Connecticut College
Digital Commons @ Connecticut College

CISLA Senior Integrative Projects

Toor Cummings Center for International Studies and the Liberal Arts (CISLA)

2020

How Public Transportation Can Combat Social and Economic Inequality

Madeleine Megargee
Connecticut College, maddie.megargee@gmail.com

Follow this and additional works at: https://digitalcommons.conncoll.edu/sip

Recommended Citation
Megargee, Madeleine, "How Public Transportation Can Combat Social and Economic Inequality" (2020). *CISLA Senior Integrative Projects*. 13.
https://digitalcommons.conncoll.edu/sip/13

This Honors Paper is brought to you for free and open access by the Toor Cummings Center for International Studies and the Liberal Arts (CISLA) at Digital Commons @ Connecticut College. It has been accepted for inclusion in CISLA Senior Integrative Projects by an authorized administrator of Digital Commons @ Connecticut College. For more information, please contact bpancier@conncoll.edu.
The views expressed in this paper are solely those of the author.

Liberté, Égalité, Mobilité: A study of Bordeaux, France through transportation

Thesis presented to the Faculty of the Department of Sociology

Connecticut College, New London, CT

In Fulfillment of the Requirements for the Toor Cummings Center for International Studies and the Liberal Arts

Madeleine Megargee

May 2020

Abstract

The findings identify the many issues, solutions, and social dynamics that are related to the fast changes Bordeaux has experienced over the last two decades. This is putting a strain on the housing stock, which pushes people without the means to the perimeter of the agglomeration, where transportation becomes less than ideal in some cases. As more people use their cars in the periphery, this created challenges to the planners to create new ways to convince people not to rely on their cars. For those who cannot afford to have a car in the first place, effectively connecting people across growing distances becomes a necessity. Transit has the ability to encourage equity, and this study focuses on Bordeaux, France's efforts to reach this goal in the past, present and future. There is a strong focus on connecting people through railway projects especially, but there is also a growing interest in bus, biking, and pedestrian infrastructure. The city's tramway was used as an "urban policy tool" (Sari, 2015) to connect the historically disjointed right and left banks. A major future project is a new regional railroad network which would respond to the growing popularity and spread of the city. The findings suggest that there is a hesitance to address social inequalities through transportation but focus on a universal narrative for improvements.

Bordeaux is a rare example of a city which is gaining transportation ridership and facing challenges to keep up with the demand. One phrase that is often used to describe their transit is a "victim of its success." Their transit system is based on responding to social and economic demands for people most in need of mobility options. This has brought new unexpected social and economic consequences that are the focus of this study.

A snapshot of everyday life at the Place du Palais, left bank Bordeaux. The striking Porte Cailhau is seen on the right.

Table of Contents

Abstract **2**

Table of Contents **4**

Maps of Bordeaux Métropole **5**

Introduction **9**

Literature Review **18**

How do people of different identities experience public transportation? 18

How does public transportation play a role in individual quality of life for all? 24

How can public transportation encourage social and economic equity? 26

Methodology **28**

Findings **37**

Particularities of Bordeaux 38

Philosophy 47

Technicalities 55

Discussion **66**

Notes **82**

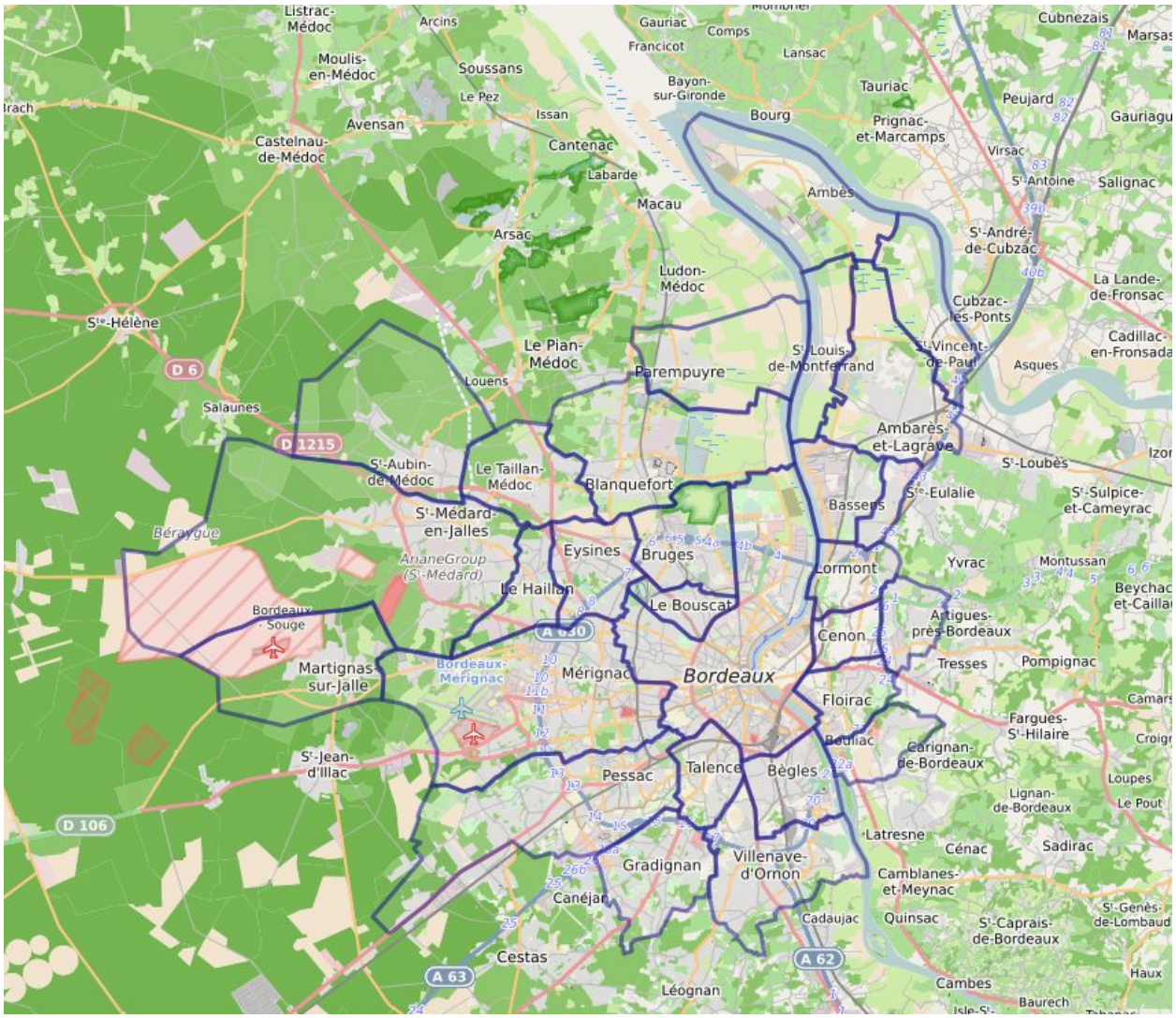
Bibliography **85**

Appendix **91**

La loi d'orientation des mobilités (LOM) 91

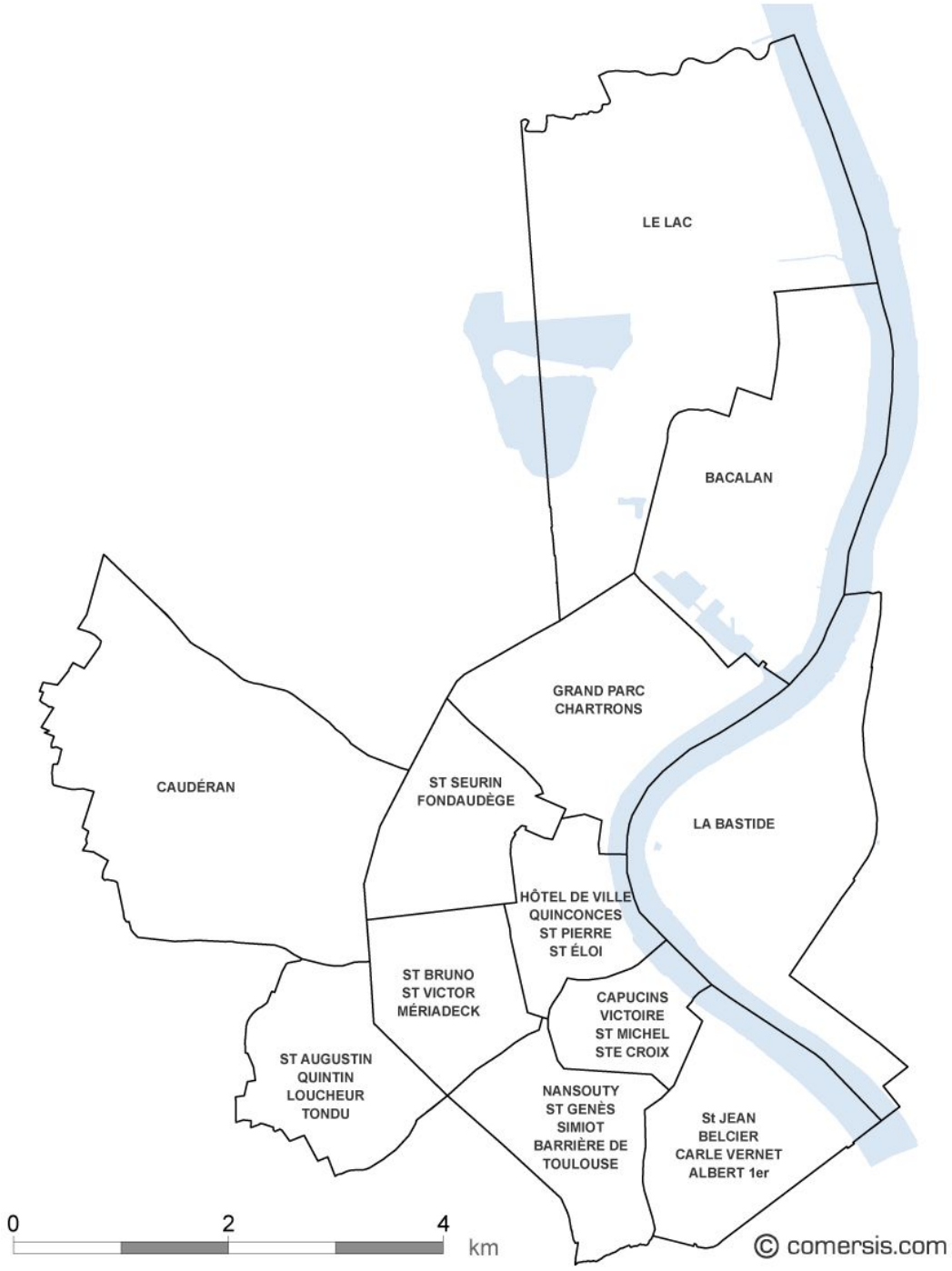
Abbreviations and key terms 93

Maps of Bordeaux Métropole



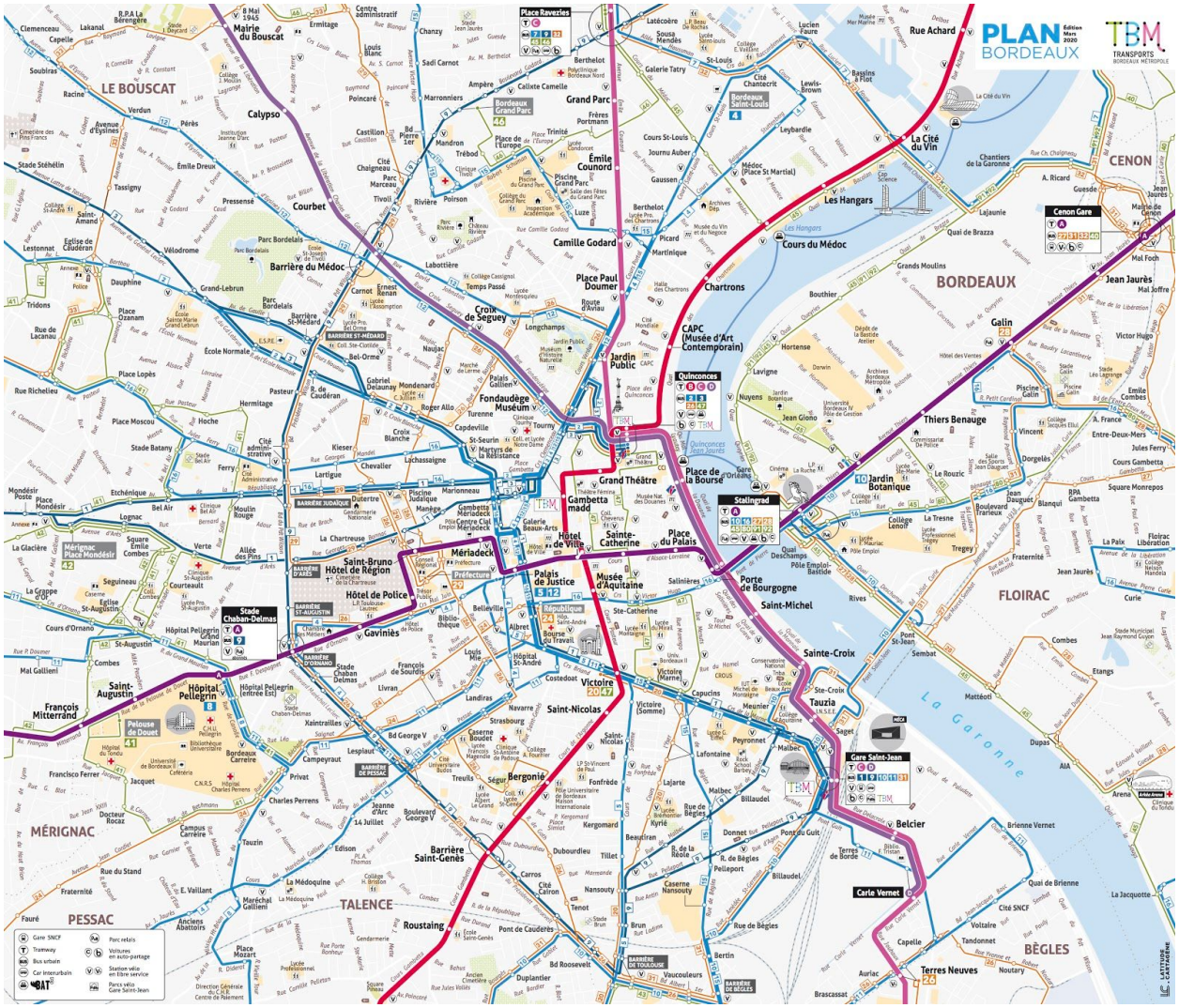
The 28 communes/municipalities in Bordeaux Métropole.

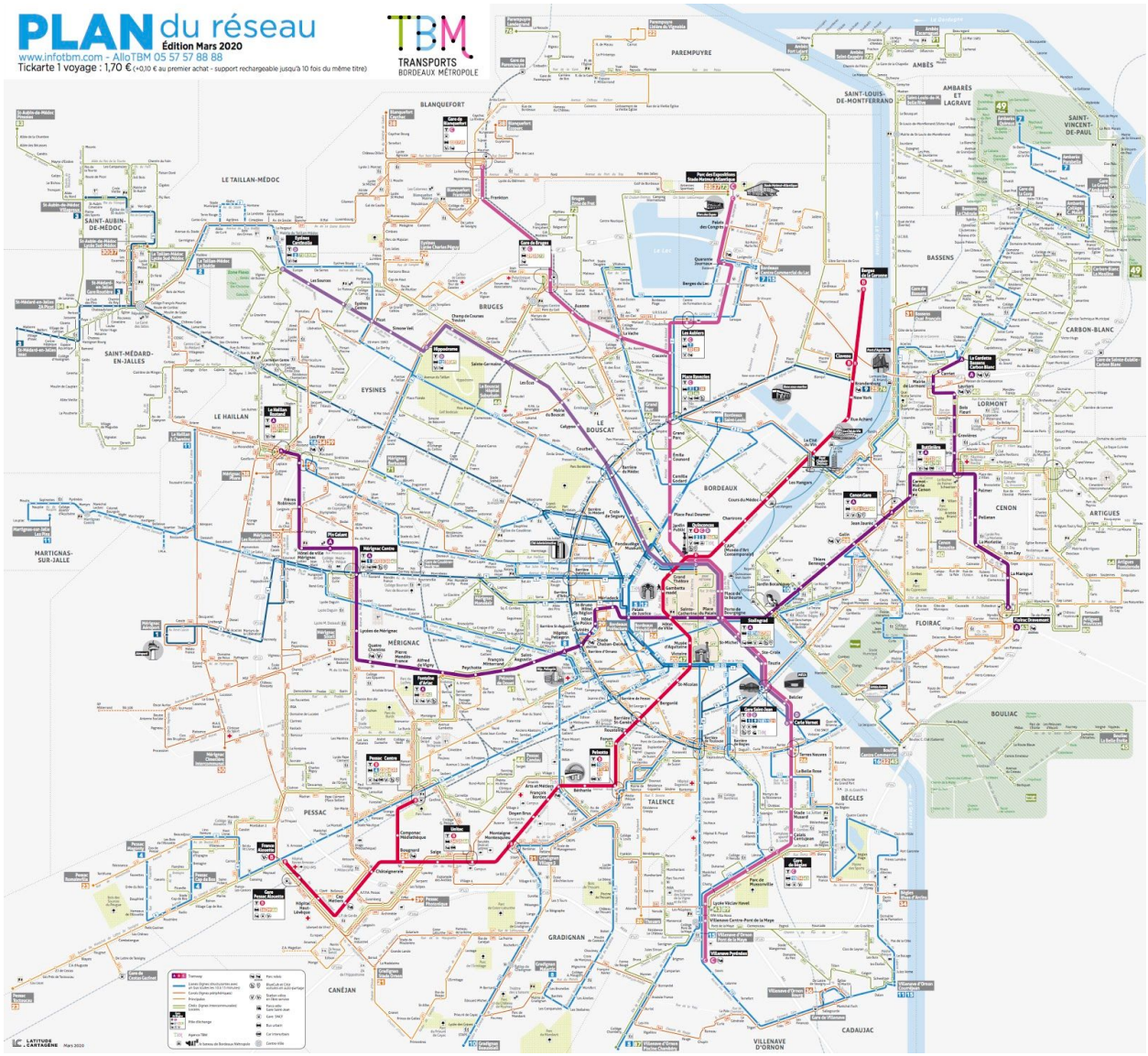
Source: Bordeaux Métropole (bordeaux-metropole.fr)



Neighborhoods in Bordeaux.

Source: map.comersis.com


PLAN BORDEAUX
TBM TRANSPORTS
LE BOUSCAT
CENON
BORDEAUX
FLOIRAC
MÉRIGNAC
PESSAC
TALENCE
BÈGLES
La Garonne
Mairie du Bouscat
Barrière du Médoc
Grand Parc
Jardin Public
Quinconces
Grand Théâtre
Place de la Bourse
Stalingrad
Gambetta
Hôtel de Ville
Sainte-Catherine
Palais de Justice
Musée d'Aquitaine
Porte de Bourgogne
Saint-Michel
Sainte-Croix
Victoire
Saint-Nicolas
Bergonié
Barrière Saint-Genès
Roustaing
Gare Saint-Jean
Belcier
Carle Vernet
Les Hangars
Cours du Médoc
Chartrons
CAPC (Musée d'Art Contemporain)
Thiers Benauge
Jean Jaurès
Cenon Gare
Rue Achard
La Cité du Vin
Fondaudège
Croix de Seguey
Barrière St-Médard
Barrière Judaïque
Barrière d'Aquitaine
Barrière d'Ornano
Barrière de Pessac
Barrière de Toulouse
Barrière de Bègles
Stade Chaban-Delmas
Hôpital Pellegrin
Saint-Augustin
François Mitterrand
Pelouse de Douet
Hôtel de Police
Saint-Bruno Hôtel de Région
Mériadeck
Préfecture
Gaviniès
Tauzia
Jardin Botanique
Lycée Victor Louis
Lycée Montaigne
Lycée Camille Godard
Lycée Sainte-Marie Grand Lebrun
Lycée Pro. Jean Monnet
Lycée Pro. Gustave Eiffel
Lycée Pro. Sud Médoc
Lycée Pro. Les Iris
Lycée Pro. Jacques Ellul
Lycée Pro. Le Dorat
Lycée Pro. Le Haut Carré
Lycée Pro. Le Vitrezay
Lycée Pro. Le Grand Parc
Lycée Pro. Le Petit Caudéran
Lycée Pro. Le Petit Cardinal
Lycée Pro. Le Petit Cardinal
Lycée Pro. Le Petit Cardinal



Entire network map.

Source: Transports Bordeaux Métropole (infotbm.com)

Introduction

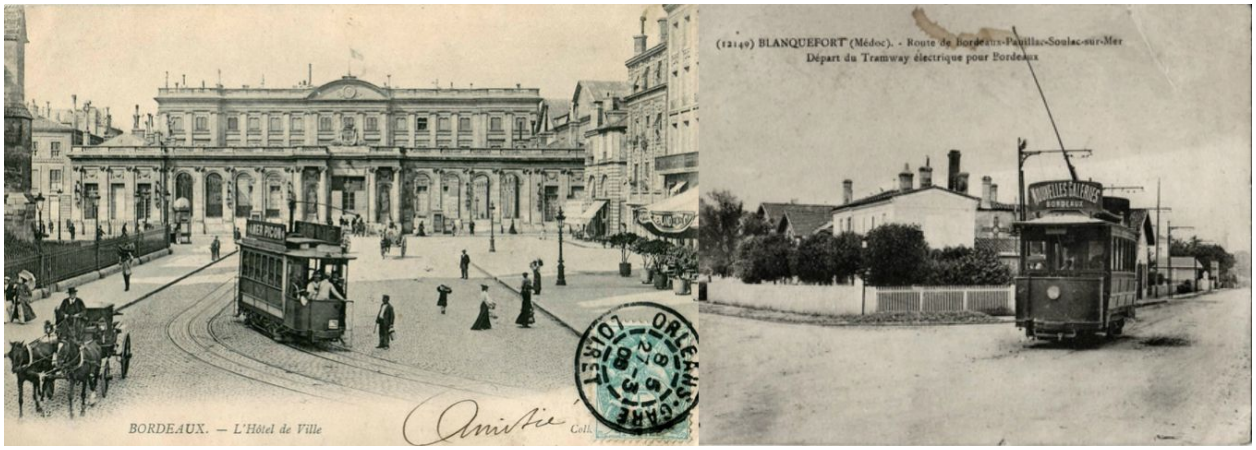
City life is as much about moving *through* landscapes as it is about being *in* them.

– Charles Montgomery, *Happy City*

Studying the City can explain so much about one culture. The Society's divisions, power dynamics, hierarchies, expectations, and sensibilities are deeply ingrained in its physical layout. And, as a consequence, scholars have long focused on the City to understand how it defines its residents and affects their lives. Cities do not emerge organically, as we once believed, nor are they built haphazardly, even when they seem to be (Park, 1916). These spaces are given shape by the people in power, most often *for* the people in power (Zukin, 1991). Since most people take their cities as givens, they rarely question why their commute took so long, or why they couldn't walk to the grocery store safely even if they tried (Kruse 2019; Montgomery 2013). But, through the sociological imagination (Mills, 1959) we see the urban environment as a both a product of history and the unique moment in which we live. We come to see the urban dweller as a reflection of the interplay between these historical and social forces and their personal stories and everyday experiences. This research focuses on public transportation as a crucial element in this interaction because it mirrors a society's priorities, inequalities, blindspots, and its sense of self. Thus, while public transportation can seem like a universal feature of urban spaces, each is unique in its history, its purpose, and the inclusivity of its access to its residents. As Bullard (2005) observes, "If you want to know who in a culture is valued and who is not, follow the transportation dollars..." (p.9).

Last year, I spent seven months in Bordeaux, France, where my experience using the transit system had a profound impact on me and my academic journey. I was startled, impressed, and appreciative of the ease in which I was able to get around the city relying solely on public transport. The speed, the reliability, the safety, and the fact that there was always someway to get where I needed to be, was freeing. Since this was such a departure from my transportation experiences across the United States, I wanted to start to understand why it is so different. I set out to do this through an examination of the goals and processes by which transportation projects are designed and implemented, the experiences of users, and what guides the decision makers in making the transportation system in Bordeaux a success.

A brief history of transportation in the United States and France can help explain some of the differences I experienced exist today. The introduction of the tramway revolutionized the way cities could look worldwide. Cities used to have limited growth that was based on how far a person could walk or ride a horse. A French engineer, Alphonse Loubat, living in New York City expanded that radius by being the first to put down horse-drawn streetcar tracks. The technology was introduced in Europe but "perfected" in the United States by Frank Sprague. A well planned transportation system can offer a number of benefits. For example, the Réseau Express Régional (RER) reduces urban sprawl by meeting the needs of 10,200,000 Parisians in a metro area that takes up no more space than Jacksonville, FL with it's 800,000 people (Grescoe, 2012). This disparity is a reflection of the dominance of the car culture in the United States (Grescoe, 2012). France, however, does have its own transportation challenges, many of which are tied to its own infatuation with the automobile age which continues today; Bordeaux even uprooted their tramways in 1958 in favor of automobiles and buses (Pech & Lafon, 2013).



Trams circa 1908 (Bordeaux Hotel de Ville) and 1910 (Blanquefort).

(TransportUrbain)

The municipality of Bordeaux has a population of 252,040 and together with its surrounding municipalities, suburbs, and satellite towns, the Métropole's population reaches 1,195,335, which makes it the sixth-largest in France. Bordeaux is a UNESCO world heritage site, and has the most historically preserved buildings in any city in France other than Paris. It has a reputation for being a "bourgeois" city, because of its role as the center and historic port of the lucrative viticulture industry. The working class in some cities, like Marseille or Lyon, have fused their culture with the image of the city. But, in Bordeaux, the "real" Bordelais attend the prestigious école Saint-Genès, have a knowledge of fine wine, and go to chic coastal towns like Arcachon or Cap-Ferret in the summer (Victoire, 2014).

The importance of transportation is a reason why each mayor of Bordeaux during the last century has modified the transportation makeup of the city that continues to have effects today. For example, Adrien Marquet (1925-1944) introduced les boulevards that create a crescent moon around the city while Jacques Chaban-Delmas (1947-1995) is responsible for the rocade (ring road) that surrounds the agglomeration and intersects many communes. But, the history of

Bordeaux hit a turning point in 1995 with the election of Alain Juppé (1995-2004, 2006-2019) (Victoire, 2014). Juppé literally cleaned up the city, which was known as the "Sleeping Beauty" of France, where numerous buildings were black with the soot produced by cars. One of his first projects was the tramway, which he hoped would foster social cohesion and bring Bordeaux into the 21st century. Juppé made sure that the A line, first of the three tram lines built and circulating, would connect the right and left banks, a bold decision considering the historically tense relationship between the two sides. Its opening day in 2003 featured pyrotechnics and an appearance from then-president Jacques Chirac (Le Blanc, 2016).

Bordeaux's geography throughout its history has informed the culture of the city. The Garonne river separates the left and right banks, defining the relationship between the two as separate entities. Until recently, the Bordelais did not willingly accept the right bank as part of the culture of Bordeaux. The first bridge (Pont de Pierre) connecting the sides was built only in 1822 for Napoleon's army, and it would be almost 140 years before the completion of the second bridge 1960 under Chaban-Delmas (the Pont d'Aquitaine). As for industry, flour mills popped up along the right bank, as more profitable and technologically advanced industries like shipyards, chemical industries, pharmaceuticals, and aeronautical industries on the west of the city near Mérignac. The left bank has held the power to attract profitable global industries. After WWII, Ford and IBM opened in Blanquefort in the far west of the métropole (left bank). This emphasized the right's provincial perception by the left bank. Later, the right bank became an enclave for factory workers, and was generally avoided by Bordelais. The rise in popularity in the right bank is thanks greatly in part to the tramway's arrival in 2003. Still, the right bank is

still not seen as equal in the rest of the Bordelais' eyes. The question of who is a "real Bordelais" has historically been closely tied to class, and is exclusive to left bank dwellers.

The Pont d'Aquitaine seen from Lormont.

View from the right bank (in Cenon). In the distance are the four posts of the Pont Chaban-Delmas that connects La Bastide (right) to Chartrons (left).

The transportation system in the métropole, functions under Transport Bordeaux Métropole (TBM). They offer different modes of transport (see Map 3 which shows the city's transit system). The three tram network lines will soon be joined by a fourth that stretches all the way to Le Bouscat. The Bat3 river boat operates like a tram or bus and makes stops along the river, crossing several times to connect both banks. The City's emphasis on accessibility is reflected in the wide reach of the Transgironde bus that connects even the most far flung places for good prices and reliable service. The buses are connected to train stations, as well, so accessibility is even more seamless. The regular Bordeaux bus network also has a wide reach and

many busses in circulation. The introduction of the V3 bikeshare system with its 175 docking stations and 1,800 bikes makes it even easier to get around the relatively flat city. The Mobibus is an on-demand service for people who have disabilities. And, all of the tram lines are accessible because the platform is a gradual incline so anyone in a wheelchair can get up and there's no gap between the platform and the tram. All buses have the ramps that extend out too. Experiencing transportation that could effectively, safely, and affordably help me meet my daily needs which demanded traveling all over the agglomeration inspired me to study it's inner workings.

Significance and guiding questions

This study seeks to understand the transportation system in Bordeaux and it's reciprocal relationship with the ever-evolving social, economic, and cultural landscape of the city. Public transportation is at a critical moment right now because it is time to reconsider our infrastructure. We have relied on a car centric structure for decades in France and in America. We have surrendered our precious public space to cars for much less than it's worth. Cars are bad for cities because they are antisocial, require exclusive and expensive infrastructure (Montgomery, 2013). Cars are dangerous, but unequally so: "Poor, elderly, and non-white pedestrians are disproportionally killed in traffic. People of color are 54% more likely to be struck and killed while walking in the United States" (Speck 2018, p. 9). Pedestrians over seventy-five are 68% more likely to be killed than those under sixty-five. Pedestrian deaths are much more common in low-income areas. Investments in pedestrian safety are investments in social equity (Speck, 2018).

The organization of the review of the scholarship to inform my study is based on four guiding questions that speak to the importance of a transportation system's influence on the life experiences of residents: How do people of different identities experience public transportation? How does public transportation play a role in individual quality of life for all? How can public transportation encourage social and economic equity? Interwoven into the responses is the question: How has Bordeaux's prioritization of public transportation, pedestrian, and bike friendly streets changed both physical and social aspects of the city's landscape?

Bus, cars, tram rails, motorcycles, and pedestrians along Cours de Verdun, center of Bordeaux.

Literature Review

Transportation takes a central role in urban sociology and social inequalities because it has the power to enforce racial, social, and economic segregation, or it can be a tool for equalizing opportunity and access across a city or region (Bullard, 2005; Pereira, Schwanen, & Banister, 2017; Yayo, 1983). The organization of the review of the scholarship to inform my study is based on four guiding questions

How do people of different identities experience public transportation?

This first section focuses on the relationship between a city's public transportation and its residents by gender, age, class, and race/ethnicity. There is a considerable amount of literature that explains how public transportation is not experienced universally by riders (Raibaud, 2015; Khanna, 2020; Rodgers, 2020; Speck, 2018; Attoh, 2017; Grescoe, 2012; Kim, 2009; Purifoye, 2017; Covington, 2018). The way that people of different identities use and experience transportation can not be ignored by policy makers, or overlooked when considering the allocation of funding (Attoh, 2017; Bullard, 2005; Purifoye, 2017; Yayo, 1983).

Gender

Women's experiences and demands with public transit are different than men's, but even though they represent the majority in ridership in the US and France, this is rarely reflected in an adjustment to create the kinds of services they require (Raibaud, 2015; Goodyear, 2015). Vienna, Austria has taken a head-on approach to discussing and breaking down gender barriers in the planning world for a few decades. Their studies started by asking about daily transit use, and while many men filled it out in five minutes because all they had to note was their commute,

women spent much longer recounting their trips to pick up and drop off children, errands, and helping their aging parents get around. This resulted in some changes like wider sidewalks, stroller-friendly ramps, and safety lighting along streets (Khanna, 2020; Rodgers, 2020).

Women also make up the majority (56%) of transit riders in France (Raibaud, 2015). This is similar in the US, where women nationally make up 55% of riders, and in some places, like Philadelphia, for example, they make up 64% of all transit riders (Saksa, 2015). In Bordeaux there is very little representation of female city officials, which can contribute to a male-centric conversation on transportation (Raibaud, 2015). In the seminars and conferences that went behind A'Urba's *Grenelle de Mobilités* (a document that identifies the city's main long-term mobility priorities) of the 91 participants, 24% were women. At the conference men spent 3 hours and 23 minutes speaking, and women only spoke for 17 minutes. Women's statements were often interrupted, deemed off-topic, treated as a "particular case" and not generally applicable, or told they were talking too long. The only women's perspectives that made it into the final report, 10 lines, for a 186 page report (Raibaud, 2015). It is problematic when city planning innovations (coming from a majority-male panel) that promote male lifestyles are presented as universal truths. Women's lifestyles are more often treated as individual cases.

In discussing gender and public funding, Raibaud found that "75% of public budgets for youth recreation are consumed by boys…a city made by and for men." (Raibaud 2015, p. 38) Considering that women make up the majority of transit riders in France and the US, there is an interesting neglect to fund or study gender-related demands, or to implement more public spaces that are preferred by women and girls.

Family unit

Transportation costs can put a huge strain on households and individuals when they are car dependent, which affects women to a much greater degree when they are car-dependent. If one has no other choice but to be car-dependent because of an insufficient transit infrastructure, this can intensify existing socioeconomic inequalities. In the US, households spend more on average on their cars than on their food and health care combined (roughly $16,700) (Grescoe, 2012). For households that are able to rely on public transit because it is accessible to their home, only 9% of their income goes towards transportation. For households who depend on cars, an average of 25% of their income goes towards those costs (Grescoe, 2012). Not only can a significant amount of one's income go into their car, but tax dollars are being used to fund roads and highways at a much higher rate than transit (think 80%/20%) (Mangan, 2020; Montgomery, 2013). When studied at the national level in the US, car traffic costs the economy $115 billion in wasted time and fuel. This would be equivalent to $808 per person (Grescoe, 2012).

Age

Transportation needs vary drastically by age of the user, and these too deserve special consideration and not treatment as individual cases. Elderly people "live an average of 7 to 10 years beyond their ability to drive safely,"(US Department of Housing and Urban Development, 2014). They have needs for transportation and walkable spaces when driving is no longer an option (Speck, 2018). Children also benefit from special consideration in transportation planning. They have more independence when they are able to walk and take public transportation, and don't need to rely on their parents to drive them places (Speck, 2018).

Class

Relying on public transportation is not a choice for many people, and is closely tied to class (Montgomery, 2013; Speck, 2018). The majority (nearly two thirds) of public transportation riders in America have a household income of less than $50,000. And more than 20% have a household income of less than $15,000 (Speck, 2018). As welfare reform in the 1990's brought many into the workforce, the transit system in the US proved to be unable to fit their needs, based on one study of Syracuse, NY. Those workers were disproportionately working outside of the "typical" 9-5, Monday-Friday work week, on night or weekend shifts. When transit systems do not provide adequate service for people who work entry-level jobs, especially in the home healthcare field like in this study, they leave many vulnerable people in desperate situations (Attoh, 2015). Contrary to the cliché of the white collar worker biking for their commute, "a cyclist or a pedestrian is more likely to be a minimum-wage worker than a well-to-do professional" (Speck 2018, p.8). In the US, a recent look across the nation finds a general trend of transit riders cutting back on usage. Over two years, 9% of respondents abandoned transit altogether, and 25% decreased transit use, and often in favor of personal cars, not TNCs (transit network companies, like Uber) like one might think (TransitCenter, 2019). Moving has the largest impact on transit use (increase or decrease), but it is disproportionately low-income people who were pushed farther from transit when they move, which inhibits their ability to rely on transit. TransitCenter found that,

> "On average, respondents with household incomes below $25,000/year experienced much larger losses in transit quality near home— compared to households earning $75,000/year—after moving" (TransitCenter, 2019).

A Parisian example of the importance of connecting the exurbs to the city is the "infamous 13" metro line which runs from Saint-Denis to the suburbs in the south, some of the poorest parts of Paris. It is one of the busiest lines in the metropolitan area, proving that transit really is crucial for the population who either cannot afford a car or for whom a car is impractical. In the Paris metropolitan area, 82% of the region's population lives outside the city, and there have to be continual efforts to meet their needs. For example a new supermetro line is being built to center around them (Grescoe, 2012).

Race and Ethnicity

Race and ethnicity is an important element in the conversation about public transportation inequality because of the disproportionate representation of users of color in the US. In the US, 60% of daily transit riders are nonwhite people (Speck, 2018). According to the US census, the nation's nonwhite population is only 23.5% (United States Census Bureau). Immigrants are more likely than non-immigrants to commute using a "non drive-alone" mode. "Long-term immigrants spend more time commuting on public transit than do nonimmigrants and the other immigrant populations. New and intermediate-term immigrants spend more time commuting by bicycling or walking than do long-term immigrants and nonimmigrants" (Kim 2009, p. 161). In studying Chicago and the surrounding suburbs, Purifoye (2017) found striking differences between communities of color in the south and communities that are majoritarily white in the North. Poor majority minority communities even within Chicago limits were much less likely to have access to express routes to the central business district than majority while suburbs like Skokie and Evanston (Purifoye, 2017). The facilities in neighborhoods that were different in their racial makeup are also stark, even along the same line of transit (Purifoye, 2017).

The conversation on race and ethnicity is common in studies on public transportation, but this kind of data is not collected in France. It is important to understand why they would refrain from collecting this kind of data, comparable societies like the US, the Netherlands, Canada, and the UK have been doing it for many years. By combining other statistics, one can approximate that 5% of the French population is non-European and non-white. They do not wish to make this figure more precise because the French have a strong attachment to the idea of equality, and they maintain a "color-bind" approach to this goal (Bleich, 2001).

In 1978, a law was passed that "banned the collection and computerized storage of race-based data without the express consent of the interviewees or a waiver by a state committee. France therefore collects no census or other data on the race (or ethnicity) of its citizens" (Bleich, 2001). It is no coincidence that this policy was enacted during the decade when the French started to come to terms with their complicit role in the Holocaust instead of only acknoweledging the Resistants (Rousso, 1991). Instead of measuring inequalities and conceiving policies based on racial or ethnic criteria, they address inequality through geographic and class criteria to address social inequalities. Historically, the French have steered clear of gathering racial and ethnic data, or even really acknowledging it, based on their long and entangled history with colonization, immigration, and slavery (Simon, 2010). Put simply, "the reluctance in French social sciences to use the semantic field of ethnicity and race has to be understood in connection with the French republican credo of 'indifference to differences' and the strategy to downplay the salience of cultural disparities in order to unify the nation" (Simon 2010, p. 159-160).

How does public transportation play a role in individual quality of life for all?

Physical health and safety

Transportation safety is a major issue, and it can even be thought of as a tool for public health. Every year, automobiles kill 1.2 million people around the globe and injure 20 million more. Grescoe illustrates this point by calculating that it would be equivalent in fatalities to a "dozen fully loaded jumbo jets crashing everyday" (Grescoe 2012, p.12). Across transportation modes, vehicles with a capacity of 10+ (so, virtually all funded public transportation) represent just 0.1% of the total fatalities. In the US from 2000-2009, crashes involving private users (not commercial highway carriers) added up to 26,678 average annual fatalities. For the same period, rail transit passengers in commercial transportation averaged 22 fatalities annually (Kille, 2017). Street safety is an especially salient issue because it can have a disproportionate impact on some of the identity groups mentioned above. "Poor, elderly, and non-white pedestrians are disproportionally killed in traffic. People of color are 54% more likely to be struck and killed while walking in the United States" (Speck 2018, p.9). Pedestrians over seventy-five are 68% more likely to be killed than those under sixty-five. Pedestrian deaths are much more common in low-income areas (Speck, 2018).

Rue Fondaudège, center city Bordeaux. Tram D rails visible. Bus/car/bike lane on the right. Sign indicates 30km/h zone.

In France, Paris's semi-auto piloted metros have been in place since the 1970s, and are used to operate on the majority of their metro lines. The technology has never been implicated in an accident (Grescoe, 2012).

Physical well being is also closely related to mode of transportation for people of all ages. For example, when children are driven, instead of walking, to school they are more likely to be obese: 45% vs 14% (Grescoe, 2012). When the light rail line LYNX was installed in Charlotte, NC, people who lived in the vicinity of the line who changed their daily transportation routine to

incorporate LYNX ended up walking an extra 1.2 miles per day. They even reported losing some weight over the first year of ridership (Montgomery, 2013). Skin cancer is more often found on the left side of the body, where drivers are exposed to sunlight (Grescoe, 2012).

Mental health

Mode of Transportation affects all aspects of a person's health from physical to mental (Montgomery, 2013). Although safety and perception of safety affects the results, one study finds that for elderly people in Scotland, neighborhood walking was positively associated with mental well-being (Curl & Mason, 2019). In one Swiss study, biking as a mode of transit is recognized as a way to commute but also as a source of exercise (98%), freedom (90%), pleasure (88%), and out of respect for the environment (88%). These feelings all are connected to personal well being and positive mood associations. Despite these positive results, 36% reported that risks from cars keep them from commuting by bike (a threat to physical safety) (Rérat, 2019)

Cars can have an isolating effect, which can affect mental well-being. Every ten minutes spent commuting in a car cuts community affairs by 10% (Grescoe, 2012). One US study found that "every 1% increase in the proportion of individuals driving to work is associated with a 73% decrease in the odds of an individual having a neighborhood social tie" (Freeman 2001, p.74).

How can public transportation encourage social and economic equity?

Socioeconomic impact of transportation

Access to mobility has profound impacts on the social and economic character of a city. In the US, cities that offer more transit choice also have less income inequality, as well as less

overspending on rent (Speck, 2018). Public transportation supply had a significant effect in a study that found wage inequality to be closely determined by social and demographic, economic and spatial characteristics. Results from tests comparing previous literature on inequality and transit suggested that increased supply is significantly and "negatively correlated with wage levels for the metropolitan areas in the sample" (Sanchez 2002, p. 433). Ensuring that transportation not only serves advantaged communities is crucial. Among the benefits of creating communities with affordable housing and transit access are the ability to "help reduce households' transportation costs, connect workers to jobs, and facilitate upward mobility." (Center for Transit Oriented Development, 2014). In the US, racial disparities in car ownership exacerbate employment disadvantage. To that effect, better transit coverage and functioning is essential to negate the existing disadvantages (Covington, 2018).

Funding and impacts on different populations

Funding for transportation and city planning is an important factor responsible for the success or demise of a transit system (Montgomery, 2013). In France, funding for the project comes from regional and national governments, loans, and new real estate taxes (Grescoe, 2012). In Paris for example, a full quarter of the region's 4.7 billion euro annual budget goes to roads and transit. A transit-specific payroll tax on any company with more than 9 employees has long guaranteed the revenue stream that keeps public transport constantly improving (Grescoe 2012, p.124). This is the "versement transport," (transportation payment) and it will come up later in the findings.

Job Location

There is also a focus on inaccessibility when jobs are located in the suburbs or a more sparsely populated area. Planning and providing adequate access in landscapes like these is a challenge, so there is often insufficient public transportation. This poses a problem for people who need to rely on public transportation but are segregated from potential job opportunities. (Attoh, 2017; Bullard, 2005).

Spatial inequality is a problem that should be approached from many angles in planning, economic development, and housing among other ideas– but increasing transit service options has been found to be an effective solution in the short term at least (Covington, 2018).

Sari's (2015) study on the relationship between public transit and the labor market outcome in Bordeaux presents the phenomenon called Spatial Mismatch, first introduced by Kain in 1968. This refers to the role of "physical disconnection between the place of residence and job centers" (Sari 2015, p. 231). In the presence of substantial distances between place of work and residence, people without access to a solid transportation system are faced with transportation costs that are too high for their offered salary. Furthermore, they can encounter difficulties finding information about jobs (Sari, 2015).The historical center of Bordeaux holds 30,000 jobs, or 20% of the city's jobs (Sari, 2015). The tramway's implementation has improved job accessibility for some neighborhoods and reduced unemployment, but more significantly has allowed for a reduction in the *difference* in unemployment between the two banks. In effect, the tramway urban policy tool can claim this as a success. In terms of frequency on the line, 40,000 riders use A per day on average, compared to 52,000 on B and 18,000 on line C, which shows interest as well as demand for transportation.

Methodology

The Data

The data for this study came from an array of literature from the US, France, and other countries; my own observations in Bordeaux during the months that I lived there; images pictured throughout the thesis for visual support; and through four conversations with French experts in the field conducted over the course of a week in January 2020.

I conducted the conversations with questions that were more open-ended, ("what would you say is the philosophical approach to transportation planning in Bordeaux?") to questions more specific for the individual, ("What is the approach and what differences arise when planning for neighborhoods of different status?"). The four conversations lasted about an hour each. Three were recorded and transcribed. The experts in these conversations were contacted through connections at my summer internship in Bordeaux in 2019 or through independent research. The contacts are people who I had previously met, people who I was able to connect with through my summer internship in Bordeaux, and people to whom I reached out, after reading about their work online.

While I am using pseudonyms, the interviewees are experts in their respective areas of research and/or administration. They include: Gabriel Nicholas, a friend of a colleague of mine, who works in the city of Bordeaux's Directorate General of Solidarity and Citizenship. Louise Dubois is an economics professor at a reputable University. Adam Martin works in the transportation division for the City. His contact was given by a colleague from the summer

internship. Alice Beaumont is an urban planner and mobility specialist at a major urbanism agency in Bordeaux. This interview was organized by reaching out to the contact email address for her place of work.

Data Analysis

Using grounded theory, I coded the conversations and grouped the codes into bigger themes and looked for overlap between the conversations. The content of the conversations fell into three broader categories: information about Bordeaux and particularities to the agglomeration; philosophy and theory; and technicalities of the transit system in Bordeaux and France that would be useful to the study. Details about the system or facts that did not have enough social significance were not included in the findings.

Cours de Fondaudège, Tram D

The Setting

In Bordeaux, the tramway project was launched in 1995 by Alain Juppé with three distinct objectives for improving the city's social and economic landscape. The first was to dynamize the center of the agglomeration by providing easier access for the surrounding areas. Second, modernize and improve the standard of living in the neighborhoods that the tram serves. Third, to economically integrate the right bank with the left bank. For these goals, Sari states that the tramway could be called an "urban policy tool" by introducing social mixing (Sari 2015, p.232).

The setting of Bordeaux as a location provides a unique backdrop to this study. The dynamics between the right and left banks of Bordeaux were of particular interest to me because of the rapid changes in the status of the right bank, the special impact that public transportation had on this change, and the river boundary that provides a consistent physical boundary to overcome or to embrace. The right and left banks of the Bordeaux Metropolitan area are essential to compare when studying the area. Décamps introduces their differences this way:

> "The influence of proximity to a group of very poor neighborhoods (class 6), previously identified through the selective spreading dimension, is confirmed here. The diffusion effect is particularly pronounced within the right bank of the river (the Garonne), which was already characterized in 1990 by zones concentrating neighborhoods very difficult and whose influence seems to extend. This effect can be attributed to the segregative dimension of the river and the lack of infrastructure enabling it to cross, which contributes to the isolation of a certain number of districts on the right bank which are characterized by more restricted access to the main functions, and some employment opportunities. The diffusion effect linked to the concentration of neighborhoods in great difficulty is combined here with the isolation dimension to fuel the dynamics of segregation (Décamps 2011, p.174).

Some notable differences (deemed statistically significant) in the social and economic differences from Sari's study on the impact of the tram between the left and right banks are highlighted below (2006 INSEE data):

Variables	Left bank mean	Right bank mean
Unemployment rate (15-24 years old)	20.8%	27.8%
% of individuals without diploma	12.7%	26.1%
% of individuals with a 2nd year univ. Level	14.6%	7.8%
% of executives	15.1%	6.3%
% blue-collar workers	11.4%	21.3%
% of social housing	14.4%	40.3%
% of indiv. Using public transp. To go to workplace	17.8%	19.9%
% of households with a car	70.6%	78.8%
Median income (Euros)	23,837	22,576

Social housing on Rue Anatole in Cenon (right bank). Towers are going to be rebuilt in the near future. Second picture shows the parking lot and bridge in the distance that crosses a highway. Community garden and pétanque court in the last picture is at the base of the towers.

Findings

I found that the responses were different based on the expert's position in relation to the transportation world. Those who worked in the planning and municipal context had a generally more pragmatic and straight-forward vision of the system. Their concerns were management related in response to the increasing demand for housing, space, and transit in Bordeaux. Perspectives from the academic context were more critical and socially concerned. The women in the results invoked more social concern for vulnerable populations. The voices in this study are significant because they hold a high level of expertise for the general culture and transportation culture of the city of Bordeaux. Their concerns and priorities are significant because of their position of experiencing and influencing the "everyday life" of Bordeaux.

Based on my interviews, supplemental information from reports, personal observations, three major themes emerged: particularities about Bordeaux, philosophy and theory, and technicalities of transportation. The particularities of Bordeaux speak to the history and modern day effects that are unique to Bordeaux and the region. The philosophy and theory section speaks to the themes in conversations that centered around the idea of choice, image as it relates to class, vulnerable populations, and a French egalitarian vision of the city. The technicalities sections explains the themes of infrastructure informing the form of the city, and vice versa, and future improvements. Each of the themes interacts with the others to provide a richer understanding of what makes the transportation culture in Bordeaux unique. Every overarching category is connected to the others– for example the technical details of the transit infrastructure are affected by the culture and geography of Bordeaux, and they affect ideas in the philosophy

section like choice and vulnerable populations. The results are organized by the three main themes above, and are then organized into subheadings that are more descriptive of the findings.

Particularities of Bordeaux

Attractive location

These are the topics that came up that are connected to the history of the city and its present day situation. Mainly, all experts discussed the fact that in recent years, beginning in the late 1990s with the changes mayor Alain Juppé made to modernize the city. The city has become more and more attractive to businesses, for its proximity to many other attractive locations like the beach and Bilbao, Spain, and generally to people all over France, including those who moved to Bordeaux from Paris to escape the high rent while enjoying the luxuries Bordeaux has to offer. This has created an effect where the price of living and rent has shot up to the point that many people have been pushed further and further out of the city. Already, one expert pointed out, Bordeaux is a relatively spread out city. This combined with the rapidly expanding population and scope of the agglomeration has posed many challenges to the transportation system. This will be explained later.

Regional Focus

The experts recognized the important role of the region and what kinds of steps are taking place to ensure a more interwoven transportation system, but there were differences in their opinions on the subject.

Bordeaux is the capital of the region, and all of the experts mentioned its regional importance and how that has affected the city. One explained that with the growing popularity of

Bordeaux, the right bank (discussed later) has attracted a lot more business opportunities, including the center of a regional bank. One discussed the region's role in the planned Réseau Express Régional (RER) rail lines that are being worked on to be able to connect those at the fringes of the metropole to the center city, and to interconnect the outlying areas too. The project involves taking unused or underused regional rail train stations that are state operated and looping them into the metropolitan network. Martin used this project as an example of another principle that he and Dubois discussed, which is strengthening existing infrastructure and avoiding starting big, expensive infrastructure projects from scratch. The regional importance of Bordeaux was discussed from a number of angles. Much of the attractivity for Bordeaux is due to the fact that it is just one hour from many popular coastal locations, three hours from the Spanish border and the Pyrenee mountains, and four from Bilbao, Spain. Dubois was strongly in favor of a more regional approach to public transportation as an appropriate response to Bordeaux's popularity and all that comes with it, good and bad. The tramway reaches into Pessac, Talence, and Lormont for example. For people on the perimeter, access to the city via car is often preferred, as the tram is not always regular. The recently passed LOM (Loi du 24 décembre 2019 d'orientation des mobilités) or the December 24th Law on the Orientation of Mobilities was evoked in conversation. This law was prompted by the Gilets Jaunes insistent presence in France, and their demands for equitable transportation. LOM includes 189 articles. These new mobility plans that cover all forms of mobility are to replace the existing plans de deplacement urbain (PDU) or urban travel plans. The law reinforces the role of regions as real leaders in mobility. Organizing authorities of mobility are also supported so they can more easily provide mobility in the name of reaching underserved communities in the region.

Throughout the interview, Dubois stressed the need for a more regional transportation vision in response to the changing needs and scope of the agglomeration. The problem is that there are several local authorities that manage at different levels, and there is a lack of coordination between them. Many jobs are concentrated in the metropolitan area of Bordeaux, and mostly in the center. Since this means many people have to reach the center but also the other job zones, there needs to be more coordination to connect people.

Beaumont noted that one particularity of Bordeaux was that when the tram was planned, they decided to build the three original lines simultaneously, not one at a time. The lines had staggered openings over a few years, but it did not take an extremely long amount of time, which was rather modern for the time. More about the technical aspects of Bordeaux's system will be covered later.

Bus stop next to the Jardin Public. Time table shows when the next bus will arrive. These are found at some of the bus stops in Bordeaux.

Work

Work, and more importantly the location and accessibility of work emerged as another theme that concerned the participants. Most jobs in the agglomeration are concentrated in the center of Bordeaux, as mentioned earlier. While companies are locating to the right bank, it would take some coordination in city planning to attract businesses to dedicated spaces for companies on the right bank. It wasn't that long ago that on resumes you had to indicate if you had a driver's license, and if not, some companies wouldn't employ you because of your perceived immobility. One of the priorities in the agglomeration is to mesh together all of the modes of transit, so that commuting mode can be a day to day choice. Not only are they working to improve access into the city, but to interconnect the outlying areas. Having to go through the city, which slows down commute time, is a challenge for people who commute from one periphery location to another. Another challenge for the city is to make public transportation more competitive against the car for people who are living further and further away from the center. A number of these solutions are covered in the technicalities section.

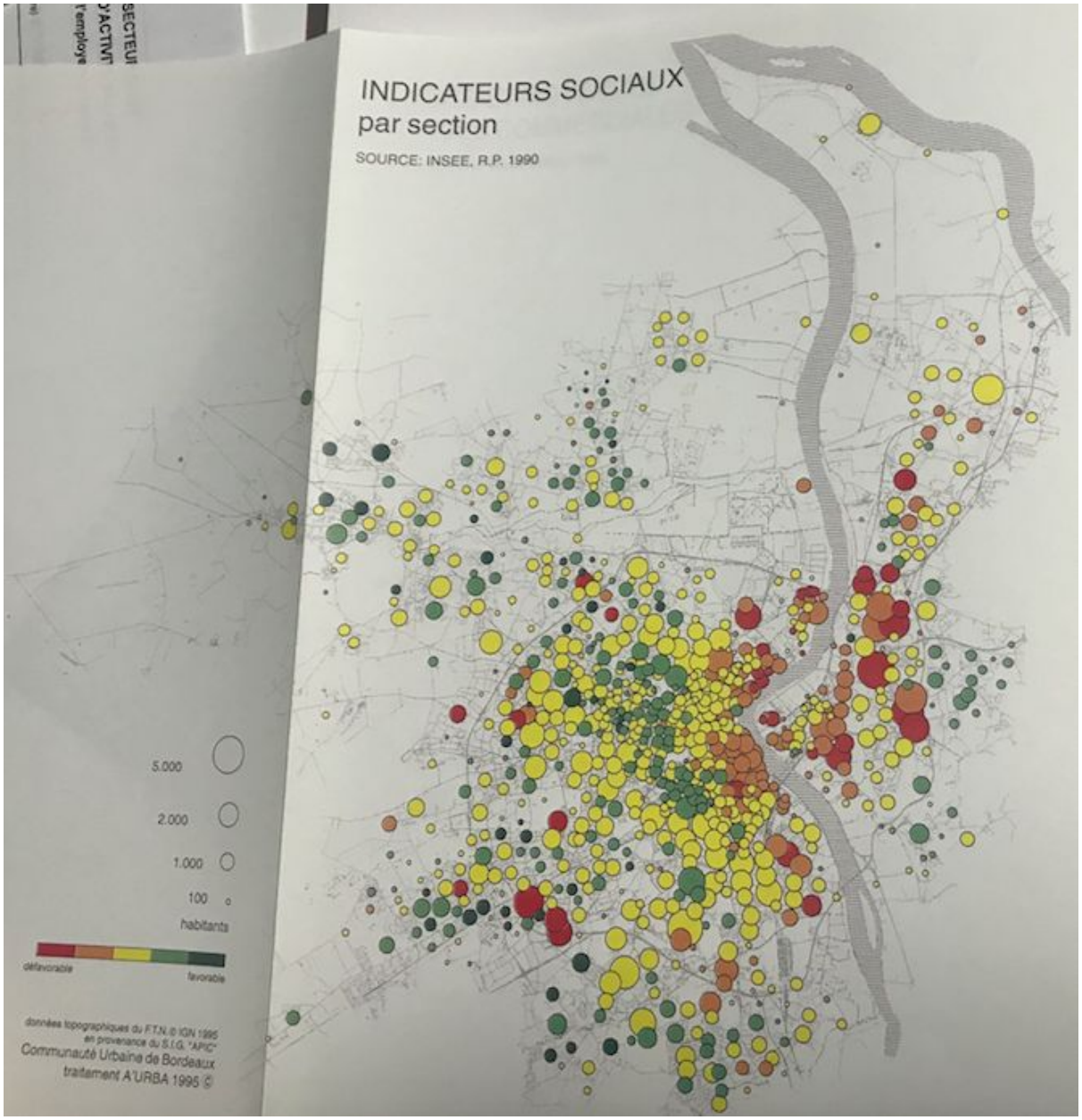
Right bank vs Left bank

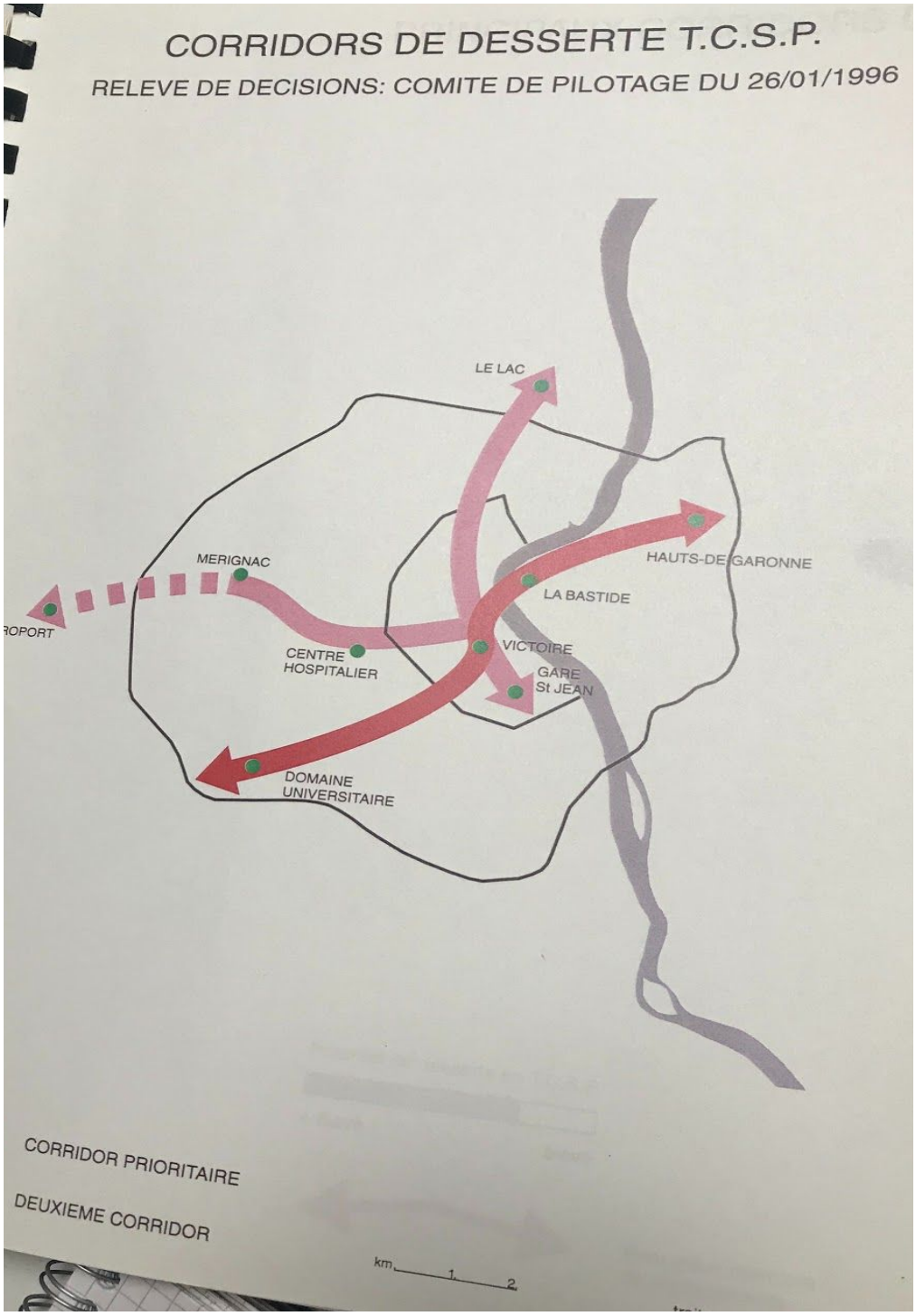
Bordeaux's right and left bank dynamic was worth asking about because of the city's divided past and present. The right bank of Bordeaux was described when discussing the overwhelming demand for space in the city. The Bastide neighborhood was "forgotten" for a while, and people saw it as "smelly, dirty, unfavorable, disgusting, nothing to do". The right bank was historically a bit forgotten and impoverished, and that this changed once the tram was put in in 2003. Now, the prices are much higher there and it is more attractive, but it is still a challenge to navigate between the banks. Now the tram brings you to new restaurants and cultural spaces, which have given it a new status as a "yuppie" hotspot (boboisé). When asked

about if there is a different approach in planning transportation for the right and left bank, Martin emphasized that although there are lots of different kinds of populations in the agglomeration, the goal is of course to create conditions so that everyone can get to where they need to go. This goes for all kinds of modes. The goal is to not limit people to a small area. He mentioned that when the tram was originally proposed, there was pushback from some people who said that it would bring people from difficult neighborhoods over and they would break things around the city. While there may be certain issues related to transit security in some neighborhoods, travelling around the territories with a standard of security is the goal of mobility. One of the solutions for the right bank's mobility problem is the Bat3, an electric boat that runs along the river and accepts the same fare as the bus or tram. This is a solution that not may not be useful for everyone, but it still helps reduce congestion on the A tram.

The Chaban-Delmas bridge was put in to connect Lormont to Chartrons, and there is another bridge being built south of the train station. This bridge is running behind on construction. Dubois explained that she hears more complaints from the right bank about congestion, travel time, and especially from the university students who live there. The differences in infrastructure between the periphery (which includes much of the right bank) and the center of the city are noteworthy. Congestion pricing was not introduced as a good idea for Bordeaux because it would be even more exclusive for people who already have more mobility restraints as they try to come into the city. Living car free is easier in the center, where there are many pedestrianized streets already, but if you go out a bit more into the periphery, it becomes much more dangerous on the streets to bike or walk.

One of the main objectives for the tram was to connect the right with the left bank, and that today the Bastide is rather dynamic. Beaumont showed this map that A'Urba created in the 90s to present to the mayor as the city decided where to install the tram lines. Since there was a significant difference between many neighborhoods, they knew that they had to make sure the red "disadvantaged" zones would be accessible through the more "favorable" zones. A look at the tram map overlays the original map of these challenged areas.


INDICATEURS SOCIAUX
par section
SOURCE: INSEE, R.P. 1990
5.000
2.000
1.000
100
habitants
défavorable
favorable
données topographiques du F.T.N.© IGN 1995
en provenance du S.I.G. "APIC"
Communauté Urbaine de Bordeaux
traitement A'URBA 1995 ©



Top map from A'Urba prepared for the city in 1995:

"Social indicators by section": red equals "unfavorable" and green equals "favorable."

Bottom map:

"Service corridors. Reporting of decisions: steering committee from 26/01/1996

Priority Corridor (Red)

Second Corridor"

The future is… Paris? Nicholas believes that Bordeaux is starting to become like Paris, with a very rich center and poor outer ring. There used to be a good socioeconomic mix because the city was more affordable, much lower than the rest of France about 20 years ago. The expert in an academic context also has studied how drastically the price of living in Bordeaux has gone up, and how it is creating many positive and negative effects simultaneously. Even though Bordeaux may be becoming a less economically integrated place, Nicholas noted that,

> "Bordeaux is less intense than other cities like Paris, and its periphery, like St Denis, spatially and racially. In Bordeaux, immigrant populations and victims of racism do not necessarily have the capital resources, and can not find accommodation in the city center. That is the case in Paris, and it is more and more like this in Bordeaux, but before it was possible…"

Issues of segregation in Paris are exacerbated where there is less access to public transportation.

Philosophy

Image and class

Another theme which came up a lot was the idea of image, and how that affects people's transportation choices, if given a choice. This is tied with what was mentioned about car culture, and how it can be a status symbol. All experts mentioned the attraction of Bordeaux, and more specifically the attractiveness of the tram. Martin said that the tram's attractiveness means less people choose to take a bus that would get them to their destination faster or more directly in favor of taking the tram. It is tied to "image," and that it also can be a habit to choose one mode

over another based on the image or attractivity of the mode. He finds that the perception and resistance to change over transportation mode is an important trend. Dubois also applauded the attractivity of the tram, but doesn't believe that it comes close to solving the real mobility problems. She said that there is much work to do in the city to face climate and social change, and that pretty façades are not enough. Buses are also neglected because they perceived as the slowest option, which may or may not be true for everyone. There are projects to boost the attractivity of the bus, like adding dedicated lanes to increase their speed and effectiveness. These are already in effect across the city, but there will most likely be an expansion of the project.

Choice

The Bordeaux métropole offers many different modes of transportation, and many people have the choice between them to get where they need to go. The idea of choice and freedom to choose came up in these conversations, but not all experts had the same convictions about how much mobility freedom there is. Since Martin's job is essentially to provide a multiservice to the city, he had much to say on the subject. Since there are many different transport options,

> "I think that today it is less of a question of intermodality or multimodality, is rather a question of what service I offer to the user, and the user will... if he wants to come by car he can come by car, if he wants to come by public transport he can come by public transport, walk or bike, he can do both, it's a bit - I am sensitive to the concept of service, it is that we offer a range of solutions, and according to its needs, its constraints, one day a person chooses one mode and one day another mode, and voilà, according to the

territories, there is not the same offer of transport, and according to that, one changes, voilà."

Place Paul Doumer. Scooter and bike share TNCs (Transportation Network Companies), personal bikes locked up, pedestrians, bike lane, tram stop in the distance, and bus stops out of line of sight.

One can come into and navigate the city by bus, tram, bike, or by car, and while there are constraints it is still a matter of choice. Martin explained that his role is to not just offer one option, but to offer users a chance to make a decision based on price, feasibility, attractiveness, and function. From his own personal transit experience, he discussed how he chose his housing location because it offers him a choice of comfortable commute methods (bike, walk, or tram). He explained that his choice was to have a shorter more pleasant commute than to live further

away and have a larger house and garden. Ultimately, his point of view is that choice is what makes people lean towards one method of transit over another, and that the goal is for more people to be able to have a choice.

While the housing situation in Bordeaux is a real problem that only seems to get worse and uproot more and more people, there is still plenty of room for choice. Perhaps not as much as Martin saw, though. Choice and freedom to choose transit mode is not experienced equally across the agglomeration. Not everyone who is outside of the Bordeaux metropole is, of course, there by force. But this depends more or less on the region. In the south (Bègles), more people are there because of a choice to be close to family, close to the highway, the local train, all kinds of ways exist for them to get into the city relatively quickly. These people are often middle class. People in the northeast (Lormont) are more in the situation where they are not necessarily there because of choice, but because the other options are too expensive.

Egalitarian vision

Experts who worked for the city understandably promoted a more egalitarian vision of planning in the city, where French Republican ideals really shine through. I asked Martin if there were any differences to planning on the right bank and the left bank to cater to different needs for the users. He explained that,

> "Yes, they are not the same exact populations, but we always pose the question of- well I live somewhere and where I go and how I get there... actually it is not the same populations but overall we realize that the difficult neighborhoods on the right bank towards Lormont, Cenon, but also towards Grand Parc near Bordeaux, it is the fact of saying well, when I create a network of transportation, tram, bus, even bicycle, the goal

of the game is that the populations can go from one point to another, and the goal, the endgame of diversity, is to create conditions so that we move, that everyone moves, and it is not a network for staying in a limited area or environment."

There are lots of modes of transportation, but what is necessary is an entity that manages all of them effectively, but it's starting to happen thanks to the LOM. The recently passed LOM (Loi du 24 décembre 2019 d'orientation des mobilités) or the December 24th Law on the Orientation of Mobilities was prompted by the Gilets Jaunes insistent presence in France, and their demands for equitable transportation. (see endnote)

Cenon.

Elaborating on what Dubois found about the difference in infrastructure between the center and the periphery, these differences amount to a difference in perceived danger. For

cyclists, using the quays of the river to get around is not possible to do in peace beyond the pedestrianized zone. There is a real lack of bike infrastructure along the river once you get out of the picturesque center of town. Since the center city infrastructure is already more pedestrian-friendly, there is a need to expand more user-friendly infrastructure so that all people, no matter their class or location, can safely navigate their surroundings.

Cours de Verdun. Center of Bordeaux, affluent area. Bike lanes are wide and separated from motor vehicles. Pedestrians have a slightly elevated sidewalk next to the bike lanes.

Vulnerable populations

Dubois and Beaumont focused the most on different user needs. They were especially interested in the needs that the oldest and youngest populations need in order to safely get

around. Dubois said she "worked with students last year on the elderly population, and the elderly complain that when they're on the sidewalk... that there are people on scooters, and they are scared to get around on foot." She saw this as a demand for dedicated safe walking lanes, because they reported feeling, "safer driving than even walking 100 meters on the sidewalk." She sees that people in power are starting to think more and more about addressing the kinds of needs that the old and the young have, but,

> "they don't really pay them much mind but still, it's starting anyway, because the population is aging. In 15 years we will have more elderly people than young active people, almost everywhere, and cities must anticipate this. There are suburban zones everywhere, so how do we rethink these spaces, and services for people like that? This question is coming up at the departmental and national level, but in the minds of elected officials and the public, not quite."

There are local groups working to make this a priority, like "association des pietons, Federation national des usagers des transports, Velo cité in bordeaux who do a lot of work, Villes amis des aînés, Bordeaux takes part in that… we have a few programs that work on development in that area, and promote more effective mobility. It's not bad, but it is still dangerous." She personally has a lot of stake in this issue, because as she said, "I have two kids and I wouldn't let them bike alone in Bordeaux, it is impossible because it is just too dangerous."

Beaumont is one of the authorities who is working on studying these vulnerable populations and proposing solutions for improving their experience getting around the métropole. St. Aubin De Medoc was mentioned as a good example of pedestrianizing, or more specifically "childizing" their town. She has contributed to studies of patterns of use by the old

and the young, to provide the city with specific solutions and suggestions to improve their mobility.

Since the participants are experts in their fields, they explained many technical details of transportation projects. These can be broken up into a few elements: system improvements, political, economic, and topographical details.

Technicalities

Improving the system

Many of the improvements they discussed were suggested as solutions to the problem of being able to connect people across the agglomeration of all socioeconomic status to reach their job, school, and recreation needs. Every conversation mentioned the planned RER system (Réseau Express Régional/Regional Express Network). Nicholas first brought the project to my attention. The idea is to reopen the small train stations in the outer areas of the city, and use the existing infrastructure again instead of building new costly tram lines. The new RER will be able to cut down on the amount of single-user-in-car commuting done to reach the center city and elsewhere. The LOM advances ¾ of the first round of investments into rail projects. In cases like Bordeaux where there is already the pre-existing infrastructure, this provides a cost-friendly way to make the most of the government's funding to increase mobility. Taking what already exists and making it more useful is a theme that was applied to boulevard refurbishments and pedestrian infrastructure.

The new RER is not the enemy of the car, exactly. There are expected to be plenty of places for people to park at these stations, because more people in the periphery rely on cars.

This project brings more choices and alternatives to people who live further away from the dense city center, a population that typically can pose a challenge to planners. Car parks like these would help make rail and transit more competitive against total car use. When asked about what makes Bordeaux a unique place for transportation, he mentioned the project again, stating that it was one of the first cities in France to have a large project like this based on the question of "if we have something that exists, how can we optimize it?" He also noted that strengthening this rail infrastructure works nicely with the existing regional and national system, and would be able to connect more people and meet more of their needs. This solution takes on the congestion issue in Bordeaux and is less invasive because it repurposes an existing infrastructure. It is also in line with the territory's political stance that to live well, you must be able to get around, so authorities must intervene in different ways when it comes to mobility. The railway project could set a good example for other cities. The Bat3 river boats also came up as one solution that he believes other cities could look to as an alternative and eco-friendly transportation mode.

Improving and attracting more users to the bus system was also a trend among these conversations. Some frequently mentioned solutions include priority traffic lights to help speed the bus along, and sectioning off more bus lanes to make travel time speedier and more reliable. The boulevards that circle the city are an area where bus lanes would make a huge improvement. Dubois, Nicholas, Martin, and Beaumont also pointed to the rocade (ring road) around the metropole, which expanded the number of lanes a while ago. The expansion neglected to set aside a lane for buses or biking, which they found problematic. The city is taking the steps in the right direction, but finds that it is taking time to get to where they need to be.

Bus and bike lane on Cours de Verdun, center city of Bordeaux.

When Dubois was asked if she believes that a BHNS/BRT system, and the RER would be enough to face the rising needs in the métropole, she said it is very possible but would require lots of coordination with other modes of transit to properly function. Martin echoed this idea as well. He explained that the goal is to create a more complimentary network, like a big spider web, so that places like the new rail lines will have bus stops, for example. He saw examples from other places as sources of inspiration for improving the bus system in Bordeaux, but that it should never be a "copy/paste" situation, because each city needs to closely study their own needs before arriving at a solution. He noted,

> "countries in South America have their collective transportation system where the buses really set the rhythm, but there are only buses, and it would perhaps make sense for us to do the trams first, but that is another logic. They actually have a kind of bus station, then in other places– or for example Nantes, they made the Bus Way that actually like a tramway, they created a platform and put buses on it, and they have their own area just like a tram, BHNS (BRT), I had worked on it, on this system."

Beaumont echoed this idea, that the role or A'Urba is to use a design thinking approach, and not just apply ideas without thoroughly consulting the possible users. Making a cleaner network that runs on electricity or hydrogen would also be a smart next step.

Improving bike infrastructure

Nicholas was favorable of the city's efforts to establish more bike paths, bike parks, and places to lock up bikes. Among the city's transportation priorities right now, developing active modes like biking and walking is an important one. He is proud of the already strong practice of biking in the city, and noted the city's framework document for bike planning. He said there is still room for improvement, especially because as more and more people choose to bike. His perspective is that they are more people to manage on the streets. In the city, he mentioned how it is becoming congested for bikers across the Pont de Pierre, and when people bring their bikes onto the tram. He also noted that they are also working on how they can develop biking from far away, which includes coming up with specific bike routes the same way they would build a tram, like a major highway for bikes. This is a project that has not yet started, but is a possibility in the future. He discussed how his department is well versed on the "big" infrastructure projects, but that working on bike planning brings them more into the "lacework" of the city. To him, it's

important to have a balance between the big and small projects because they need to be able to compliment each other.

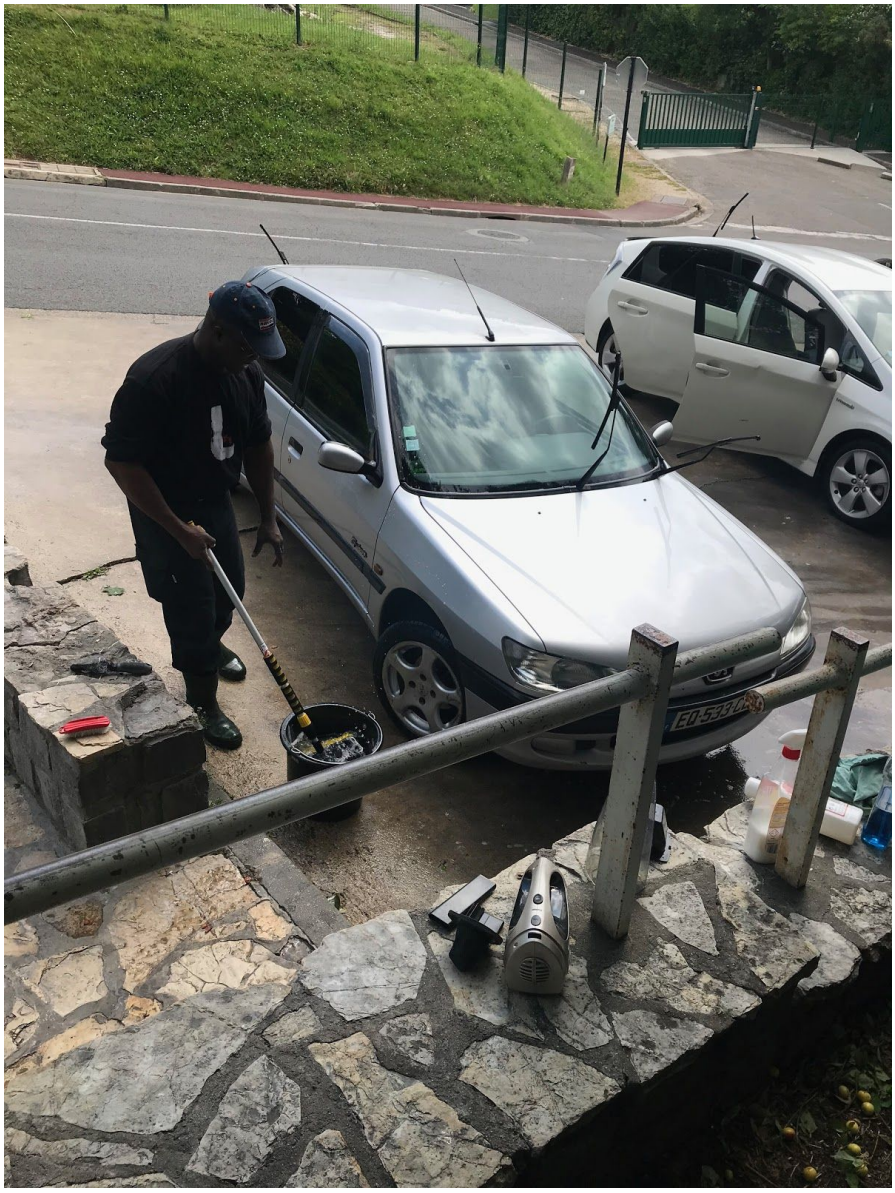
Le Bouscat, side street located near tram line D. Residential street featuring bike racks.

Dubois spoke to the need for better bike infrastructure from a personal and professional perspective. She is a frequent biker herself, and she said that she was injured in a bike accident last year. This event seemed to bring out even more frustration with the security issues that could be solved through better infrastructure. She said that there is still a real hierarchy on the streets with the cars at the top. She called for more dedicated bike lanes, and not just caution signs. She mentioned Vélo Cité, a bike collective which is calling for changes like these in the municipal

elections. As previously mentioned, her personal experiences with biking have made her wary of letting her children bike alone.

Car Culture

One theme that came up across all of the conversations was the existing car culture in France, but that it seems to be notably prominent in Bordeaux and the Gironde (the department). In Bordeaux, the transit system is relatively well developed and many are able to live without a car, but still having a flashy car is a social marker that many French aspire to. This is changing with the younger generations, though. It is a slow change because there are not enough disincentives in place to keep people from always relying on their cars, even when going only short distances. Each interviewee pointed to the habitual nature of car culture. Especially for older generations who grew up with little incentive to choose a more eco-friendly option. Dubois went one step further to say that it is especially present in Gironde. Habits, and breaking them, will be discussed later.



Man washing his car from a spring in Cenon.

Another detail within car culture is the parking situation in Bordeaux. Compared to other French cities, Bordeaux had been behind on a comprehensive parking plan, and neighboring communes all have different fees. This could actually be seen as a sort of hidden congestion pricing, an idea which they are not considering for the socially restrictive effects it can have, but that perhaps it is still not going far enough to encourage people to leave their cars behind.

A Ford Ranger spotted in center city. American cars are expensive and make a statement.

Finance

As a professor of economics who focuses on public transportation, Dubois had much to say on the topic of financing the system. Because the city manages public transportation, it benefits from funding which comes both from user revenues (a number which is not very significant in relation to the overall cost) and the transport payment (versement). If companies in the metropole do not put in place a transport system for their employees so they don't have to take their car, the company will pay the transport payment (Versement Transport/VT) a certain

sum which goes to public transportation. It is being revisited in the LOM, because currently it is the local authorities who can benefit from the VT, but now it will expand even to more rural communities. The money to fund transit comes from businesses, riders, and state subsidies. The problem is that these state subsidies are becoming less and less, and the rate of VT in Bordeaux reached its ceiling a few years ago. To compensate for this, the community has had to slightly increase the prices for riders. Funding becomes a problem when you try to avoid raising rider prices too much and without any more to gain from the VT. So, the options are to elicit even more from enterprises, or widen the perimeter of management of mobility to be able to allow companies to finance other communities' transport. One solution in discussion is the establishment of an urban carbon tax. Cities have less money to work with but still have to provide more options for their inhabitants are turning more and more towards BHNS/BRT because in terms of operating costs, it is much less than a tram or metro.

Ticketing machine at Place Paul Doumer tram stop. All tram stops feature at least 2 machines.

The challenge of maintaining the existing tram infrastructure is also very expensive, and it works well now, but at some point there will have to be new carriages. Funding is having to lean on local authority more than national authority. Since the financing situation seems to be getting more precarious, it is so important to think more about the mobility infrastructures that are put in place today, and how to finance them down the line too. Instead of taking on big expensive projects, there needs to be more creative thinking to find other solutions. There are many questions about where money for transportation will be coming from, but there still is so much work to do, Dubois says. She believes that the problem is that there is too much short-term thinking, and not enough to address climate and social change. She says, "there needs to be a disruption in car use, because of the strong impacts that cars have. The change has to come from the top and the bottom intersecting, citizens and politics. Everyone must meet and talk, with more coordination, and on the European level too… there is *everything* to do."

Discussion

Although there were different opinions on priority and approach, the experts agreed that improvements in transportation infrastructure that meet the needs of all populations, and are thus more equitable, are necessary to make a more accessible city. The city of Bordeaux is one of the few in France whose transportation network is actually gaining customers (and lots of them– between 2014 and 2017, ridership on the TBM network increased 19%) and actively expanding (Bordeaux Métropole, 2018). This has earned the city distinctions and praise, but has also raised some concerns for the experts at the level of planning, sociology, and economy. The attraction to the city is rearranging residents and making it harder for lower income people to stay in the city. As more people are being pushed out, towards the edges of the agglomeration, the city is scrambling to reach their mobility needs. There is an unequal amount of choice for people to move depending on the neighborhood. There is more relocation by necessity to the North East part of the agglomeration to places like Lormont, and more choice when it comes to the people relocating to the South like Bègles. This is exacerbating the existing dynamics between the left and right banks, where centuries of inequality in infrastructure persist today. There is an inequality in offers to access the job centers around the agglomeration, and less attention to safe infrastructure for pedestrians and cyclists on the right bank than the left bank. This is of note, because another French study found that, "for cyclists, the injury rates seemed higher in non-dense areas than in dense areas" (Blaizot, Papon, Haddak, & Amoros, 2013).

The Gilets Jaunes protests also play a part in the conversation on regional transportation demands. At the same time that the rising cost of living in Bordeaux pushes people out and

creates demand for a more regional planning approach, the Gilet's movement incited a new law be passed, the LOM, that reinforces the region's importance in planning to reach more people that are not in the city center. There is also a fear that Bordeaux is becoming like a new Paris, where there are stark differences in SES and opportunity between the center and periphery of the city. This kind of segregative dynamic comes with an assortment of problems, but transportation and access has been highlighted as a major way to reduce inequality.

In essence, the city is reacting using public transportation as a tool to reduce the effects of their socially and economically segregated city.

Bordeaux's growing success and popularity (A'Urba, 2017) has led to a rise in the number of newcomers and a growth in tourism that have increased demand for expanding public transportation. The city reports that from 2014-2017, the TBM network usage went up 19%, and biking up 38%. Bordeaux in 2017 was the third most congested agglomeration in France. (Bordeaux Métropole, 2018). This oversaturation of the system was evoked many times throughout the interviews, as the city keeps looking for new solutions to help this "victim of its success."

This study found that the experts were acutely aware of the challenges that come with a city that is becoming more popular and expensive to live in. The concern that the periphery inhabitants will become more and more financially challenged as the center becomes even richer is a departure from earlier studies and literature, which paint Bordeaux as a more socially mixed city. There is some conflict in the literature as to the social structure of Bordeaux. One aligns more with what my study found, and one describes the city as my interviewees said it was years ago. As earlier described, it could be called an "American city" because of its sprawl,

forever-growing autoroutes, the rich and the middle class far from the center, and the poorest within the first "ring" of the city (Victoire, 2014). My study found that this is no longer the reality of the city as it is becoming more and more like other French cities and notably the capital in terms of social segregation. Some of the literature supports this stance more, explaining that although there are neighborhoods that are not always at the same SES as their neighbors, the greatest difference in SES appears when comparing the center ring of Bordeaux and the periphery, where the center is overall much more rich than the next "ring," which is a mixed "buffer" zone of SES (Decamps, 2011) .

From my results, I found that there is a strong motivation to work on improving mobility especially for the people who live in peripheral neighborhoods and communes for the sake of offering all people the opportunity to be mobile. There is an emphasis not only on being able to give them access to job centers, but to provide inter-periphery connections that can circumvent the city center.

The effects of this rise in price and popularity are especially problematic when the periphery zone falls on the right bank of the agglomeration (César, 2019). There are already many physical and social dividers that isolate and segregate this part of the city. As neighborhoods on the right bank become more "boboisé," this pushes many people even further (Décamps, 2011). The right bank has higher and higher demands for transit options, and the current infrastructure is not enough to efficiently connect people to the many higher paying jobs, universities, and services on the left bank. This demands that other solutions are put in place, like the RER coming within the next decade, and small investments like more bus lanes, bike lanes, and pedestrianized zones.

These results also provide insight on the issue of the left and right banks of Bordeaux and their differences, which is addressed in news, planning documents, and local publications but is not as well documented in academics (Sari, 2015; Decamps, 2011). In particular, the differences in offerings in transit between the sides of the city. While experts did not all agree on the existence of certain segregative issues, there was agreement on the need for improvements in the infrastructure to keep connecting people on both sides of the river.

Cenon (right bank) street views.

This study provides particular insight on the kinds of improvements that Bordeaux has, is, and will embark on to be able to connect the city and the periphery. The new RER system was a major point that came up in the conversations, and the experts shared how this plan is a source of pride for the agglomeration. They are very interested in this idea which optimizes old infrastructure to make it new again. This project is much like the suggestions made in the LOM, which prioritizes it's rail investments in favor of projects that modernize existing networks instead of taking on new expensive projects.

In these conversations, there was somewhat of an unspoken (and sometimes spoken) common goal to reduce the cars on the street. Experts agreed that there are a lot of personal comforts in car travel, and empathize with people who prefer to drive because of habit (Elhorst, Madre & Pirotte 2020; Klöckner & Matthies, 2004), convenience, conspicuous consumption (Grescoe, 2012), control (H. Bouscasse and M. de Lapparent, 2019), and perceived safety (Rérat, 2019). While they acknowledged why many choose to rely on their cars to get around, they frequently cited that there need to be more competitive transportation options in place to convince car users to consider transit or "soft modes" ("modes doux," or walking, biking) instead. There were many suggestions in these conversations to make all transit modes more attractive and practical, because restrictions on car use cannot happen without offering alternatives. This task becomes more challenging as the agglomeration broadens its scope to accomodate more people.

The Aged

The findings are also consistent with prior research (US Department of Housing and Urban Development, 2014; Speck, 2018) that shows user preferences and demands vary greatly

by age. For example, there was a particular concern for the elderly, who said they felt unsafe while walking which was why they chose to drive. Their concerns are supported by research that finds that those 65 and over are at higher risk for serious injury while cycling, walking, and driving. They are also the most likely to be a pedestrian than any age group after ages 5-14 (Blaizot et al., 2013). In fact, there are more people over 65 in the periphery than in the center of Bordeaux (A'Urba, 2020), so this compounds with the existing issues of transportation in those areas. Some of the experts interviewed had conducted studies concerning the elderly and their transportation needs and uses, and found that their perceived lack of safety on the sidewalks and streets requires attention and infrastructure changes.

A sidewalk like this one (narrow, parked cars on it) would be hard to use for someone who has trouble walking.

Gender

While the literature has found that women experience transit in a number of different ways (Kim, 2009; Raibaud, 2015), my interviews did not explicitly touch on this subject. One interpretation could be that Dubois and Beaumont (the two women I had conversations with) addressed how they had worked on studies concerning children and the elderly and/or had personal reasons to be particularly concerned for these age groups. This uneven responsibility is in fact in line with the literature, which points out how these pressures are usually upon women (Raibaud, 2015). The men who were interviewed did not bring up gender in the conversations.

Class

Socioeconomic status is a critical part of studying public transit. Décamps (2011) studied SES segregation in Bordeaux and found that spatial mismatch in Bordeaux is represented by the five job center clusters and a regional imbalance between the right and left banks. My results discussed how most jobs in the agglomeration are concentrated in the center on the left bank of Bordeaux. This study found that the city is becoming more segregated by class, and this can be seen as a result of Bordeaux's increasing popularity.

There is a real worry that isolating neighborhoods that are in greater difficulty intensifies class segregation dynamics. In the neighborhoods to the northeast, where distance from the city is perceived to be more often imposed than by choice, there was and still remains a focus on being able to offer public transportation to those communities. The literature finds that "cities with more transit choice demonstrate less income inequality and less overspending on rent"

(Speck, 2018). This also ties nicely into the theme of choice which came up frequently in the conversation with Martin.

Choice was expressed as something that all people could and should have control over when deciding their transportation mode. In a French study by Reigner and Brenac, they found that studying urban transport policies in France, the prominent narrative is of users' individual responsibility to make the most rational choice. The responsibility falls heavily on them to have "economically rational behaviours, and conveying moral injunctions for them to adopt the 'right', safe, healthy, sustainable mobility behaviours" (Reigner & Brenac 2019, p. 2018). A depoliticized policy approach, they found, leads to an increase in value and attraction to certain parts of the city while displacing problems to more disenfranchised areas. Putting responsibility of choice onto users ignores "macrosocial determinants"(Reigner & Brenac 2019, p. 2018). This is one way to interpret and critique a French egalitarian vision to planning.

Alpilles-Vincennes social housing plaza, Lormont. My colleagues and I were setting up for a community presentation of the new plans to remodel the space.

Another study finds that communities that are able to offer affordable housing and safe, convenient ways for people to meet their needs using transit or soft modes, can "help reduce households' transportation costs, connect workers to jobs, and facilitate upward mobility" (US Department of Housing and Urban Development, 2014). This is seen in action on the right bank, where the tram was installed specifically to be able to connect the right bank, where there is a much higher percentage of public housing than on the left bank (Sari, 2015). From a personal example, one of the places I worked this summer was a public housing complex in Lormont (a commune frequently mentioned when to represent the right bank) and it was located just 140m away from a tram stop. It's also important to note that every tram stop is the same no matter

where it is in the agglomeration. There are machines to buy tickets, maps, and in-time arrival boards. This contrasts with what some literature found for example in Chicago, where even along the same transit line, the facilities in neighborhoods that were different in racial and socioeconomic makeup were very noticeable, The facilities in neighborhoods that were different in their racial makeup are also stark, even along the same line of transit (Purifoye, 2017).

Arrival times along tram D. Important to note that this is functioning on a Sunday morning schedule, and trams on the weekdays and saturdays run much more frequently.

Tram stops along the new line D

The connection between image and social class also came up in discussions, where the bus is a less prefered method than the tram because in part because of its lack of attractive image. This attractivity is not only because of the relative comfort of the tram, but also can be understood as a class distinction (Montgomery, 2013). Even if a bus route is more convenient for a person's trip than the tram, people gravitate towards the tram (H. Bouscasse & M. de Lapparent, 2019). Although habits are deeply ingrained, the city is ramping up infrastructure in effort to make the bus a more attractive option.

Tram stop at Place de la Bourse (used to be stock exchange, now used for different purposes). It is the only stop without signage or ticket booths. It features unobtrusive design that emphasizes cultural landmarks. .

Race and ethnicity

There is a considerable amount of literature in the United States that focuses on race/ethnicity and transportation (Covington, 2018; Speck, 2018: Kim, 2009; Purifoye, 2017). Studying transportation racism (Bullard, 2005), and the importance of race and transit is a challenge in France because collecting statistical data on race/ethnicity is not permitted. It goes against their stance of being "indifference to differences," (a phrase mentioned in the discussion with Nicholas). Their strategy is to downplay the cultural significance of people's differences to unify the nation (Simon, 2010).

> "The reason the French census only collects information on individuals' nationality and country of birth is that the model was not designed to track the pathways of immigrants from one generation to another, and it was not so designed because the understanding in France is that the integration process normatively culminates in the acquisition of citizenship" (Simon 2010, p. 160).

I asked Nicholas about his perspective on this, because of his work on race in France and elsewhere. I was curious about what he thought about this choice because race and transit is studied in an overlap oftentimes in the US (Covington, 2018) when discussing inequality, access, and a number of other issues that France is not immune to. His response was complex. He said that France prohibited it,

> "because of a republican pact, of indifference to differences, it is effectively the colorblind policy, blind to differences, we speak in principle that all that is in reference to religious affiliations, racial is of the private sector do not concern the public interest."

However, he acknowledged that,

> "it is quite complicated, I am a sociologist and ... I find it interesting the use of the figures, on race and ethnicity to have a fairer view of the statistical representation of the French population in terms of religion ethno racial 'belonging'... even if today there are things like looking at the name of the statistics on attendance Mosques for example, Muslim and black populations in fact in France too, we make do, there are alternatives, we can do without the stats…"

Ultimately, he explained that this was based on the idea that identity is a very private thing, and that it is not right to make people define their race or ethnicity based on the perspective of others and not the individual. He said that while he was working on his masters thesis, this topic came up, and that people made comments like, "physically yes I am perceived as black, but do not I define myself as black necessarily," and, "I do not consider myself black first, in fact there is something else that takes precedence over the color of my skin, in fact, above all I am French, Bordelais, or gay or LGBT, before being black."

While discussing forms of racial and social segregation in cities that are exacerbated or helped through transit, I asked Nicholas if there were any racial dynamics that were unique in any way to Bordeaux. He disagreed, saying,

> "No no, Bordeaux in terms of racism and exclusion, we are still quite protected from that, a city where there is quite a lot of co-existing, it's not bad… in addition I had launched an investigation this February on the experiences of racism and anti-Semitism in Bordeaux and it did not at all… Because there are very few answers, very very few answers, … we believe that ultimately it is because people

did not feel the need to answer because their experience of racism and anti-Semitism is very limited, or nonexistent, so.... And in Bordeaux, there is racism, sure…but it remains in fairly low proportions."

This statement does not completely align with some comments I heard from people in Bordeaux. In professional and personal settings I heard racially charged comments and assertions that were difficult to hear, and I feel it is necessary to include that in here.

Notes

In the US, the importance of funding public transportation is a more prominent part of the national conversation than it was before the COVID-19 pandemic. 2.8 million essential workers in America rely on public transportation to be able to get to their place of work. The essential need for transit is becoming more and more obvious. Congress is starting to give it the recognition it deserves as an essential service. The CARES act appoints $25 billion in direct emergency funding to transit, which is more than double what the federal government usually granst in a year. The money that agencies did receive from the federal government was only allowed to be used on maintenance and capital (building new stations or vehicles). This bill allows them to also use the funds towards operations too (Mangan, 2020). This is not to say that this bill will come close to providing all the funding that agencies need, but it could set a precedent for the future, where funding for transit is prioritized and financially recognized as a vital service (TransitCenter, 2020).

Across the country, streets are being closed off to cars, and people are beginning to see streets as the public land that they really are. This experience could have lasting effects after the

pandemic, and people may advocate to keep streets car-free. This is a possibility that is being discussed currently in Paris. Mayor Anne Hidalgo said that Paris will not be returning to it's normal car-dominated state once lockdown starts to lift on May 11th. She is making this decision for traffic reduction as well as for public health, because air pollution has been found to increase the chance of Covid-19 fatality (O'Sullivan, 2020).

Bordeaux is working on their strategy for "déconfinement" too. Currently 98 of their 423 buses are in circulation during the confinement period, and 30 of their 130 tramcars (Géa, 2020a). TBM is using their Mobibuses, usually an on-demand system for people with reduced mobility, to provide free and on-demand transportation for healthcare workers (Géa, 2020b).

Bordeaux has historically strived to use transportation as a way to connect people who need it most– starting with the tram at the turn of the millenium. But with that success came new challenges that many cities could learn from. Bordeaux is a rare example of a city which is gaining transportation ridership and facing challenges to keep up with the demand. One phrase that was often thrown around during my week there in January was that it is a "victim of its success." The future should have different solutions than the ones they relied on 20 years ago. If transit improvements are made, there should be a consideration for the kind of ripple effects that happened after the tram. Transportation improvements need to be in coordination with other departments to ensure that the city does not become ultra-segregated socially, economically, or culturally. Providing more social housing that is woven into the existing city landscape is one example that has already been playing out in the currently-gentrifying neighborhood of St. Michel. Regional cooperation will also need to be a priority in the future of transportation for the métropole. The city and the surrounding areas have changed so much over the past 5, 10, 20

years, resulting in a need for more regional actors to be brought into the process as the city continues to improve their network.

If I were to continue this work, I would incorporate user voices into the conversation. I would talk to people on the trams, buses, on the street. I'd be very curious to see what narratives emerge based on transit mode, and by gender, class, neighborhood, race, age, and perhaps even identities that I hadn't considered to include in this study.

The conversation on transportation is always evolving, always moving forward. Frequently considering the physical and social infrastructure of a city will continue to be a crucial part of improving landscapes for all people.

Bibliography

Attoh, K. (2017). Public transportation and the idiocy of urban life. *Urban Studies, 54*(1), 196-213. doi:10.1177/0042098015622759

Blaizot, S., Papon, F., Haddak, M. M., & Amoros, E. (2013). Injury incidence rates of cyclists compared to pedestrians, car occupants and powered two-wheeler riders, using a medical registry and mobility data, rhône county, france. *Accident Analysis and Prevention, 58*, 35-45. doi:10.1016/j.aap.2013.04.018

Bleich, E. (2001, May 1). Race Policy in France. Retrieved from https://www.brookings.edu/articles/race-policy-in-france/

Bordeaux Métropole. (2018). *Plan d'Urgence Mobilité de Bordeaux Métropole.* Bordeaux, France. Retrieved from: https://sedeplacer.bordeaux-metropole.fr/Actualites/Plan-d-urgence-Mobilite-2018-2020

Bouscasse, H., & De Lapparent, M. (2019). Perceived comfort and values of travel time savings in the Rhône-Alpes Region. Transportation Research Part A, 124, 370-387.

Bullard, R. (2005). All Transit Is Not Created Equal. *Race, Poverty & the Environment, 12*(1), 9-12. Retrieved May 2, 2020, from www.jstor.org/stable/41555221

CARES Act Funding Will Last Half as Long for Large U.S. Transit Regions Compared to Other Areas. (2020, April 28). Retrieved from https://transitcenter.org/cares-act-funding-will-last-half-as-long-for-large-u-s-transit-regions-compared-to-other-areas/

Carte de la Métropole. (n.d.). Retrieved from https://www.bordeaux-metropole.fr/Metropole/1-metropole-28-communes/Carte-de-la-Metropole

César, N. (2019, July 8). Immobilier : à Bordeaux, la chute des prix se confirme. Retrieved from https://www.sudouest.fr/2019/07/08/immobilier-a-bordeaux-la-chute-des-prix-se-confirme-6310955-4689.php

Chiffres clés du territoire. (2020, April 28). Retrieved from https://www.bordeaux-metropole.fr/Metropole/1-metropole-28-communes/Chiffres-cles-du-territoire

Comersis.com. (n.d.). Bordeaux city districts map. Retrieved from https://map.comersis.com/carte-Bordeaux-city-districts-map-cm4f505f7a4.html

Covington, K. L. (2018). Overcoming spatial mismatch: The opportunities and limits of transit mode in addressing the black-white unemployment gap. *City & Community, 17*(1), 211-235. doi:10.1111/cico.12278

Creating Connected Communities: A Guidebook for Improving Transportation Connections for Low- and Moderate-Income Households in Small and Mid-Sized Cities: HUD USER. (2014, June 30). Retrieved from https://www.huduser.gov/portal/publications/commdevl/connecting_communities.html

Curl, A., & Mason, P. (2019). Neighbourhood perceptions and older adults' wellbeing: Does walking explain the relationship in deprived urban communities? Transportation Research Part A, 123, 119-129.

Décamps, A. (2011). *La dynamique de la ségrégation urbaine à travers l'évolution des profils de quartiers : étude sur l'agglomération bordelaise*. Paris: Armand Colin. doi:10.3917/reru.111.0151 Retrieved from https://www.cairn.info/revue-d-economie-regionale-et-urbaine-2011-1-page-151.htm

Deymier, Ghislaine. (2013). Formes urbaines et coût de la mobilité : une approche à partir du Compte Déplacements Territorialisé de l'agglomération bordelaise. Les Cahiers scientifiques du transport. 64. 61-90.

Elhorst, J. P., Madre, J., & Pirotte, A. (2020). *Car traffic, habit persistence, cross-sectional dependence, and spatial heterogeneity: New insights using french departmental data*doi:https://doi.org/10.1016/j.tra.2019.11.016

"France and the Unknown Second Generation", *International Migration Review*, *37*, 4, pp. 1091-1119.

Freeman, L. (2001). The effects of sprawl on neighborhood social ties: An explanatory analysis. *Journal of the American Planning Association, 67*(1), 69-77. doi:10.1080/01944360108976356

Géa, J.-F. (2020, April 9). Coronavirus et transports en commun : questions autour de la fin du confinement. Retrieved from

https://france3-regions.francetvinfo.fr/nouvelle-aquitaine/coronavirus-transports-commun-questions-autour-fin-du-confinement-1813408.html

Géa, J.-F. (2020, April 9). Coronavirus : un service de transport à la demande et gratuit pour les soignants de Bordeaux-Métropole. Retrieved from https://france3-regions.francetvinfo.fr/nouvelle-aquitaine/gironde/bordeaux/coronavirus-service-transport-demande-gratuit-soignants-bordeaux-metropole-1813422.html

Goodyear, S. (2015, January 30). More Women Ride Mass Transit Than Men. Shouldn't Transit Agencies Be Catering to Them? Retrieved from https://www.citylab.com/transportation/2015/01/more-women-ride-mass-transit-than-men-shouldnt-transit-agencies-be-catering-to-them/385012/

Grescoe, T. (2012). *Straphanger : Saving our cities and ourselves from the automobile* (1st ed.. ed.). New York: New York : Times Books/Henry Holt.

Khanna, M., A.I.C.P. (2020). MIND THE GENDER GAP. *Planning, 86*(2), 22. Retrieved from https://login.peach.conncoll.edu/login?url=https://search.proquest.com/docview/2356654000?accountid=10255

Kille, L. W. (2017, April 6). Transportation safety over time: Cars, planes, trains, walking, cycling. Retrieved from https://journalistsresource.org/studies/environment/transportation/comparing-fatality-risks-united-states-transportation-across-modes-time/

Kim, S. (2009). Immigrants and transportation: An analysis of immigrant workers' work trips. *Cityscape, 11*(3), 155-169.

Klöckner, C.,A., & Matthies, E. (2004). How habits interfere with norm-directed behaviour: A normative decision-making model for travel mode choice. *Journal of Environmental Psychology, 24*(3), 319-327. doi:10.1016/j.jenvp.2004.08.004

Kruse, K. M. (2019, August 14). How Segregation Caused Your Traffic Jam. Retrieved from https://www.nytimes.com/interactive/2019/08/14/magazine/traffic-atlanta-segregation.html

L'a-urba – Agence d'urbanisme Bordeaux Aquitaine (2020, February). Anticiper le viellissement de la population: Un enjeu pour les quartiers de la métropole. Retrieved from https://www.aurba.org/productions/anticiper-le-vieillissement-de-la-population/

Le Blanc, J.-M. (2016, December 21). VIDEO – Quand Bordeaux inaugurait son tramway, il y a treize ans. Retrieved from https://www.sudouest.fr/2016/12/21/le-21-decembre-2003-bordeaux-inaugure-son-tram-3045556-2780.php

Les tramways de Bordeaux - première époque (1879 - 1957) - transporturbain - Le webmagazine des transports urbains. (2017, March 18). Retrieved from http://transporturbain.canalblog.com/pages/les-tramways-de-bordeaux---premiere-epoque--1879---1957-/27193513.html

Loi du 24 décembre 2019 d'orientation des mobilités. (2019, December 26). Retrieved from https://www.vie-publique.fr/loi/20809-loi-du-24-decembre-2019-dorientation-des-mobilites-lom

Mangan, E. (2020, April 14). Stop funding transit like it's 1982, Congress. Retrieved from http://t4america.org/2020/04/14/stop-funding-transit-like-its-1982-congress/

Mills, C. (1959). *The sociological imagination.* New York: Oxford University Press.

Montgomery, C. (2013). *Happy city : Transforming our lives through urban design* (First edition.. ed.). New York: New York : Farrar, Straus and Giroux.

Network maps. (n.d.). Retrieved from https://www.infotbm.com/en/use-all-our-maps/network-maps.html

O'Sullivan, F. (2020, April 29). Paris Has a Plan to Keep Cars Out After Lockdown. Retrieved from https://www.citylab.com/transportation/2020/04/paris-cars-air-pollution-health-public-transit-bike-lanes/610861/

Robert E. Park, "The City: Suggestions for the Investigation of Human Behavior in the City Environment," *American Journal of Sociology*, Volume 20, (1916): 91-96. University of Chicago Press.

Pech, O., & Lafon, C. (2013, December 18). 1830–1958 : L'ancien tram de Bordeaux, "Un tramway nommé souvenir". Retrieved from https://www.sudouest.fr/2013/12/19/1830-1958-l-ancien-tram-de-bordeaux-un-tramway-nomme-souvenir-1404703-6004.php

Pereira, R. H. M., Schwanen, T., & Banister, D. (2017). Distributive justice and equity in transportation. *Transport Reviews: Equity in Transport, 37*(2), 170-191. doi:10.1080/01441647.2016.1257660

Présentation. (n.d.). Retrieved from https://forumurbain.u-bordeaux.fr/Projet/Presentation/r1596.html

Purifoye, G. Y. (2017). Transporting urban inequality through public transit designs & systems. *City & Community, 16*(4), 364-368. doi:10.1111/cico.12266

Raibaud, Y. (2015). *Durable mais inégalitaire : la ville* [Sustainable, but Unequal: The City]. Paris: La Découverte. doi:10.3917/tgs.033.0029 Retrieved from https://www.cairn.info/revue-travail-genre-et-societes-2015-1-page-29.htm

Reigner, H., & Brenac, T. (2019). *Safe, sustainable… but depoliticized and uneven – A critical view of urban transport policies in france* doi:https://doi.org/10.1016/j.tra.2019.01.023

Rérat, P. (2019). Cycling to work: Meanings and experiences of a sustainable practice. Transportation Research Part A, 123, 91-104.

Rodgers, M. (2020). THREE LESSONS FROM THE LEADER IN GENDER EQUITY. *Planning, 86*(2), 29. Retrieved from https://login.peach.conncoll.edu/login?url=https://search.proquest.com/docview/2356669631?accountid=10255

Rousso, H. (1991). *The Vichy syndrome : History and memory in France since 1944*. Cambridge, Mass.: Harvard University Press.

Sanchez, T. W. (2002). The impact of public transport on US metropolitan wage inequality. *Urban Studies, 39*(3), 423-436. doi:10.1080/00420980220112766

Sari, F. (2015). Public transit and labor market outcomes: Analysis of the connections in the french agglomeration of bordeaux. *Transportation Research Part A, 78*, 231-251. doi:10.1016/j.tra.2015.04.015

Saksa, J. (2015, January 26). SEPTA has largest percentage of female riders – 64% - among large transit agencies. Retrieved from https://whyy.org/articles/septa-has-largest-percentage-of-female-riders-64-among-large-transit-agencies/?utm_content=buffer97258&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer

Schwabe, M. (2011). Residential segregation in the largest french cities (1968-1999): In search of an urban model. *Cybergeo,* doi:10.4000/cybergeo.24601

Simon, P. (2010). Statistics, French Social Sciences and Ethnic and Racial Social Relations. *Revue française de sociologie*, vol. 51(5), 159-174. doi:10.3917/rfs.515.0159.

Speck, J. (2018). *Walkable city rules 101 steps to making better places* (1st ed. 2018.. ed.). Washington, DC: Washington, DC : Island Press/Center for Resource Economics : Imprint: Island Press.

Stille, A. (2014, July 11). Can the French Talk About Race? Retrieved from https://www.newyorker.com/news/news-desk/can-the-french-talk-about-race

Les tramways de Bordeaux - première époque (1879 - 1957) - transporturbain - Le webmagazine des transports urbains. (2017, March 18). Retrieved from http://transporturbain.canalblog.com/pages/les-tramways-de-bordeaux---premiere-epoque--1879---1957-/27193513.html

U.S. Census Bureau QuickFacts: United States. (n.d.). Retrieved from https://www.census.gov/quickfacts/fact/table/US/PST045218

Victoire, É. (2014). *Sociologie de Bordeaux* (New Edition). Paris: Éditions La Découverte.

Yago, G. (1983). The sociology of transportation. *Annual Review of Sociology, 9*, 171-190.

Zukin, S. (1991). Landscapes of power : From Detroit to Disney World. Berkeley: University of California Press.

Appendix

La loi d'orientation des mobilités (LOM)

The LOM includes 189 articles. There are 4 main goals of this important plan. The first focuses on the need to cut out total car dependence. The law intends to remove “zones blanches” or white areas, areas where there is no coverage from a mobility organizing agency. They aim to do this by assisting territory collectives to organize services like car sharing, carpooling, and on-demand transportation. These new mobility plans that cover all forms of mobility, are to replace the existing plans de deplacement urbain (PDU) or urban travel plans. This reinforces the role of regions as real leaders in mobility. Organizing authorities of mobility are also supported in more easily providing mobility in the name of solidarity. This covers individual support for job seekers, apprentices, and work study students. The same goes for mobilizing the differently abled, through the means of better information about accessible solutions and a lower price guarantee for their companions.

The second goal is to accelerate the growth of new mobility. This is to be done by opening up expansive data on mobility across the territory by the end of 2021. Data including stops, hours, fares, and real time data like traffic and availability. This data would apply to public transportation as well as on-demand, roadway networks, and parking lots. This is to allow 100% of the information on transportation solutions to be available and easily accessible online. Automated shuttles are also authorized as of 2020. They are also exploring and developing carpooling as a solution to daily transportation issues. The text also sets out a new regulatory framework for self-service mobility offers: scooters, bikes or scooters without a docking station.

The mobility organizing authorities may introduce specifications to be respected by new operators.

The third goal is in favor of a successful ecological transition to greener mobility. They have a carbon-neutral goal for all land transport by 2050 is included in the law. Along with this is a ban on producing cars that run on fossil fuels by 2040. A bike plan is being implemented to triple its use by 2024. There is a new fund to create better biking infrastructure, fix bike paths, and prevent bike theft. The law also favors electric vehicle use by setting the goal of installing five times the amount of public charging stations by 2022. A sustainable mobility package to replace the bicycle kilometric allowance was introduced. It allows employers to pay up to 400 euros a year to employees who commute by bike or carpool. It can be paid using a "un titre mobilité," like a restaurant title (which is like a lunch voucher provided by employers for salaried employees only). The state will generalize this package to its agents in 2020, up to 200 euros per year. Local volunteer authorities can deploy low emission zones (ZFE). Access to these zones is reserved for less polluting vehicles and works with the Crit'air sticker system. Local authorities can define the terms of access to these areas: geographic perimeter, vehicles concerned, hourly and daily terms.

The fourth and final goal is to program investments into transportation infrastructure. The state has programmed 13.4 billion euros into investments in transportation infrastructure by 2022, and 14.3 billion spread out from 2023-2027. Three quarters of the investments between now and 2022 are dedicated to rail transportation. These investments are reoriented in favor of daily transportation more than big new projects: maintenance and modernization of road networks, existing rail and river networks, desaturating major railway nodes, opening up roads in

medium cities and rural territories… etc. Finally, the law contains different measures to ensure the proper functioning of the transportation sector. It makes drivers licenses more accessible and focuses on road safety (Loi du 24 décembre, 2019).

Abbreviations and key terms

Bordelais: people from Bordeaux

BHNS Bus de Haut Niveau Service: BRT Bus Rapid Transit

TBM: Transports Bordeaux Métropole, public transportation system

Bordeaux Métropole: 28 municipalities including the city of Bordeaux. Also referred to as the agglomeration.

Right bank municipalities in métropole: Bordeaux La Bastide neighborhood, Bouliac, Lormont, Cenon, Floriac, Artigues, Carbon Blanc, Bassens, Saint-Vincent-de-Paul, Saint-Louis-de-Montferrand, Ambarès et Lagrave, and Ambès.

Left bank municipalities in the métropole: Bordeaux, Parempuyre, Blanquefort, Bruges, Le Bouscat, Talence, Bègles, Villenave d'Ornon, Gradignan, Pessac, Mérignac, Le Haillan, Eysines, Le Taillan-Médoc, Saint-Aubin-de-Médoc, Saint-Médard-en-Jalles, and Martignas-sur-Jalle.

RER: Réseau Express Régional (Regional Express Network)

SES: Socioeconomic Status