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CYCLING AND WALKING AS MEANS OF TRANSPORT
CURRENT REVIEW OF THE RESEARCH

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REVIEW OF THE RESEARCH ON CYCLING AND WALKING AS MEANS OF TRANSPORT

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Introduction

Recent surveys by the Mobile Lives Forum show that around 30% of the French population live locally, yet many trips under 5 km are made by car. There is therefore huge potential for a modal shift to active modes of transport (Kaufmann et al. 2020, Héran 2021). The purpose of this research note is to provide a thorough understanding of this paradox. It aims to explore, through a detailed overview of the current research in social sciences and urban planning, the ingredients that are likely to enable people to lead lifestyles in which walking and cycling are more regularly practised as a means of transport in daily life. This review allowed us to identify research questions that have already been well studied, as well as some blind spots. It led us on a journey through Europe, in particular Scandinavian countries, but also North America and Latin America where numerous studies are carried out, as well as Japan, a pioneering country in terms of research on walking and cycling.

Walking is now the most common mode of urban travel in the world, on all continents except North America (Aguiléra and Guébert, 2014). In major American cities, the modal share of walking in terms of the number of trips is 1 to 4%, while in some European cities it sometimes exceeds 40%. In France, around a quarter of local trips are made mainly on foot, with an average duration of 14 minutes per trip (Ministry of Ecological Transition, 2019).

However, the modal share of walking remains hard to observe, quantify and compare, because it is often embedded in mobility loops that involve the use of other means of transport. Walking is often still not seen as a real mode of travel, given how natural and obvious it is. Distances covered on foot are generally hard to measure, even by pedestrians themselves. Recreational walking, on the other hand, is easier to categorise and measure. Indeed, data on this kind of journey on foot is more regular and reliable than data on daily and more utilitarian trips.

Cycling, which is the alternative to walking in terms of active mobility, can be more precisely quantified. It is much easier to identify a bike trip, its distance and its travel time, and therefore to enter and report it in statistics. This is probably linked to the fact that this type of movement requires a vehicle, which consequently leads to a greater awareness of the trip.

The modal share of cycling has had a completely different history to that of walking. Following the generalisation of bicycles at the end of the 19th century, linked to industrialisation and a concomitant decrease in price, cycling grew in popularity up until the post-war period - coinciding with the rise of cars - when suddenly it practically disappeared from cities. For example, in Sweden, the modal share of cycling by number of trips went from 80% during the Second World War to less than 1% in the 1970s (Emmanuel, 2010).

Over the last three decades, cycling has nevertheless experienced significant growth, according to figures drawn from international and historical comparative studies (Buehler, et Puecher, 2021 ch. 1). Between the beginning of the 1990s and the middle of the

2010s, the modal share of cycling tripled - and even quadrupled in some American cities, such as Boston, New York, Chicago and San Francisco. It has also dramatically transformed mobility practices in some Latin American cities, including Santiago de Chile (twice as many trips by bike), Buenos Aires (six times as many) and Bogota (eleven times as many). We find a similar phenomenon in many European cities, such as Paris, Seville, Valencia, London and Vienna, where cycling remained marginal until recently but is now becoming an important part of people's mobility practices. Amsterdam, Copenhagen, and even some Japanese cities that are pioneers in the field, continue to see increasing numbers of kilometres travelled by bike. Finally, as far as France is concerned, it should be noted that cycling has been on the rise for several years (Héran 2019) and it now represents almost 3% of trips and 1% of kilometres travelled in people's daily lives at the national level (figures from the 2019 Personal Mobility Survey, in French: *Enquête mobilité des personnes*, or EMP).

While these statistics reflect the general development of cycling, other figures reveal a growing diversification in terms of cycling purposes and profiles. While in North America, cycling trips are still mainly performed for leisure, in Europe, utilitarian motives are much more common (Buehler and Pucher, 2021, ch.2). A recent international comparative study found that commuting to work currently accounts for nearly 60% of bike trips in the 35 cities studied, and 40% within urban areas in the 11 countries being compared (Goel et al. 2021). The researchers also observed that, in contexts where the practice of cycling was more widespread, there was a greater balance in terms of motives for cycling (work-related or not).

The aim of this note is not to provide an exhaustive survey on these topics, but to offer an overview of the current knowledge on the matter, of avenues worth exploring in the future and of some more controversial topics, with a particular focus on sociological aspects related to these modes of travel. A great deal of research has been carried out on cycling and walking in recent years, but mainly in disciplines similar to engineering and operational research. We have opted instead to focus our attention on comprehensive and experiential approaches to cycling and walking, i.e. from the standpoint of geography, sociology, public health and traffic accidents, as well as ergonomics and urban planning. This document is organised by themes.

The first two themes are dedicated to cycling and to the different profiles of cyclists. The next two themes (3-4) focus specifically on walking. Finally, themes 5-8 question different facets of these two active modes. In a short conclusion, we identify some themes that have been neglected by research but that are still important for promoting the practice of walking and cycling, even more so in the years to come.

Theme 1: Lifestyles and bike use

According to recent research, cycling can allow us to break out of the car paradigm by reinventing our relationship to the world. It therefore offers a way to change values and foster a new relationship with proximity and rhythms of life. What is the nature of the transformations currently under way? Who is leading them?

Cycling is slowly becoming part of urban lifestyles but it is also the subject of many citizen mobilisations. According to academic research, several reasons explain this phenomenon.

Socialisation

The first aspect relates to socialisation. At the level of primary socialisation, riding a bicycle during adolescence promotes the acquisition of enduring positive attitudes towards cycling as well as high levels of cycling skills (Thigpen and Handy, 2018; Thigpen, 2019). These are two aspects associated with choosing to travel by active modes rather than by car (Abasahl, Kelarestaghi, and Ermagun, 2018) and with the more frequent practice of cycling (from Geus et al., 2007).

In terms of secondary socialisation (in adulthood), cycling has become the preferred expression of a certain lifestyle, with the bicycle strongly associated with the idea of sustainable mobility. A whole world of organisations and associations has appeared around promoting cycling as a means of transport in daily life, gradually bringing users together. These communities are organised around "DIY" repair stations and thereby also attract handy people who practise self-repair (e.g. Rigal, 2021). There is also another more formal community that is structured around measures to (re)integrate vulnerable young people into the labour market, such as professional opportunities in cycling workshops created for this purpose. Cycling is clearly becoming a multifaceted political object that encapsulates the desire for a circular economy, for more inclusive cities and mobilities, as well as anti-capitalist demands (Gillot and Rérat 2022).

For several years, the primary and secondary socialisations of young urbanites have been marked by these pro-cycling mobilisations. In particular, Critical Mass demonstrations, during which hundreds if not thousands of cyclists take possession of the streets to demand a more equitable sharing of roads, have become spaces for young people to become politicised, thus making them more open to other kinds of movements.

The transformation of user attitudes

A second aspect is the transformation of attitudes towards using different modes of transport, favouring of cycling. The image and use of cycling has greatly changed over the last twenty years. Cycling is no longer seen as simply a leisure activity but has become a means of daily transport — one that is healthy and good for the environment. As a result, it generally enjoys a very positive image, with the only downside being the risks

involved (in France and Switzerland) (Kaufmann 2021). Beyond these positive views, however, in southern European countries (including France), cycling is now a highly divided means of transport, both spatially and socially, between young and educated urbanites who enjoy cycling on the one hand and disadvantaged urban populations who rarely use it on the other. Moreover, in peri-urban and rural contexts, cycling remains marginal, regardless of social category or age. These social gaps are also found on other continents, like Latin America, where cycling has experienced significant growth over the last two decades, particularly in Mexico, Argentina and Colombia (Pardo et al. 2021)[1]. The popularisation of cycling is especially impressive among commuters (Useche et al. 2021).

In Bogotá, a major pioneer of active mobility in South America, this increase in cycling can mainly be attributed to the creation of a cycling culture, linked to citizen movements and proactive public policies (Rosas-Satizábal and Rodriguez-Valencia, 2019). However, it is worth noting that citizen-led cycling movements are mainly found in cities and led by young and educated individuals, showing that cars remain an important marker of social status in this region of the world. Investments in cycling infrastructure tend to be concentrated in middle- and high-income neighbourhoods (Pardo et al. 2021; Parra et al. 2018). Numerous research studies suggest that by massively developing dedicated infrastructures (especially outside the centres), by ensuring their safety and by seeking to meet the aspirations, needs and lifestyles of population groups who are still reluctant to cycle, we can overcome these differences, as the situation in northern European countries suggests.

Dutch, German, Danish and even Japanese cities — small and large (Pucher and Buehler, 2012, ch. 15) — are often cited as models. They are a source of inspiration for cycling urbanism. However, we should not forget that in these cities (at least, for the European ones) as in the rest of the continent, cycling dropped dramatically during the 30 years of economic boom after the end of the Second World War, in favour of cars and motorised two-wheelers. The current situation owes nothing to chance, nor to a particular geographical context, nor even to cultural predisposition (as Pucher and Buehler, 2012 point out, without exploring this further)[2]. First and foremost, it is the result of over forty years of demands voiced by citizen movements (for the Netherlands, Dekker 2021) and of an integrated and coherent policy to promote cycling and walking (Rérat 2019, p. 10). However, it remains hard to differentiate the respective impacts of physical interventions (cycleways, signage, crossings, parking spots) and incentive measures (education, promotion, financial contribution, temporary closures) on the promotion of cycling in these exemplary regions (Forsyth and Krizek 2011). More and more researchers agree that the success of certain policies depends primarily on the multiplication of measures at these different levels. Several studies also show that a policy to promote cycling is much more

[1] It should be noted that Brazil remains a country where cycling remains a marginal mode, with a modal share around 1%, which is comparable to the United States (Goel et al. 2021)

[2] Garrad (2021) identifies a cultural difference between the Netherlands and the Anglo-Saxon countries in bicycle use with regard specifically to functional or utilitarian trips. Koglin, te Brömmelstroet and van Wee (2021) also note that the post-war decline of cycling was however less pronounced in Copenhagen and Amsterdam than in other European cities. They also claim that in these cities, cycling has always attracted a diverse population — in terms of gender, age, and income.

effective when it is accompanied by measures that discourage car use (Hull, 2010; Berent & Yoshida, 2017; Pucher and Buehler, 2008; Pucher, Dill, & Handy, 2010) and when a modal shift to public transport is facilitated. Finally, we can point out that the proportion of bicycle trips in the cities at the forefront of cycling urbanism – such as Copenhagen and Amsterdam – has continued to rise considerably over the past three decades[3] thanks to continuous pro-cycling policies and significant investments to accompany them (Pucher, Buehler, 2021; Koglin, te Brömstromelet et van Wee 2021).

Although cited less frequently, Japan is nevertheless a pioneering country in terms of cycling. The mass adoption of cycling was not the result of national or local pro-cycling public policies, but rather it emanated from a particular sociocultural context in which cycling is particularly valued (Steele, 2012; Martial et al. 2019; Lagadic, 2022). Japan is unique in that the majority of cyclists are women (Goel et al., 2021), and this is despite the absence of high-quality infrastructure dedicated to cycling and despite the continuing unequal distribution of household tasks between men and women; these two elements are usually decisive factors for an egalitarian practice of cycling (see on this subject, Theme 2, section "Gender"). In Japan, the main purposes of trips performed by bicycle are of a private nature, often related to childcare (Lagadic 2022). This distinctive feature of Japan confirms the relevance of conducting comparative studies to understand the potential drivers for promoting cycling in different geographical and sociocultural contexts.

Road planning

A third aspect relates to how road infrastructure and layout encourages cycling. There is already extensive research on cycling infrastructure and experience shows that to increase bicycle use, cycling networks with high quality infrastructures are needed (Dill and Carr, 2003; Akar and Clifton, 2009; Schoner and Levinson, 2014). Cycle paths that are separated from car traffic or that are even on dedicated lanes are more reassuring and play a decisive role in popularising cycling (Gårder, Leden, and Pulkkinen, 1998; Howard and Burns, 2001; Habib et al., 2014; Pucher and Dijkstra 2000; Pucher and Buehler 2008). These distinct and secure infrastructures are crucial for promoting cycling among non-cyclists, especially women, senior citizens, and children (Dill 2009; Pucher and Buehler, 2012, ch. 15; Furth 2011; Elvik 2021; Aldred et al. 2017; Winters and Zanotto 2017). Cyclists also tend to prefer routes on dedicated paths, rather than shorter alternative routes (Lu, Scott, and Dalumpines, 2018).

In response to the Covid 19 pandemic, many cities and urban areas in Europe established infrastructures and measures inspired by tactical urbanism, to promote mobilities that facilitate social distancing and to avoid increasing the use of private cars. These observations form the starting point of a research project that several EPFL research laboratories carried out during 2021 (Fritz et al. 2022). The goal of this project was to

[3] In Copenhagen, bike trips increased from 22% to 29% between 1995-2016. In Amsterdam, they increased from 21% to 31% between 1990 and 2017.

analyse how an urban planning approach based on temporary and small-scale interventions, deployed in a crisis context, can advance more long-term policies aimed at decarbonising mobility, and thus open up perspectives and opportunities for a transition towards urban sustainability. The study, focused on Geneva and Lyon, demonstrated that cycling infrastructure implemented during the Covid pandemic allowed new practices to emerge and to be maintained in the long term, particularly in Lyon where these measures were ambitious (Meinherz et al. 2022).

Furthermore, the proximity of self-service bike stations combined with the availability of bike paths augments people's motivation to cycle (Dill and Voros, 2007; Faghih-Imani and Eluru, 2016; Kabak et al., 2018). For some authors, identifying these links shows the importance of introducing a new planning model based on cycling urbanisation. According to Rérat (2019, p. 9) "cycling urbanism includes methods, infrastructures and amenities (hardware) as well as measures aimed at legitimising cycling in the mobility system (software)."

Residential location

Cycling as a means of everyday transport remains largely an urban practice. As an exception to this rule, the proportion of cycling trips is almost identical in suburban peripheral areas, small towns and villages as it is in the centre of large cities in Germany, Austria, Switzerland or even the Netherlands (Buehler et al. 2017). However, the type of urbanisation at play generally appears to be an important differentiating factor (Heinen, van Wee and Matt 2010; Buehler and Pucher 2021 ch.2; Koglin, te Brömmelstroet and van Wee 2021). Many authors agree that the density and diversity of urban fabrics, and indeed the distances that need to be covered, play an important role in how likely a person is to ride a bike. But this modal choice also depends largely on socio-economic factors. In this context, the exact role of the built environment in modal choices remains hard to measure (Krizek, 2012).

While there are indeed many studies on the influence of the built environment on active mobilities, Franck Hess' thesis shows that we cannot rely on this alone to significantly increase the use of active modes among the population. This is because — especially in the suburbs — we observe that peoples' attitudes modulate the influence of the built environment on active mobility. He concludes that, in order to fully understand people's mobility behaviours, we must consider both the built environment and people's attitudes simultaneously (Hess, 2018).

Proximity to green spaces and leisure areas, schools, universities, museums, shopping centres, sports areas, restaurants, hotels and transfer hubs also favours the use of self-service bicycles (Kaltenbrunner et al., 2010; Kabak et al., 2018; Wang et al., 2018). People therefore have varying degrees of accessibility depending on where they live. However, the trend (in developed countries) to expand self-service bike stations into disadvantaged neighbourhoods (Buck et al., 2013) can significantly increase cycling in these areas (Goodman and Cheshire 2014).

Finally, it has been observed that, depending on the geographical context, individuals perform trips that vary greatly in terms of distance (Pucher and Buehler, 2008). A recent comparative study conducted by an international group of researchers (Goel et al. 2021) nevertheless showed that 50-60% of trips (all modes combined) were less than 5 km. The question of local urban living, which is enabled by a dense and diverse fabric, remains a key factor worth leveraging to promote active modes.

Theme 2: Cycling and social differentiations

Many studies show the ambivalence with which cycling is perceived, alternately seen as a leisure and a transport mode, sometimes viewed as a poor person's vehicle or on the contrary as the positive expression of a young and environmentally sensitive lifestyle. How are cycling differentiations expressed according to social environments and socio-demographic categories? What are the different profiles of cyclists today and what are their respective needs?

Before getting to the heart of the matter, we must first note that in France, nearly one in two individuals aged 15 or over do not own a personal bicycle[4]. And among those who do, only 61% of those bicycles are in good working order (Active Mobility Observatory, 2013, p. 3). In addition, 6.1% of French people say they do not know how to ride a bike and 15.6% admit to not knowing how to use it properly (Active Mobility Observatory, 2013, p. 4). According to France's 2019 Personal Mobility Survey, 2.6% of local trips prior to Covid were mainly carried out by bike. Cycling seems to be more sensitive to seasons and terrain than walking; it is also more used more in cities that have cycling infrastructures.

In terms of differentiating factors for bicycle use, research shows that age, gender, social position and cycling skills are powerful markers.

Age

Overall, senior citizens represent a small proportion of cyclists on an international scale. However, some studies show that the age-related decline in cycling occurs later in life in places with a well-established cycling culture, such as in the Netherlands, where the drop-off in cycling is only noticeable at the age of 70 (Götschi et al., 2015, Goel et al. 2021). According to Goel et al, this phenomenon is even more pronounced when making comparisons at the national level (rather than between cities), which suggests that cultural factors play as important a role, if not more so, than cycling infrastructure at the local level. However, there is a wealth of evidence that physical exercise, such as practising an active mobility, has health benefits for senior citizens who suffer from cardiovascular diseases, diabetes, dementia, loss of balance or social isolation, among others. Older cyclists are generally put off by uphill slopes as well as by high traffic volume and/or speed (Misra and Watkins, 2018). Their tolerance threshold for risk — whether real or perceived — associated with cycling is also lower. But if their safety and comfort are ensured, they are able to cycle well beyond the age of 65 (Pucher and Buehler 2012 ch.1, Garrard et al. 2021). The recent development of bikes that are more adapted to their needs (electric bikes, tricycles, Sofie e-bikes) also encourages this growing segment of the population to travel in this way (Garrard et al. 2021).

[4] In comparison, 80% of the Danish population owns a bicycle (Nielsen et al. 2013; Nielsen and Skov-Petersen 2018).

The issue of safety is also an important barrier to cycling for children. For a child, learning to ride a bike is beneficial on various levels, in particular because it gives them more independence and widens the perimeter of where they can travel. Cycling, as a physical activity, also has health benefits for children and adolescents, who increasingly suffer from problems associated with a sedentary lifestyle.

However, in most countries, cycling among children and young people has been declining for several decades (McDonald, Kontou and Handy, 2021, Schmassmann, Baehler, Rérat, 2019). With regard to children's utilitarian trips such as commuting to school, parental motorised transport is increasingly replacing active modes, for multiple reasons such as security, privacy, time pressure on families, or the networks of daily life (European Commission 2002; Fotel and Thomsen 2003). Fortunately, despite this growing trend, walking and cycling remain, for now, the main means of transport for children for these trips. In some countries or cities that have invested massively in cycling policies, we even find that more children cycle to school than walk (McDonald 2012).

However, numerous studies point to an increasingly late onset of independent active mobility — i.e. not supervised by an adult — in several western European countries over the last few decades (O'Brien et al. 2000; River 2016; Shaw et al. 2013; Skår et Krogh 2009). Securing and improving children's cycling journeys, through adapted facilities, good quality cycling networks throughout the neighbourhood, and awareness-raising programs, could help reverse this trend. Temporary measures, such as making certain roads leading to schools pedestrian-only at peak hours, or supervised trips such as Barcelona's Bicibus, can also encourage cycling among young people. Other factors, such as topography or distance, are significant barriers to practising an active mode for children and are harder to overcome (Mc'Donald 2012).

Finally, from around the age of 10, trips made by children seem to be influenced by what is in fashion. Thus they will gladly experiment with scooters, skateboarding (or other kinds of boards), roller skates, etc. Children therefore learn to master different uses of public space, becoming familiar with the pleasure of actively moving around.

Gender

But age alone does not determine the potential for cycling. Indeed, apart from senior citizens and children, women are among the groups who are most concerned with safety issues and risks associated with road traffic (Garrard, Rose et Lo 2008; Garrard, Handy and Dill 2012; Aldred and Crossweller, 2015). Perceived dangers include traffic hazards, as well as the risk of assault (Garrard, Handy, and Dill 2012; Garrard, Crawford, Hakman 2006; Emond, Tang, and Handy 2009), which is a major obstacle particularly in South American and Indian cities (Pardo et al. 2021; Pucher et al. 2021; Pucher et al.2007; Rathi 2017). The discrimination and criticism directed at cyclists in general and even more so at female cyclists, and to the manner in which they cycle (slow, insecure, taking up too much space, etc.) also factor into their hesitation to opt for this mode of transport (Carrard, 2021).

Significantly more women than men never learn to ride a bike, and those who have access to one, on average, learn to ride at a later age (39.8% learn before the age of 6 compared to 47.2% for boys) (Active Mobility Observatory, 2013). This discrepancy is compounded by the fact that considerably more women quit cycling during adolescence (Bonham and Wilson, 2012; Goddard and Dill, 2014; Underwood et al., 2014; Sayagh, 2018). Teenage girls are more subject to injunctive social norms, pressuring them to take care of their appearance, to avoid physical activity and risky behaviours, and to shun travelling alone or venturing outside. As a result, they do not have the same opportunities for cycling as boys (Sayagh, 2018; Horton 2007; Jacobsen, Raccioppi, and Rutter 2009, Whitehead and Biddle, 2008). More generally, women feel more embarrassed than men with regard to cycling: their hair gets messed up in helmets, their skirts get caught in the chain or are too revealing, female body odours are less acceptable, etc. According to Jan Garrard, a specialist on the subject, the effects of sociocultural influences on women's bicycle use remains insufficiently addressed in scientific research (Garrard, 2021).

The general modal share of cycling also plays an important role in the proportion of women cyclists. In particular, recent international comparative research shows that women are just as likely as men to cycle in cities and countries where the modal share of cycling is high[5] (Goel et al. 2021, Buehler et Pucher, 2021 ch.2). Several researchers have thus observed a higher proportion of women cyclists in central and northern European countries (the Netherlands 54% in 2016, Denmark 52% in 2017, Sweden 50% in 2014, Germany 49% in 2017), as well as in Japan (55% in 2015), which are pioneers in terms of cycling facilities and policies (Buehler and Pucher, 2021, ch.2). In general, comparative studies show that contexts where the modal share of cycling is high are also those with a greater diversity of cyclist profiles, whether in terms of gender or age (Götschi et al., 2015; Goel et al. 2021)

Other studies show a direct correlation between the quality of cycling facilities and the proportion of female cyclists (Grudgings et al., 2018). These findings show that the presence of bike-friendly infrastructure has a direct impact on women's appropriation and practice of this mode of transport. However, this infrastructure has to be adapted to their needs. Indeed, the development of cycling infrastructure cannot be directly correlated with greater diversity among users (Aldred et al 2016). Women do not behave in the same way as men and therefore do not have the same preferences when it comes to cycling facilities (Dill and Gliebe 2008; Garrard, Handy and Dill 2012). In particular, they tend to make shorter and more complex trips than men (Garrard, Rose, et Lo 2008; Gossen and Purvis 2005, Sersli et al. 2020, Ravensbergen et al. 2020) and are less likely than men to cycle for commuting purposes, such as going to work (Krizek, Johnson, and Tilahun 2005; Tin, Woodward, Thornley, and Ameratunga 2009). The question of cycling at the scale of the neighbourhood and of local cycling trips therefore needs to be addressed in order to meet women's expectations (Goel et al 2021; Garrard 2021).

[5] The critical limit is around 7% of trips made by bicycle according to the study by Goel et al. In particular, the second study identifies Denmark, the Netherlands, Germany, Sweden and Japan as countries where this observation holds true. Finally, Baker (2009) claims that women can be seen as valuable indicators that an environment is favourable to cycling.

The social position

Generally, households with lower incomes and education levels have more limited access to bike-sharing services (Ursaki and Aultman-Hall, 2016; Braun et al., 2019), while regular users, who subscribe to these services, are mostly male, young, educated, professionally active and with high incomes (Fishman et al., 2014; Ricci, 2015). Also in terms of social position, we find that the gender gap described above is mitigated among people with high cultural capital, who are more likely to respond to current injunctions by deploying the bicycle as a tool for social distinction, showing respect for the environment and taking control of one's body and health (Sayagh, 2018; Biernat et al., 2018). Conversely, women from disadvantaged backgrounds, especially immigrants from developing countries, are especially likely never to have learned to ride a bicycle (Segert and Brunmayr, 2018), including in the Netherlands (Harms 2007; Martens 2013) which is one of the few countries where women cycle as much as if not more so than men (Pucher and Buehler, 2008). Notable differences between ethnic groups have also been identified in the United States where the vast majority of bike trips are performed by white Americans, as categorised by the US Census Bureau (Martens, Golub, and Hamre 2021). According to the same study, these disparities can be explained, among other things, by the fact that these different groups do not have equal access to infrastructure, wherever they live. In France, there is also a particularly strong gender gap in the most disadvantaged urban neighbourhoods (known as QPVs, for *quartiers prioritaires de la politique de la ville*), where the norms of male appropriation of public space are especially pronounced (Clair, 2008; Lapeyronnie and Courtois, 2008; Oppenchaim, 2011; CGET, 2016). Cycling as a mode of transport is very much associated with poverty and childhood. While cycling tends to promote boys' appropriation of public space, it is often unwelcome among girls and young women, whose mobility is particularly monitored and restricted (Sayagh, 2018). This finding is all the more alarming because the obesity rate is particularly high in priority neighbourhoods, and even more so among women (Jung et al., 2018).

User skills

Regardless of the demographic categories mentioned above, we must now look at the different skill levels of cyclists and their respective infrastructure needs. Some operational documents make a distinction between "experienced" cyclists, who prefer speed and are comfortable in traffic, and "ordinary," less confident cyclists (Forsyth & Krizek, 2011). In addition to these two main categories, there are children and the elderly, who have already been mentioned above. These different user groups require different cycling conditions. However, recent studies show that cycling planning policies tend to focus on "busy commuters," investing mainly in measures aimed at functionally optimising the cycling networks for these users and, in particular, by establishing fast cycle lanes (Goel et al. 2021; Forsyth & Krizek, 2011). Confirming the existence of these inequities, Roger Geller (2009) developed a typology of cyclists according to their skills and identified the proportion of each group in the cycling population in the city of Portland, Oregon:

“strong and fearless” (1%) – “enthused and confident” (6%) – “interested but concerned (60%) – “no way, no how” (33%). At the time of his study, he criticised the fact that planning measures generally focused on “enthused and confident” cyclists and therefore ignored the majority of the population. These findings should lead policy makers and planners to invest more heavily at the neighbourhood level and on school routes, but also to pay more attention to the quality of cyclist experiences, considering their full diversity.

Theme 3: The potential of walking for modal shift

Walking has significant potential for growth but is poorly analysed. We will review this topic here by focusing on the drivers that are likely to promote or discourage walking and that are not necessarily linked to road development.

In terms of orders of magnitude, walking represents between 30% and 45% of urban trips in European cities. In France, the 2019 Personal Mobility Survey shows that 23.9% of local trips are mainly made on foot, with an average duration of 14 minutes. This modal share is higher among women – at 25.8% compared to 21% for men. While the modal share of walking has increased by 3% for men over the last ten years (mainly to the detriment of cars), it has remained stable among women during the same period. More generally, the survey shows that individuals have higher levels of active mobility in dense urban environments such as city centres, "intermediate" levels in suburban and small-town environments, and generally lower levels in rural environments (Hess, 2018). In addition, individuals residing in neighbourhoods with good access to green spaces and nearby amenities are particularly likely to walk or cycle (Charreire et al., 2012). While residential density correlates with both utilitarian and recreational walking, hilly terrain plays a favourable role in encouraging recreational walking, but tends to hinder utilitarian walking (Lee and Moudon, 2006).

However, beyond these general considerations, Tamara Bozovic highlights in her thesis (Bozovic 2021) a lack of consensus in research on how the environment influences the choice to walk in everyday life. While it is understood that the same environment may be experienced differently by different people, there is a lack of research on the interaction between individual characteristics and the perceived importance of certain elements or barriers to walking. In addition, the objective and perceived characteristics of the walking environment tend to be used tautologically to describe "what matters" in order to promote walking and predict physical activity and walking. There is also little analysis of how the objective characteristics of the walking environment influence people's perceptions of *walkability* among people of different ages, abilities, and backgrounds.

While research on these aspects is still lacking, here we highlight various studies that identify levers not directly linked to road planning issues but which can be leveraged to either promote or discourage walking among certain categories of the population.

Feelings of insecurity

Several recent studies, such as Börjesson (2012) and Diaz (2021), indicate that insecurity – whether perceived or real – can be an obstacle to walking and therefore to the use of public transport. A study on pedestrians (Albrecher et al. 2022) identified three areas of insecurity: road insecurity (lack of readability, lack of clear separation and designation between pedestrians and cars, forced crossings), social insecurity (refers to other users and their real or potential behaviour) as well as the insecurity that can be conveyed by a

location's atmosphere. These aspects are greatly underestimated in modal shift policies (on this subject, see also theme 5 "The experience of walking and cycling").

In many cities in Latin America, but also in Europe, the daily practice of walking is limited by fear of assault. This phenomenon affects women more strongly but is not limited to women. It is also more pronounced in the evening and at night. This issue often remains a blind spot in policies promoting a modal shift to active modes and public transport. However, to encourage walking, policies aimed at reducing this sense of insecurity need to be implemented (Gekoski, Gray, Horvath, Edwards, Emirali and Adler 2015, Loukaitou-Sideris and Fink. 2009). In terms of urban planning, public lighting contributes to improving safety, in line with the "eyes on the street" concept according to which pedestrians should feel like they are always visible from the surrounding buildings or by other users of the public space, particularly in the event of an assault (Jacobs, 1961).

Focus: Road fatalities by mode of travel: pedestrians, cyclists, motorists

In Europe, road accidents mainly kill drivers and passengers of motorized vehicles. Cars cause 53% of fatalities, while two-wheelers cause 18%. Active modes therefore account for less than one third of road accidents, according to three recent reports compiling European statistics (Adminaité-Fodor and Jost, 2020; European Commission 2021a, 2021b[6]). Pedestrians represent about 20% of road fatalities, bicycles 8%. Concerning this last figure, and taking account of the volume of travel, it should be noted that the risk of death is three times higher when travelling by bicycle than by car.

In general, road deaths are decreasing in Europe (-23% between 2010 and 2019). While pedestrian fatalities have decreased over the past decade (as have those of motorists), the number of cyclists killed on the road remains constant. This can be explained by the fact that this mode of travel is growing rapidly, both in terms of the number of practioners and the number of kilometers traveled. For example, although the Netherlands records the highest proportion of cyclists killed (6 deaths per million inhabitants), its level of cycling is among the highest in Europe (70% of the inhabitants cycle weekly). Denmark is in line with the European average. Conversely, the countries with particularly low cycling mortality rates (Malta, Cyprus, Bulgaria, Greece, the United Kingdom and Ireland) are also those where cycling remains marginal (less than 3% cycling weekly).

It is also interesting to analyse the distribution of road fatalities from a geographical, territorial and temporal perspective. The per capita pedestrian fatality rate is very high in Eastern European countries (more than twice the average in Romania, Bulgaria, Lithuania, Poland and Latvia), while it is particularly low in northern countries (half the average in Finland, the Netherlands, Germany, Denmark and Sweden). The vast majority of fatal accidents involving active modes occur in urban areas (72% for walking and 58% for cycling), whereas for all road deaths and for all modes combined, accidents are more frequent in rural areas (53%). In terms of time of day, pedestrian fatalities are more frequent during the morning and evening rush hours than for all other modes of travel. Road fatalities are also twice as frequent in winter than in spring for pedestrians.

There is a gender difference in the profile of pedestrian victims, almost two thirds of whom are men (three quarters are men for all road accidents combined). In the case of bicycles, 80% of all

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[6] The following paragraphs are a synthesis of figures and observations from these three documents. The report by Admininaité-Fodor and Jost has the advantage of including Swiss statistics, in addition to the 27 EU member states, hence some variations in the figures.

fatalities are men. This proportion tends to decrease in countries where cycling is evenly distributed between the sexes, particularly in northern Europe. Finally, for both modes, nearly half of the deaths are among older people (65 years and older).

If we look at the victim profiles, we must also consider the causes of road deaths. 83% of fatal accidents involving cyclists are caused by motorized vehicles, whereas this is the cause of death for 99% of pedestrians. This last figure puts into perspective the tensions between active modes (bicycles and pedestrians) which rarely result in a fatality. Furthermore, only 1% of cyclist deaths are the result of a collision with another cyclist.

The fear of getting lost

The fear of not being able to find the way can be an obstacle to walking, especially when going to unknown places. To remedy this issue, research on pedestrian wayfinding was developed, integrating four processes: orientation, route planning, route monitoring, and destination recognition. Markus Kattenbeck conducts studies on pedestrian behaviour and orientation using eye tracking devices to understand how the environment influences practices (Kattenbeck, 2015). Taking an interdisciplinary approach, Manuell Ullmann (computer science), Christina Bauer (artificial intelligence), and Bernd Ludwig (information linguistics), studied the behaviour of pedestrians based on their perception of the environment and their orientation skills (Bauer, 2015; Ullmann, 2016). This work led to the development of a pedestrian navigation system called "URwalking"[7] on the campus of the University of Regensburg. This system takes into account pedestrian needs and aspirations, allowing for qualitative choices to be made (for example: choosing a sheltered path in case of rain, the shortest route, without obstacles, etc.)

While research on wayfinding focuses primarily on how pedestrians process information, the praxeological approach complements it by focusing on the sensory experience of the environment (Kazig, 2011). A recent study (Bongiorno, 2021) shows that pedestrians tend to choose the most direct route from their starting point to their destination, rather than going on a meandering journey.

Walking during childhood

It should also be noted that primary socialisation is an important element in promoting the appropriation of public spaces (Gülgönen, 2015). When children practise walking, it allows them to acquire independence and autonomy by exposing them to social life, to a changing environment, to other modes of travel, to the weather and, more generally, to the risks and pleasures of public space, the city and outdoor life (Kyttä, 2018; Tsoukala, 2007; O'Brien, 2000; Horton, 2014). Walking is not just about putting one foot in front of the other. It requires the honing of skills to manage diverse and changing situations as

[7] https://urwalking.ur.de/navi/

well as unknown terrain and paths. The demanding nature of walking is regularly noted by people who grew up in the countryside. Even experienced walkers from this category of the population can find walking in the city taxing and tiring. The sooner children learn to manage these risks and challenges, the less they will find urban walking challenging.

The desire to get by without motorised transport in daily life

In his doctoral thesis, Derek Christie (2018) describes the frequent urban walkers. Representing a small minority of the population, a few percent, these are people who have started walking rather than using other means of transport, whether mechanised (such as cycling) or motorised (such as cars or trains), sometimes to commute, sometimes for other reasons - excluding leisure walks that have no other purpose than the walk itself. These individuals walk for a long time – 45 minutes, an hour, or more per day – and do so in urban areas (Christie. 2018). What motivates their daily trips on foot? While the statistics do not provide us with the answers, Derek Christie's thesis offers several ideas. Their behaviour first of all stems from a desire to avoid driving a car or taking crowded public transport at rush hour, and instead to rediscover the pleasure of strolling on foot. They also view walking as a way to do more physical exercise, given how difficult it can be to make time for sports with the many daily demands of contemporary life. Finally, some are guided by reasons that are linked to environmental concerns, while others are more prosaically seeking to add some joy to their daily life by walking.

Pedestrian lane equipment

According to recent research, several specific amenities are likely to promote walking: benches are an essential ingredient, for various reasons linked to the social nature of the public space, to the appropriation of time and to the need to rest for an increasingly elderly population (Albrecher et al. 2022a). Promoting walking undoubtedly requires a policy that invests in benches, which are a staple of public space and yet have scarcely been studied. There is therefore a need for more research and analyses on the diversity of needs in terms of the materials and locations of benches. Not all benches are necessarily adapted to all uses and users, just as not all materials allow for the same uses. To offer benches that are adapted to all groups of users and to encourage their use, we must understand the needs in terms of models, materials and location (orientation and positioning), as well as accessibility conditions.
In the same vein, we can also look at public tables: to promote certain types of appropriation, the presence of tables alongside benches may increase a location's attractiveness. In order to adapt the pedestrian infrastructure to local users and uses, public participation seems indispensable. The EU-funded project "Citizen Bench" and its web application "hogga.me" is an example of low-threshold citizen participation combined with research (Albrecher et al., 202b).

The presence of public toilets is another particularly important amenity to encourage walking, in particular for women, children and the people accompanying them, and the

elderly. The absence of toilets, their appearance, poor maintenance and the lack of signage (whether physical or on digital tools) are all obstacles to walking for these categories of population. Clara H. Greed, one of the few researchers working on this topic, criticises the fact that these facilities are overlooked, particularly in qualitative terms, by the predominantly male committees that set public amenity standards (Greed, 1995/2003).

Theme 4: The pedestrian as a subject

Social science approaches are still poorly developed in terms of research on walking. They need to be developed because they complement engineering approaches. This section presents the social issues linked to walking and how the pedestrian is considered as a subject of research.

Utilitarian walkability

Numerous studies aimed at promoting walking focus on the potential for walking within a territory, a concept known as walkability. It is meant to restore the quality of the pedestrian environment, by highlighting possible factors that may hinder or facilitate walking.

Numerous indexes and criteria have been developed to measure walkability. Among them, the Frank Walk Index (Frank et al. 2005) is based on residential density, intersection density, and land use diversity, while Michael Southworth identifies six criteria (Southworth 2005): connectivity, links with other modes of transport, fine grained and varied land use patterns, safety, quality of paths and path context. Walkability has also become a business model: for instance, in 2007, former Microsoft employees - who were also coders and commuters - created the Walkscore app (Walkspace 2011) to offer a digital tool to help identify pleasant places to walk.

Most walkability indexes are based exclusively on digitally accessible open-source data. Often, they ignore the diversity in how individuals perceive walking conditions, both positively and negatively. Qualitative layout elements, such as the quality of the paths and of their borders, their width, their condition, the presence of seating or the available sights, are also frequently ignored in these indexes.

These indexes and functional measures are intended to be descriptive, but given the studies in which they are used, there is a great temptation to use them as factors explaining the practice of walking: does the built environment encourage frequent walking, or, conversely, does a population already willing to practise active mobility settle in neighbourhoods with a high walkability index?

Studying the subject

However, one central actor is missing from this work: the subject, the person meant to be walking. In this respect, Lucius Burckhardt, a Swiss sociologist and economist, points out that planning is never done in isolation, but is part of a social system (Burckhardt, 1979). Austrian planner Harald Frey further points out that a functionalist approach based on the implementation of technical standards does not correspond to lifestyles and aspirations of individuals (Frey, 2014). This observation clearly shows that there is a lack of research in social sciences addressing the issue of pedestrian expectations.

Ironically, the only data on individuals that is consistently documented in many countries is on mortality rates in road accidents. Interestingly, there is a lack of discussion about how the media covers road accidents according to modes, often stigmatising cyclists

and pedestrians (Fevyer 2020). Indeed, a large number of publications and data sets focus on accidents (e.g. Methorst, 2017; Schepers, 2017), allowing us to study different situations, environments and user profiles to draw lessons that are useful for designing spaces (e.g. crossroads, pedestrian crossings, etc.) and traffic regulations, with an exclusive focus on safety.

There have been other attempts to understand and measure walking using machine learning. Autonomous vehicles need to identify and predict the behaviour of pedestrians as precisely as possible to avoid collisions (e.g. Razali, 2021; Alahi, 2017). Optimising pedestrian flows in dense environments, such as train stations, has also led to research on the length and frequency of steps, the influence of the built environment and of "nudging" on pedestrians (e.g. Wernbacher, 2020; Chen, 2020). Other researchers focus on modelling crowd dynamics and pedestrian evacuation patterns (e.g., Moussaid, 2016; Helbing, 2011)

The importance of pedestrian aspirations

These highly utilitarian, quantitative, and focused views on safety concerns tend to reduce pedestrians to their physical characteristics, seeking to normalise them without considering their subjectivity. This has or will have inevitable repercussions on the future development of pedestrian infrastructure and amenities, while influencing the regulations, directives and standards that define open spaces, and the ability of future users to take ownership of them.

Several studies conducted in the fields of sport and health highlight the benefits of physical activity for the body and mind (e.g. Murtagh, 2005), warning about the consequences of physical inactivity, such as chronic diseases, heart disease, strokes, obesity, etc. (e.g. Carlson et al. 2018; Kruk 2014, Altavilla et al. 2016; Kohl et al 2012). This can be found in a number of publications on cycling, which also regularly emphasise the positive effects of active mobility.

Recently, ethnologists have taken an interest in the study of walking and pedestrians. For example, Marie Pelé and her colleagues launched a comparative study on pedestrian behaviour at road crossings in Japan and France (Pelé et al. 2017). They found great cultural and social differences, despite both countries having comparable infrastructure, legal frameworks and traffic accident rates[8]. These sociocultural differences are consistent with similar findings from comparative studies on cyclists (see theme 1) and they reinforce the need to continue exploring this area of research for all active modes of travel. Research on cultural differences in pedestrian behaviour is also relevant with regard to the development of autonomous vehicles that need to avoid collisions in different cultural environments (e.g. Hell et al. 2021). This is a start, but what about the diversity of pedestrians?

[8] 5.5 per 100,000 inhabitants per year in France, 4.7 in Japan, 30% of which are pedestrians. The modal share of walking on a daily basis in urban areas in Japan (71%) is similar to other European countries, as shown by another comparative study with Germany (80%). (Inoue et al. 2010).

To restore the diversity of the pedestrian, Jérôme Monnet calls for "demystifying the single term of "walking" that masks very different socio-spatial realities" (Monnet, 2015/2016): "walking" seems to be associated by default with "leisure-walking," as a chosen activity that is carried out for itself. It can be described in more nuanced terms: strolling, visiting, sauntering, hiking, wandering, rambling, etc. Yet, "transport-walking," which is ever-present in daily life, remains an exo-justified activity, because the reasons for engaging in it are external to it – here walking is a consequence, not the goal. According to Monnet, "leisure-walking" appeared in the 17th century, when cities were being reorganised and optimised with the physical separation of roads to prioritise vehicles, which were the tools and symbols of the elites. Intellectuals from Rousseau to 21st century writers and scientists have glorified leisure walking as a noble activity—reducing the collective representation of walking to something purely recreational. Transport walking, which is seen as a trivial and "forced" activity, has for its part been poorly documented. It is "relegated to an inferior status, unworthy of philosophical reflection, artistic representation or urban intervention" (Monnet, 2016). While there is increasing investment in amenities for leisure walking, hiking and strolling, the places meant for transport walking — which is utilitarian and essential — remain unsuited to its practice, unsafe, fragmented, cluttered and congested.

While in recent years, walking has tended to be analysed either from the standpoint of leisure or of transport, some recent research challenges this dichotomy, arguing that it does not necessarily correspond to pedestrians' real experiences, in particular women: for them, daily trips do not only serve a utilitarian purpose, they are often combined with recreational and social functions. It is therefore all the more important that daily trips offer opportunities to stop, discover, and thrive socially, culturally, and intellectually (Albrecher et al. 2022). The same applies to children, for whom the walk to school takes on a much richer value than a simple trip between two important places in their lives. This journey becomes a place of learning, that offers many opportunities to develop social, spatial and motor skills, all while gaining independence, according to the analogy provided by architect Hertzberger of a city functioning like a macro-school (Hertzberger 2008).

Obstacles to walking

Another unexplored facet of research on pedestrians concerns the great diversity of walking situations, and in particular the discomfort encountered when walking. There are different types of obstacles: they can relate to road conditions (congested sidewalks, roadworks, etc.), but also to the metrics of the built environment (nothing is within 5-10 minutes walking distance). They can relate to people themselves, whether temporarily (a broken leg) or permanently (an elderly person with reduced mobility), individually (shopping cart, suitcase) or collectively (accompanying a child). The diversity of pedestrian needs, expectations and constraints is not systematically considered, as most research and road standards are based on a stereotypical representation of pedestrians as being alone, healthy, without responsibilities (care activities) and walking recreationally; yet, this profile actually represents a minority of urban pedestrians. The notion of a pedestrian, as

a normalised individual, should be challenged by social sciences to uncover its true diversity and to measure it, in order to inform other areas of research as well as urban planning and norms.

Data and measurable criteria allow us to engage with planners and influence them. Counting pedestrians is expensive because it takes time. But importantly, a simple tally-style count will not suffice. There is still a lack of data reflecting the complexity of pedestrians' real-world experience. While counting cars is easy because they are standardised in their shape and "possible behaviours" (stops, trips, speed, interaction with the environment, etc.), pedestrians are hard to understand and describe (Albrecher et al. 2022a). Pedestrians that are excluded from one type of urban environment are by definition unidentifiable without these comparative data and contextual indexes. Counts that consider the three types of hindrances listed above would also allow us to understand which amenities facilitate, encourage or prevent walking and for what types of users, as has been the case for other kinds of practices in the public space (Curnier 2016, Curnier, 2022).

Theme 5: The experience of walking and cycling

The experience of walking and cycling is a very important theme, as it refers to the way in which users experience these practices from a sensory and social point of view. It takes on an even greater value when we consider that the planning of spaces dedicated to these active modes is usually governed by norms, rather than considering the diversity of uses and user needs.

Multisensory experiences

Several researchers have recently pointed out how literature on the promotion of cycling focuses mainly on issues of safety and network optimisation. However, the small scale of the infrastructure and the quality of the cycling experience remain poorly addressed (Silva et al 2010; Forsyth & Krizek, 2011). Some highlight the influence of public lighting, sound, vegetation and architectural quality in making the practice of cycling more pleasant, safe and comfortable, but do not go into further detail (Furth, 2021).

According to Anne Jariggeon (2021), "to envision walking as an experience means using a subjective, emotional and sensitive approach." Walking is in fact closely intertwined with social life and the activation of all the senses – sometimes rewarding, sometimes exhausting. Pedestrians are permanently exposed and may be subject to a variety of potential inconveniences (e.g. the cold, wind, noise, heat, looks from others, pollution, varying speeds, sudden movements, close proximity to others). Strength and speed are constantly at play among pedestrians, requiring each individual to persistently adapt their own movements. But because of its slow pace, walking also allows for social interactions, as well as a more intense relationship with the natural and built environment.

In an article about the promotion of walking and cycling as alternative travel forms, Robert Schneider identified "pleasure" as one of the five actionable areas to drive a major change in modes of travel (the others being supply and raising awareness, safety, convenience and cost, and finally habits) (Schneider, 2013). These themes deserve to be explored further in future research.

The sociologist Rachel Thomas (2020) has conducted many studies on the "sensory configuration" of walking. The pedestrian's configurative activity consists of associating and ultimately appropriating the resources (visual, light, sound, tactile, thermal, etc.) offered by the sensory environment. This activity allows pedestrians to decode their immediate environment, to orient themselves and finally to adapt their behaviour to urban situations. Hillnhütter (2022) quantifies the visual stimuli that pedestrians unconsciously receive from their surroundings. By analysing pedestrians' head movements, he measures the stimulation provided by urban squares and pedestrian streets. A pedestrian who is looking down is turning away from his surroundings and ignoring them. This is consistent with the empirical observations that have been carried out by Jan Gehl and his team for several years (see in particular Gehl 2010; Gehl 2011).

A subjective perception of comfort and insecurity

Walking as a mode of travel is particularly complex and demanding. The hazards and risks involved have many origins, such as the person's own body, other people, vehicles and machines (buses, cars, construction sites), weather, etc., and they require constant attention. Walking therefore entails developing protection strategies, in addition to optimising travel time. Despite the pedestrian's vulnerability, the infrastructures and facilities that support walking practices are often overlooked (e.g. neglect for the pedestrian's point of view, lack of proper signage, few benches, few shelters, lack of reliable digital navigation assistance). Travel planning is based on knowing the amount of time required and the risks associated with using a given mode of travel. With a better knowledge of one's environment (shortcuts, possibilities, risks, details, opportunities and constraints related to the chosen mode of travel and route), one can anticipate eventualities, which can then encourage walking.

The pedestrian experience also includes the notion of insecurity, which is expressed in two forms. On the one hand, there is "objective" insecurity, which is measurable and documented, such as road accidents or crime in public spaces, and which influences the pedestrian's individual experience. This form of insecurity is widely addressed in research, no doubt because of the costs these risks generate for society and insurances in particular. On the other hand, there is subjective insecurity: a more complex subject that is difficult to measure or document. So far, it has mainly been subject to qualitative research, particularly in the field of gender studies, focusing on the layout of public spaces (lighting, visibility, street fronts), their use, and the transitions with private spaces (for example: Jacobs 1992; Königseder 1999; Ruhne 2011; Albrecher et al. 2022a). The perception of safety strongly influences how walking is experienced, which routes are taken, how trips are temporally organised and even how much time is spent in public space, but above all, it impacts the modal choice of walking.

Varied experiences depending on the context

How walking is experienced depends to a large extent on the pedestrian's body, the circumstances and motives of the walk, the space-time framework, and especially on the physical environment, its layout and the other users of public space. The experience of walking necessarily varies according to the legal framework, but also according to local culture and mentalities.

Cross-cultural comparisons between Japan and Europe (e.g. Pelé et al. 2017, Hell et al. 2021) reveal differences with regard to uncertainty and risk prevention, which, according to the authors, is mainly due to different ways of relating to norms and rules. For example, in France, 41.9% of pedestrians cross at a red traffic light in a situation where other pedestrians are waiting, compared to only 2.1% of pedestrians in Japan. If the intersection is deserted, these numbers rise sharply – but relatively more so in Japan than in France, which itself reveals the influence of social pressure on pedestrian behaviour. Measures to improve pedestrian safety are often based on the three E's model: Engineering, Enforcement and Education. Pelé and his colleagues, on the other hand, conclude from

their study that the majority of factors that influence pedestrian behaviour are not environmental, but are mainly related to human characteristics that may be of a personal, social, or cultural nature. In order to reduce the frequency of accidents, it therefore seems necessary to have a better understanding of human behaviour by considering the different mechanisms at play according to gender, age and culture.

Whether a person lives in an urban or a rural environment also has an impact on how they experience walking in their daily life and leisure activities. While this observation is obviously linked to human density and to locally available amenities, some studies have shown that the pattern between utilitarian walking and recreational walking is different in the urban world and in the rural world. A North American study comparing a large city (Seattle) with smaller communities (Stewart et al. 2016) showed that people in smaller communities walked less for utilitarian reasons, but more for recreational ones. The researchers also identified differences in which factors were perceived as positive or negative when walking.

Several meta-studies analysing how the built environment influences the physical activity of adults in rural environments have also shown that aesthetics, the presence of footpaths and parks, and the feeling of safety have a positive influence on recreational walking (Frost et al, 2010 ; Saerlens et Handy, 2008). Since these qualities are generally associated with recreational physical activity, we can conclude that walking in rural areas is primarily a leisure activity (Kegler et al. 2014).

Theme 6: User conflicts between active modes

With the rise of cycling, there has been an increase in conflicts between cyclists and pedestrians, as well as with riders of electrically assisted bikes, whether they are limited to 25 km/h or 45 km/h.

Recognising the diversity of active modes

Some researchers suggest that conflicts between pedestrians and cyclists may be due to these users too often being grouped into the same category – i.e. "active modes", or "soft mobility" or even "non-motorised travel" – by planners, engineers or policy makers, even though their characteristics and needs are in fact quite different (Forsyth and Krizek, 2011). We should therefore take time to look at the commonalities and differences between both groups.

According to the researchers mentioned above and others (Muhs and Clifton, 2016; Nielsen and Skov Petersen, 2018), cycling appears similar to walking in that it is an active mode of travel, it has no age limits, it allows people to be in direct contact with the built, natural and social environment, it is fragile among traffic and sensitive to the climate, and its travel range remains relatively limited. They note, on the other hand, that cycling is different from walking in many respects: cycling makes it easier to move goods or people; it is faster, which alters one's relationship to the environment; for the same reason, cycling presents a risk for pedestrians; the directions of travel are generally spatially distinct; furthermore, cycling requires skills, which vary greatly depending on the person; in practice, bikes can go everywhere (on the road and on the sidewalk) but steps and level changes are harder to overcome; with cycling, it is more difficult to spontaneously transfer to another mode of transport in the event of a breakdown or bad weather; and finally, pro-cycling policies are more recent and remain marginal in many geographical contexts.

Focus: Accidents and injuries among pedestrians and cyclists

Accidents between pedestrians and cyclists are rarely or poorly accounted for in official statistics, representing between 1% and 6% of all road accidents in European countries (OFROU 2022 and Gesamtverband der Deutschen Versicherungswirtschaft, 2013:4-8). Accident statistics generally refer to cases recorded by the police, but the number of actual accidents is much higher. Furthermore, the criteria and sources (police or hospitals) for recording these accidents vary from country to country, making international comparisons difficult. In Australia, for example, a large proportion of incidents between pedestrians and cyclists involving hospitalisation are not recorded as "road accidents" because they do not necessarily occur on roads (Chong et al. 2010). Meanwhile, minor injuries are generally not treated medically or reported to the police. Thus, hit and run offenses – which are particularly common in accidents between cyclists and pedestrians, with, for example, 18% of cyclists in Berlin fleeing the scene (Polizeipräsident Berlin, 2013:20-22) – are missing from these statistics.

On top of these actual accidents, we should not forget all the avoided accidents, which are not documented and yet have a significant impact on people's perception of safety. A Finnish study

revealed a 1:50 ratio between actual collisions between pedestrians and cyclists and near misses (Mesimäki and Luoma, 2021).

Accidents involving a cyclist and a pedestrian are certainly less often fatal than those involving a motor vehicle, but they are more likely to result in serious injury than other accidents (OFROU 2022). According to a German study (Graw and König, 2002), the rate of injuries varies according to each party's responsibility: among accidents caused by cyclists, the cyclist is injured in 27% of cases, while the pedestrian is injured in 92% of the cases. Conversely, among accidents caused by pedestrians, the pedestrian is injured in 46% of cases while the cyclist is injured in 80% of the cases. In short, the victims of these accidents are mainly the others – and the pedestrians who are most at risk of hospitalisation after being hit by a cyclist are children under the age of 10 and elderly people over 70.

The most common injuries sustained by pedestrians mainly come from the fall that follows the initial impact with the bicycle (Graw and König, 2002) — such incidents thereby differ from accidents involving pedestrians and cars, where the collision with the car is the main cause of serious injuries (Ashton and Mackey, 1979). In a collision with a cyclist, pedestrians are more likely to sustain head trauma than the cyclist, who often only receives minor head injuries. This is because cyclists generally wear helmets and their fall is even sometimes cushioned by the pedestrian's body (Graw and König, 2002).

Head wounds are also the main injury that pedestrians seek medical attention for after a collision with a cyclist. Then come various different injuries, such as knee and lower leg injuries, then elbow and forearm injuries, as well as wrist and hand injuries (O'Hern and Oxley. 2019).

While accidents with serious consequences remain marginal compared to road accidents (all modes combined), the cohabitation of pedestrians and cyclists generates real tensions and a sense of insecurity. Generally speaking, an increase in the number of cyclists leads to an increase in the risk of accidents for pedestrians.

Sources of conflict

For pedestrians, the main source of tension and concern comes from the danger posed by cyclists, due to their speed and lack of consideration for others. This threat presents itself more as an issue of comfort than of safety, as incidents remain rare and relatively minor. Nevertheless, this discomfort affects how pedestrians experience the urban environment (Ggekas, Bigazzi, and Gill, 2020). For pedestrians, cyclists invade public space by weaving their way around them, even on sidewalks. Their behaviour is often seen as aggressive and unpredictable. The more a pedestrian has to focus on walking, the less attention they can give to other tasks (looking after a child, carrying items), activities (talking to someone), or pleasant distractions (window shopping, admiring the landscape).

A Canadian study (Gkekasa, et al. 2020) on shared spaces on a university campus found that physical contact between pedestrians and cyclists is common, but that real accidents remain rare. Nevertheless, these incidents are a perceived safety issue. While conflicts generally arise from riding too close or recklessness, pedestrians consider the

speed at which cyclists travel to be a major factor in conflicts, while cyclists tend to minimise this aspect. It is worth bearing in mind that this study focused on a campus, which — unlike a city — is primarily attended by healthy people who are likely to be able to react quickly, adapt to speed differences, and have a greater attention span.

Vulnerable people, for their part, feel particularly threatened by individuals with a different travel speed or pattern. They then tend to avoid such situations and give up using shared spaces, especially those used by scooters and bicycles. A study in Vienna found that pedestrians experienced strong negative emotions towards cyclists, following the implementation of pro-cycling measures, revealing a significant generational conflict (Hulmak et al. 1992). For many elderly users, walking is the only mode of individual travel possible. However, their mobility requirements are limited by having to share spaces with cyclists. This is compounded by the fact that if they fall, it can have serious health implications for them.

As far as cyclists are concerned, pedestrians are mainly seen as obstacles to the efficiency of their trips, with behaviours that often force them to slow down or change course. A Swedish study (Eriksson, 2019) found that cyclists slow down in places with large numbers of pedestrians, to the point of going at walking speed. This is especially problematic in the presence of a steep slope, where cyclists naturally want to maintain their momentum. Thus, pedestrians represent a disadvantage for cyclists looking for efficient travel. Furthermore, pedestrians, if not paying attention, pose an additional threat to cyclists, that of a collision: for example, if a pedestrian suddenly changes course or steps into a bike path. This risk is particularly concerning for certain cyclists who are unable to react quickly, such as senior citizens or people carrying children.

The places of conflict

Where do we find speed conflicts in the uses of active modes? Recent work carried out in our laboratory shows that crossroads and crossings, as well as shared lanes, are the main places of conflict (Albrecher et al. 2022a). This finding corresponds to the results of several studies carried out on the issue.

A study in Brisbane's Central Business District (Haworth et al. 2014) found that conflicts between pedestrians and cyclists — but also cars — in this district of downtown Brisbane (Australia) were more frequently associated with the following factors: male cyclists, cyclists not wearing helmets, sidewalk traffic, higher pedestrian density, rush hours, two-way roads, multi-lane roads, higher speed limits, and roads with a bicycle symbol marked on the ground. The UK Countryside Study (Uzell, 2001) shows significant correlations between certain characteristics, trail quality and perceived conflict, particularly with respect to the lack of lighting, lack of visibility, and trail maintenance problems. The perception of conflict also increases with travel speed.

An Australian study carried out for Austroads (Ker, 2006) confirms these observations, detailing the sources of conflict that are linked to poor path quality (lack of signage and markings, inadequate size). The study also reveals in detail the inappropriate behaviour of various users ("uncontrolled" dogs or children, non-compliance with separate lanes,

lack of courtesy, unpredictable movements, lack of reflective clothing and thus visibility, inability to understand the needs and abilities of other users).

Rethinking the dimensions of public spaces

The cohabitation between these two active modes is affected by many factors that are compounded by the fact that shared spaces are often cramped and overcrowded. For example, some cyclists will avoid using areas that are very popular with pedestrians at peak hours, while they will gladly use the same routes at other times. This is why it is important to have an extended network offering alternative routes. Even exemplary cities like Amsterdam and Copenhagen have to deal with these conflicts. They suffer in particular from the success of walking and cycling in terms of available surface. During peak hours, some routes are overloaded and require alternative routes to be put in place. The authors of a book chapter on these two cities advocate for a better sharing of public space in favour of active modes: so far, cycle paths have mainly been established by taking space away from the sidewalks, rather than from motorised vehicles. They believe this practice should be called into question (Koglin, te Brömmelstroet et van Wee 2021).

In 1966, anthropologist Edward Hall put forward the idea that man's limits begin and end with his skin. (Hall 1966:115). In his book, The Hidden Dimension, he proposed a model of finely delimited distances around the "I," from the intimate, to the personal, to the social and to the public, which are differentiated by their respective (potential) impact on the human senses. Because public space does not allow for any expression of private appropriation, in particular due to the presence of strangers, Hall considers that public space is by nature uncomfortable. In the same vein, sociologist Erving Goffman developed the concept of "territories of the self" (Goffman 1971), which include, in particular, one's close, personal space: that of functional and everyday needs (line of vision, conversational space, required space to manipulate objects). Many conflicts between the different modes of travel result from a lack of sufficient personal space, in particular for pedestrians and cyclists, or even for users of public transport. In other words, to promote active modes, we must rethink the size and design of all areas that receive traffic, especially sidewalks.

The generosity of the available spaces can indeed have a positive influence on mitigating these conflicts. For example, "meeting zones" (large, barrier-free spaces where pedestrians have priority and can walk in the road, and where cars are limited to 20km/h) seem to facilitate the coexistence of pedestrians and cyclists. At the Technical University of Vienna, a research project carried out in 2018 analysed such spaces through videos and interviews. The recordings show that during the period of observation, there were no accidents between pedestrians and cyclists, even though the subjective perception of the studied space helped identify numerous concerns about safety and a lack of respect by motorists regarding the pedestrians' right of way. Overall, however, we can say that pedestrians and cyclists can coexist in meeting areas (Marsch, 2018).

A completely different planning strategy to resolve these conflicts consists in clearly separating bike lanes from sidewalks. With clear delimitation, marked by a slight level

difference - as is the case in many Dutch cities - cyclists can travel quickly without putting pedestrians at excessive risk (Furth 2021). Clear signage (for instance, with the use of different colours) reminds each user group of the other's presence. Measures to reduce cycling speeds on certain sections may also prove to be a useful solution.

Conflicts between users of bicycles and electric bikes

Electrically assisted bikes (EAB 25) are very successful in Europe[9]. In some countries, fast e-bikes (EAB 45) are also allowed and seem to attract a different type of cyclist (as in Switzerland for example). However, these EABs, and also electric scooters, are a source of conflict with users of other active modes because of their speed. The difference among users of the same mode of travel (bicycle, scooter, EAB, EAB+) is sometimes greater than between modes. There are also fast, agile pedestrians and slow-to-react, fragile pedestrians. As already mentioned in theme 2, there are also agile and fast cyclists, as well as beginners, children, families, or even senior citizens. Fears, conflicts or tensions may emerge between these different groups of cyclists, because of their speed or the way they cycle (Garrard et al 2021; Garrard 2021). There are experienced EAB users, with quick reflexes, but also individuals who are less agile, whether on e-bikes or traditional bicycles. It does seem possible for agile and experienced users of different modes to coexist. However, for more vulnerable users, or for cyclists carrying passengers or goods, adapted travel conditions and amenities are needed to remove these fears and conflicts.

[9] Electric bikes should not be confused with self-service bikes, which may or may not be electrically assisted, but which are available in public spaces, and are therefore a different mode of transport.

Theme 7: Walking and cycling as complementary to public transport

In recent decades, the habit of chaining activities has developed considerably, as the distances travelled in daily life have increased. This has led to a strengthening of multimodal and intermodal practices and turned walking and cycling into modes that are used to access public transport.

In this world of movement, places that can be traversed by pedestrians and cyclists present opportunities to serve as meeting points, to carry out some of the many microactivities of daily life, or simply to find entertainment or clear one's head. Interchange stations thereby take on a new dimension. Train stations and public transport stops that are designed to optimise flow, functionality and efficiency, become potential places of appropriation, so long as they ensure the traveller's comfort (Bourdin 2005). One of the challenges for the attractiveness of interchange stations is therefore to go from representing a time-distance (which needs to be reduced, to be neutralised) to a time-substance (a time that is sensitive, usable and individually valued) (Amar, 2004).

Many studies show, in various ways, that the transfer between means of transport is a critical moment during a trip, and that it is hard to make it an enjoyable one.

Time perception

Research conducted on functionally optimising interchange stations very often considers user behaviour in a strictly rational manner based on time and cost (Kaufmann et al 2000). As a result, a whole body of scientific literature has been developed on the perception of transferring. This research focuses on how the actor experiences his or her transfer from one means of transport to another: some studies examining the perception of waiting times (Kaufmann 1995) have shown that such situations in public transport are associated with users largely overestimating travel times, due to the boredom they experience while waiting. However, the extent of this overestimation depends both on the waiting conditions and on the mode of transport – with train users perceiving much longer waiting times.

In a review of the quality of pedestrian access to public transport stops, Helge Hillnhutter (2016) detailed the temporal questions related to multimodal journeys. According to her findings, public transport users spend around half of their travel time from door to door outside of a public transport vehicle (Brög, 2014). According to other researchers cited, users perceive the time they spend walking and waiting to be longer than the time spent riding a public transport vehicle (Walther 1973, Wardman 2004). Finally, pedestrian-friendly environments tend to increase the acceptable walking distance to the nearest transport stop by up to 70% (Peperna, 1982). Hillnhutter concludes that unattractive walking conditions reduce the value of public transport. Conversely, a favourable walking environment promotes public transport and also encourages walking.

The first and last mile

According to several studies, the daily use of different means of transport depends in particular on how good the accessibility is over the first and last mile, and this applies to public transport, to car traffic and parking conditions, to pedestrian paths and cycling infrastructures (Brisbois 2010, Munafò et al. 2012, Vincent-Geslin 2010). Given the desire to encourage travellers to move away from cars, this finding has been particularly useful in designing and zoning parking restriction policies, which have significant effects on modal practices.

Regarding soft mobility, some works have been produced on the first and last mile (Brisbois 2010). The idea is that walking is an essential link in a mobility chain, one that should be considered as such and that, consequently, the quality of the paths in neighbourhoods leading to public transport stops should be designed to encourage their use. Some even suggest that this concern for the quality of these continuities should extend into buildings, all the way up to each person's front door (Sim 2019).

The bicycle, a vehicle that must not be left out

Marc Wiel (1999) considers the public transport user as a pedestrian, because many of the pedestrian's characteristics remain unchanged while riding on a train, bus, or subway – whether that is being exposed to the environment through all the senses or carrying all of one's belongings on or near one's body. The ability to sit for a certain period of time is similar to the presence of a bench in the public space. The same cannot be said for the cyclist, who depends on a vehicle that can sometimes turn out to be cumbersome.

Thus, much thought has been given to cycling infrastructure and amenities to and from major public transport stops and interchange stations (train, tram, metro, etc.) and to bike parking facilities nearby (which ideally are covered and secure, like bike stations). The availability of high-quality bike parking facilities near public transport increases the use of both modes (Krizek and Stonebraker, 2011). In this regard, it should be noted that Buehler, Heinen and Nakamura criticise the general lack of scientific literature on the subject of bicycle parking, which they identify as a "determining factor for current and potential cyclists" (2021).

In addition to these measures, in some contexts, it may be possible for cyclists to take their bike with them on public transport — to travel longer distances or to continue their journey in case of a breakdown or bad weather (Pucher, Buehler 2012 ch. 8). In Copenhagen, for example, subways and trains include large spaces for bicycles, free of charge. Some taxis are also equipped with bike racks, allowing an easy modal shift, if necessary. Several studies also show that the presence of a bike path near the home or workplace positively influences the practice of cycling (Moudon et al. 2005, Krizek et Johnson 2006). The quality of the network and the ease of use for cycling therefore play a crucial role in choosing this mode of travel. Nevertheless, more detailed studies on the obstacles or incentives in terms of planning relating to this modal choice should be carried out.

Theme 8: Urban rhythms and the mobility of pedestrians and cyclists

A defining feature of modern lifestyles is being overloaded with activities while also being pressured to travel fast and far. As a result, a significant part of the population aspires to slow down their pace of life. In this section, we look at how walking and cycling can contribute to fulfilling this aspiration.

In praise of slowness

Today, after more than a century of promoting the speed of travel, "an intellectual tradition has gradually given rise to a body of criticism against the myth of the 'natural' benefits of speed" (Desjardins, 2015). Indeed, over the past twenty years, there has been growing interest in issues relating to slow mobility. Copenhagen has pioneered this trend, but many European cities are also getting involved. They are beginning to redesign spaces occupied by cars in favour of efficient public transport systems and so-called soft or active modes of transport. The aim is primarily to improve the quality of life, but also to reduce air pollution, traffic noise and stress for inhabitants of city centres (Gehl, 2011). This renewed interest in slowness is reflected in the growing number of pedestrian or shared areas around city centres, as well as through the creation of networks of cycleways and pedestrian paths.

To carefully analyse the relationships between slowness and the commons, we must also delve into the roots of the renewed interest in slowness in urban planning. Since the 2000s, a new urban utopia has emerged around the concept of the Slow City (Knox, 2005). Through the Cittaslow international network, 200 small cities (under 50,000 inhabitants) have committed to pursuing a strategy that promotes environmental quality, a strong urban fabric, local products and specificities, and the sense of community. Echoing the principles of "slow food" or even "slow science," the idea of slowness refers not only to a difference in speed, but, more fundamentally, to alternative forms of production, social organization and relationships to others. When applied to the city, the fundamental idea is therefore this: we must slow down — our traffic, our flows, our production rates, etc. — to create the conditions for sustainable urban development.

While speed has traditionally been considered a symbol of productivity and technical progress, slowness now appears to be an "innovation" that can drive a new urban transition (Wiel, 1999). As such, compared to the motor city, the pedestrian city is presented as "the ultimate fast city" (Lévy, 2008, p. 58).

A principle that is hard to generalise

Nevertheless, the Slow City has also been criticised by some authors who claim that, as an urban model, it responds to specific localised interests and contexts that are hard to generalise. Recent studies on this topic suggest that when urban planners are inspired by the Slow City model, their proposed plans are narrowly and selectively focused on areas within cities (Knox, 2005). As a result, the Slow City model appears to be a "luxury" of privileged portions of the territory (the centre versus the periphery) (Reigner, 2013).

This raises the question of what slowing down means. The slowness of a given lifestyle certainly depends on the ergonomics of public spaces and transport systems, but it does not maintain mechanical relationships with them. In other words, it is not because a space is designed to promote slowness that it is used as such. Rather, research on the subject suggests that slowness can go hand in hand with an intensive use of digital communication systems (smartphones, tablets, laptops connected to the Internet), which is facilitated by the increasing availability of free Wi-Fi in public spaces (Christie 2018). Similarly, numerous studies show that people who travel shorter distances each day carry out activity programs that are more complex in terms of the number and diversity of activities than people who complete large daily mobility loops.

Conclusions

In the introduction, we defined the goal of this research note: to provide an overview of current research in social sciences and urban planning on the factors likely to promote lifestyles that are more focused on walking and cycling. What significant insights can we draw from this work?

Without attempting to provide an exhaustive analysis, here are a few important points to take away from this review:

Walking as a means of transport is still poorly measured

Statistically, walking is still poorly measured. Pedestrian trips are not systematically recorded, as they are sometimes considered to be too short or to be nothing more than transitional gaps within travel loops that involve using other means of transport. This lack of measurement actually hides a devaluation of walking as a means of transport in daily life. As a result, basic data on walking is incomplete in many databases, making comparisons difficult and rendering this mode of transport invisible.

Research focuses largely on urban uses of cycling and walking

Research has developed considerably over the last five years regarding cycling (especially) and walking (a little). However, it is striking to note that the vast majority of this work concerns urban environments, and even more specifically, the urban living environments of the central districts in large cities.

Although there are some studies on rural walking, the differences between the urban and rural worlds are always analysed with reference to the urban context. This urban lens and its influence on how pedestrians are represented do not correspond to rural populations and contexts. We should therefore develop criteria and methodologies based on rural realities, in particular to properly reflect walking conditions in these contexts.

Sensitive approaches to walking and cycling are poorly developed

Research carried out on walking and cycling remains very strongly influenced by quantitative approaches and, more precisely, by engineering approaches. As a result, there is a disregard for the sensitive and social dimensions of walking and cycling, and similarly, cyclists and pedestrians are insufficiently viewed as subjects with aspirations and free will.

Yet these aspects are central to understanding the use of transport modes. The increased use of cycling as a daily means of transport is a case in point. In urban areas in southern Europe and to a lesser extent in Latin American cities, cycling is largely practised as a factor of social distinction associated with young and educated urbanites expressing their environmental awareness by riding a bicycle. This distinction is sometimes complemented by political mobilisations: the idea that an object can change the

world, the so-called *velorution*, is quite widespread. We therefore claim that it is absolutely essential to address these questions in the analysis of cycling practices.

The diversity of walking practices is poorly studied

Walking is not considered in its diversity and the walker is almost always reduced to a single individual, who is not carrying anything, who has no particular physical ailment and who can therefore move at a sustained pace. Walking situations involving several people (a family, for example), items being carried, children's strollers, the slow pace of elderly people, the need to rest en route and therefore have access to a bench - all these factors and more are generally overlooked when studying pedestrians and their experiences.

Comparative approaches offer a wealth of insights

Comparative approaches between cities and between countries offer a wealth of insights and should be developed. In the corpus that we reviewed, comparisons between European countries and Japan proved to be particularly instructive. With regard to social practices, they revealed very important sociocultural factors in the practice of walking and cycling that are rarely explained. Generally speaking, more comparisons deserve to be conducted and developed.

Historical research projects need to be developed

Some (contemporary) historical research projects uncover decisive factors for promoting cycling. These are particularly enlightening on the mechanisms of change and should be further developed.

User conflicts as indicators

Throughout our overview, the study of accidents and the analysis of user conflicts have emerged as powerful indicators of the obstacles individuals encounter when practising active modes. By developing research on user conflicts, we could achieve a finer understanding – through the lived experiences of pedestrians and cyclists – of the challenges they encounter when using these means of transport. Such an approach could allow for the assessment of pro-walking and pro-cycling public policies on the basis of their sedimentation in the built environment.

The diversification of the bicycle

Among future research avenues on the expansion of cycling, one important theme would be to look at how the diversification of bicycle options impacts the use of this mode of transport. We have long seen how the diversification of available options can broaden a product's adoption, such as in the automotive field with the expansion of model catego-

ries (low cost, premium, sedan, station wagon, coupé, minivan, SUV). The same phenomenon has been at work for a few years now with bicycles: first with mountain bikes, then with other variations such as recumbent bikes, folding bikes, cargo bikes, and more recently, with a generalisation of e-bikes and trailers.

The reviewed literature reveals that these technical innovations allow for a wider use, facilitating the adoption of new lifestyles, especially for families wishing to make do without a car. E-bikes also enable cyclists to cover greater distances quickly and effortlessly, thus helping to change the purpose of trips performed by bike, especially for commuters. They also allow the elderly to reclaim this mode of travel. Similarly, since these new models have arrived on the market, cycling has also become popular in cities and regions with difficult topography or significant urban sprawl.

Cycling as a political mobilisation

Recent research on cycling shows that this mode of transport has become a central object of political mobilisation. The cycling revolution known in some activist circles as the *velorution* takes various forms. First of all, it refers to the desire to promote bicycle reuse and the circular economy, in particular through participatory repair workshops. It also refers to the desire to transform public space in cities, initiated by movements such as the “critical mass” that have spread throughout the world. Finally, it refers to feminist demands and to criticisms of capitalism. While research on these themes has been growing within social sciences over the last few years in Europe and in North and South America, it would be worth developing larger investigations. Indeed, these efforts suggest that pro-cycling movements are drivers of urban transformation and as such they should be taken seriously in urban policies.

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Cahiers du LaSUR

A partir d'une conception ouverte de la sociologie qui invite l'architecture, l'urbanisme, l'économie, la géographie ou l'histoire à contribuer à l'étude sociale de l'urbanisation, le LaSUR étudie les sociétés urbaines et la ville, leurs spatialités, leur matière, leurs dynamiques sociales, ainsi que les politiques et les efforts de planification qui contribuent à les façonner.

Mais, pour le relater, l'écriture et la production scientifiques dans le champ de l'architecture, de l'urbanisme ou de l'ingénierie comme dans celui des sciences humaines et sociales se réduisent trop souvent à deux types d'ouvrages : les articles de revues internationales arbitrés par les pairs ; et les livres d'auteurs. Un angle mort subsiste, où prend potentiellement place une partie importante de la production des sciences urbaines, la diffusion publique de travaux « in progress » (ou en chantier), working papers et autres productions telles que rapports d'études, actes de colloques, papiers préparatoires, travaux hybridant textes et images, travaux d'étapes d'un projet de recherche, y compris la phase essentielle et jamais publiée du projet déposé, les notes introductives, essais esquissés, même les idées abandonnées, mais bien présentes dans les carnets de bord du chercheur, tous les micro-échafaudages de nos idées... Bref, l'ensemble des productions que l'on désigne, trop souvent pour mieux l'oublier, sous le nom réducteur de « littérature grise », mais qui vaudrait d'être réhabilité pour mieux faire voir la diversité des formats et des aboutissements du travail de recherche.

Avec la publication des Cahiers du LaSUR – qui ont pris en 2001 la suite des Cahiers de l'IREC (près de 150 numéros en vingt ans) –, nous avons pour ambition d'investir cet angle mort, de le rendre vivant et d'en faire un lieu – une bauhutte – où penser en mouvement l'espace urbain et la sociologie urbaine, l'architecture et l'urbanisme telles que ces sciences construisent leurs savoirs au quotidien, à l'écart des grandes conférences internationales et des maisons d'éditions prestigieuses, en prenant le risque de mettre en discussion des produits dont l'inachèvement est l'offre généreuse d'une parole scientifique plus libre de ses thèmes et de ses mots.

Les Cahiers du LaSUR, plus de 30 numéros parus à ce jour, reflètent, ensemble et séparément, la cuisine interne et l'état d'une recherche urbaine mobile et novatrice, une recherche curieuse et agile aussi, car capable d'une édition en temps (presque) réel, de ces trouvailles autant que ses doutes.

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