns in different ways: bad weather has proven to be a stronger deterrent for female cycling than male cycling. (Bergström & Magnusson, 2003)

For this reason, to keep consistency and representativeness and to be sure that rain will not cause variations in terms of user profile all observations took place during non-rainy days.

The observation periods consisted in two phases.

Phase 1 (March-April):

- 2 hours in the morning for each location, between 7:45 to 9:45. The expected profile of cyclists during this period is mostly commuters and parents taking their kids to school.
- 2 hours in the afternoon for each location, between 17:00 to 19:00. The profile of cyclists at this time is expected to be more diverse.

Due to the Covid-19 pandemic and the increase of remote work and part-time remote work, it is hard to say whether these times can still be considered as "peak hours", but the aim was still to have the bigger sample possible.

Phase 2 (April-May):

The measurements conducted during *Phase 1* were repeated during *Phase 2*. *Phase 2* takes place in April and May in order to have comparable temperature, weather and light, especially during the evening, with previous studies of some of the featured sites that have been conducted in May (Lind et al., 2018).

Flow count

Based on results from the pilot observation, we determined that 2 hours would be the right amount of time to spend on each site to obtain a representative and conclusive sample.

To count the cyclists using the different kinds of infrastructure the Gehl method to study public life was used. This method has been used before for several studies about public life and active mobility in Barcelona (Akaltin et al., 2019), it consists in defining a "flow count transect" (see figure xx) in the street and count every cyclist and micro mobility user that crosses this transect.

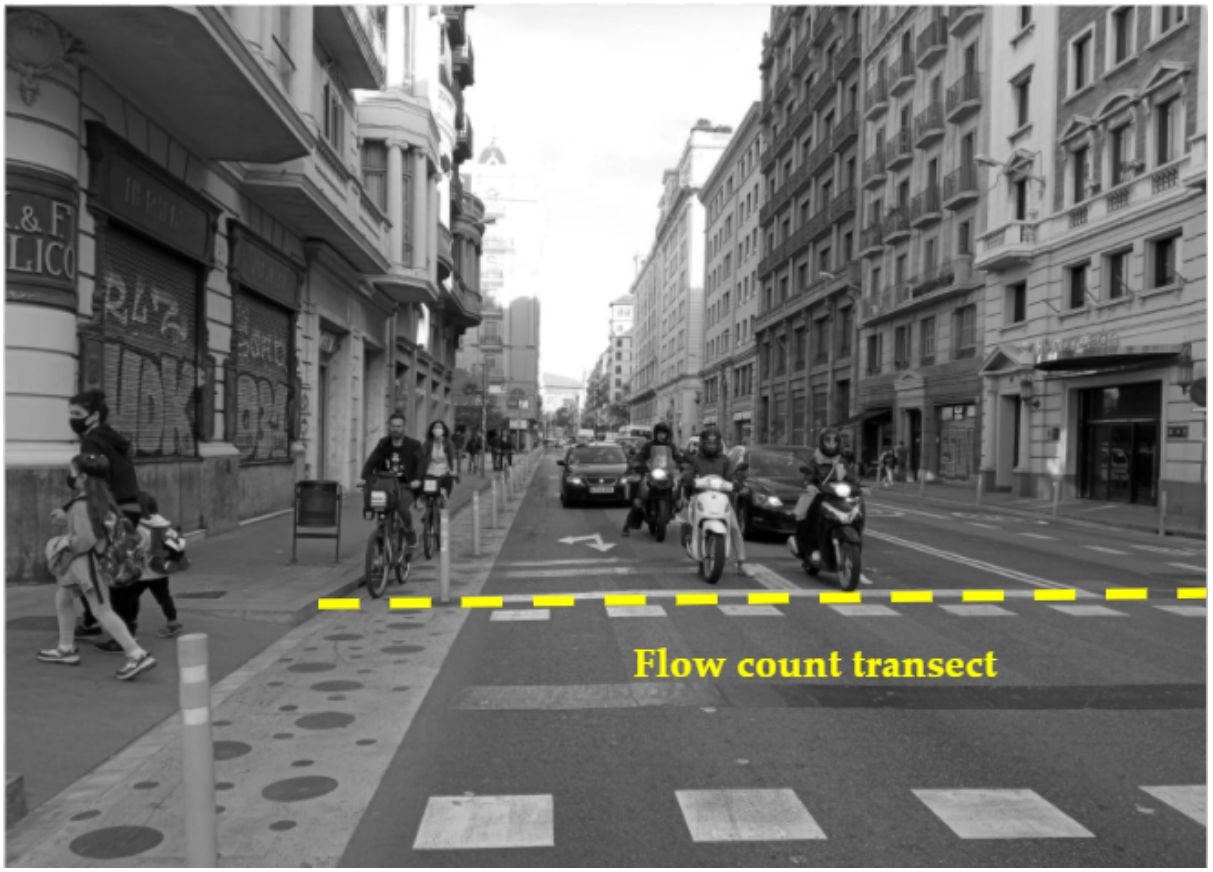

Figure 6.14: Flow count in Via Laietana (self made)

When studying a dedicated cycle lane, we focused only on the cycle lanes and not the sidewalks or people cycling on the road. If the bike lane is two-way, we will count cyclists going both ways. Similarly, in Via Laietana the street is bidirectional so we counted cyclists and micromobility users going in both directions.

For traffic calming areas like the Superilles we observed the whole area: the road and the sidewalk, and people walking with a bike, as well as people cycling. Indeed, during preliminary research it has been found that quite a few people, especially women, get off their bike when they arrive in the Superilla and walk beside their bike and we thought it relevant to include this aspect in the measurement.

6.2 Qualitative material

Interviews

The interviews took place in between *Phase 1* and *2*. The objective was to complement the quantitative data collected during on-site observation with insight from people from the municipality, people from activist groups or people working in the cycling field.

Choice of interviewees:

The Delphi method was used to conduct the interviews, meaning that the interviewees were chosen to constitute a "panel of experts". What is considered an expert according to the Delphi method is a person with deep knowledge of the studied field. The aim is to collect material that can be compared and to reach a form of consensus to answer the research question. (Daniels, 2017)

Four interviews were conducted, two with people working with the planning and design of cycle lanes in close relation with the municipality and two with people working for cycling related organizations. All four interviewees also cycle regularly in Barcelona.

Ferran Rodriguez is a consultant for the municipality of Barcelona and makes proposals for the design of new bicycle lanes. He is also involved in cycling activism and is part of several organizations whose aim is to promote cycling in Sant Cugat, a town part of Barcelona Metropolitan Area.

Silvia Casorran works for the municipality of Barcelona with issues related to mobility and cycling. She previously worked for the Barcelona Metropolitan Area. She has been involved in cycling activism and she actively promoted the creation of traffic calmed areas in Barcelona. In particular, she was involved in the development of Superilla Poblenou.

Gemma Simon works for Biciclot, a cooperative which promotes cycling in Barcelona through training people how to ride or repair a bicycle. Biciclot also has a feminist perspective and organizes female-only workshops, courses and events.

Nuria Soto is the founder of Mensakas, a cooperative of bicycle delivery messengers which seeks to offer a socially sustainable alternative to other delivery companies. Mensakas also has an ambitious policy to promote gender equality: they are trying to reach gender parity among their employees and pay their female employees 5% more than their male employees as a way to protest against the gender pay gap.

Interviews

The same questions were asked to all the interviewees to keep consistency and comparability. The questions were asked either in English (Silvia Casorran, Gemma Simon) or in Spanish (Ferran Rodriguez, Nuria Soto). The interviews with Ferran Rodriguez, Gemma Simon and Silvia Casorran were in-person photograph-led interviews based on a presentation.

It was not possible to conduct an in-person interview with Nuria Soto: the interview was conducted over the phone. The questions were read to her and she had not access to the pictures of the sites. However, as a bicycle delivery messenger she is very knowledgeable about the streets of Barcelona and the interview could be conducted without pictures.

The questions for the interview were chosen with three main goals:

- Knowing if, in the professional opinion of the interviewees, the cycle infrastructure had an influence over the cycling gender gap
- Gaining insight on the cycling context in Barcelona and, when possible, gaining insight on the municipality's view of cycling and in particular cycling from a gender perspective
- Gaining knowledge about the 12 chosen sites and about the preliminary results from Phase 1 and in particular if they had specificities that could help interpreting the results

Online workshop (see *Appendix 2: Online workshop*)

On the 9th of March 2021, I also participated in an online workshop organized by Biciclot and Col·lectiu Punt 6 called " Urbanism with a gender perspective" which was focused on cycling in Barcelona. As the workshop was not organised by me, I could not directly ask questions to the participants. However, the data collected during this workshop is still primary material as I was able to take notes.

The workshop was female-only but apart from this criterion there was no selection for the workshop participants, anyone could attend. An open call was placed on Biciclot and Col·lectiu Punt 6's social media account. The participants were 14 women living in Barcelona or in the surrounding municipalities, they were frequent cyclists from 22 to 55 years old. They were not beginner cyclists but rather "advanced", very knowledgeable, who were involved with cycling through their work, activism or both.

The workshop consisted in a presentation from Sara Ortiz Escalante from Col·lectiu Punt 6 who presented the key aspects to take into account when planning for mobility from a gender perspective. The presentation was followed by a discussion where each participant could discuss the barriers they face as female cyclists, whether in terms of design, lack of facilities or inappropriate behavior from other users.

7. Results & analysis

7.1 What is the context in Barcelona, and in particular at the 12 observation sites, regarding gender and cycling?

The aim of this section is to present general information about the different sites.

Previous studies conducted in Barcelona have shown that the infrastructure does matter when it comes to encouraging women to cycle. Indeed, 63% of the non-cyclist women who answered the survey conducted in 2019 by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019) have stated that the main changes that would encourage them to take up cycling would be a better bike infrastructure, a better network of protected cycle lanes and a better cycle connection between the municipalities of Barcelona Metropolitan Area.

Although some improvements have been made regarding Barcelona's cycling network during the Covid-19 pandemic, when the study was conducted by Col·lectiu Punt 6, very few women (16%) considered they can use the bicycle for care "reproductive" work.

This chapter is an analysis of the observations of 14,536 cyclists and micromobility users conducted in 12 sites, including dedicated and shared bike infrastructure, in Barcelona between March and May 2021. Observations to each of the sites were done in two phases, which means that for each site, observations have been done twice at the same time of the day (from 7:45 to 10:00 in the morning and from 17:00 to 19:00 in the afternoon), once during *Phase 1* and once during *Phase 2*.

7.1.1 Infrastructure

Table xx shows that the gender gaps are consistent between *Phase 1* (March-April 2021) and *Phase 2* (April-May 2021) across all sites. Although further research would need to be conducted to see if extreme weather conditions such as heat in summer or precipitations and cold in winter have a decisive influence over gendered micromobility and cycling patterns, Table XX seems to indicate that the gender gap is stable for each site regardless of the time of the year.

	% of females Phase 1	**% of females Phase 2**	**% of difference between Phase 1 & 2**
Balmes at Diputacio	18.80%	14.10%	4.70%
Via Laietana at Princesa	27.50%	28.40%	0.90%
Superilla Poblenou	37.50%	37.20%	0.30%
Superilla Sant Antoni	29.00%	28.50%	0.50%
Riera Alta at Aurelia Capmany	23.00%	28.90%	5.90%
Madrazo at Alfons XII	34.90%	31.70%	3.20%
Compte d'Urgell at Diputacio	34.60%	37.10%	2.50%
Diputacio at Girona	37.10%	41.00%	3.90%
Parallel at Parlament	31.10%	30.70%	0.40%
Passeig de Sant Joan at Diputació	38.30%	39.90%	1.60%
Aragó at Passeig de Gràcia	30.30%	29.40%	0.90%
Creu Coberta at Rector Triado	28.10%	29.60%	1.50%

Table 7.1: Comparison between the percentages of female at each location depending on the phase (own results)

	Male	Female	Number of observation
Balmes at Diputacio	**83.6%** *(230)*	**16.4%** *(45)*	275
Via Laietana at Princesa	**72.1%** *(485)*	**27.9%** *(188)*	673
Type 0 (no cycling infrastructure)	**75.4%** *(715)*	**24.6%** *(233)*	**948**
Superilla Poblenou	**62.7%** *(514)*	**37.3%** *(306)*	820
Superilla Sant Antoni	**71.2%** *(530)*	**28.8%** *(214)*	744
Type 1 (Superilla)	**66.8%** *(1,044)*	**33.2%** *(520)*	**1,564**
Riera Alta at Aurelia Capmany	**73.7%** *(463)*	**26.3%** *(165)*	628
Madrazo at Alfons XII	**66.7%** *(168)*	**33.3%** *(84)*	252
Type 2 (30 kmph street)	**71.7%** *(631)*	**28.3%** *(249)*	**880**
Compte d'Urgell at Diputacio	**64.1%** *(1,608)*	**35.9%** *(901)*	2,509
Diputacio at Girona	**61.0%** *(854)*	**39.0%** *(547)*	1,401
Type 3 (protected cycle lane on the side of the street)	**63.0%** *(2,106)*	**37.0%** *(1,019)*	**3,910**
Parallel at Parlament	**69.1%** *(1,592)*	**30.9%** *(713)*	2,305
Passeig de Sant Joan at Diputació	**60.8%** *(1,624)*	**39.2%** *(1,046)*	2,670
Type 4 (protected cycle lane in the middle of the street)	**64.6%** *(3,216)*	**35.4%** *(1,759)*	**4,975**
Aragó at Passeig de Gràcia	**70.2%** *(912)*	**29.8%** *(387)*	**1,299**
Type 5 (cycle lane on the side of the street protected by parked vehicles)	**70.2%** *(912)*	**29.8%** *(387)*	**1,299**
Creu Coberta at Rector Triado	**71.1%** *(683)*	**28.9%** *(277)*	**960**
Type 6 (lane shared with buses and taxis)	**71.1%** *(683)*	**28.9%** *(277)*	**960**
Overall	**66.5%** *(9,663)*	**33.5%** *(4,873)*	**14,536**

Table 7.2: percentage of each gender depending on the location (own results)

The overall percentage of female micromobility users is 33.5% in Barcelona, which is consistent with the results of the study conducted by Lind et al in 2018 (Lind et al., 2018), which found a gender gap of 2:1 among cyclists and micromobility users.

Table 7.2 shows that the gender gap is better than the average in protected cycle lanes, both the ones located in the middle and in the side of the street, except in Aragó. The low percentage of females in the Carrer de Aragó bike lane could be explained by the recent creation of the cycle lane (during the pandemic) and its location in a very busy street. Some women have commented that that don't like cycling in Aragó because of the noise and the contamination and would rather use the other cycle lanes located in parallel, quieter streets like Diputacio (see *Appendix 4: interview with Ferran Rodriguez*)

The gender gap is worse than the average in shared spaces: the shared bus-taxi-bike lane in Creu Coberta, 30 kmph streets and 50 kmph streets. 30 kmph and 50 kmph streets refers to streets with no dedicated bike infrastructure where cyclists and other micromobility users have to share their space with the cars which are supposed to go at a maximum speed of 30 or 50 kmph. However, speed limits in these streets are routinely infringed and for example, the car speed between traffic lights in Creu Coberta can be close to 50 kmph (see *Appendix 4: interview with Ferran Rodriguez* and *Appendix 6: interview with Silvia Casorran*). The only shared spaces with a gender gap better than average are the Superilles where the space is shared with pedestrians and a few cars and where the speed limit is 10 kmph.

The survey conducted in 2019 by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019) found the following percentages for the use of the different types of infrastructure:

Separated bidirectional bike lane between the car lane and the sidewalk	93%
Separated unidirectional bike lane between the car lane and the sidewalk	89%
Street shared with the motorized traffic where the speed is limited to 30 or 20 kmph	70%

Separated bidirectional bike lane in the middle of the street	70%
Separated unidirectional bike lane in the middle of the street	64%
Street shared with motorized traffic with a speed limit higher than 30 kmph	48%
Sidewalk without bike infrastructure, shared with pedestrians	45%

Table 7.3: type of infrastructure used by female cyclists (adapted from Col·lectiu Punt 6, 2019)

The results of the observations conducted for this study (see Table 7.3) and the survey conducted by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019) are consistent and show a strong preference of women for segregated cycle lanes.

The report from Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019) contains qualitative material and stories of women being afraid of cyclists coming in the opposite direction when they are using bidirectional cycle lanes. Gemma Simon (see Appendix xx: interview with Gemma Simon) has also underlined that bidirectional cycle lanes can neither the observations conducted for this project nor the survey from Col·lectiu Punt 6 shows a strong female preference towards unidirectional cycle lanes.

One reason that could explain that results from Barcelona are different from those from other cities is convenience. Indeed, many bidirectional cycle lanes are located in the Eixample grid and some of the bidirectional cycle lanes in Barcelona, and in particular Compte d'Urgell, the one observed for this study, are located in one direction streets. It is possible that these bidirectional cycle lanes provide more direct routes for cyclists, which might explain why the percentage of females in Compte d'Urgell (bidirectional) is only slightly lower than in Diputació (unidirectional).

The Superilla/Single level streets (Plataforma unica) typology was not taken into account by the survey conducted by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019). The only inconsistency

between this study and the one conducted by Col·lectiu Punt 6 is regarding 30 kmph streets. The thesis and the study conducted by Col·lectiu Punt 6 shows that women use 30 kmph streets shared with the motorized traffic as much as they use protected bicycle lanes, which contradicts what has been shown by on-site observations.

One reason that could explain the difference in findings between the self-reported preference study conducted by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019) could be that 30 kmph street seems good on paper: because the speed is limited they sound safer. However, the qualitative results of the same study by Col·lectiu Punt 6 (Col·lectiu Punt 6, 2019) has shown some negative experiences of women being harassed by car or taxi drivers while cycling in those streets (see *Chapter 7.3*).

The difference between the self-reported preference study and the observation might actually illustrate one of the biases of self-reported preference studies: the social desirability bias. This bias refers to the tendency of the survey respondents to answer the questions based on what he perceives as more socially acceptable. Here, streets with lower speeds are generally perceived as safe, which might influence the respondents to say they use them, even though they personally feel uncomfortable using them and actually prefer other itineraries. (Garrard et al., 2008)

7.1.2 Time variation

	AM	PM	Overall
Balmes at Diputacio	11.2%	19.6%	16.4%
Via Laietana at Princesa	27.9%	27.9%	27.9%
Type 0 (no cycling infrastructure)	**22.5%**	**25.7%**	**24.6%**
Superilla Poblenou	38.7%	35.8%	37.3%
Superilla Sant Antoni	34.4%	24.1%	28.8%
Type 1 (Superilla)	**36.8%**	**29.8%**	**33.2%**
Riera Alta at Aurelia Capmany	28.5%	25.0%	26.3%
Madrazo at Alfons XII	38.7%	25.5%	33.3%
Type 2 (30 kmph street)	**32.5%**	**25.1%**	**28.3%**
Compte d'Urgell at Diputacio	41.9%	32.0%	35.9%

Diputacio at Girona	42.0%	35.8%	39.0%
Type 3 (protected cycle lane on the side of the street)	**41.9%**	**32.1%**	**37.0%**
Parallel at Parlament	34.1%	28.4%	30.9%
Passeig de Sant Joan at Diputació	45.9%	33.6%	39.2%
Type 4 (protected cycle lane in the middle of the street)	**40.5%**	**31.2%**	**35.4%**
Aragó at Passeig de Gràcia	33.3%	25.7%	29.8%
Type 5 (cycle lane on the side of the street protected by parked vehicles)	**33.3%**	**25.7%**	**29.8%**
Creu Coberta at Rector Triado	31.2%	27.3%	28.9%
Type 6 (lane shared with buses and taxis)	**31.2%**	**27.3%**	**28.9%**
Overall	**37.9%**	**29.7%**	**33.5%**

Table 7.4: percentage of female depending on the location and the time (own results)

We can see a clear trend across all sites except Balmes, showing that the gender gap is lower in the morning than in the afternoon. Observations were conducted between 7:45 and 9:45 in the morning and between 17:00 and 19:00 in the afternoon. In Barcelona school starts at 9:00 and finishes at 16:00, one explanation to the higher percentage of women in the morning could have been mobility of care: women dropping their children at school in the morning that we didn't not observe picking them up from school in the afternoon because observations started an hour after the end of classes.

Mobility of care was indeed more important during morning observations (see *Table 7.5*: *Number and percentages of male and female carrying or accompanying children depending on time*). The number of females carrying or accompanying a child is higher in the morning than in the afternoon, so is the number of males carrying or accompanying a child. However, the percentage of females carrying or accompanying a child compared to males is not higher in the morning ; mobility of care and having to drop the children to school in the morning is not the explanation for the higher percentage of women using cycle lanes in the morning.

Actually, the gender gap for the activity of carrying or accompanying a child is slightly higher in the morning than in the afternoon.

	Male	Female	Total
AM	**61.0%** *(125)*	**39.0%** *(80)*	205
PM	**58.3%** *(91)*	**41.7%** *(65)*	156

Table 7.5: Number and percentages of people carrying or accompanying children depending on time and gender (own results)

Previous studies have found that women tend to travel more outside of peak hours than men (Whitzman et al., 2013). However, for this study no conclusion can be drawn regarding peak hours: mobility patterns have changed a lot during the Covid-19 pandemic, partly due to the increase of people remote working.

What can be noted however it that the time variation is more important at the sites with segregated bicycle lanes (Compte d'Urgell at Diputació, Diputació at Girona, Parallel at Parlament, Passeig de Sant Joan at Diputació and Aragó at Passeig de Gràcia) than for the sites where cyclists have to share their space with motorized traffic (Via Laietana at Princesa, Riera Alta at Aurelie Capmany and Creu Coberta at Rector Triado). Balmes at Diputació is actually the only location where women cycle more in the afternoon than in the morning (see *Table 7.4: percentage of female depending on the location and the time*)

As for spaces shared with pedestrians, both Superilla Sant Antoni and Superilla Poblenou were quieter in the mornings when observations were done than in the afternoons. In Superilla Sant Antoni, there were almost no pedestrians, people sitting or children playing during morning observations and very few cars, mostly trucks delivering food and drinks to surrounding restaurants and bars. In the afternoons when the observations were made Superilla Sant Antoni was busier with pedestrians, children and other vulnerable users. (see *Appendix 8: Qualitative observations)*

In the same way, Superilla Poblenou was quieter in the mornings when the observations were made and in the afternoons during which the observations were done, after school, the Superilla was busier with vulnerable users such as children playing and parents walking. (see *Appendix 8: Qualitative observations)*

When the observations were done, it was easier to cycle in the mornings than in the afternoons as there were less potential conflicts with other users and the perceived safety might have been higher, which could explain the higher share of women cycling in the Superilles in the morning than in the afternoons. During the afternoon many women actually get off their bikes in the Superilles, potentially in respect of other users, namely children with unpredictable behaviour (see *Chapter 7.3*).

7.1.3 Different types of micro mobility devices

Device	Female (%)	Male (%)	Total of users
Bicycle	**31.5%** *(2,189)*	**68.5%** *(4,756)*	6,945
Bicing	**39.5%** *(1,470)*	**60.5%** *(2,251)*	3,721
Scooter	**32.6%** *(1,149)*	**67.4%** *(2,371)*	3,520
Skateboard	**10.8%** *(16)*	**89.2%** *(132)*	148
Other micromobility	**14.9%** *(11)*	**85.1%** *(63)*	74
Cargo Bike	**19.7%** *(12)*	**80.3%** *(49)*	61
Roller skates	**41.0%** *(25)*	**59.0%** *(36)*	61
Disability device	**16.7%** *(1)*	**83.3%** *(5)*	6
TOTAL	**33.5%**	**66.5%**	**14,536**

Table 7.6: gender gap for each device (own results)

The percentage of females using bicycles is slightly lower than the one found by the *Barometre de la bicicleta 2019* from the Catalunyan region, which found that 36,6% of cyclists were female. However, the *Barometre de la bicicleta* considers all cyclists, making no distinction between frequent and infrequent users or whether it is cycling for transport, leisure or sport, while the Barometre also shows that in Catalunya male are more likely to

cycle daily (6.9%), than women (2.8%), which could explain the difference. (Generalitat de Catalunya, 2019)

For the Table xx: *modal share of each mode depending on the location*, only four types of devices are analysed: bicycles, Bicing shared bicycles and e-scooters, because they are used much more frequently than the rest of the devices, and cargo bikes. Indeed, even though cargo bikes are not frequently used in Barcelona, they are often related to the mobility of care, for example they are used to transport groceries or children. Mobility of care has been shown to have a crucial influence on women's mobility patterns (see *Chapter 4: Theoretical Framework*)

	Bike	**Bicing**	**E-scooter**	**Cargo bike**
Balmes at Diputacio	**63.6%** *(175)*	**25.1%** *(69)*	**10.2%** *(28)*	**1.1%** *(3)*
Via Laietana at Princesa	**53.2%** *(355)*	**31.5%** *(210)*	**14.7%** *(98)*	**0.6%** *(4)*
Type 0 (no cycling infrastructure)	**56.3%** *(530)*	**29.6%** *(279)*	**13.4%** *(126)*	**0.7%** *(7)*
Superilla Poblenou	**51.7%** *(408)*	**27.4%** *(216)*	**20.0%** *(158)*	**0.9%** *(7)*
Superilla Sant Antoni	**52.0%** *(371)*	**18.4%** *(131)*	**29.2%** *(208)*	**0.4%** *(3)*
Type 1 (Superilla)	**51.8%** *(779)*	**23.1%** *(347)*	**24.4%** *(366)*	**0.7%** *(10)*
Riera Alta at Aurelia Capmany	**56.8%** *(142)*	**19.2%** *(48)*	**24.0%** *(60)*	**0.0%** *(0)*
Madrazo at Alfons XII	**50.5%** *(312)*	**23.3%** *(144)*	**25.9%** *(160)*	**0.3%** *(2)*
Type 2 (30 kmph street)	**52.3%** *(454)*	**22.1%** *(192)*	**25.3%** *(220)*	**0.2%** *(2)*
Compte d'Urgell at Diputacio	**41.3%** *(1,018)*	**28.6%** *(706)*	**29.8%** *(736)*	**0.2%** *(6)*
Diputacio at Girona	**47.3%** *(659)*	**27.9%** *(389)*	**24.3%** *(339)*	**0.4%** *(6)*
Type 3 (protected cycle lane on the side of the street)	**43.5%** *(1,677)*	**28.4%** *(1095)*	**27.9%** *(1,075)*	**0.3%** *(12)*
Parallel at Parlament	**49.9%** *(1,125)*	**25.8%** *(581)*	**24.0%** *(541)*	**0.3%** *(7)*
Passeig de Sant Joan at Diputació	**46.1%** *(1,198)*	**31.2%** *(810)*	**22.2%** *(576)*	**0.6%** *(16)*
Type 4 (protected cycle lane in the middle of the street)	**47.8%** *(2,323)*	**28.7%** *(1,391)*	**23.0%** *(1,117)*	**0.5%** *(23)*
Aragó at Passeig de Gràcia	**51.4%** *(654)*	**21.2%** *(270)*	**27.0%** *(344)*	**0.3%** *(4)*
Type 5 (cycle lane on the side of the street protected by parked vehicles)	**51.4%** *(654)*	**21.2%** *(270)*	**27.0%** *(344)*	**0.3%** *(4)*

Creu Coberta at Rector Triado	**55.6%** *(528)*	**15.5%** *(147)*	**28.6%** *(272)*	**0.3%** *(3)*
Type 6 (lane shared with buses and taxis)	**55.6%** *(528)*	**15.5%** *(147)*	**28.6%** *(272)*	**0.3%** *(3)*
Overall	**48.7%** *(6,945)*	**26.1%** *(3,721)*	**24.7%** *(3,520)*	**0.4%** *(61)*

Table 7.7: modal share of each mode depending on the location (own results)

Cargo bikes

Contrary to Superilles, separated cycle lanes are not cargo bike friendly, indeed during online workshops several women have mentioned how segregated cycle lanes are too narrow to be comfortable using a cargo bike (see *Appendix 2: Online workshop*).

Cargo bikes are surprisingly more frequent when there is no cycle infrastructure at all, like in Balmes or Via Laietana. Maybe it gives people more confidence, more stability, less perceived risk to fall (reference) but the number of cargo bike is not important enough in Barcelona to draw a reliable conclusion and the use of cargo bikes in Barcelona is influenced by other factors than the infrastructure such as the risk of theft and the lack of parking spaces.

Bicing

The share of women using Bicing is higher (39.5%) than the share of women using private bicycles (31.5%) (see *Table 7.6: gender gap for each device*). One explanation for the smaller gender gap observed with Bicing than with privately owned bicycles could be that Bicing gives cycling beginners the opportunity to use a bicycle in an urban context without having to buy their own. A higher share of beginners would then use Bicing and a higher share of "expert" cyclists would own their own bicycle. The *Barometre de la bicicleta* (Generalitat de Catalunya, 2019) has shown that women are more likely to be cycling beginners than men, which could explain the higher share of women among people using the bike sharing system, compared to people using their own bicycle.

The study conducted by Col·lectiu Punt 6, (Col·lectiu Punt 6, 2019) has shown that the Bicing could constitute a good complement to the private bike for women, especially when their

itinerary includes steep hills. Indeed, the Bicing bike sharing system offers the possibility to rent an electric bike or the option to go down using the Bicing and go back up using public transportation.

A typology with a higher share of Bicing, such as protected bike lanes: Compte d'Urgell, Diputació, Parallel and Passeig de Sant Joan could be an indication that women and cycling beginners feel more comfortable using this type of infrastructure than other typologies.

The share of Bicing is also high in Balmes and Via Laietana (type 0: no cycling infrastructure), not because these sites are accessible for beginners or women (see *Table 7.2: percentage of each gender depending on the location*) but rather because Balmes and Via Laietana are direct routes to the waterfront and many people use the Bicing to go towards the waterfront and then leave the Bicing bicycle in stations close to the waterfront and use other modes of transportation to go back (uphill). This phenomenon is actually made visible by the imbalance it creates in terms of Bicing availability (Col·lectiu Punt 6, 2019).

E-scooters

E-scooters users are usually less experienced than bike users. They often have taken up micromobility usage in the previous years and are not familiar with the rules of traffic, which could create conflicts with others users, car, cyclists and pedestrians alike. (see *Appendix 2: Online workshop* and *Appendix 5: Interview with Gemma Simon*)

The share of e-scooters is similar across all sites with protected cycle lanes, whether they are located in the middle or on the side of the street. There is a significant difference between Superilla Poblenou (18% of e-scooters) and Superilla Sant Antoni (31% of e-scooters). An explanation to this difference could be that Poblenou is more pacified than Sant Antoni (see *Appendix 4: interview with Ferran Rodriguez*), it is less convenient to use an e-scooter in Poblenou as the user has to stop a lot and the infrastructure cannot accommodate the speed of an e-scooter.

In the absence of bike infrastructure the percentage of e-scooter is lower than any other observation site, indeed, in Barcelona it is forbidden for e-scooter to use the road in streets where the speed limit is higher than 30 kmph, like Balmes or Via Laietana. In practice, we can still observe e-scooters in those streets, which indicates a latent demand for infrastructure accessible for e-scooters.

The influence of e-scooter over the gender gap is unclear: on the one hand, research has shown that young women use e-scooters more than they do private bicycle (AMB, 2019) suggesting that e-scooter s could be a way to make micromobility accessible for some social groups, for example women who need to maintain a "feminine" appearance (see *Chapter 4: Theoretical framework*). However, it has also been shown that many e-scooter users had an aggressive behaviour towards other users and that the speed of e-scooters, which is often higher than the speed of bicycles, can create conflicts, create a stressful atmosphere for female cyclists and decrease their feeling of safety (see *Appendix 2: Online workshop* and *Appendix 5: Interview with Gemma Simon*).

Moreover, e-scooter is an emerging mode of transport, with a number of users increasing rapidly and regulations changing often. Consequently, no conclusion can be drawn with regards to whether an infrastructure which is more accessible for e-scooters is automatically more accessible for women and beginners.

7.1.4 Sub Conclusion

The results from this section have shown traffic calmed spaces such as Superilles and segregated bicycle lanes have a smaller cycling and micromobility gender gap than the other typologies. The gender gap does not only depend on the infrastructure but also on the time of day: indeed, the share of women is significantly higher in the morning than in the afternoon for most typologies. The number of trips related to the mobility of care was also more important during morning observations, which is consistent with the school schedules in Barcelona.

Finally, the gender gap also varies depending on the vehicle: private bicycles have a gender gap higher than average, scooters have a gender gap close to the average and Bicing have a gender gap smaller than average.

7.2 What type of infrastructure can create better conditions to include all potential users and support the use of bike for the mobility of care?

In the survey conducted in 2019 by Col·lectiu Punt 6, 15% of the women who responded have stated they do not cycle because they have dependent people to take care of: children, but also elderly and disabled people with whom they don't feel like they can cycle with. (Col·lectiu Punt 6, 2019).

7.2.1 Carrying or accompanying children

As it has been mentioned in previous sections, women are often the primary caregiver of the household: they are often the one who has to travel with children. Creating bicycle lanes where women feel safe enough to cycle with kids is thus crucial to develop female cycling. This section seeks to analyse whether the 12 sites that have been studied are locations where people tend to travel with children and whether women in particular choose to travel with children in those locations.

According to the results of this study, there are almost twice as many men carrying or accompanying children as women. Indeed, 59.8% of the people accompanying children are men. It is unlikely to be a sign that men travel with children more than women in Barcelona: extensive feminist research with consistent results across countries has demonstrated the contrary, but rather that women who travel with children choose other modes of transportation than cycling. Indeed, several women have described how challenging cycling with children can be in Barcelona and how unsafe they sometimes felt. (Col·lectiu Punt 6, 2019 ; *Appendix 2: Online workshop*)

Moreover, a significant part of the people carrying children do not have reglementary saddles in the back of their bike but engage in illegal (Ajuntament de Barcelona, 2021) and risky behavior such as carrying a child on a scooter (32 males, 22 females), carrying a child

on a Bicing bicycle (4 males, 3 female) or even sometimes in balance on the handlebar of the bike (see *Appendix 8: Qualitative observations*). This type of behaviour can result in accidents, for example many people treated for scooter accidents are children while children under the age of 16 are not even allowed to use electric scooters. (Ajuntament de Barcelona *b*, 2021)

Cycling in an urban environment, especially on a cargo bike or with children in a precarious equilibrium, requires skills, in particular when the infrastructure is not designed for this kind of practice. Research has shown that women are less likely to feel confident riding a bike than men and that this discomfort is even more important when they fear for the safety of their children (Aldred, 2013 ; Sersli et al., 2020 and Ravensbergen et al., 2020). This might explain why in spite of women performing most of the care "reproductive" work in general, there are more men than women cycling while carrying a child overall in Barcelona.

As a matter of fact, women giving up cycling after getting pregnant or giving birth is a problem in many developed countries with low cycling rates, as it has been demonstrated by a study conducted in Australia in 2012 (Bonham & Wilson, 2012), a study conducted in Canada in 2020 (Sersli et al., 2020) and another study conducted in Chicago in 2019 (Heim LaFrombois, 2019). (Sersli et al., 2020) found out that women who know how to ride a bicycle and used to cycle as children and young adults often give up cycling when they take up parental responsibilities. This study has shown that the main reason why women are not comfortable cycling with children is fear for their safety and fear of traffic, more than for practical reasons or for lack of skills.

As a consequence of trip-chaining and multi-purpose trips that are often taken by women (Whitzman et al., 2013) not being able to accompany their children to school by bike impacts the ability of women to use a bike for the rest of their trips. For example if a woman has to drop her kids to school before going to work, not being able to use the bike to accompany the kids also prevents them from cycling to work (see *Chapter 4: Theoretical Framework*).

An eloquent example of this phenomena has been brought up by Ferran Rodriguez during our interview (see *Appendix 3: meeting with Ferran Rodriguez*): "escuela concertada" (*concerted*

school). Escuela concertada is a type of partly funded private school in Barcelona which, contrary to public school, does not force parents to enroll their children to the school closest to their home. As a result parents with small children have to travel long distances to accompany them to school and older children, who could go to school on their own if the school was closer, have to be dropped there by their parents.

Ferran Rodriguez underlined that these long distances often end up being travelled by car and that parents who start their day by using a car to drop their children to school are unlikely to change transportation mode afterwards and often make the rest of their trips during this day by car (see *Appendix 3: meeting with Ferran Rodriguez*). In the same way, women who cannot use a bike to accompany their children to school at the beginning of the day are unlikely to go back home to get their bike and use it for their following trips.

This makes the issue of building cycle infrastructure that connects all parts of the city, that can accommodate all kinds of mobility (especially care mobility), all kinds of users (including females) and all kinds of cycles (especially cargo bikes) and micromobility vehicles all the more crucial in terms of reduction of car usage.

Some types of infrastructure show potential to narrow the gender gap when cycling with a child. The typology that shows the most potential is the Superilla typology (see *Chapter 6:* Methods). The Superilla typology has the highest share of users carrying children in general (8.0% of the users are carrying a child), especially in Superilla Poblenou (10.7%). This is consistent with findings from other studies showing that women fear for the safety of their children in the presence of dense traffic (Bonham & Wilson, 2012 and Serli et al., 2020) and high speeds (Grudgings et al., 2018). Superilles which are pedestrianized, traffic calmed areas, with very few motorized vehicles, especially Superilla Poblenou (see *Appendix 4: interview with Ferran Rodriguez*), offer women better conditions in terms of traffic density and speeds. As a result we can see that the Superilla typology is the only one with no gender gap in the activity of carrying a child.

Unsurprisingly the typology with the worst gender gap is the "no bike infrastructure" typology. Indeed many studies have found that women have a strong preference for cycling infrastructure that is separated from the motorized traffic than men (Aldred et al., 2017). The bus-taxi-bicycle road lane typology could not be analysed as no bicycle carrying children passed during the observation. This can be interpreted as a sign that people, regardless of their gender, don't feel comfortable cycling with a child in the back of their bicycle when they can be followed by a bus.

Protected cycle lanes, either on the side or in the middle of the street: Diputació, Compte d'Urgell and Passeig de Sant Joan have similar gender gaps: 60 to 70% of children are carried by men. The results of Parallel show that only men were carrying children there during the observations.

As people carrying children are not that many these results are probably not relevant enough but still constitute a good indicator of the level of perceived safety these different typologies offer to the users.

Site	% of users carrying a child	% of Male	% of Female
Balmes at Diputacio	**1.7%** *(1)*	**0.0%** *(0)*	**100.0%** *(1)*
Via Laietana at Princesa	**1.9%** *(13)*	**84.6%** *(11)*	**15.4%** *(2)*
Type 0 (no cycling infrastructure)	**1.5%** *(14)*	**78.6%** *(11)*	**21.4%** *(3)*
Superilla Poblenou	**10.7%** *(88)*	**47.7%** *(42)*	**52.3%** *(46)*
Superilla Sant Antoni	**5.0%** *(37)*	**67.6%** *(25)*	**32.4%** *(12)*
Type 1 (Superilla)	**8.0%** *(125)*	**53.6%** *(67)*	**46.4%** *(58)*
Riera Alta at Aurelia Capmany	**2.0%** *(10)*	**60.0%** *(6)*	**40.0%** *(4)*
Madrazo at Alfons XII	**1.6%** *(5)*	**60.0%** *(3)*	**40.0%** *(2)*
Type 2 (30 kmph street)	**1.7%** *(15)*	**60.0%** *(9)*	**40.0%** *(6)*
Compte d'Urgell at Diputacio	**2.6%** *(33)*	**63.1%** *(23)*	**36.9%** *(10)*
Diputacio at Girona	**2.4%** *(65)*	**69.7%** *(41)*	**30.3%** *(24)*

Type 3 (protected cycle lane on the side of the street)	**2.5%** *(98)*	**65.3%** *(64)*	**34.7%** *(34)*
Parallel at Parlament	**0.7%** *(68)*	**86.7%** *(32)*	**13.3%** *(36)*
Passeig de Sant Joan at Diputació	**2.5%** *(15)*	**47.1%** *(13)*	**52.9%** *(2)*
Type 4 (protected cycle lane in the middle of the street)	**1.7%** *(83)*	**54.2%** *(45)*	**45.8%** *(38)*
Aragó at Passeig de Gràcia	**1.7%** *(22)*	**77.3%** *(17)*	**22.7%** *(5)*
Type 5 (cycle lane on the side of the street protected by parked vehicles)	**1.7%** *(22)*	**77.3%** *(17)*	**22.7%** *(5)*
Creu Coberta at Rector Triado	**0.4%** *(4)*	**75.0%** *(3)*	**25.0%** *(1)*
Type 6 (lane shared with buses and taxis)	**0.4%** *(4)*	**75.0%** *(3)*	**25.0%** *(1)*
Overall	**2.5%** *(361)*	**59.8%** *(216)*	**40.2%** *(125)*

Table 7.8: percentages of users carrying children (own results)

When they are carrying or accompanying a small child or a baby, 39% of women bike on the sidewalk, as they legally can (Col·lectiu Punt 6, 2019) which can create conflicts with other users such as pedestrians (see *Chapter 7.3)*.

7.2.2 Age gap

As it has been mentioned in previous sections, women are often the primary caregiver of the household and often have to travel with elderly people or children. Creating bicycle lanes that are accessible for elderly people and children and where women can cycle with them is thus crucial to develop female cycling. This section seeks to analyse whether the 12 sites that have been studied are locations where children and elderly are cycling.

	Child	**Adult**	**Senior**
Balmes at Diputacio	**0.0%** *(0)*	**99.3%** *(273)*	**0.7%** *(2)*
Via Laietana at Princesa	**0.3%** *(2)*	**99.3%** *(668)*	**0.4%** *(3)*
Type 0 (no cycling infrastructure)	**0.2%** *(2)*	**99.3%** *(941)*	**0.5%** *(5)*

Superilla Poblenou	**15.6%** *(128)*	**83.2%** *(682)*	**1.2%** *(10)*
Superilla Sant Antoni	**2.3%** *(17)*	**96.1%** *(715)*	**1.6%** *(12)*
Type 1 (Superilla)	**9.3%** *(145)*	**89.3%** *(1,397)*	**1.4%** *(22)*
Riera Alta at Aurelia Capmany	**0.3%** *(2)*	**98.6%** *(619)*	**1.1%** *(7)*
Madrazo at Alfons XII	**0.0%** *(0)*	**96.4%** *(243)*	**3.6%** *(9)*
Type 2 (30 kmph street)	**0.2%** *(2)*	**98.0%** *(862)*	**1.8%** *(16)*
Compte d'Urgell at Diputacio	**0.2%** *(6)*	**98.7%** *(2,477)*	**1.0%** *(26)*
Diputacio at Girona	**0.3%** *(4)*	**98.2%** *(1,376)*	**1.5%** *(21)*
Type 3 (protected cycle lane on the side of the street)	**0.3%** *(10)*	**98.5%** *(3,853)*	**1.2%** *(47)*
Parallel at Parlament	**0.1%** *(3)*	**98.5%** *(2,270)*	**1.4%** *(32)*
Passeig de Sant Joan at Diputació	**0.7%** *(19)*	**97.6%** *(2,605)*	**1.7%** *(46)*
Type 4 (protected cycle lane in the middle of the street)	**0.4%** *(22)*	**98.0%** *(4,875)*	**1.6%** *(78)*
Aragó at Passeig de Gràcia	**0.2%** *(2)*	**96.9%** *(1,259)*	**2.9%** *(38)*
Type 5 (cycle lane on the side of the street protected by parked vehicles)	**0.2%** *(2)*	**96.9%** *(1,259)*	**2.9%** *(38)*
Creu Coberta at Rector Triado	**0.0%** *(0)*	**99.3%** *(953)*	**0.7%** *(7)*
Type 6 (lane shared with buses and taxis)	**0.0%** *(0)*	**99.3%** *(953)*	**0.7%** *(7)*
Overall	**1.3%** *(183)*	**97.3%** *(14,140)*	**1.5%** *(213)*

Table 7.9: age split depending on the site (own results)

There are more children cycling in Superilles than using any other kind of infrastructure. Superilla Poblenou is especially child-friendly with 15.6% of users being children. An explanation to this high percentage of children could be the proximity to a school and the fact that, as several interviewees have underlined, Superilla Poblenou is more traffic-calmed than Superilla Sant Antoni (see *Appendix 4*: interview with Ferran Rodriguez*).*

The number of children is not important enough to have statistical significance for the rest of the sites. In the same way, the number of senior users is not important enough to have statistical significance and point to a typology which would be more accessible for seniors

but rather, this means that the whole cycling infrastructure in Barcelona is not perceived as safe enough for this age group.

Indeed, a result consistent across all observation sites is that the percentage of senior cyclists and micromobility users is very small in Barcelona compared to other countries with a stronger cycling culture like the Netherlands or Denmark. (see *Figure 7.1* and *Figure 7.2*)

Gender gap among seniors is worse than among the rest of the population: 18% of senior cyclists are female, compared to 33% for the rest of the population (see Appendix xx: *Results of the observations*). Indeed, it is common to find that women older than 50 years old who do not know how to ride a bicycle (see *Appendix 6: interview with Silvia Casorran*). This makes the issue of building bicycle infrastructure accessible for all age groups, including seniors and in particular female seniors, all the more crucial from a Mobility Justice point of view.

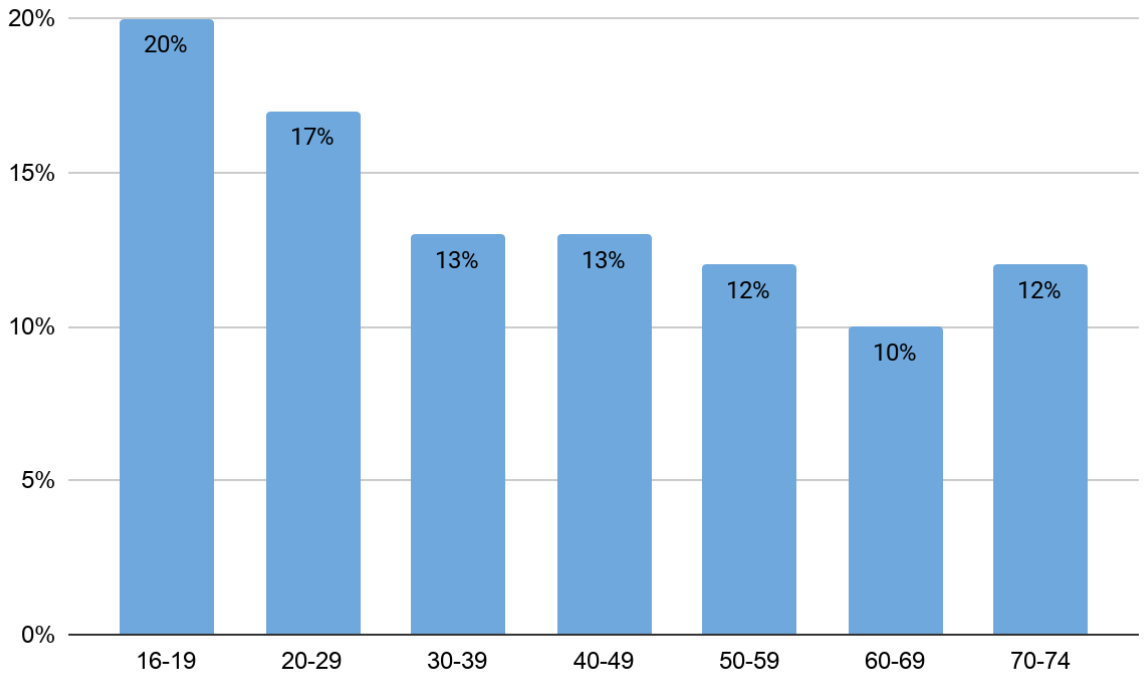

Figure 7.1: Share of trips made by bike per age group in Denmark (adapted from Pucher & Buehler, 2008)

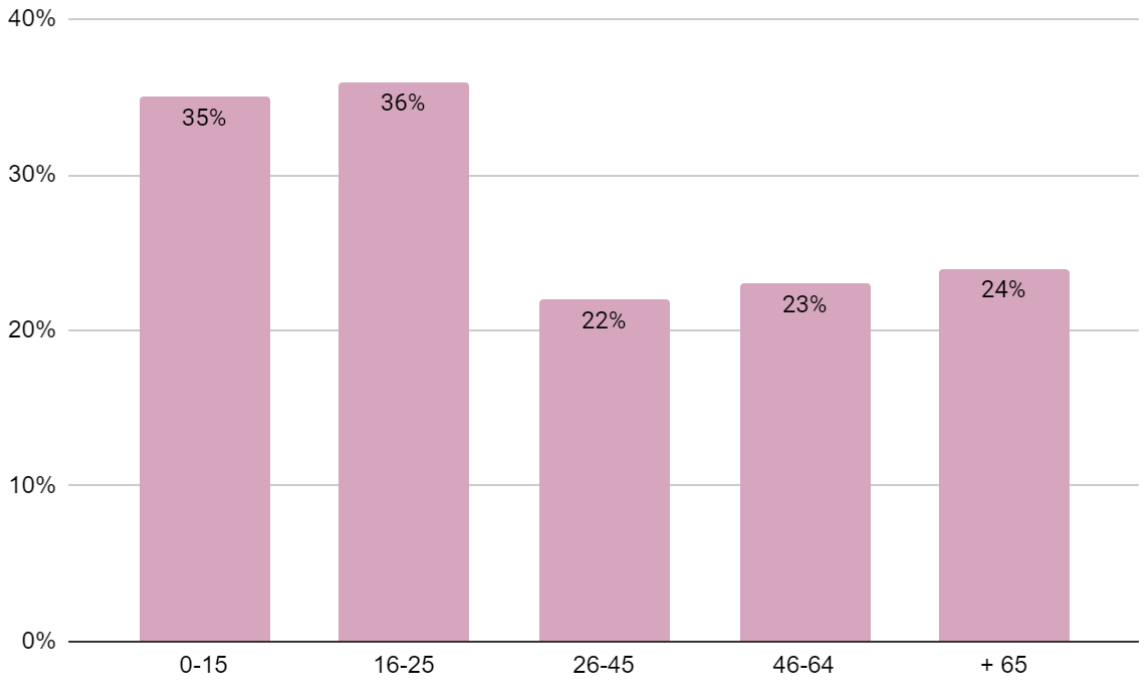

Figure 7.2: Share of trips made by bike per age group in Denmark (adapted from Pucher & Buehler, 2008)

7.2.3 Disability

Similarly to previous sections, as women are often the primary caregiver of the household and sometimes have to travel with disabled people, building cycle lanes that are accessible for disabled people and where women feel safe enough to cycle with them is thus crucial to develop female cycling. This section seeks to analyse whether the 12 sites that have been studied are locations where disabled people are cycling.

Among the 14,536 users observed during weekdays only 6 were using disability devices whereas in other countries with a stronger cycling culture, it is common to see tricycles or electric wheelchairs using bicycle lanes (Copenhagenhize, 2018). For example in the Netherlands the modal share of adapted micromobility devices such as electric wheelchairs or tricycles, among disabled people is 16% due to subsidies and adapted infrastructure (Douma, 2020). This shows that building a coherent network that enables disabled people to use micromobility as a mode of transport is achievable. However, in the case of Barcelona, it is unclear whether the infrastructure is not adequate for the use of disability devices or if the

problem comes from a lack of connection between the protected bicycle lanes, making it impossible for disabled people to have an itinerary which is completely accessible and safe.

Moreover, studies have shown that disabled cyclists use non-conventional cycles that require more space and that cycle lanes are often too narrow to accommodate these kinds of devices (Wheels for Wellbeing, 2020).
Indeed, a study conducted in the United States has shown that as a consequence of inadequate design, disabled users were five times more likely to get hit by a car or a motorcycle than the rest of the population. This study has also shown that disabled users were particularly vulnerable when they were using spaces shared with motorized traffic (Clayton et al., 2017).

7.2.4 Delivery messengers

Bike delivery messengers are mostly young males, experienced cyclists with an extensive knowledge of the streets, cycle lanes and shortcuts. Due to this unique profile and since they have very important time constraints while on the job, delivery messengers have a behaviour that differs from the behaviour of the average cyclist. (Ferguson, 2017)

A separate category was created for delivery messengers in case they would influence the results of the study, but few delivery messengers were observed during this study as observations were conducted during commute peak hours (7:45-9:45 and 17:00 to 19:00) and not restaurant peak hours.

The percentage of female bike delivery messengers is 3.1%. According to Nuria Soto (see *Appendix 7: interview with Nuria Soto*) this gender gap among bike delivery messengers is not due to the infrastructure but rather to other factors which have a more decisive influence such as sexual harassment from customers and the persistent cliché that a job which requires a physical effort is a male's job.

According to Nuria, female delivery messengers are experienced cyclists, they don't have the same fears and constraints the average female cyclist has regarding dense traffic or having to combine several care responsibilities in one trip.

7.2.5 Sub Conclusion

The results from this section have shown traffic calmed spaces such as Superilles and in particular Superilla Poblenou can create good conditions for women to cycle for care purposes. Superilla seem to create particularly good conditions to cycle with children, whether when carrying a small child in a saddle or accompanying a child cycling on his own.

Some other factors related to the mobility of care, such as the presence of senior cyclists, did not give conclusive results. Similarly, the use of adapted cycles which take up more space such as adapted devices for disabled people or cargo bikes is not developed enough in Barcelona to indicate which type of infrastructure might be more adequate for these users. A conclusion that can be drawn from the percentages of seniors users, disabled users and cargo bike users being so small is that the entire network of cycle lanes and parking facilities could be improved in order to provide better conditions for these users, as other European countries have succeeded in doing.

7.3 How can infrastructural design create conflicts between female cyclists and micromobility users and other users in shared spaces?

As it has been mentioned in previous sections, women are more conflict-averse than men. Moreover, they often feel less skilled and less entitled to the public space, which makes conflicts with other users a stronger deterrent for female cycling than for male cycling. This section is an analysis of the 12 locations where observations were conducted to try and see whether the design of the infrastructure creates conflicts and whether this influences women's presence at these locations.

7.3.1 Absence of bike infrastructure and the specific case of Via Laietana

There is no bike infrastructure in Via Laietana. In the online survey conducted in 2019 by Col·lectiu Punt 6, several women mentioned the difficulty of cycling in Via Laietana and the

unsafety they perceived, in particular they feel trapped between cars and buses, especially on the way up, when the lane on the right side of the street is a bus-taxi only lane, which use is forbidden for cyclists. They also complain of harassment and motorized vehicles overtaking them without respecting a safe distance. (Col·lectiu Punt 6, 2019)

As a result, especially when the traffic is very intense, cyclists are using the yellow temporary extension of the sidewalk as a bike lane. The results from *Phase 2* show that 63% of people are using the yellow extension of the sidewalk instead of the car lane they are legally supposed to use.

	AM	**PM (dense traffic)**
Yellow extension	29% of female	37% of female
Car lane	21% of female	16% of female

Table 7.9: gender gap in Via Laietana (own results)

This causes several problems: first of all, this yellow part of the street is not designed for cyclists and most definitely not for cargo bikes. The "yellow lane" is too narrow and cyclists who are using this part of the street are hitting the protective bollards and are uncomfortable cycling there.

Moreover, this part of the street is supposed to be for pedestrians. This temporary extension was installed at the beginning of the Covid-19 pandemic and its design has been confusing; it has been perceived as available for cyclists, which then prevents pedestrians from using it. Even though very few pedestrians are actually using it, this could create conflicts or accidents if pedestrians do decide to use this space. Finally, the "yellow lane " is not present all along Via Laietana, from Carrer de la Princesa to the sea front there is no "yellow lane" anymore. Many cyclists, especially during peak hours when the traffic is dense, decide to cycle on the sidewalk rather than to share space with the cars (see *Appendix 8: Qualitative observations*).

This is especially problematic as the "yellow lane" was created specifically because the sidewalks in Via Laietana are already too narrow to accommodate the normal flow of pedestrians (Ajuntament de Barcelona *b,* 2020). Instead of solving the conflicts between motorized traffic and cyclists by prioritizing cyclists and reducing the space allocated to cars, the existing design transforms this conflict into a conflict between pedestrians and cyclists.

A eloquent illustration of this problem is the ad campaign recently launched by the municipality on bike parking to warn cyclists about the conflicts between bikes and pedestrians in Ciutat Vella and along Via Laietana (see *Figure 7.3*)

Figure 7.3: "Don't get confused, the pedestrian has priority [over cyclists]"

Studies have shown that when they know they risk facing conflicts with other users, either car drivers or pedestrians, women tend to avoid the location altogether and usually change their itinerary for a safer but more time-consuming one (Sersli et al., 2021) which raises questions in terms of equal access and Mobility Justice (see *Chapter 4: Theoretical Framework*)

7.3.2 30 kmph streets

In the online survey conducted in 2019 by Col·lectiu Punt 6, women reported harassment from taxi and car drivers in 30 kmph zones even though bicycles legally have priority in these streets. Especially in one-lane 30 kmph streets where motorized vehicles cannot overtake cyclists, many women have reported being honked at and yelled at so much that it might dissuade them from cycling in this street again, especially if they are carrying children with them.

The study conducted by Sersli et al. in 2021, underlines that cycling in a shared space feels very different if you are going up or going down, especially for women who have taken up or gone back to cycling recently. (Sersli et al., 2021)

This underlines the importance of separated bike infrastructure when cyclists have to go uphill to make the street more accessible for beginners and conflict-averse people such as women.

7.3.3 Lane shared between buses, bicycles and taxis

Similarly, even if no harassment has been reported from bus drivers, several interviewees (see *Appendix 4: interview with Ferran Rodriguez* and *Appendix 6: interview with Silvia Casorran*) have underlined how sharing their space with buses can be stressful for women, especially if they are carrying children. Moreover, this kind of infrastructure also negatively impacts public transportation, a mode of transportation predominantly used by women, as it slows down buses. According to the interviewees, the only case when this kind of infrastructure might be adequate is when the lane is downhill.

7.3.4 Superilles

Even though Superilles are traffic calmed areas designed to make the cohabitation possible between the different users, this typology is not free of conflicts between cyclists and other users. First of all, conflicts with cars are not completely overcome with the Superilla typology, especially in Superilla Sant Antoni which is not as pacified as Superilla Poblenou. For example bikes are supposed to be legally allowed to go in the opposite direction of the

traffic, but the police wouldn't let them and there is no safe connection between the Superilla and the rest of the municipal bike infrastructure, making it unsafe for cyclists when they leave the Superilla. (see *Appendix 4: interview with Ferran Rodriguez*)

Moreover in Superilles, especially in Superilla Poblenou, when there are many children playing for example during the afternoon after school, many women (25%) get off their bikes (see *Appendix 8: Qualitative observations*), most likely to protect other users (children with unpredictable behaviour). Men don't. (see *Appendix 8: Qualitative observations).* As mentioned above, when they know they will face conflicts with other users, women tend to change their itinerary for a safer but usually more time-consuming one (Sersli et al., 2021), raising concerns of Mobility Justice.

7.3.5 Sub Conclusion

The results from this section have shown that all shared spaces create conflicts between female cyclists and other users. However, when looking at the gender gap depending on the typology, it is obvious that some conflicts might deter women from cycling more than others. Indeed, even though women do experience conflicts with car drivers in 30 kmph streets, the gender gap is still smaller in Riera Alta and Madrazo than in a street with higher traffic intensity and higher speed limit like Balmes.

Similarly, even though cohabitation between cyclists and pedestrians might be difficult in shared spaces like Superilles and might cause women to dismount, the gender gap is still smaller in Superilles than in most typologies, especially in Superilla Poblenou which is more pacified.

8. Site by site recommandation

This chapter consists of recommendations to improve Barcelona's cycling infrastructure in ways that could reduce the gender gap. These recommendations are based on the results of the interviews conducted with the different stakeholders

General recommendations for Barcelona's cycling infrastructure

- A more connected and coherent network of protected cycle infrastructure would encourage more women to cycle, and in particular senior women for whom cycling with the cars can be perceived as a major obstacle (Col·lectiu Punt 6, 2019) (see also *Appendix 2: Online workshop* and *Appendix 5: interview with Gemma Simon*)

- Secure bicycle parking is a major problem in Barcelona, where the risk of bicycle theft is very high (Generalitat de Catalunya, 2019). In order to further develop cycling in Barcelona, more bicycle parking spots are needed, especially around locations related to the mobility of care: schools, supermarkets… and locations crucial for the development of multi-modality such as train stations and major bus stations (see *Appendix 2: Online workshop* and *Appendix 5: interview with Silvia Casorran*). More secure bicycle parking in buildings, ideally on ground level, is also needed to develop the use of cargo bikes in Barcelona (*Appendix 5: interview with Silvia Casorran*)

- Wider cycle lanes, especially for bidirectional cycle lanes would improve the general feeling of safety, enable parents to cycle side by side with kids and enable more experienced cyclists and e-scooters to overtake slower cyclists more easily, without putting pressure on them or creating conflicts (see *Appendix 2: Online workshop* and *Appendix 5: interview with Gemma Simon*)

- Making car drivers respect speed limitations, for example via radars or any other type of enforcement, would be crucial to improve cyclists' general feeling of safety (see also *Appendix 4: interview with Ferran Rodriguez ; Appendix 5: interview with Gemma Simon* and *Appendix 6: interview with Silvia Casorran*)

- Women prefer dedicated bike traffic lights than traffic lights shared with the cars (Lusk et al., 2014). Bike traffic lights located both before and after the intersections would make it clearer for cyclists when they can go and when they cannot and improved perceived safety (see *Appendix 6: interview with Silvia Casorran*)

Balmes (type 0: no cycle infrastructure)

Carrer de Balmes is a one-way, four car lane street with no cycle infrastructure.

Figure 8.1: Site 1, Balmes at Diputació (self-made)

In Balmes, where the gender gap is the highest (see table xx), a latent demand for protected cycling infrastructure has been observed: women were seen cycling on the sidewalk with their children (see *Appendix 8: Qualitatives observations*). Gemma Simon (see *Appendix 5: interview with Gemma Simon*) has underlined how the absence of protected infrastructure was a problem for women and especially old women who do not feel confident enough to cycle with the cars and have to dismount and go on the sidewalk with the pedestrians. This delays

women in their trips and can end up deterring them from cycling altogether and cause them to choose other transportation options.

Via Laietana (type 0: no cycle infrastructure)

Via Laietana is a two-way street with four lanes dedicated to motorized traffic.

Figure 8.2: Site 2, Via Laietana at Princesa (self made)

Although the gender gap in Via Laietana is much better than in Balmes, a latent demand for protected cycling infrastructure has also been observed. Cyclists are currently using the yellow extension of the sidewalk as a cycle lane and creating conflicts with pedestrians (see *Chapter 7.3*). This is shown by the gender gap in the yellow extension being much smaller than on the rest of the road (shared with motorized traffic).

Gemma has underlined how the current design of the street favoured experienced cyclists who feel they can manage to cycle in the narrow yellow extension of the sidewalk but how less experienced cyclists may feel less confident and in the end may not cycle there at all.

Superilla Poblenou (type 1: Superilla, one-level street, traffic calmed)

Superilla Poblenou is a traffic calmed zone with a speed limit of 10 kmph. It is a space shared between pedestrians, cyclists and few cars.

Figure 8.3: Site 3, Superilla Poblenou (self made)

According to Ferran Rodriguez (see *Appendix 3: meeting with Ferran Rodriguez*), before the Superilla there was a segregated cycle lane in Sancho de Avilla street. There is no data available to compare the flow and demographics of cyclists in Sancho de Avilla before and after the Superilla. There is enough space to build a cycle lane segregated from the pedestrian space in Sancho de Avilla, which might be preferable to the current design for women, as they would not have to stop and dismount when the Superilla is busy with pedestrians and children playing.

Superilla Sant Antoni (type 1: Superilla, one-level street, traffic calmed)

Superilla Sant Antoni is a traffic calmed zone with a speed limit of 10 kmph. It is a space shared between pedestrians, cyclists and few cars.

Figure 8.4: Site 4, Superilla Sant Antoni (self made)

According to Ferran Rodriguez and Silvia Casorran (see *Appendix 3: meeting with Ferran Rodriguez* and *Appendix 6: interview with Silvia Casorran*) Sant Antoni is less traffic-calmed than Poblenou, which might explain the difference in gender gap, the smaller percentage of children and the smaller percentage of people carrying children.

However, according to Ferran Rodriguez, this has not to do with the design of the infrastructure so much as with the neighbourhood, which consists of many shops and

restaurants that need trucks for deliveries. Moreover, the Sant Antoni Superilla is more recent than Poblenou, so it is possible that people also need time to adjust.

Riera Alta (type 2: 30 kmph street)

Riera Alta is a one lane street located in the Old City of Barcelona. It is a narrow street shared between cars and bicycles with a speed limit of 30 kmph.

Figure 8.5: Site 5, Carrer de la Riera Alta (self made)

According to Ferran Rodriguez, there is no possibility to build protected cycle lanes in Ciutat Vella, the neighbourhood where Riera Alta street is located (see *Appendix 4: interview with Ferran Rodriguez*). Indeed, Ciutat Vella, the Old Town, consists of narrow one-lane streets where there is no space for segregated infrastructure, the space has to be shared with the cars. However, there are different types of shared spaces. According to Ferran

Rodriguez, very few cyclists can actually reach the speed of 30 kmph, most cyclists have a speed of 15 to 20 kmph. The streets located in Ciutat Vella should, like the streets located in the Superilles, have a speed limit for cars of 10 or 20 kmph.

Madrazo (type 2: 30 kmph street)

Madrazo is a street shared between cars and bicycles with a speed limit of 30 kmph. Some parts of the street have two lanes, other parts have only one lane but have motorcycle parking on both sides.

Figure 8.6: Site 6, Carrer del Madrazo with motorcycle parking on both sides (self made)

According to Ferran Rodriguez, there is enough space in Madrazo to create a cycle lane (see *Appendix 4: interview with Ferrna Rodriguez*). Indeed, Madrazo consists of a two car lane street in the beginning and then a one car lane street with motorcycle parking on each side (see *Figure 8.6*). There would thus be enough space to build a dedicated cycle lane in this street if the municipality was willing to take away space from the motorized traffic to create space for bicycles. According to Ferran Rodriguez there was actually a plan to build a dedicated cycle lane in this street but it was abandoned because the municipality was reluctant to take away parking space from the residents.

Compte d'Urgell (type 3: segregated cycle lane on the side of street)

Compte d'Urgell is a one-way street located in the Eixample grid with a bidirectional cycle lane.

Figure 8.7: cyclist lacking space to turn, site 7, Compte d'Urgell (self made)

Gemma Simon (see *Appendix 5: interview with Gemma Simon*) is giving cycling classes, most of which are directed towards women and children. She said during the interview that beginners are afraid of bidirectional cycle lanes because they are afraid of collisions with people coming in their opposite direction.

The cycle lane in Compte d'Urgell is a bidirectional cycle lane, with curbs, trees and Bicing stations and may need to be widened to improve the feeling of safety.

Diputació (type 3: segregated cycle lane on the side of street)

Diputació is a one-way street located on the Eixample grid and has a unidirectional segregated bicycle lane.

Figure 8.8: Site 8, Diputació (self made)

The cycle lane in Diputació is safe, segregated and has been there for decades so cars and motorcycles are more respectful. It constitutes a good alternative to cycle lanes built in busier streets such as Aragó. (see *Appendix 4: interview with Ferran Rodriguez*)

Parallel & Passeig de Sant Joan (type 4: segregated cycle lane in the middle of street)

Parallel and Passeig de Sant Joan are both two-way streets with cycle lanes located in the middle of the street. A notable difference between Parallel and Passeig de Sant Joan is that Parallel has some elevation gain while Passeig de Sant Joan is flat.

Figure 8.9: Site 10, Parallel (self made)

Cycle lanes located in the middle of the street like Parallel or Passeig de Sant Joan are not usually very appreciated by cyclists. However, they have a number of advantages, such as

avoiding conflicts with cars at the intersections and avoiding conflicts with pedestrians who want to reach a bus, a taxi or a container from the sidewalk (Silvia). The results of the observations have also shown that for these lanes the gender gap is smaller than the average gender gap this study has found in Barcelona.

However, there are still a number of problems that need fixing in Parallel and Passeig de Sant Joan. For example, Gemma (see *Appendix 5: interview with Gemma Simon*) has underlined during the interview that the pattern of the traffic lights forces cyclists to stop at each traffic light. Moreover, the design of both Parallel and Passeig de Sant Joan does not give enough space for cyclists who wait before turning (see *Appendix 6: interview with Silvia Casorran*). A better example of cycle lane located in the middle of the street would be Meridiana, which has wider lanes, which is more segregated (with trees) and has more space for cyclists to wait (see *Appendix 6: interview with Silvia Casorran*)

Aragó (type 5: segregated cycle lane on the side of street, protected by parked vehicles)

Aragó is a one-way, four lane, 50 kmph street located in the Eixample grid. It is a busy street of Barcelona, a "basic axis of circulation". A segregated unidirectional cycle lane was built in Carrer de Aragó during the Covid-19 pandemic.

Figure 8.10: Site 11, Aragó at Passeig de Gràcia (self made)

Nuria Soto thinks the cycle lane recently built in Aragó is a major improvement for the safety of cyclists (see *Appendix 7: interview with Nuria Soto*), but there is still room for improvements according to other interviewees.

First of all regarding the cycle lane itself: during the interview with Ferran Rodriguez, it has been mentioned the cycle is only "semi-segregated" and that cars and motorcycles can surpass the segregation and park on top of the cycle lane, creating conflicts with cyclists and forcing them out of the cycle lane. Moreover, Aragó street is a 50 kmph street. If there is an obstacle, for example a car parked on top of the cycle lane, cyclists have to go out of the cycle lane and share their space with cars going at 50 kmph. Having this kind of experience can deter women from cycling there again. Ferran has also underlined that the speed, noise and pollution of cars as well as the density of traffic in Aragó might discourage women from using this cycle lane, but that safer, quieter alternatives exist in parallel streets such as Diputació. (see *Appendix 4: interview with Ferran Rodriguez*)

Finally, Ferran Rodriguez (see *Appendix 4: interview with Ferran Rodriguez*) has also argued that spaces shared between pedestrians and cyclists, such as taxi stops where pedestrians have to cross the bicycle lane should be made more visible. As a matter of fact there was an accident involving an e-scooter and a pedestrian crossing the Aragó cycle lane to reach a taxi in March 2021. (La Vanguardia, 2021)

Creu Coberta (type 6: shared lane between bicycle, buses and taxis)

Carretera de la Creu Coberta is a four lane two-way street with a speed limit of 30 kmph. Two lanes are dedicated to private motorized traffic and two lanes are shared between buses, bicycles and taxis.

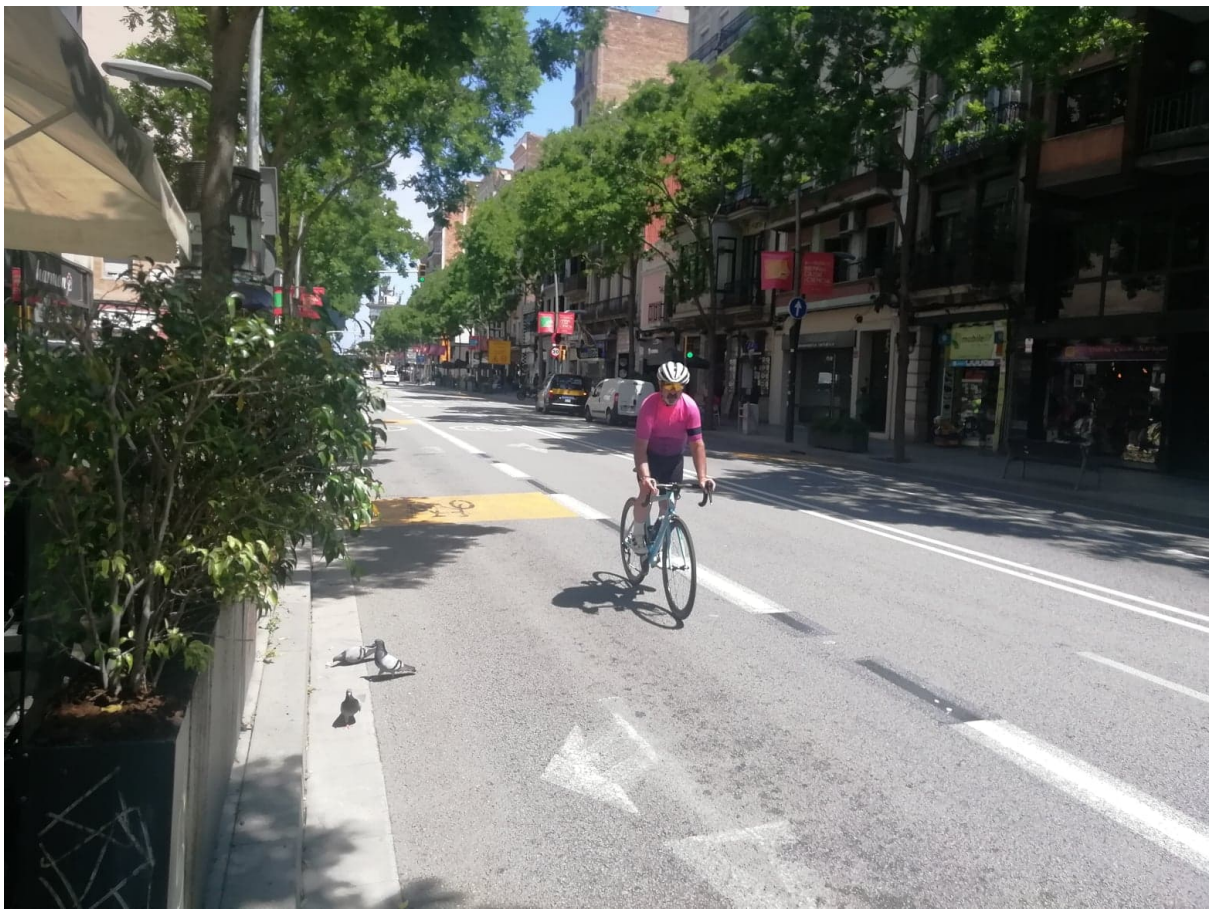

Figure 8.11: Site 12, Creu Coberta (self made)

According to Ferran Rodriguez, a lane shared between buses and bicycles is not a good solution: it reduces the commercial speed of the buses which have to wait behind "slow" bicycles and puts pressure on cyclists. According to him, a lane shared between buses and bikes can only work for small distances or if it is downhill. (see *Appendix 4: interview with Ferran Rodriguez*)

Silvia Casorran (see *Appendix 6: interview with Silvia Casorran*) has also underlined that a lane shared between buses, taxis and bicycles may not cause problems for experienced cyclists riding on their own, but many women, especially women with small children feel unsafe sharing their space with the buses. However, she has also mentioned that there is no "perfect solution" for the Creu Coberta street, as there is not enough space to have a segregated bicycle and a segregated bus lane in both directions.

9. Conclusion & Discussion

The results from this study show that two typologies have a smaller cycling and micromobility gender gap than average: Superilles and segregated cycle lanes. Indeed, as mentioned above, Superilles create better conditions than other type of infrastructure for the mobility of care: they provide a high feeling of safety because of their 10 kmph speed limitation, many people carrying children and many children cycling on their own are using the space, and they provides sufficient space to move with adapted cycles such as cargo bikes.

Segregated cycle lanes help reduce conflicts with other users to some extent but better design would improve the general feeling of safety (see recommendations). Indeed, especially at intersections, there are frequent conflicts between cyclists and both motorized vehicles and pedestrians. Moreover many of the segregated cycle lanes are narrow, which creates conflicts among cyclists and micromobility users themselves.

However, as shown by the differences in gender gaps between Balmes and Via Laietana, the absence of dedicated cycle infrastructure has such a negative impact on the cycling and micromobilty gender gap that even a confusing infrastructure that was not design for this use can improve the gender gap as long as it provides separation from thz motorized traffic.

Indeed, not all segregated cycle infrastructure has the same impact on the cycling and micromobility gender gap. A striking example is the cycle lane located in Carrer de Aragó, which is wide, unidirectional and segregated from traffic. However, the cycling and micromobility gender gap is higher than in most sites in Aragó, most likely due to the intensity of traffic and the 50 kmph speed limit. The case of the Aragó cycle lane shows that cycling promotion is not just about building cycling infrastructure but also about reducing the number and the speed of motorized vehicles all over the city.

Indeed, the gender gaps are smaller in 30 kmph streets than in Balmes, showing that when cyclists and micromoblity users have to share their space with motorized traffic, decreasing the speed of the cars has a positive impact on the gender gap.

The design and level of segregation of the cycle lanes also seems to influence the gender gap. A cycle lane with a higher level of protection from motorized traffic (ferran) and with a better intersection design (silvia) such as Passeig de Sant Joan has a smaller gender gap than a similar cycle lane, also located in the middle of the street, in Parallel.

As said above, Superilles show potential to narrow the cycling and micromobility gender gap. However, the gender gap is much higher in Sant Antoni than in Poblenou, showing that the land use is also important: a Superilla with a school and many residential buildings such as Poblenou is likely to be more traffic calmed and to have a smaller gender gap than a Superilla with many shops, bars and restaurants such as Sant Antoni.

10. Perspectives

In a city like Barcelona where the cycling modal share is rising but still small and where there is not yet a strong cycling culture, building a safe and accessible infrastructure for cycling beginners of all social groups is crucial to develop cycling as a mode of transport in the urban environment. Scholars have argued that as they are more risk-averse than men and often travel with vulnerable people such as children or elderly people, the presence of women is a good indicator of the level of safety and accessibility of a cycle lane (Gulsah et al., 2013).

However, in order to develop cycling among all social groups, infrastructural change is necessary but not sufficient and scholars have stressed the importance of a more holistic and integrated cycling policies. These policies would involve infrastructural change but also classes to learn how to safely ride a bicycle in the urban environment or how to repair a

bicycle, regulations that prioritize cyclists, and models of governance that involve the citizens to avoid community opposition towards cycling. (Anaya-Boig, 2021)

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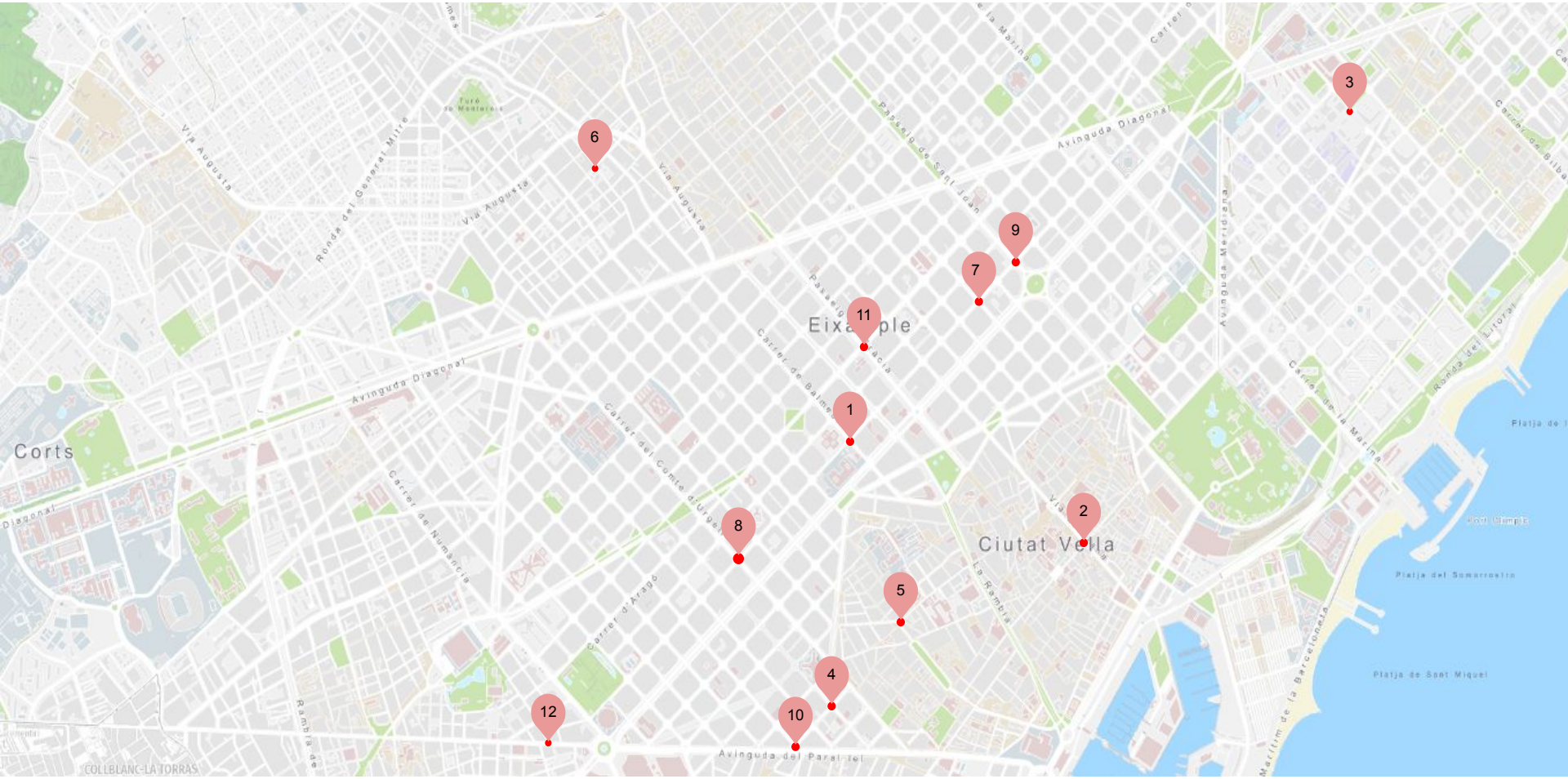

Site 1: Balmes at Diputació ; Site 2: Via Laietana at Princesa ; Site 3: Superilla Poblenou ; Site 4: Superilla Sant Antoni ; Site 5: Riera Alta at Aurelie Capmany; Site 6: Madrazo at Alfons XIII ; Site 7: Diputació at Girona ; Site 8: Compte d'Urgell at Diputació ; Site 9: Passeig de Sant Joan at Diputació ; Site 10: Parallel at Parlament ; Site 11: Aragó at Passeig de Gracia ; Site 12: Creu Coberta at Rector Traido *(self made, adapted from Ajuntament de Barcelona c, n.d.)*

Appendix 1: Map

Appendix 2: Online Workshop

Taller urbanismo con perspectiva de género (9/03/2021)

Presentation from Sara (Collectiu punt 6)

- the way the municipality of Barcelona has plan for cycling is not structured but more of a "go with the flow" manner of planning: very diverse infrastructure, different generations of bike lanes and no cycling network but rather isolated cycle lanes that are not connected with one another and with no good connection to the public transportation network (multi modality was not taken into account)
- stressed the importance of visible and recognizable **signalization.**
- need for bike lanes that can accomodate diversity: diversity of signalization to accomodate diversity of capabilities, wider lanes to accommodate diversity of rhythm...
- importance of designing spaces that can be "**vigilados colectivamente**" (vigilancia informal) because increase the number of video cameras from the police has not proven to make spaces significantly safer and often do not increased subjective perception of safety
- importance of **equipment** to complement the bike lanes: lights, safe parkings, auto repair facilities…
- importance of planning for mobility outside peak hours:
    - only 30% of the total of bike trips are trips to go to work or to the University
    - most reproductive work happens outside of peak hours

The Catalunyan barometer of cycling is not inclusive in the sense that it studies the profile of a typical user who rides a bike to see how and why and what are their problems. The issue with this approach is that the group of people who are more likely to cycle are young educated men, the barometer is thus indirectly excluding the part of the population that is currently not biking and the minority groups who are biking (women, elderly…)

Among non cyclist women, 55% percent used to ride a bike in the city of Barcelona at some point in their life: why did they stop?

Discussion

The discussion first took place in small groups of 5 women, all of us described our typical day biking in Barcelona and we had to find 3 "good" things and 3 "bad" things about the bike system in Barcelona. The aim of the discussion in small groups was for everyone to be able to talk, both in terms of time and in terms of being more comfortable speaking with less people (according to Sara).

The conclusions of these meetings in small groups were then shared with the rest of the group, the main points that were discussed were:

Lack of continuity in the bike network

- some bike lanes lead nowhere, they don't lead to other bike lanes
- some bike lanes are inaccessible except if you walk besides your bike first
- lack of continuity between the bike network and the public transportation network

Feeling safety (lack of it)

- feeling unsafe at night when riding a bike (lack of light)

Conflicts with other users

- feeling unsafe when having to share with pedestrians, fear of running them over involuntarily
- electric scooter are scary: they are faster than bike, they arrived from one day to the other in the city of Barcelona, the municipality didn't plan for them and don't know where they belong, they have an aggressive behaviour

Bike parking (lack of it)

- lack of safe parking spots in Barcelona at malls and around other shops (especially for electric or expensive bikes), women are afraid of leaving their bikes so they don't use them

Narrow bike lanes

- women feel pressured into going faster even if they don't want to/ are afraid to in several cases: when they are sharing the road with cars and motorcycle and they hear them behind them (motor, honking…) and in narrow bike lanes where other cyclists cannot advance them
- no room for error, hesitation, improvisation, no room to wait if you wanna turn

Understanding the infrastructure and the signalization

- confusing infrastructure: one women confessed that if she has to go through an itinerary she doesn't know she'd rather walk or use public transportation than a bike: no room to check her phone for maps, fear of not understanding the infrastructure
- confusing over-signalization because of infrastructure that is not intuitive
- many times we see the bike lights at the last moment, they are hidden by trees or tents from restaurants

Appendix 3: Meeting with Ferran Rodriguez, 30th of March 2021

Design of bike lanes

- **Containers**: they either need to be placed on adjacent streets or pedestrians have to cross the bike lanes to access them
- **Parking spots for dissabled people and for hotels**: they have to be moved to a another location at a close proximity
- **Bus stops**: two solutions exist, either make a "ramp" for bikes in front of the bus stop (see Via Augusta) or place the bike lane behind the bus stop to avoid conflicts with bus users
- The car lanes have to be at least 3.20 meters wide if a bus is supposed to use it
- No bike lanes are build without physical separation anymore
- The bike lanes are located in the middle of the street when they are bidirectional and they don't serve adjacent streets

Politics

- The Guardia Urbana is an organisation "cochista" that does not support the bike policy of the municipality. They don't really answer to the municipality and they don't give fines to drivers who have behaviours that can endanger bike users (exceed the 30 kmph speed limit, park on the bike lane…)
- The head of the Mobility department of the municipality is not in favour of bikes but the mayor Ada Colau is, so she had to ask the Urbanism department of the municipality to plan for the bike lanes
- What would facilitate the creation of safe spaces for bicycles would be to make many streets "residents and services only". It is possible and is already happening in some parts of Barcelona thanks to number plate radars
- One major problem of Barcelona and Spain in general is "la escuela concertada". People can choose to put their kids in a school located far away from their home, the kids cannot go to school on their own and their parents need to drive them there. This forces people to start their day in a car and then they are more likely to use the car for the rest of their activities (work, shopping…)
- The municipality of Barcelona is saying the city has 230 km of bike lanes in total but actually there are only 180 km of separated bike lanes and the rest is shared space between bikes and other users

Comments on the chosen sites

Most of the sites are located in Eixample which is understandable since we need high number of bikes

Balmes: in some sections of the Balmes street there is a bus lane which the bikes are not supposed to use. They have to go on the left with the cars and leave the bus on their right which is even more dangerous.

Via Laietana: three propositions, none of them involve bikes lanes

Superilla Poblenou used to be an industrial neighbourhood which has recently been urbanised while **Superilla Sant Antoni** has been a residential neighbourhood for a long time, with shops and a busy nightlife. People are much more used to using the car in Sant Antoni, it has been much more difficult to make them give it up. Before the Superilla there was a separated bike lane in Sancho de Avilla.

Madrazo: there was a plan there to make a one-way bike lane in Madrazo (with another bike lane in the opposite direction in a parallel street) but in the end it was never done because the municipality didn't want to take away car space (parking space) from the residents, but there is enough space for a bike lane.

Parallel and **Passeig de Sant Joan**: the municipality was worried the pedestrians would use the bike lane as a sidewalk, this is why they put grass and the pavement is not horizontal: it is supposed to keep pedestrians away.

Creu Coberta: the lane shared between buses and bikes makes no sense and reduces the commercial speed of the buses. A lane shared between buses and bikes can only work for small distances or if it is downwards.

The procedure to build new bike lanes has improved lately. For the bike lane in **Compte d'Urgell** they had to fight for every centimeter with the municipality while the one in **Aragó** was even finished ahead of schedule because the municipality and the Guardia Urbana made their requirements much clearer from the beginning.

Appendix 4: Interview with Ferran Rodriguez, 9th of April 2021

English summary:

- Comments on the sites
- General comments about the cycling context in Barcelona
- Comments on the actions taken by the municipality
- Comments on the lack of cycling culture and gender perspective

Interview:

Charlotte: *Estoy con Ferran Rodriguez y le pregunto si puedo grabar la entrevista*

Ferran: Si, puedes grabarla

C: Estoy haciendo un estudio a propósito de la brecha de género en los carriles bici en Barcelona y me gustaria saber si sabes cual es la brecha de género en el uso de bici en Barcelona

F: ¿El porcentaje de hombres y mujeres?

C: Si

F: Yo diría que está entre un 70 y un 30, el 70% de hombres y el 30% de mujeres

C: Si, según nuestro estudio las mujeres representan el 33% de los usuarios.

F: Sólo de bicis?

C: No, todos los usuarios, patinetes también, Bicing...

F: Si, vale, yo creo que hay más mujeres con patinetes que hombres

C: Y depende mucho de la infraestructura: si hay infraestructura ciclable o no hay como en Balmes o Via Laietana.

F: Cuando hablas de Via Laietana con Princesa son mujeres que van en Vía Laietana y acceden a Princesa?

Esther: *No, allí hemos hecho la medición, pero se mire Via Laietana.*

F: Bueno pero el 30% en Via Laietana son muchas mujeres!

E: Sí porque, bueno, no todo el rato, pero cuando hay muchos coches, toman la parte amarilla para peatones

F: Vale, porque está hecho la ampliación táctica de acera!

E: Si, pero la utilizan los ciclistas, eso les da un poquito mas de protección y por eso se sube un poquito

F: Bueno y el 19% de Balmes incluso me parece alto, porque Balmes es una jungla. Hay cuatro carriles para los coches y las aceras son estrechas en Balmes.

C: Y después tenemos las calles 30, compartidas entre coches y bicis, donde la brecha de género es un poquito más baja, como en Madrazo o Riera Alta.

F: Si, Madrazo es un eje horizontal que conecta dos distritos, dos barrios. Y para no tener que bajar a Diagonal y coger el carril bici, va muy para no tener que hacer pendiente, por eso hay muchas mujeres que utilizan esta calle, porque si tienen que bajar y luego tiene que subir pues ya cogen Madrazo, a pesar de que también tiene sus problemáticas.

Y Riera Alta tendría que ser todo Superilla, Ciutat Vella tendria que ser todo Superilla. Esta no lo es del todo porque pasan muchos coches, hay pocas vías de acceso a Cuitat Vella. Y el 23% es porque al final las mujeres van por otros itinerarios más tranquilos que la trama urbana de Cuitat Vella no permite porque es antigua.

Y pienso que siempre que hay un carril bici compartido con coches, la velocidad tiene que bajar a 20 kilómetros por hora, si no, si los coches van a 30, no me sirve absolutamente de nada. Yo puedo ir a 20, pero hay mucha gente que no puede ir a 20, va a 15, entonces por qué pones 30 ? Para que se sientan presionadas por el coche?

E: Igual es por allí que tenemos esta brecha en los carriles 30. Porque por este otro proyecto que era también de qualitativo, con las entrevistas hicimos con las mujeres descubrimos que tenían mucho "assetjament" [harassment]

F: Ah sí, claro ! Creo que aquí en Barcelona en las plataformas únicas está limitado a 20, por normativa. Yo pienso que hay que ponerlas a 10 kilómetros por hora, directamente. Si quieres limitar el uso del coche, lo que tienes que hacer primero es bajar la velocidad, que es un criterio que no se tiene en cuenta. Porque la gente dice "es que el coche es más cómodo". Detrás del concepto "comodidad" escondes el concepto "rapidez". Si limitas la velocidad y cuando sales de casa tienes que ir a 10, luego a 20 y luego a 30, ya verás como el coche no va a ser tan atractivo, tan cómodo. Yo lo veo así: todas las plataformas únicas a 10, todas las zonas residenciales a 20, 30 las demás calles, y algunas, esporádicas, a 50.

C: Y después tenemos el carril de la Creu Coberta, que es compartido con los buses y los taxis.

F: Este carril bus-bici de Creu Coberta lleva poco tiempo abierto. Es un eje que tiene mucho potencial porque conecta la parte Oeste del Barcelonès me sorprende que sea un 28% porque es muy agresiva también la zona .

C: Quizás es porque hay muchas mujeres que bajan y pocas que suben.

F: Si, es lógico, yo lo entiendo, lo he hecho varias veces. Hay tramos que son de subida y tramos que son de bajada. Y cuando subes, si no vas con una eléctrica tienes que apretar, y más si tienes el bus detrás. Pero creo que este tramo tiene mucho potencial porque hay mucha gente que llega de Hospitalet y va por allí. Hospitalet es la segunda ciudad de Catalunya, tiene mucha población, entonces al final tiene que haber muchos usuarios, por eso es un 28%. Muy interesantes los datos.

C: Y después tenemos el de Aragó con Passeig de Gràcia que está protegido con vehículos aparcados

F: Aragó, hasta ahora no se ha pensado en construir nunca porque es un eje básico de circulación para los vehículos motorizados. A partir de ahora se ha decidido construir carriles bici en ejes de circulación básicos también, y eso tiene todo el sentido del mundo. Lo que no tenía sentido era no hacerlo.

Un 30%? Bueno, está dentro de la media. Yo, aquí, por los inputs que he recibido, creo que no es tan alto -porque podría ser más alto- por dos razones. Una: la contaminación de la propia calle y porque haya madres, mujeres, que vayan con sus hijos y la seguridad que perciban no está tan alta a pesar de que esté protegido. Como van con los hijos pues a lo mejor prefieren ir por otra calle que no sea Aragó. Pero bueno, también las alternativas que hay son Diputació y Provença. Al final creo que será un éxito, de hecho ha sido un éxito esta calle, no ha habido ninguna crítica prácticamente, a pesar de que ha habido un accidente justo en este cruzó. Pero de un ciclomotor [y no de una bici] que iba por el carril bici. Pero el 30%? Yo creo que podría tener más este. Y la segunda razón es el ruido, a las mujeres no les gusta el carril bici de Aragó a causa del ruido: varias mujeres me lo dijeron.

E: En Aragó yo he hecho otro trabajo también y hemos hecho alguna observación allí. Y el tema de que la segregación sea semi-segregado, que se puede superar, que siguen habiendo coches en doble fila y que algunas veces la bicis tienen que salir a los carriles de coche, que son de 50 por hora, eso feina mucho también. Si han tenido la experiencia de que si hay un obstáculo, me tengo que meter en un carril a 50, no quieren volver a utilizar el carril bici.

F: Si, total, eso es una tercera variable. Hay una vía al lado de 50 pero también es segregado con aparcamientos, sobre todo en el segundo tramo. Pero si que es cierto que los tramos donde no hay separación con aparcamientos, la separación tendría que ser mayor, tendría que ser de 20/30 centímetros más para ofrecer más seguridad. Por cada 10 kilómetros por hora del vehículo motorizado que tienes al lado tiene que haber 10 centimetros de separacion. Si el vehículo al lado va a 50 kilómetros por hora, tiene que haber 50 centimetros de separacion libre, pinturas al margen.

Es cierto que esa sensación de falsa seguridad [cuando hay un obstáculo y tienes que salir al carril 50], las mujeres la perciben más.

Donde tuvo lugar el accidente, el carril está segregado con aparcamientos también. Es un punto muy sensible de aparcamientos de taxis, no se podía quitar y mi propuesta, posiblemente, no hubiese ocasionado el accidente. Yo signalizaba toda la parada de taxis con la cuadrícula [los cuadros blancos y negros pintados en el suelo que signalizan tambien los contenedores]. Toda, 30 metros, para que el peatón vea esto y piense "oh y esto, tengo que ir con más cuidado". Lo redujeron a cinco metros, entonces pasó lo que pasó. No sé si hubiese pasado, pero como mínimo el ciclomotor que iba por el carril bici - que no debería haber ido - se había dado cuenta antes. No se hubiese dado cuenta justo en el momento de verlo, cuando atropelló a la mujer.

C: Y después tenemos las superilles donde la brecha de género es más baja. Algo interesante pasa en la superilla Poblenou: cuando las escuelas terminan y que los niños están jugando en la calle, creo que las mujeres tienen un poco miedo porque hay muchas que bajan de la bici.

F: ¿En Sant Antoni?

C: No, en Poblenou

F: ¿Las mujeres tienen miedo en Poblenou?

C: Si, porque el lugar donde hizo las observaciones fue la salida de una escuela e hizo las observaciones a las 5 de la tarde, todavía había padres y niños con pelotas, y no se puede anticipar lo que los niños van a hacer, por eso creo que las mujeres bajaron de la bici. El 25% de ellas bajaron de la bici cuando había niños

F: Vale, todo coge de datos sobre usuarios de bici en el entorno escolar ahora se tiene que coger con pinzas. Primero porque hay un porcentaje de coches que acceden por encima de la media a este ámbito, entonces hay que tomarlo con pinzas, no es un comportamiento general a lo largo de todo el día.

Poblenou, le 38% de mujeres? Si, encima de la media porque es una zona super pacificada y muy bien diseñada en el sentido de que todos los vehículos están obligados a salir y entonces nadie entra, o entran muy poco, solo los que tienen la necesidad de entrar.

Y Sant Antoni te lo explicó el otro día, es una selva, pero es por el uso que hay en el espacio. Poblenou antes era un entorno industrial, ahora es un entorno residencial, prácticamente no hay comercios o la tipología de comercios que hay se ha adaptado a las nuevas necesidades de la ciudadanía. En cambio, Sant Antoni, tiene una tipología de negocios totalmente diferente, bares nocturnos que llevan 75 años abiertos y hay gente que incluso va en coche al bar y lleva 30 años yendo a este bar en coche. Y la gente aún no percibe que es una superilla. Además la Guardia Urbana no hace ningún favor porque no hace ningún trabajo en la Superilla. La Guardia Urbana no sabe la normativa de circulación en plataformas únicas y culpa a los ciclistas de ir en sentido contrario cuando pueden ir en sentido contrario. De hecho, la normativa de circulación de Barcelona

permite a todas las bicicletas circular en plataformas únicas en sentido contrario de la circulación de los vehículos motorizados.

No me sorprende que el porcentaje de mujeres sea más alto en Poblenou que en Sant Antoni. Sant Antoni es una selva, una selva de cargas y descargas, por la tipología de comercio. Continuamos.

C: Si, y después tenemos los carriles bici segregados pero en medio de la vía, como Parallel y Passeig de Sant Joan, donde la brecha de género es más baja.

F: Bueno, 32% Parallel, está en la media. Parallel, yo creo que la mayoría de los itinerarios que tanto hombres como mujeres cogen por Parallel, bueno depende de donde vayas pero hay itinerarios alternativos en las calles superiores. Entonces Parallel puede evitarse por la inseguridad de que sea central, podría ser. A mi no me parecen inseguros los carriles bici centrales que se han construido: tienen suficiente espacio de segregación. Pero no son funcionales, cada vez que quieres desviarte, tienes que pararte en el semáforo, sale muy perjudicada la persona. Al final, la mujer igual que el hombre piensa "si hay otro itinerario que si lo coge tardare 2 o 3 minutos menos, pues a lo mejor me voy por este sitio".

E: Dejo que contraste una idea contigo. He hecho un trabajo con observaciones sobre el tema de género y los bidireccionales. Bueno Parallel y Passeig de Sant Joan no son de los más estrechos, pero no son tan anchos, y la percepción de que viene alguien en otra dirección genera un poco de incomodidad. Como lo ves tu ?

F: Si, tienes toda razón. No creo que haya mucha diferencia entre en ancho util entre Passeig de Sant Joan y Parallel, creo que no, pero lo que pasa es que la segregación si que es diferente. Porque en Sant Joan es obra civil en los dos lados y en cambio Parallel en un lado tiene obra civil y en otro lado tiene piezas segregadoras, y creo que la percepción de la gente es que la piezas no son tan seguras como la obra civil. Y eso creo que desalienta a las mujeres de utilizar Parallel. Si fuese como Passeig de Sant Joan con obra civil a los dos lados la distancia hacia el tráfico sería mayor.

Para un próximo estudio sería interesante analizar la brecha de género en Provença, porque Provença es un carril bici bidireccional muy estrecho entonces debería haber muy pocas mujeres. Y yo creo que hay muy pocas mujeres. Pero si, creo que la seguridad de Passeig de Sant Joan justifica plenamente el 38% de mujeres.

C: Y después tenemos los carriles bici como los de Diputació y de Compte d'Urgell que no estan en medio de la vía si no en el lado

F: Ambos estaban segregados, verdad? ¿Con piezas?

C: Si

F: Si, es que en su momento estuvieron sin segregación. Bueno, Diputació es el primer espacio ciclable que se generó en Barcelona, en la calzada, en el año 1983. Era compartido con coches y luego, a partir de las Olimpiadas, se hizo en Diputació el primer carril bici separado, con señalización horizontal. Es un carril que lleva muchos años funcionando y además no hay pendiente. El carril bici de Diputació también permite la conexión entre barrios y distritos, y es prácticamente toda la Eixample. Creo que en este calle [Diputació] como lleva muchos años funcionando el carril bici, el respecto de los coches que hacen cargas y descargas es mayor, los coches no aparcan en el carril bici.

C: ¿Qué opinas del estudio? ¿Tienes críticas o dudas sobre la realización de un estudio sobre este tema?

F: Me parece muy interesante, creo que son necesarios esos estudios y son muy poco aprovechados. Evidentemente, a un estudiante no se le puede pedir una rellana de tráfico, pero se puede sacar de esos estudios variables cualitativas que serían muy interesantes para la administración, para hacer artículos, para la opinión pública. Por ejemplo, si en esta calle pasan más mujeres que hombres y que esta calle está iluminada, pues a lo mejor hay que iluminar las otras calles también.

Esos estudios se le saca poca información con comparativa a la que se podría sacar. Hay que luchar para establecer convenios con el ayuntamiento, de manera periódica y regular. Hay becarios y becarias que trabajan por el ayuntamiento pero al final los técnicos les piden algo por pedir. Es preferible que la motivación nazca de la persona que está haciendo el estudio.

C: ¿Qué podría explicar la brecha de género?

F: Pues primero creo que la brecha de género se está reduciendo. Creo que una infraestructura ciclista segregada haría que se redujese mucho más, pero hay ser valiente por parte de las administraciones para hacer la [la infraestructura segregada] porque se implica quitar espacio al coche al fin de al cabo. Siempre habrá una brecha de género, creo yo, sobre todo en tramos con mucha pendiente. Barcelona no tiene mucha pendiente, de hecho el 80% de Barcelona tiene menos de un 5% de pendiente. Pero es un hecho que influye [la pendiente] pero Barcelona es una ciudad perfectamente ciclable, creo que la brecha de género se puede reducir rápidamente.

El problema de la brecha de género es que también muchas mujeres se desplazan en transporte público y a la administración no les interesa perder esas clientes del transporte público. Por ejemplo si en casa hay un coche, y las dos personas tienen que ir a trabajar, normalmente el hombre coge el coche y la mujer coge el transporte público u otro medio de transporte. A la administración no le interesa que la mujer coja la bici. ¿Por qué ? Porque está perdiendo un cliente del transporte público. Y además con la pandemia el

transporte público ya está perdiendo usuarios (40/50% reducción de usuarios a nivel estatal).

A ver, a la administración no le interesa si lo hace desde un punto de vista cortoplacista, pero a largo plazo le interesa que el espacio sea utilizado de igual manera por hombres y mujeres. Es una conquista social. A la larga les beneficiara, a la administración.

Esperamos que se reduzca la brecha de género, tanto en el transporte público como en el uso de la bici, pero para eso hay que reducir el uso del coche, porque en el uso del coche también hay una brecha de género. Yo creo que para reducir el uso del coche hay que dificultar la accesibilidad con el coche, que sea imposible llegar a los sitios en coches.

C: ¿Qué está haciendo el ayuntamiento para reducir la brecha de género en el uso de bici?

F: De manera consciente? Nada. De hecho, construir carriles bicis segregados reduce la brecha de género, pero no lo hacen de manera consciente: no están conscientes de que construyendo esos carriles bici segregados aumentaron el número de mujeres usuarias de bici. Porque no saben el número de usuarios.

C: ¿Crees que en el ayuntamiento se tiene en cuenta la perspectiva de género en el diseño de la infraestructura ciclista?

F: En el ayuntamiento de Barcelona? Si, cuando está en obra, pero los otros de la AMB no. "aquí: podemos hacerlo mas grande, aqui: mas iluminación" ese tipo de cosas si que se las tienen en cuenta. Pero es en obra, directamente. De hecho hay un ejemplo en Passeig Taulat: iluminaron todo el Passeig Taulat por el carril bici, porque se exigió desde movilidad que tuviese mejor iluminación. Pero se exigió durante la obra. Pero creo que cuando hacen el proyecto el ayuntamiento no piensa en el género. Pero podría pensar más, ejemplo: los cruces, los espacios de espera para la gestión de los giros. A un hombre al final no le importaría esperar si hay coches detrás. En cambio una mujer " igual espero en el cruce de peatones para cruzar con los peatones y tal". Yo pienso que todos los cruces de peatones tienen que ser habilitados por los bicis cuando hay dos carriles bici que se crucen, así da más seguridad a la mujer.

Appendix 5: Interview with Gemma Simon, 13th of April 2021

Charlotte: *I'm with Gemma Simon from Biciclot and I'm asking her if I can, record the interview*

Gemma: Yes sure, you can record it

C: Great, thank you. So first, do you know approximately the gender gap here in Barcelona, the percentage of men and women using either a bike, Bicing or scooter?

G: I don't know exactly but from surveys I would say that it's about 40% of women and 60% of men

C: From what we have observed it's actually a little bit less than that, it's actually 33%. And so what do you think are the major problems of the cycling infrastructure here in Barcelona, from a gender perspective?

G: I think Barcelona is a city still with lots of cars, a lot of traffic and we still don't have a very coherent bike network with safe bike lanes. And so if you start biking you don't know if the bike lane is gonna end at some point and if you are going to be able to reach your destination using bike lanes or if you will have to go with the traffic at some point.

If you walk you know you can walk in both directions in every street, but with the bike you cannot, or it is not safe, so if you are in a hurry or something you might not perceive the bike as the fastest and easiest way to reach your destination.

C: And what about the other users? The pedestrians, the cars, do you think they are aware of the bikes, they are mindful of them?

G: Well I think it is starting to change, there are more and more people cycling and other users are a bit more aware but I think here there is this problem that since it is still not safe enough for bikes to be in the street, sometimes they have to go on the sidewalks. I wouldn't blame the cyclists because they are just trying to be safe, but they are bothering the pedestrians and the pedestrians don't like the cyclists. And now there are the scooters, and everybody hates the scooters, and I don't know if the bike will appear more likeable in comparison with the scooters or if we are going to be identified with them.

C: Is it a big problem here in Barcelona, the scooters?

G: Yes, and people have the feeling that they go super fast and in places they shouldn't go, and they don't leave enough space when they pass you.

C: So now I'm going to present you the results. Unsurprisingly the places where the gender gap is the highest are the places with no bike infrastructure at all, like Balmes and Via Laietana. Though in Via Laietana it is a little bit better because there is this yellow part which is supposed to be an extension of

the sidewalk and, not all the time, but when there is a lot of traffic, cyclists are using this part of the street as a bike lane.

G: Yes, but I think it is a little bit dangerous, because in the beginning it is quite wide, but then it becomes really narrow. And maybe if you are a skilled cyclist it is ok, but if you don't have so much experience I think it might be quite unsafe for you.

[presenting the rest of the results]

C: And then we have the protected bike lanes in the middle of the street, like in Parallel or Passeig de Sant Joan. And the gender gap is no so high there, even though several people have told me they are not so nice because when you want to turn you have to wait forever to use the pedestrian crossing

G: Yes, actually I talked with a guy from Vic and he was super concerned because they wanted to do a bike lane like that there, in the middle of the street, and he was saying "that's super dangerous". But it is true that I also feel quite safe there, even though it is true that it is difficult to turn but then if you go a long way, like the whole street, I think it is ok. Even though it is not so nice because you have to stop at almost every traffic light.

C: And then the ones with the smaller gender gap are the one which are protected and located on the side of the street like Diputació and Compte d'Urgell.

G: So only one way?

C: Diputació is one way and Compte d'Urgell is two ways

G: Ok, I have heard that in bidirectional bike lanes people feel safer when they go counterflow, because they see what is coming, but in bidirectional bike lanes inexperienced bike users might feel unsafe because they are worried that they will hit the person coming in front of them.

With Biciclot I'm giving classes for people to learn how to cycle, so first they learn how to ride a bike and then level II is about "ability", you know how to ride a bike but you want to continue gaining skills. And the vast majority of the participants are women and we have very few guys. I don't know if that means that women had less opportunities to practice with the bike or because they feel less confident riding a bike

C: So what are you teaching women during these lessons? The rules of urban cycling, what they can and cannot do?

G: No, that's actually level III. So level I is learning how to ride a bike, level II is about feeling more comfortable riding a bike, gaining ability, and level III is about the rules of traffic. People are interested in level III, but they don't show up for the course so we don't have enough people to make a classe. And I think this is because people learn how to ride a bike and once they know that they think "ok, now I have enough ability to cycle in the

city", but knowing how to ride a bike is not the same as cycling in the city, because there are rules, there are things you don't know.

C: And the people who register for level III, are they men or women?

G: Recently it has been mostly women. Actually the only level III class we did was the Bicifeminista. Maybe these classes would be more popular if we were only targeting women, I don't know, maybe we could have better responses

C: So what do you think of this study, do you see potential biases or problems?

G: No actually it is super interesting because we get most of our data from surveys, but surveys are not actually the real truth, and maybe the real gap is more important than the one found in the surveys so that is interesting to know.

C: So what would explain the cycling gender gap, according to you, in Barcelona?

G: Well, in the end I think everything comes down to the level of protection and safety people feel when they cycle. Maybe it also goes a little bit deeper than that, because we still don't have a very strong "bike culture" here in Barcelona, and many women still prefer public transportation or walking rather than cycling. For example my mom told me "I'm using the bike, but only on bike lanes, I would never go with the traffic. If the bike lane ends then I just get off my bike and go with the pedestrians". But this takes a lot of time, you can do that if you don't mind, if you're not in a hurry

And actually that is something that we teach during the level III classes, that you have to make the itinerary first, before you go on your bike, but we have to do this only because the city is not safe enough for bikes yet, you cannot cycle everywhere and you don't have a safe, connected network of bike lanes.

C: And do you think the municipality is working to narrow the cycling gender gap?

G: I don't know if it has the objective of looking at the specific needs of women, but by expanding the cycling network they are creating better conditions for women to cycle in the city

C: Ok, but you don't think they are doing that on purpose?

G: Well they hired Collectiu Punt 6 and Esther Anaya to write this report on gender and cycling, so they are looking at the issue but I don't know if they are serious about it or if they are only doing this because it sounds nice.

Appendix 6: Interview with Silvia Casorran, 14th of April 2021

Charlotte: *I'm with Silvia Casorran, from the municipality of Barcelona and I'm asking her if I can, record the interview*

Silvia: Yes sure, you can record it

C: In your opinion what are the major problems with the cycling infrastructure in Barcelona, from a gender perspective?

S: I think, first of all, there are still many women, especially women over 50 years old who never learnt how to cycle and they still don't perceive cycling as "something they can do", as a way of transportation. I think it is a major barrier to female cycling, maybe in other countries it doesn't exist but here in Spain and in Barcelona it is a major issue. In fact the majority of the participants of the cycling courses from Biciclot are women. For example we gave that as a gift to my mother, when she turned 60, we got her a course from Biciclot, that's something very typical.

And secondly, women are often travelling with kids, and maybe when the kids are in the back of the bike, in the saddle, it's ok, but when they grow up and they have to ride a bike themselves, the bike infrastructure in Barcelona is still not safe enough for kids.

And also the segregated bike lanes are too narrow, so that means that the kids cannot cycle next to their parents. This is a big difference with the Netherlands where everyone can cycle next to their friend or family, here the cyclists are in a line generally and it makes it quite uncomfortable to cycle with kids.

And the last thing is women are less comfortable than men when it comes to cycling with the traffic, and still in Barcelona, for some itineraries, you have to share space with the cars. I think women are less used to that, they feel less safe, maybe because we are more careful

C: Ok, so the fact that sometimes the bike lanes end, that they are not all connected together and that sometimes you have no choice but to bike with the traffic, you feel like this is a barrier to female cycling?

S: Yes, and also that some streets are supposed to be traffic calmed but they are not. It's quite tricky to share space with the cars, even when the speed limit is 20 or 30. Here [in Superilla Poblenou] it is quite safe, but often when it is written 20 or 30 it is not respected. I think that is also a major problem in Barcelona: the speed limits are not respected, there are no punishments so everybody feels like they can go faster than the speed limit.

C: And here are the results, beginning with the worst gender gaps: where there is no bike infrastructure at all. So the worst of the worst is Balmes. Then Via Laietana is a little bit better because when I did the observation there I could see that in the morning there was not that much traffic so people were using the car lanes, biking with the traffic, and then during the afternoon, when the car lanes were really packed with cars, the majority of cyclists were using the yellow part, the tactical extension of the sidewalk, as a bike lane. But you could tell they were uncomfortable, because sometimes they were hitting the sticks

S: Yes, yes, it is not a bike lane, it is too narrow, and at some point along the street it disappears so it's not a solution.

C: Yes, but still it improves the gender gap, it's smaller in Via Laietana than in Balmes, so maybe women feel a little bit safer there than with the cars

S: And then, 30 kmph streets, and then shared with buses and taxis, in Creu Coberta. Many women with kids don't feel safe there, I mean these bus/bike lanes are for experienced cyclists, not for kids.

Jordi: Yes, that's why we decided to include it, because it seems like a new sort of typology, this bus/bike lane and we wanted to see how it might work to build an informed strategy

S: Yes but it's tricky because there is not enough space so it means we'd have to choose between buses and bikes

C: And actually when I was doing the observations there, well it's qualitative, I don't have numbers about that, but I could see that women who were using bikes were almost always going downwards and the only ones going upwards were the ones using electric scooters, maybe their speed gives them a feeling of safety and their don't feel pressured so much by the bus behind them

S: And then Aragó at Passeig de Gràcia, 30%, only?

J: Yes so we tried to have 2 sites per typology but actually Aragó is the only one of its kind

S: Ah Superilla Poblenou 38%, I think that's maybe because there are schools around so maybe that's why the gender gap is reduced. Ok, and then Passeig de Sant Joan 38%. Yes, so the bike lanes in the middle of the street: the experienced cyclists are always against them, but in general people think they are safer. Of course: you are avoiding all the conflicts at the intersections, with cars, with bus stops, with garbage containers… But then they say "you put the cyclists there because you don't want to be bothered by the bikes. But at the same time when you do it right it is actually quite safe. Passeig de Sant Joan and Parallel are not the best examples because they didn't think of the spaces for the bikes to wait when they want to turn. And in Parallel especially, when you come from Poblesec there are many intersections that are not open, that are not accessible from the bike lane, so you have to go with the traffic when you want to turn there. But Meridiana is

a good example, there are trees, the bike lanes are wide, the spaces for the bikes to wait are wide enough as well, and I think that really improves the feeling of safety.

I mean these center bike lanes have pros and cons, but one of the pros is that the safety feeling is more important there, and from a gender perspective that is good.

J: Yes, that's a very important part of the observations. You can ask people about their feeling of safety but with the observations you can actually see how they behave and that should be an indicator of perceived safety.

I find it very interesting that the percentage of women in Passeig de Sant Joan is 38%, so one of the highest with Superilla Poblenou. Cyclists tend to be a little bit dismissive, or against these center bike lanes, but that 38% suggests that they provide a higher perception of safety. We will see, the numbers will be updated with the second rounds of observations but I think the general trend will stick.

S: Ok, and then on the side of the street, Diputació and Urgell, 37%, even when they are bidirectional, which is not ideal for the safety feeling. Ok, and then questions.

C: What do you think of this study? What gives you confidence and might make you skeptical of a study on this topic?

S: Well, no, I'm not skeptical, it's just that the issue of accessibility has different aspects to it, there is also the age gap that you have to take into account. I think it's really interesting to analyse people's behaviour, not only from a gender perspective but also looking at other factors like age. But I think the observations reflect the reality, I mean I'm not surprised by the results and by the fact that women cycle more in protected bike lanes and protected areas like the Superblocks.

It would also be interesting to see if women are wearing more helmets than men, if women are carrying more kids, if they are more likely to use e-bikes or normal bikes… I don't know, maybe you are also analysing that.

C: Well I haven't looked at e-bikes, but we could see that the gender gap for scooters is far less important than the gender gap for bikes

J: And we are also collecting data on whether they are accompanying a child and we also have three age categories: children, younger than 18, adults from 18 to 55 and then seniors. We did not include helmets, but we did include delivery and cargo bikes.

S: Yes, delivery people are mainly men, right?

C: Yes. And we are still not done with the observations, but from what we have seen so far it's all kind of related: if we see more women we also see more children, more seniors…

J: Yes, there is this positive correlation with those right? There are all good safety indicators.

S: Ok, and then next question: what do you think explains the cycling gender gap? Well when we look at Denmark, or at the Netherlands, after 50 years of cycling for the whole population, maybe the gender gap disappears, I hope so. But here in Barcelona, well people started cycling in the last 10 years, so the gender gap might also be explained by historical legacy. I mean we have always cycled, the bike was always there, but not as a mean of transportation.

I think in Barcelona the cycling started very much with the Bicing because we have so many problems with parking facilities and the space in the apartments. And now finally with the Bicing everyone can ride a bike easily and then because of that the municipality also had to improve the cycling network, so it was really good for cycling in general.

And I mean, people had a bike but they had it in their home town outside of the city

C: They were not using it to go to work for example

S: No, no no. In my previous job, in Barcelona Metropolitan area we got 10 parking spots for bikes when I started there, now we have 40 and it's almost full, even with the pandemic, so it's quite used, but we didn't have this need before, this need is quite recent because people were not used to cycle to work.

And we still don't have enough education programs to promote cycling in schools, that something that would help as well I think. I think the cycling gender gap is more due to tradition than anything else. I mean the is also the problem of the infrastructure that we talked about, the speed of the motorized traffic

C: And then the next question, what is the municipality doing to narrow the cycling gender gap?

S: Well we have a really nice report from Collectiu punt 6 which was finished a few weeks ago. Most of the teams are already introducing some of the measures proposed by the report but I hope we can do something in public to say "we take the commitment to do this and that".

For instance the new bike lanes, they are trying to make them a little bit wider, right, two meters wide minimum, so it's possible for two people to cycle side by side and be comfortable and feel quite safe. Because when it's narrower than that it feels quite unsafe when you cycle with the children.

I don't know what else we are doing, not much. The parking policy for example is really important and we are not working with this. I mean it's mentioned in the plans, they know that there is something there that should be done. Because also when you are carrying kids and you are using the saddle, the chair, the cargo bike, you need a place to park that bike in a safe way, and the elevators for instance are too small for big bikes. So we need ground level bike parking facilities, but in the city of Barcelona we are not there

yet. The Metropolitan area is doing more with this parking issue, with the Bicibox and now they are also putting the second ground level bike parking.

But still, it's like 100 places here, 50 there, it's going very slow, and they don't have a big plan with thousand of bike parking spots

C: And the municipality of Barcelona, they don't want the Bicibox, right?

S: No, they never wanted it because the architects always thought they were ugly, which I could agree with, but all these cars are also ugly and they have the right to be here but not the Bicibox. It's true that in Barcelona [there are many bike users so this means that] we should have one Bicibox at each corner or two or three but, why not? I mean, in London they do it. In Barcelona what we should do is like in the Netherlands, the municipality should buy or rent places so people can put the bikes on the ground floor, but it's not on the agenda yet

C: And would you say that most people working for the municipality have a gender perspective or that this is not something the are aware of?

S: I think everyone in the municipality of Barcelona is quite aware of that. For example in the municipality of Barcelona we were using the manual from the municipality of Barcelona for inclusive language. I think the municipality is quite aware of this, but the rest of society not so much. But in a formal way, the municipality of Barcelona is doing quite well

And there are also many women in power in Barcelona City Council, I think this is also showing something. In the Metropolitan Area it's not like that, in the political area it's quite equal but then when you go to the manager's position or the directors then in the Metropolitan Area they are all men, in Barcelona City it's more balanced, and I think that's also helping, the gender perspective is more widespread

C: Yes, and then one more question about the design: is the gender perspective taken into account in the design of the bike lanes.

S: Well now they are putting the stop lines for the bikes after the traffic light, I think it's also giving people a higher sense of safety. First because you are more visible for cars, because you are already in front, and it's also giving you more time to start cycling before they start, so I think this will improve safety at the intersections which are always the critical points for accidents and so on

C: But even when the intersection is not designed like that I think people are already doing that anyway, right?

S: Yes, that's what we said with the team: "let's do it , people are doing it already". We had a discussion also about whether the traffic lights had to be on the other side of the street.

But I said that sometimes the streets are too wide so when you see the traffic light on the other side of the street you don't recognize it as yours so I told them that the traffic light should be also at the stop line level, but we will see because it means that you have to build the place to put the traffic light at these level, these are the kinds of practical problems we have.

But the municipality is thinking about these kinds of solutions to improve the safety feeling. I think the people who are working with this are quite motivated and there are not many in the end, for my team, for the architect team, there are two of them who are quite involved with bike lanes and mobility. I fact under the previous government there were more people working with bikes but the new head of the Mobility department is a "bike hater"

But during the pandemic we made 30 more km of bike lanes, including Aragó, Passeig de Zona Franca and Valencia. Mallorca will come now. And there are 25 more km of bike lanes coming in the 2 coming years, so 55km of bike lanes in total created under this government, under the previous government it was 100km but considering the conditions I think it is quite ok

Also the mayor recently declared 75% of Barcelona's streets 30 kmph streets, but the signalization is not there yet. It's quite stupid, right? You've got a paper saying the streets are 30 kmph, but the signs are not there yet and the police don't recognize it. I mean it's just paint, right, it should be easy. And now they are putting some radars to check the speed, and that's also very important to force people to respect the speed limit, but they've only put radars in Aragó street so far

J: I have a question. I know there is a new Mobility plan, do you have general thoughts on the new Mobility plan and cycling in particular? I think the objective is for around 5% of trips to be cycling trips. And then of course the gender, is there a gender angle to this plan?

S: There should be, it's mandatory, but I'm not really sure. I think this plan is very formal, it was mandatory because the previous one ended in 2018, so they wrote a Mobility Plan because they had to, but for instance the plan does not even include the Superilla concept, so what's that? Just another paper.

And the plan says the objective is 5% but I think if we add the number of trips made by bike and by electric scooters we have already reached 5%. So I think we should really aim for 10 or 13%, I mean 5% is very low

J: Yes, I agree, Vancouver, North America, has 7% already

C: And who are you targeting when you try to get more people to use bikes, are you targeting more the car users or the people who are currently using the public transportation?

S: Well we would love to take all these car users and turn them into bike users, of course we will also turn some public transportation users into bike users along the way but the main objective is to target motorized traffic users.

And now we have the stupid debate with some colleagues and some people from the opposition party, they say that they don't want to promote the bike because the bike is taking users away from the public transportation. Of course the public transportation system is in a big crisis right now and will be for the next few years, because of the pandemic. It was already in a crisis before and it had to be subsidized, and now we don't know how it will go, will people get back their confidence in public transportation? But we really need it, it's like the backbone of the mobility system here in Barcelona.

But at the same time most of the Metropolitan trips are potentially cyclable so maybe with the right infrastructure we could get much more people on bikes and e-scooter for the Metropolitan trips. Probably the gender gap in Metropolitan connections is worse than the one we have here in Barcelona. But I mean for the society in the end it's good to have more people on bikes than on buses. It's economically more efficient for the individual, for the society… Of course we need public transportation for the people who need it but active mobility is even better.

I mean, in the Netherlands the mobility is based on the railway system and the bikes. Bikes for the shorts distances and trains for the long distances. In Catalonia our train system could be improved. But for the urban trips in Barcelona, when you can take a bike then it's better for everyone that you take the bike so why do we have this fight between bikes and buses, right?

C: Yes and the Netherlands also works a lot with multi modality and the coherence between the bikes and the public transportation network

S: Ah yes, the BTB (bike-train-bike) project, I worked for this project from 2014 to 2017 and we were working with the Netherlands to learn how to do it, but in the end it didn't happen.

Because carrying bikes in trains is not efficient so we need to facilitate the bike-train-bike combination

C; So that's something the city of Barcelona is aiming for in the end?

S: Well we still have work to do, for example Sants, a train station in Barcelona which is the biggest train station of Catalonia, is being renovated. And Adif, the infrastructure operator is saying that the new train station is going to have 200 bike parking spots and 2,000 car parking spots, and this is happening now

For example a few months ago, because I'm a coordinator of the City Club for bikes (we are more than 130 public administrations from all over Spain), I was at a meeting with Adif. We signed together some papers saying that we will work together to promote bike/train intermodality. We also did that with Renfe. And at the meeting Adif showed us this proposal about Sants station and I said "this is not right, there should be at least 2,000 parking spots for bikes". And Sants is the location in all Catalonia that is best served by public transportation, why are we putting 2,000 car parking spots there? So I said "no, let's change it [the proposal], we already have a hundred bike parking spots in the Sants area, if we are building a new station the capacity should be much higher. In Gava train station we've already got 100 bike parking spots, and Gava is a village, and in the city center of Barcelona we are just putting 200? This is not right. And the Catalonian railway operator is much more sensitive to the multi-modality aspect, but the national railway operator, Renfe is awful.

Appendix 7: Interview with Nuria Soto, 19th of April 2021

English summary:

- Male and female delivery messengers are experts cyclists
- They have different behaviors and constraints, but not because of the cycling infrastructure, rather because of sexual harassment from clients and endangering behavior from online platforms

Interview:

Charlotte: *Estoy con Nuria Soto y le pregunto si puedo grabar la entrevista*

Nuria: Si, puedes grabarla

C: Estoy haciendo un estudio a propósito de la brecha de género en los carriles bici en Barcelona. Primero me gustaría saber cual es el porcentaje de mujeres entre los riders de Mensakas

N: Ahora somos 5 chicas y 7 chicos. Aun no hemos llegado a superar el 50% pero alli vamos

C: Y sabes si los hombres y las mujeres tienen un comportamiento diferente, por ejemplo si eligen diferentes itinerarios

N: No no, hacemos lo mismo, independientemente del género

C: Y los riders pueden elegir los pedidos que reparten?

N: No, o sea yo con mi compañero del departamento de logística hacemos los horarios. Y según los horarios asignamos unos turnos u otros. Asi que practicamente todos hacemos lo mismo. Que hagamos un servicio u otro no depende tanto de que seamos hombres o mujeres si no de la cantidad de horas que tenemos y disponibilidad. Hay compañer@s que solo puede trabajar de mañanas, entonces suelen hacer más unos servicios que otros

C: Y en general en las otras empresas hay mucho más hombres que mujeres que trabajan como riders, verdad?

N: Si

C: Y en tu opinion que podría explicar esta brecha de género?

N: Bueno, lo de siempre en cualquier trabajo, no? Que todo lo que requiera un esfuerzo físico se relaciona mucho más con los hombres y por otro lado todo lo que requiera unas curas siempre se relaciona con las mujeres. Creo que tiene que ver mucho con eso

C: Y en Mensakas me has dicho que casi hay un 50% de mujeres, que hacéis para reducir la brecha de género?

N: En Mensakas primero nos esforzamos que el número de mujeres sea mayor, esto es un trabajo difícil, porque la mayoría de candidaturas son chicos, hay pocas chicas que apliquen, en comparación con la cantidad de chicos. Y luego también, lo que hacemos como acto simbólico ante la brecha salarial y también como una manera de valorar como es el hecho de ser mujer y repartir a cómo es ser hombre y repartir pues las mujeres cobremos un 5% más que los hombres

C: Y crees que la infraestructura ciclista en Barcelona también influye en el hecho de que hay mucho más hombres que reparten que mujeres ?

N:¿Si la infraestructura de Barcelona fomenta esa brecha?

C: Si

N: En que sentido?

C: Hemos visto que las mujeres en general no suelen ir con los coches tanto como los hombres y les gustan más los carriles bici protegidos. Crees que eso también es un problema para las mujeres riders?

N: Creo que la brecha está más cuando hablamos de trabajo que cuando hablamos de dia a dia. Es decir que hay más mujeres en bici cuando no están trabajando que mujeres en bici cuando están trabajando. Y lo mismo con los coches. En el mismo sector del taxi hay muy pocas mujeres, eso no significa que haya pocas mujeres que cogen el coche que igualmente el porcentaje de hombres sea mayor. Pero cuando hablamos de trabajo esa brecha creo que se acentúa. ¿Que la infraestructura de Barcelona fomenta eso? No veo una relación directa. En Barcelona cada vez hay más carriles bici, cada vez se asegura más el paso de la bicicleta. No veo una relación directa en eso, veo más una relación directa con una estructura social patriarcal y en el dia a dia que no es tanto una cuestión de infraestructura

C: Entonces os sentís seguros cuando vais en bici?

N: Yo creo que sí, es decir hay puntos en Barcelona donde aún es peligroso ir con la bicicleta pero cada vez hay más carriles bici que dan seguridad a los ciclistas. Otra cosa es la mujer ciclista en un contexto de trabajo. Aqui cambia. Porque ya se han registrado varios casos, y yo mismo lo he vivido, de ciertos machismo o incluso el acoso de algunas compañeras por clientes que las reciban por ejemplo sin ropa o con insinuaciones. En este aspecto, en la economía de plataforma en cuanto el reparto la mujer está más desprotegida y las propias plataformas fomentan eso aportando la foto y el nombre de la repartidora al cliente. Es decir que cuando el cliente pide sabe si le va a llevar un chico o una chica y que chica le va a llevar. De manera que muchos de ellos les esperan si ropa o les preparan callejones sin salida… En este sentido, las consecuencias del machismo serán fomentadas por la propia empresa que no protege a sus repartidores, los cuales ni siquiera reconoce como tales, les expone a las chicas especialmente

C: Y has comentado que hay algunos puntos en Barcelona donde aún es peligroso ir en bici. ¿Cuáles son esos puntos, cuales son los mayores problemas con la infraestructura ciclista en Barcelona?

N: Pues mira, por ejemplo la Avinguda Meridiana si que hay una parte donde el carril bici está muy bien pero luego se junta por ejemplo con la acera y hay un carril bici que va haciendo curvas y pasa por la acera misma, va esquivando los containers, las basuras… Hay momentos en que este carril bici se desdibuja y te juntas con la gente en la acera que se queja. La Avinguda Meridiana es un lugar donde cuando más te alejas de Glories más yendo hacia San Andreu peor es el carril bici.

Y luego en la calle Aragó era super peligroso, nunca la cogíamos, ahora han hecho un carril bici en toda la calle Aragó que la verdad es que esta muy bien.

C: Vale, y has dicho antes que nunca cogiabais Aragó. ¿Quién elige las rutas que toman los repartidores?

N: Bueno, yo con mi compañero de logística hacemos normalmente la ruta. Pero la ruta significa que indicamos qué direcciones tienen que entregar. Entonces aparecen los distintos puntos en el mapa y es el propio repartidor que elige el orden en el que hace estas entregas y por qué calles. Esto es libre, tu tienes 10 entregas y eliges el orden y el camino que coges para llegar a ellas

C: Y sabes si los hombres y las mujeres eligen diferentes caminos para ir al mismo punto?

N: Yo creo que cogemos bastante las mismas rutas. Al final lo que buscamos es la manera mas optima y mas rapida de hacerlo y eso nos acerca hacerlo de formas similares. Si que ha pasado, por ejemplo, que igual teníamos alguna entrega tarde en algún barrio como Lámina y algún compañero ha preferido ir en lugar de que fuera unas de sus compañeras. Por el hecho de entender que ciertos lugares de Barcelona en ciertas horas son más seguros para un hombre que para una mujer

C: Y todos los pedidos los reparteis con bici, verdad?

N: Si

C: Entonces tenéis que ir muy rápido. Hay conflictos con otros usuarios que no van tan rápido como vosotros?

N: No, no suele haber problemas. Intentamos adelantar, cuando es el momento y ya esta. Cada uno es libre de ir a su ritmo

C: Vale, gracias! No tengo más preguntas. Tienes algún comentario, alguna cosa mas que quieres decir?

N: Pues, lo que diría es que las plataformas que se presentan como innovadoras y como la solución a todo al final lo único que hacen es reproducir los problemas discriminatorios ya existentes: machismo, homofobia o racismo. No cambian las realidades si no que las reproducen y las esconden, las intentan maquillar. Creo que esto es el resumen de la economía de plataforma en el contexto neo liberal y creo que es uno de los mayores retos que tenemos, con la bici o sin ella, como mujeres. Es decir que esa realidad, a través de la economía de plataforma y el neo liberalismo, lo que hace es llamar las cosas por otro nombre. Por ejemplo que una mujer esté repartiendo con un niño en brazos le llaman conciliación familiar. Esto no es conciliación familiar. Es como en Deliveroo cuando te despiden y te dicen "no, yo no te he despedido, te he desconectado". Este neo-language es el principal reto que tenemos para enfrentarnos a la discriminacion y al sistema patriarcal al final. Tenemos que identificar las cosas y no permitir que se las llamen por otro nombre

C: Muchas gracias

Appendix 8: Qualitative observations

Site	Date	Time	Notes
Aragó at Passeig de Gràcia	05/03/2021	PM	No cars were parked on top of the bike lane but no cars were parked along the bike lane either: the was no physical separation between the bikes and the cars except for the distance
Superilla Sant Antoni	09/03/2021	AM	No one was playing in the center of the Superilla, and very few people were walking or sitting
Creu Coberta at Hector Triado	10/03/2021	PM	At the beginning of the observation the gender gap was very small but when it started getting dark almost all the cyclists were men
Via Laietana at Princesa	17/03/2021	AM	Most people were going downwards, especially women. Many women were using a Bicing and I saw the truck carrying the Bicing going upwards full and downwards empty several times. It is possible that women (and people in general?) use the Bicing to go downwards and walk/use public transportation to go back up.
Balmes at Diputacio	17/03/2021	PM	Same as Via Laietana, most people were going down, especially women and I saw the truck carrying the Bicing going down empty several times.
Superilla Poblenou	18/03/2021	PM	Between 5:00 and 5:50 pm many parents stayed with their children in the Superilla in front of the school. Children were playing in the middle of the road (see photos). Between 5:00 and 5:50 pm the gender gap was 1.6:1 but 25% of women were actually walking next to their bicycle.
Superilla Sant Antoni	25/03/2021	PM	The Superilla was quite busy in the beginning with many children playing in the middle. More women at the end when the children left the Superilla
Via Laietana at Princesa	26/03/2021	AM	Only 6% of the people biking in Via Laietana were biking on the road during the afternoon (heavy traffic) most people were biking on the yellow part between the sidewalk and the sticks. People carrying children were not biking on Via Laietana, just crossing

Appendix 9: Interviews questions

- From a gender perspective, what do you think are the major problems with the cycling infrastructure in Barcelona?
- What do you think of this study? What gives you confidence and might make you skeptical of a study on this topic?
- What do you think explains the cycling gender gap?
- What is the municipality doing to narrow the cycling gender gap?