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RESEARCH ARTICLE

Situating Divergent Perceptions of a Rapid-Cycling Network in Montréal, Canada

Lancelot Rodrigue[1], Aryana Soliz[2], Kevin Manaugh[1] and Ahmed M. El-Geneidy[2]

[1] Geography, McGill University, CA

[2] Urban Planning, McGill University, CA

Corresponding author: Lancelot Rodrigue (lancelot.rodrigue@mail.mcgill.ca)

As cities work to accelerate sustainable-transport transitions, the expansion of cycling networks has become a significant topic of debate. Even as cycling modal shares are increasing across many North American contexts, "bikelash" (i.e., community opposition to cycling facilities) remains prevalent. In this paper, we draw from qualitative questionnaire data and quantitative travel data from Montréal, Québec to contribute a situated understanding of factors influencing both positive and negative social perceptions of cycling infrastructure. Our analysis confirms general trends that contribute to residents' overall satisfaction with recent cycling interventions, including enhanced safety considerations and family-friendly infrastructure. We also identify particular sources of bikelash that require deeper consideration, including conflicting ideas about the impacts of cycling facilities on local businesses, divergent opinions about the planning process, perceived inequities in the distribution of cycling networks, as well as issues of seasonality and modal integration. These findings can be of interest to practitioners and decision makers working to support sustainable-mobility transitions, including recommendations on public-communication and consultation processes, winter cycling facilities, integrated infrastructure for active travel, as well as the inclusion of social-equity and critical-disability perspectives.

Keywords: cycling; public perceptions; active travel; winter mobilities; equity; Montreal

1. Introduction

On May 27, 2019, Montréal Mayor Valérie Plante announced plans to begin the construction of the *Réseau Express Vélo* (REV)—an ambitious rapid-cycling network. With an acronym homophonous of the French word for "dream" (*rêve*), this new cycling expressway is recognized as a trademark of the current administration, setting a clear vision for Montréal's cycling network. This new rapid-cycling network is designed to provide spacious and high-speed infrastructure, to enable longer-distance trips, and to promote a substantial modal

shift away from private cars. It also aims, according to the mayor, to "be accessible to all levels of users" and to "meet the needs of those who are interested in cycling and have not yet adopted this mode of travel" (CBC, 2022). Once complete, the REV will consist of 184 kilometres of wide, protected cycling routes along 17 axes **(Figure 1)**, adding to the over 700km of cycling facilities criss-crossing the city.

Despite significant efforts from policy makers in Montréal to increase the appeal and accessibility of the REV, the expansion of cycling infrastructure remains a socially contentious process. As in other contexts of high automobile dependency, "bikelash," or community opposition towards cycling facilities, has become an impediment to the success of new infrastructure initiatives (Wilson and Mitra, 2020). Previous research has identified resistance from local retailers and voters as well as concerns about social displacement and political exclusion as major sources of bikelash (Rérat et al., 2022; Wild et al., 2018; Wilson and Mitra, 2020). Cycling research also requires locally situated analyses to account for the ways that experiences and perceptions of transport infrastructure shift across time, space, and social conditions (Castañeda, 2021; Sagaris, 2021; Soliz, 2021).

Figure 1: Pictures of different Réseau Express Vélo (REV) corridors in Summer 2022.

Drawing from mixed-methods survey data, this paper contributes a nuanced understanding of the factors that influence both positive and negative perceptions towards new cycling infrastructure in Montréal. Specifically, this paper asks: (1) How are Montréal's new express-cycling facilities perceived by both cyclists and non-cyclists? and (2) What can we learn from situating these perspectives within Montréal's unique political, environmental, and socio-cultural milieux? Through these research questions, we hope to contribute to the cycling scholarship aiming to move beyond one-size-fits-all cycling interventions towards more equitable, inclusive, and situated urban planning processes.

2. Literature review

Cycling research has grown substantially in recent years, with studies confirming the environmental and public-health benefits of cycling, including a reduction in transport carbon-dioxide emissions (Brand et al., 2021; Keall et al., 2018), levels of cardiac disease, diabetes, cancer, and respiratory illness (Woodcock et al., 2018). Numerous studies have confirmed a positive correlation between the presence of cycling infrastructure, rates of cycling, and improved safety for cyclists (Buehler and Dill, 2016; Mölenberg et al., 2019), particularly when considering the safety needs of children and older adults (Aldred, 2012; Aldred et al., 2016; Winters et al., 2015). The importance of cycling has been re-emphasized through the COVID-19 pandemic considering that it offers an effective means transport while allowing travellers to maintain physical distance (Buehler and Pucher, 2021; Combs and Pardo, 2021; Rérat et al., 2022). While cycling lanes are often perceived as being "bad for business," a recent systematic review has demonstrated that installing cycling infrastructure often has positive or no impacts on local businesses in terms of increases in the number of customers and overall revenue (Volker and Handy, 2021).

Despite this evidence demonstrating the environmental, health, and economic benefits of cycling interventions, the implementation of cycling infrastructure is often a socially contentiousness process. While studies on the politicization of cycling infrastructure remain scarce (Wilson and Mitra, 2020), researchers are increasingly exploring the social and political processes that contribute to bikelash. For example, research on the implementation of cycling infrastructure in Vancouver, New York, and Toronto have explored the intense political debates that often ensue in contexts of heavy car dependency (Siemiatycki et al., 2016; Wilson and Mitra, 2020), even in cites with strong political support for cycling interventions (Sadik-Khan and Solomonow, 2017). In their critical review of the literature on cycling interventions, Wild et al. (2018) show how cycling infrastructure are commonly seen as threatening conservative value systems and "secessionist automobility"—the centering of everyday life around the private automobile and segregated suburban space (Henderson, 2006). Even in iconic cycling cities such as Copenhagan, research has exposed strong negative reactions to cycling interventions when limits on car driving and parking are imposed (Freudendal-Pedersen, 2015). On the other hand, critical researchers have also provided nuanced analyses of the ways that cycling-promotion activities have frequently translated into "neighbourhood revitalization" narratives, which at times bring unintended consequences that exacerbate urban inequalities, social displacement, and non-inclusive decision-making processes (Anantharaman, 2017; Golub et al., 2016; Stehlin, 2019). Thus, while cycling infrastructure can offer many benefits in terms of urban liveability and social wellbeing (Leyland et al., 2019; Waitt and Buchanan, 2022), researchers have called for an awareness of how cycling infrastructure can impact social groups differently and to work towards a more equitable distribution of transport harms and benefits (Alando and Scheiner, 2016; Barajas, 2021; Braun et al., 2021; Doran et al., 2021; Lee et al., 2017; Martens et al., 2016). Still, much of the research on the politicization of cycling interventions has focused on analyzing the perspectives of policy

makers, planners, and related consultants (Piatkowski et al., 2019; Reigner and Brenac, 2019), with limited analysis of wider public perceptions.

In this paper, we suggest that in order to understand how and why cycling infrastructure projects become contentious, it is necessary to contextualize these interventions within the specific socio-cultural landscapes in which they become contested objects. Drawing from calls for situating cycling research (Lugo, 2018; Sagaris, 2022; Vivanco, 2013), we advocate for a socially nuanced approach that takes unique public perceptions of urban infrastructure seriously. Given that public opinion has become one of the main drivers of political action in relation to sustainable-urban transitions (Banister et al., 2007; Calvo-Poyo et al., 2020), we see the study of social perceptions of transport infrastructure as an imperative research topic. This approach builds on theories of situated knowledge, recognizing how our understanding of urban infrastructure is always partial and processual, being produced through specific social, cultural, technical, and environmental conditions (Haraway, 2004; Harvey et al., 2016). A situated focus can also help to contest oversimplified approaches to cycling research, which reduce infrastructural fragmentation to a simple lack of political will (Nello-Deakin, 2020), allowing instead for a detailed evaluation of community members' experiences and perceptions of cycling facilities in diverse research contexts (Castañeda, 2021).

3. Case study context

The study area for this research is the Island of Montréal, Québec, Canada, which has a metropolitan population of over four million residents (Statistics Canada, 2021). By the start of the new millennium, Montréal was already being recognized as the Canadian city with the highest level of cycling for commuting to work, despite its winter being more severe than in other Canadian cites (Pucher and Buehler, 2005). With regard to current modal shares in the city of Montréal, 36.4% of residents between the ages of 18–74 reported cycling at least once a week, and 57% reported cycling at least once a year (Vélo-Québec, 2020). Overall, the cycling mode share for utilitarian trips on the island of Montréal is 2.83% (ARTM, 2020). This discrepancy requires greater attention to shrinking the gap between regular utilitarian cycling (2.83%) and those who cycle at least once a week (36.4%) or once a year (57%) (Damant-Sirois and El-Geneidy, 2015).

To date, Montréal's cycling network includes over 700 km of infrastructure, as displayed in **Figure 2**. Despite ongoing extensions to the cycling network, previous studies on the distribution of Montréal's cycling network across different neighbourhoods and population groups have shown that some areas are poorly served and that the network generally lacks connectivity (Houde et al., 2018). This is particularly the case for separated cycling lanes, which are less frequent and often short in distance. Such segments are often fragmented, meaning that cyclists often have to add distance to their trip in order to be able to stay on higher comfort cycling infrastructure (Boisjoly et al., 2020).

Numerous civil-society groups and municipal administrations have worked to expand the connectivity and accessibility of Montréal's cycling infrastructure over the past decade. Most recently, the REV **(Figure 2)** was presented as the main component of a $214 millions investment in Montréal's cycling network over the 2020–2031 period (Ville de Montréal, 2022a). Once complete, the 184-km express-cycling network promises to "allow residents to get around safely, efficiently and enjoyably" while helping the city of Montréal to reach "the goal of 15% of utility trips by bicycle in the metropolis by 2027" (Ville de Montréal, 2022b).

The goal of fostering a significant shift away from automobile dependency and increasing the modal share of cycling has figured strongly in the municipal government's environmental agenda (Ville de Montréal, 2018). In recent decades, household car ownership has sharply increased across Greater Montréal (rising by 31% since 1990), along with a large increase

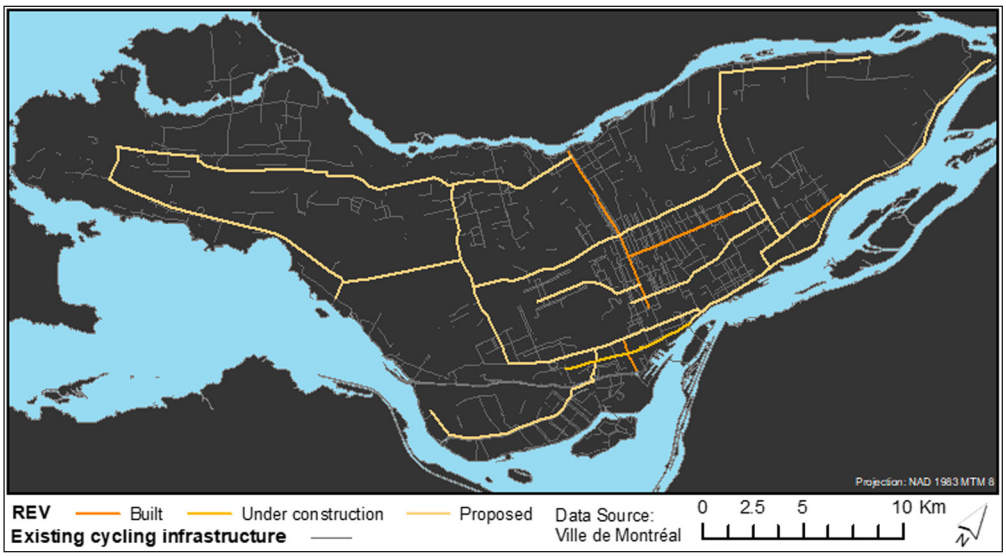

Figure 2: Built, under-construction, and proposed REV on the Island of Montréal.

in cylinder capacity (namely the use of light trucks, sports-utility vehicles, and vans) (Ville de Montréal, 2018). While the possibility of decreasing car dependency remains an ongoing policy challenge, cycling rates have shown some modest increases (Ville de Montréal, 2018). Still, the city's pro-cycling investments, framed as a means to promote sustainable mobility, cycling safety, and accessibility, remain controversial, particularly given the city's more explicit approach to reducing the street space afforded to cars and car parking (Godillon, 2020; Van Neste and Martin, 2018). The development of the REV thus exemplifies discursive struggles over the right to the city, intertwined with a number of context-specific social, political, and environmental factors. To better understand these factors, we provide a discussion of the fluctuating, and at times divergent, perceptions of Montréal's growing cycling network.

4. Methods and analysis

In 2021, the Transportation Research at McGill (TRAM) group conducted the second wave of Montreal Mobility Survey (MMS) online. Following Dillman et al. (2014), multiple recruitment methods were applied to ensure that the survey reached a large representative sample (i.e., marketing company, social media advertising, fliers, and invitations by email). As a part of the survey, respondents were asked if they were aware of the REV. Those who answered yes were asked to state their level of agreement with a series of statements regarding the perceived impacts of this express cycling facility. Descriptive statistics of those questions were compiled for the entire sample and sub-divided between cyclists and non-cyclists to provide a general overview of public perceptions of the REV.

Following the quantitative questions, respondents were prompted with the following optional open-ended question: "Is there anything else you would like to share about the anticipated impacts of the REV? If you do not have any suggestions, you do not need to respond to this question." Out of a total of 4,064 valid respondents for the entire survey, 2,157 indicated having heard about the REV, of which 387 provided answers to the open-ended question (193 cyclists and 194 non-cyclists). Open-ended questions can be used in surveys to allow a wider range of answers to be collected and to minimize directionality of said answers (Harland and Holey, 2011; Reja et al., 2003), which is relevant for public perceptions.

Given the gradual and ongoing development of the REV, data collected represent an opportunity to assess public perceptions in relation to the planning, construction, and operational phases. It should be noted that some of the quotes presented in this article were written in French by respondents and translated into English by the authors.

A thematic analysis of the qualitative results was conducted to provide a deeper understanding of diverse perceptions of cycling infrastructure and to contextualize the quantitative results. Our approach to thematic analysis draws from Braun and Clarke's (2006, 2019) reflexive and iterative method involving data familiarization, generating initial codes, searching for themes, reviewing themes, defining themes, and producing the final written output with methodological clarity. The data-familiarization process was undertaken separately by two members of the research team who reviewed the entire data set, giving equal attention to each data item, identifying patterns in the data that could form the basis of themes, and generating an initial list of codes to characterize those elements. Reflexivity notes were used in this process to record research logistics and coding ideas as well as to document the researchers' personal reflections about potential themes (Lincoln and Guba, 1985; Nowell et al., 2017). As Braun and Clarke explain: "Themes are analytic outputs developed through and from the creative labour of our coding. They reflect considerable analytic 'work,' and are actively created by the researcher at the intersection of data, analytic process and subjectivity" (2019), bringing the need for reflexivity to the forefront of the analysis process. Following established protocols in thematic analysis (Cutcliffe and McKenna, 1999; Nowell et al., 2017), we worked to enhance the credibility of this process by ensuring the raw data was reviewed by more than one researcher and by using peer debriefing with the entire research team to help researchers to examine and compare how their thoughts and categorizations evolved. The research team then searched for themes by sorting and unifying the coded data extracts into relevant groups involving patterns of shared meaning (Braun and Clarke, 2019). Following an inductive approach, we worked through peer-debriefing sessions to review these themes to ensure that our categories were based on significant patterns found in the raw data (Braun and Clarke, 2006; Nikitas et al., 2019). Themes were not finalized until the data set and coding had been reviewed by the entire research team to reach a shared understanding and to ensure the credibility of the findings (Nowell et al., 2017). Following King's (2004) suggestion, we chose to include multiple direct quotes in the final research report (selected as typical rather than exceptional responses) to help readers to understand specific points of interpretation and demonstrate the prevalence of themes. In interpreting themes, we drew from the existing literature to confirm our research findings as well as to bring attention to contextual differences that contribute to the field (Nowell et al., 2017).

Although qualitative research is not oriented toward providing statistical generalization (Denzin and Lincoln, 2011), it allows for analytical generalization, which permitted us to acquire a deeper understanding of factors influencing public perceptions of the REV and surrounding active-transport infrastructure within our unique research context. External quantitative data sources were used to triangulate the findings from the thematic analysis. Our use of quantitative sources included open-access cycling-infrastructure data classified by level of comfort according to the type of cycling lane and the level of separation from motorized traffic (Ferster et al., 2020; Winters et al., 2020). Such classification is useful given that the high-medium-low comfort scale allows to better identify disparities in cycling infrastructure quality. Socio-economic data from the 2016 and 2021 Canadian Census as well as cycling mode shares calculated using the 2018 Montréal Origin-Destination Survey were also used to triangulate the qualitative analysis. Demographics of the areas around the REV were derived using a 400-meters airline buffer around it.

5. Results

To provide a general overview of the public perceptions of the REV, quantitative data on agreement levels with four impact statements were compiled in **Table 1**. It is worth noting that the REV received mainly positive support from respondents across all statements, particularly in terms of its perceived environmental impacts (84% agreement) and impacts on the greater Montréal area (76.5% agreement). Still, noticeable differences in agreement levels were observed when the sample was separated between cyclists and non-cyclists. These findings underscore the need for qualitative analysis to understand some of the reasons and context behind these divergent perceptions of new cycling infrastructure.

Our thematic analysis of questionnaire data allowed us to identify factors influencing both positive and negative perceptions of cycling infrastructure as well as to analyze wider social struggles over mobility rights and exclusions. Specifically, we identified six emerging patterns to help situate our analysis of these public perceptions and to produce a connected discussion on each theme: (1) cyclists' safety and cycling accessibility; (2) modal integration and non-cyclists' safety; (3) parking removal and impacts on local businesses; (4) politics and planning processes; (5) distributional inequities; and (6) seasonality of cycling.

Question	Response	Total	Non-Cyclists	Cyclists
When complete, the REV will be a good thing for the greater Montreal area.	Agree	76.54%	65.85%	92.77%
	Neutral	11.40%	16.62%	3.50%
	Disagree	12.05%	17.54%	3.73%
When complete, the REV will be a good thing for my neighborhood.	Agree	58.28%	43.46%	80.75%
	Neutral	25.13%	32.77%	13.54%
	Disagree	16.60%	23.77%	5.72%
When complete, the REV will be good for the environment.	Agree	84.47%	77.46%	95.10%
	Neutral	9.69%	14.31%	2.68%
	Disagree	5.84%	8.23%	2.22%
When complete, the REV will be good for businesses.	Agree	57.90%	44.15%	78.76%
	Neutral	21.79%	26.54%	14.59%
	Disagree	20.31%	29.31%	6.65%

Table 1: Agreement levels with impact statements regarding the Réseau Express Vélo.

5.1 Cyclists' safety and cycling accessibility

One of the most prevalent and detailed themes mentioned by respondents—both cyclists and non-cyclists—was that of safety. Cyclists for the most part praised the increased feeling of safety stemming from the physically separated and spacious cycling lanes of the REV. One respondent remarked on the positive impacts of the REV in the Plateau-Mont-Royal borough, which extend beyond benefits for cyclists: "[the REV] is the best thing that has happened to dynamize [Saint-Denis] street and make it safe for non-motorized users (pedestrians, cyclists, scooters, skateboard, people with disabilities)." Another respondent added further nuance to this perception by claiming that "the infrastructures are inclusive; cyclists from all ages and physical capacities feel comfortable and safe during their transport thanks to it."

Building upon this latter point about age inclusivity, one of the primary perceived benefits from the new express-cycling infrastructure is the increase in usage by children. One respondent observed that they "see more children on bikes since the REV on Saint-Denis street has been completed" noting that "this is a very desirable and significant outcome." Going into more of a personal story, one parent noted: "biking is my primary form of transportation, and using the parts of the REV that are already complete makes my travel feel much safer, especially when I have my children with me. I look forward to having more of the city safely accessible to me and my kids by bike as the REV expands." These positive perceptions are strengthened by several commuters' choice to give up driving as a result of the REV, as exemplified in the following quote: "the REV has made it possible for me to sell my car, ride my bicycle for utility year-round, and greatly reduces my chance of being killed or injured by a vehicle operator."

Altogether, the municipality's intent to improve cycling safety through the REV is reflected in the respondents' perceptions. These comments require contextualization considering that Montréal's cycling infrastructure has often been considered as either medium comfort (20.74%) or low comfort (41.49%), reflected by the general lack of separation between cycling facilities and motorized-vehicle lanes in much of the city's network. Respondents' positive perceptions about the comfort and safety of the REV thus represent a positive step, particularly related to the accessibility of cycling for more risk-averse groups, such as children.

5.2 Modal integration and non-cyclists' safety

A frequent, but often underacknowledged, critique of cycling facilities relates to their integration (or lack thereof) with other travel modes, especially walking. This issue often relates to perceptions of safety, particularly for non-cyclists. Indeed, a number of respondents expressed concerns about the safety of pedestrians at intersections surrounding the REV with one respondent stating that "it is dangerous for pedestrians because cyclists do not stop at the red lights" with another one further adding that "if you are walking, you have to do a prayer before crossing." Hinting towards potential inequities based on age and physical ability, a 62-year-old woman wrote: "The REV renders difficult to cross the street for people with mobility impairments and for older adults. I used to cross on the other side of Saint-Denis in the Plateau-Mont-Royal borough to go shopping, but now I prefer going elsewhere." This latter point was further elaborated on by one wheelchair user stating: "[I am] concerned about impacts on pedestrian safety, especially as a wheelchair user. [Cyclists] cut me off ALL the time and jump up on sidewalks, and frequently come close to hitting me." Solutions were also proposed by respondents, with one suggesting that "designated crosswalks for pedestrians [should be] installed along the REV as a way to protect the most vulnerable road users including people with disabilities or reduced mobility."

In addition to these inequities between cyclists, pedestrians, and mobility aid users, respondents also highlighted specific conflict zones stemming from the design of the REV with one giving the example of "the Peel corridor not [being] very good as walkers may get confused on the end of sidewalk / beginning of the bike lane." Conflicts were also perceived to potentially arise between cyclists and transit users with one respondent "regretting that the REV was implemented on commercial streets such as St-Denis where there is public transit" adding that "bicycles and buses do not get on well together." Another comment further added that "caution and care must be taken not to impede accessibility at drop off locations for adapted transport users" once again highlighting the importance of carefully considering diverse accessibility needs in the implementation of cycling infrastructure.

Respondents were also critical of the REV based on concerns that it might privilege cycling above other travel modes. Indeed, one comment mentioned that "if car traffic is reduced to

favorize cycling, there needs to be a considerable increase in public transit options which is not currently the case." This consideration that cycling is not for everyone was also stressed for specific social groups with one respondent stating that "[the REV] is an important network, [...; however,] we need to think about people with reduced mobility including the aging population which cannot travel by bicycle." Still, as pointed out by one final comment, "we need transportation methods for everyone" adding that "with more people on bikes, buses and trains mean less on the road (which are safer for seniors who may need to drive for mobility issues)."

Overall, while the REV is perceived by users as adding to their feeling of safety, bikelash can still arise based on how well new infrastructure is integrated with other travel modes, primarily walking, public transit, and adapted transport. Making sure that new cycling infrastructure does not infringe on other road users' right to the city, particularly for people with limited mobility who are already underserved, is therefore foremost in promoting an inclusive active mobility landscape.

5.3 Parking removal and impacts on local businesses

In Montréal, the availability of car parking spaces has become an extremely contentious issue with the municipal administration being accused of pushing forth a "secret agenda to eliminate motorized vehicles in Montréal," as expressed by one respondent. Questionnaire responses reveal several defensive reactions from motorists relating to the removal of parking spots to make way for new cycling infrastructure. Indeed, one respondent argued that "a new cycling lane on my street, already not very wide, meant a reduction in parking spaces for local workers coming to the sector and residents coming back from work at the end of the day" and that this is "without even considering winter when parking spots diminish by at least 30%." This perception can be linked to the perceived "war on cars" that is often associated with new active-transport infrastructure. Such opinions, while seemingly very popular amongst motorists, were not accepted by other respondents, with one commenting that while "the implementation of the REV created anger amongst locals due to the removal of parking spaces [...,] the situation is not as catastrophic as the detractors of the project make it seem; there is ample available parking spaces on neighboring streets all day long."

The perceived negative externalities of parking-space removal were also expressed on behalf of business owners, with quantitative data **(Table 1)** showing that a larger proportion of non-cyclists (29.31%) perceived the REV to have a negative impact on businesses than cyclists (6.65%). One respondent summarized this common perception, arguing that "anyone on a bike is not buying large quantities, so [the REV is] not good for business and will likely take away parking spots for people coming to spend money that struggling businesses really need." Another respondent elaborated on a different aspect, emphasizing that infrastructure such as the REV "should be made on a quieter street. On St-Denis, it was a busy street before it was implemented. It was also one of the most fluid arteries. Now it is jammed packed. I am way less likely to go shopping somewhere on that street knowing that I will have to drive in that traffic. Why couldn't they do it on the next street?" This comment provides further insight into motorists' reaction to the reallocation of street space to other road users and the traffic-congestion issues that can ensure without an immediate modal shift away from private cars. Still, these comments also present a relevant discussion around the optimal location of new rapid-cycling infrastructure, which moves beyond the impacts on businesses and inches more towards the need for a better integration of all modes of transport together. It is also in concordance with the actual state of the Montréal cycling network, which remains extremely fragmented in most areas of the city.

5.4 Politics and planning processes

While cycling infrastructure are an important policy to promote sustainable-mobility transitions, the details of the planning and implementation processes can ease or aggravate incidences of bikelash. Montréal is no exception to this reality as one of the primary critiques made of the REV is targeted towards the municipal government, and how policy makers did not thoroughly consult the population on the project prior to its implementation. Indeed, many respondents—most of which are not cyclists—pointed out that "more consultation on the implementation of the REV would have been preferable," with another one conjecturing that "the municipal administration is imposing a way of life on residents that they have not chosen." On the other hand, several respondents discussed these concerns in relation to the need for increased public participation in cycling decision-making processes and a clearer rationale for the spatial distribution of the cycling network: "if cycling lanes are implemented, they should be proven to be efficient at drawing cyclists towards them for their local trips." While many respondents clearly supported the REV, many questioned the rhetoric and methods employed by the municipality: "I support this measure; except I was a little annoyed by the messaging. At first, the administration justified the speed because of covid safety. I think this was dishonest. Instead, they should be very clear about the climate emergency and the need to adapt our city quickly," wrote one respondent. Another respondent remarked: "even if I perceive the REV to be a good idea, I did not like the aggressivity with which it was implemented by the Mayor's administration."

Despite these critiques of the rapid planning and implementation of the REV, such characteristics were also praised by some respondents—mainly cyclists. A few respondents even asked for the network's extensions to be accelerated: "The REV is limited and the construction is very slow. I wish it was more expansive and connected, so everybody could reach to the network by 5 minutes ride." This shows that while public consultation and transparent communication matter in easing tensions surrounding new cycling infrastructure, the ability of policy makers to deliver infrastructure improvements in an efficient manner is also regarded as crucial by many users.

5.5 Distributional inequities

Concerns about distributional inequities were prevalent with one respondent noting that "it needs to go towards the peripheral boroughs and correct geographical inequalities." While the municipal government has pledged to expand the reach of the city's cycling infrastructure, this critique remains valid for the REV's first phases, which are either already built or in construction. The first phases of the REV are being implemented in areas that have already more cycling lanes than the rest of the island, with 0.54 meters of cycling lanes / habitants around the REV, compared to 0.38 meters / habitant for the entire Montréal Island. The REV is also surrounded by a higher proportion of high-quality cycling infrastructure in its 400-meter buffer, with 56.92% being considered high comfort compared to 37.78% for the entire Montréal Island.

It is worth noting that the initial plan for the REV excluded many underserved communities, including Montréal North which is the lowest income borough in the City of Montréal (**Figure 3**). One resident of the area exemplified their frustration with inequities in the distribution of cycling infrastructure, arguing that "the borough of Montréal-North is cruelly lacking dedicated cycling lanes" and adding that "a REV would be very beneficial." Another Montréal-North resident decried that "my borough is only served by a miserable recreational cycling path along the water," while further adding that the city should "make an effort for Montréal-North." Indeed, Montréal North is still lagging behind in terms of cycling infrastructure, with only 0.23 meters of cycling lanes / habitant. Of those infrastructure, only

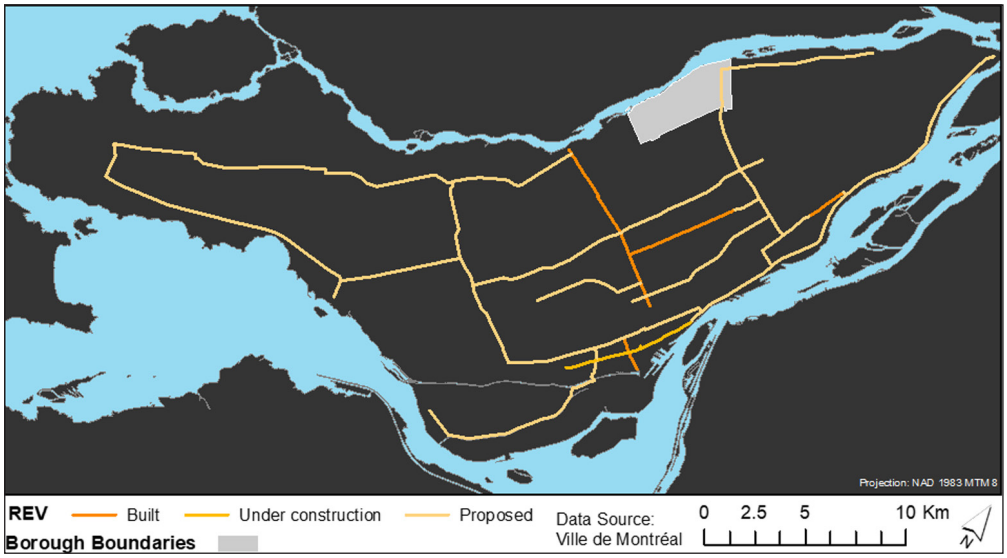

Figure 3: Geographical context of Montréal North in the planned REV.

41.6% can be considered high comfort. The lack of connectivity within and outside Montréal North is likely to represent a limitation to utilitarian cycling, which is consistent with the very low cycling mode share amongst residents of the borough (0.50%). Still, when looking at **Figure 3**, the borough remains mostly left out of the REV's proposed plan. While social pressure has led the city to eventually make a commitment to extend the REV to the borough, the initial neglect of Montréal North suggests that distributional equity considerations were not comprehensively integrated in the planning process from the start.

5.6 Seasonality of cycling

Montréal's winter conditions are particularly harsh compared to other cities its size with daily average temperatures ranging far below 0°C from December to March, and large amount of precipitation being received mainly as snow, but also as rain, freezing rain, or hail. Despite having a higher cycling mode share than most Canadian cities and a partial four-season cycling network (which includes the REV), cycling culture in Montréal is still impacted negatively by its harsh winter conditions which can reduce people's willingness or ability to cycle. One respondent stated bluntly that "[as] a Nordic city, from December to April it is not possible to do groceries, shopping or to carry children by bicycle [in Montréal]." A frequent cyclist further added that "we cannot force people to buy winter cycling equipment worth thousands of dollars solely to please a dogmatic municipal administration disconnected with daily life." Both comments point to perceived limitations in the ability to cycle during the winter, likely stemming from a lack of appropriate equipment and infrastructure at desired destinations. In addition to these limitations, winter conditions, combined with Montréal's unique topography, can also limit people's willingness to cycle, with one respondent arguing: "Montréal has a lot of super steep hills and the last thing to convince people is how sweaty they will get under their parkas while biking in Montréal."

Lastly, the relevance of winter cycling was also used to support perceptions of modal inequalities. One respondent argued that "almost no one bikes during winter while the street space available to motorized vehicles diminishes." While such comment feeds into the defensive rhetoric used by motorists, it is important to note that inequalities with pedestrians

were also highlighted. Indeed, one respondent mentioned how "cycling lanes are better maintained than sidewalks during winter" further adding: "I think that priorities are not put in the right place."

Nevertheless, several cyclists expressed interest in extending their cycling activities over the winter months, with some year-round cyclists noting that the REV made them "feel more comfortable by bike during the winter." Other winter cyclists have pointed to a disparity in snow-clearance across the city's cycling network, including the need for better attention to snow removal across peripheral and lower-income neighbourhoods. Overall, Montréal's climate, primarily during the winter, has an impact on public perceptions of the REV and cycling in general in the region. Such considerations might stem from a lack of adapted infrastructure, but they could also indicate a potential limitation in the adoption of year-round cycling for many residents.

6. Discussion

Cycling expressways have been presented as a novel infrastructure and liquid (or transferable) policy concept capable of enabling longer-distance cycling trips and encouraging greater ridership (Cabral Dias and Gomes Ribeiro, 2021; Lagendijk and Ploegmakers, 2022). Yet the extent to which these initiatives can deliver equitable, cycling-friendly infrastructure and to foster a meaningful modal shift remains uncertain, particularly in North American contexts. While some researchers have claimed that cycling research is already over-saturated, and what is missing is simply a lack of political will (Nello-Deakin, 2020), the Montréal context exemplifies the importance of a situated focus. Notably, there is substantial political will for expanding cycling facilities among Montréal policy makers, highlighting the need to continue exploring particular opportunities and challenges in the implementation of cycling facilities.

Through our thematic analysis, we have highlighted several factors that might affect the prevalence and perception of cycling in Montréal. One of the primary themes that came out of our analysis was that of safety. Most notably, respondents expressed different types of safety concerns depending on whether they were cyclists or not. On one hand, the perceived improvement in safety of the REV by cyclists and its ability to promote cycling as a family-friendly option signifies a positive improvement given that past research has highlighted the lack of accessibility of Montréal's cycling network for children as a major limitation (Houde et al., 2018). That new cycling facilities are helping some residents to feel safer while cycling and to reduce or eliminate car use are additional positive signs.

On the other hand, new cycling infrastructure can present new challenges in terms of perceived safety for other active travellers and public transit users, as pointed out mainly by non-cyclist respondents in our study. In particular, our findings suggest that active-transport interventions require greater engagement with disability-inclusive paradigms, particularly when considering the diverse needs of wheelchair and other mobility aid users. While the city of Montréal expressly states that the REV is a new infrastructure aimed at improving "bike" travel, the critical-disabilities and inclusive active-travel literature emphasizes that cycling and active travel are more than just biking (Clayton et al., 2017; Inckle, 2019; Parent, 2021; Vietinghoff, 2021). As Simon Cook and colleagues (2022) explain, multiple transport modes can be classified as active travel and can benefit from infrastructure investments—including wheelchair use, kick-scotting, skateboarding, rollerblading, pram-strolling, tricycling, adaptive cycling, among many others—yet these modes are often neglected in academic literature and policy interventions aimed at supporting active travel. Given these considerations, it is important to ensure that new cycling infrastructure do not limit access for other road users that are already underserved by current transportation infrastructure. This is particularly

relevant considering the uptick in e-bikes, which usually go faster than regular cycles, thus presenting more opportunities for injuries to other users. In addition to clearer communication to promote cycling and active travel as inclusive modes of transport, anti-ableist planning interventions should also be implemented. The installation of more inclusive signage, the removal of barriers for mobility-aid users on cycling paths, and the provision of an adaptive cycle-sharing system similar to Victoriaville, Quebec (Parent, 2021), could help expand the population benefetting directly from new cyling infrastructure, in addition to other measure that merit greater elaboration with people with disabilities. Raised crosswalks or continuous sidewalks could present an additional means of slowing down cycling and car traffic at intersections, providing a safer environment for pedestrians and other active travellers. Ensuring careful integration of cycling facilities with other transport modes, while working to continually enhance public-transit and pedestrian infrastructure, could go a long way to ease residents' apprehension about new express-cycling facilities.

Even as the modal share of cycling is increasing and gaining public support in Montréal, resistance to the removal of parking spaces remains a major source of bikelash, in addition to concerns over the potential impact of new cycling infrastructure on local businesses. While these sources of resistance have been well documented in the existing cycling literature (Freudendal-Pedersen, 2015; Wild et al., 2018; Wilson and Mitra, 2020), they speak to the embeddedness of automobility in Montréal following decades of car-centric transport planning. Motorists, who have grown accustomed to being granted a disproportionate size of the urban street space at the expense of other road users, are extremely defensive when some of their mobility privileges are redistributed. This can lead to exaggerated perceptions of the negative impacts of new cycling infrastructure on their wellbeing due to a sense of entitlement in relation to cyclists. While generalized research is already available to demonstrate the typically positive impacts of new cycling facilities on local businesses (Volker and Handy, 2021), these findings have still to make their way into local public discourse. Collaboration between municipalities and research groups could help foster relevant localized data to better quantify the impacts of the new infrastructure and potentially support further extension of the cycling network. It is also possible that local media portrayals of cycling projects have had a negative influence on public perceptions, as demonstrated in other contexts (English and Salmon, 2016; Ferster et al., 2021; Macmillan et al., 2016; Ralph et al., 2019; Scheffels et al., 2019), and could be partially behind the observed discordance between the literature and non-users' perceptions.

Through this paper, we further highlighted the contradictory effects that rapid planning and implementation of cycling infrastructure can have on community approval. On one hand, the rapid implementation of the REV displays the political will of the municipal government to accelerate sustainable-mobility transitions, which is appreciated by many citizens—mainly cyclists. On the other hand, community consultation—which was minimal for the REV—would be beneficial to evaluate the "best" location of new cycling infrastructure. Indeed, our thematic analysis revealed a "not in my back yard" (NIMBY) back and forth between business owners and residents about whether cycling lanes should be implemented on large commercial arteries or on calmer residential streets. These seemingly contradictory realities suggest that, while it is important to promptly address deficiencies in quality cycling infrastructure, more community consultation through the planning process and clearer communication, as suggested in previous research (Banister et al., 2007; Pucher and Buehler, 2017), could improve public perceptions and subsequently reduce incidences of bikelash.

Equitable access to and distribution of infrastructure for active travel also remains a foremost challenge in Montréal. Indeed, the observed inequities in the distribution of cycling infrastructure, particularly considering the case of Montréal North, are consistent with past

research in the region (Houde et al., 2018). This area has, and continues to be, overlooked when it comes to sustainable-transport infrastructure, despite the municipal government's pro-cycling urban agenda and the implementation of new infrastructure such as the REV. Recent research has revealed that, while the implementation of cycling infrastructure is often connected to socio-economic privilege, there is also a connection between lower-income areas and disadvantages in road safety and access to adequate active-travel facilities (Rebentisch et al., 2019). This suggests that the lack of service for underserved areas such as Montréal North could further exacerbate inequalities in active-travel conditions and overall road safety. Overall, even though the REV has been framed as aiming to serve the needs of current cyclists and to entice potential new cyclists to start cycling, it seems that the people being considered remain mostly limited to the more central and upper-middle-class areas of Montréal. This is particularly contradictory given that recent research conducted across Canada found that low-income individuals tend to cycle more than their higher-income counterparts (MacEacheron et al., forthcoming), meaning that they would likely benefit more from new cycling infrastructure.

Another situated finding that arose from our analysis pertains to the impact of seasonal climate patterns on cycling. Montréal's long, cold, and snowy winters differentiate it from other Nordic cycling cities such as Copenhagen and Stockholm to which it is often compared. This local reality has a direct impact on the experience and popular perceptions of winter cycling in the city, likely making it more complicated to promote year-round cycling. While many residents are simply not willing or able to cycle year-round, others would benefit from more tailored winter-cycling interventions. As such, more needs to be done than simply copying policies being implemented in Denmark and Sweden if the municipal government wishes to truly promote year-round cycling. Indeed, while winter is well integrated in Montréal's cultural life and festivities, urban planning experts have commented that the city needs to do more to embrace its nordicity, particularly when considering the winter mobility needs of people with disabilities (Parent, 2018). Given the city's goals of fostering an inclusive cycling culture and a significant modal shift, these concerns merit further research and community consultation. Potential planning interventions could take the form of added covered parking for cyclists, better and more rapid plowing of cycling lanes or increased accommodations for intermodal travel in the Metro or bus systems. Other recommendations such as raised intersections or crosswalks could also double down as a way to avoid the accumulation of water at the bottom of curb cuts, which turns into ice during the winter.

While these recommendations might be tailored to Montréal, the need to carefully adapt cycling policies to the local context is not unique to our study context. Our findings support past research that argues for more contextualized cycling research (Castañeda, 2021; Vivanco, 2013) and greater integration between cycling and other transport facilities (Bachand-Marleau et al., 2011; Sagaris et al., 2017). Our findings further contribute to the literature by highlighting the need to account for the diverse perceptions of both cyclists and non-cyclists towards new cycling expressways, the importance of considering unique climate conditions, as well as the need for greater integration of critical disability perspectives in cycling research and planning interventions.

7. Conclusion

As cycling expressways make their mark through cities across the globe, critical research is needed to ensure that these interventions are being implemented in inclusive and equitable ways. This study helps to unsettle some of the universal theorizing around cycling infrastructure, contributing to discussions on the need for situated understandings of mobility practice, perceptions, and politics (Castañeda, 2021, Cox, 2019; Golub et al.; 2016, Sagaris,

2021; Sagaris, 2022; Soliz, 2021; Stehlin, 2019). To foster appropriate and equitable infrastructure provisions for active travellers, we propose greater situated research across cities with unique climate and topographical conditions. We also contribute to the cycling literature by highlighting context-specific elements of public support and contention related to the implementation of new express cycling infrastructure in Montréal primarily in terms of safety, modal integration, economic, political, equity, climate, and disability inclusive considerations. This study's findings can provide insights for the development of policy strategies aimed at expanding cycling networks and promoting cycling as a viable and sustainable alternative to motorized vehicles. Lastly, we stress the need to bring cycling research into better conversation with the critical disabilities scholarship to better analyze the rhetoric on cycling facilities, who is welcomed to use them, and how to work towards more inclusive cities. Cycling is more than just biking, and active travel is more than just cycling. As such, the language and infrastructural interventions aimed at fostering active travel should reflect the realities of people with diverse mobility needs.

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Competing Interests

The authors have no competing interests to declare.

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