

**Mapping the Cyclist Ear: Examining My Relationship Between Sound and Space**

Caitlin Chan

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By: Caitlin Chan

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Signed by the final Examining Committee:

_____	Chair
Dr. Elizabeth Miller	
_____	Examiner
Dr. Alessandra Renzi	
_____	Supervisor
Dr. Owen Chapman	

Approved by

\_\_\_\_\_  
Dr. Fenwick McKelvie, Graduate Program Director

April 15, 2024

\_\_\_\_\_  
Dr. Pascale Sicotte, Dean of Faculty

## **Abstract**

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This thesis explores the auditory experience of cyclists, delving into perceptions and interactions with sound that are unique to that mode of transportation. I drew upon autoethnographic research methods to investigate the intricate relationship between the processes of cycling and listening. Borrowing from Dylan Robinson's concept of listening positionality, I expanded upon that concept to explore the possibility of a temporal-based, cyclist ear. Central to this exploration is the conceptual framework that the cyclist ear categorizes sounds into three distinct Levels: Level one known as self-produced sounds, Level two known as safety sounds, and Level three sounds known as ambient sounds. Self-produced sounds encompass any sounds created by the cyclist. Safety sounds refer to auditory cues signaling potential hazards. Ambient sounds denote sonic landmarks or soundmarks that aid in giving the cyclist a sense of place. To explore this theory in more depth, I utilized autoethnographic research approaches, including sound recordings and written notes, to attune to these three different Levels. Through this process, I determined that listening is indeed impacted by the act of cycling. The cycling ear does exist and does sort sound into different categories, including utility. However, the lines between the different categories can be blurred as a single sound can serve multiple purposes at once. Ultimately, this research advocates for the integration of auditory considerations into urban planning and transportation infrastructure, recognizing the significance of sound in shaping the cycling experience.

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## Chapter 1: A Shift in Mobility, a Shift in Listening (Introduction)

In March 2020, my life, like many others, changed radically. COVID-19, a worldwide virus, hit the west coast of Canada causing businesses, schools, and government services to shut down. The primary recommendation from the provincial health agency was to stay home and isolate from others. If one had to go out, it was recommended to use a method of transportation that allowed for physical distancing. Motorized public transportation, such as buses and the SkyTrain, did not fit this bill. As someone who primarily traveled further distances (5km<) via public transportation, there was a core part of my identity that was stripped that I didn't even realize affected me. Having recently moved back to Vancouver from Victoria, I decided to pick up cycling again, a choice that I was not alone in (Salazar 2021, 28). As someone who never learned how to drive, cycling is the next most accessible form of long-distance transportation that fits the pandemic values of isolation. Switching my mode of transportation shifted not only my movement patterns and identity but also triggered a shift in how I perceived the environment around me.

When unplugged, I began to experience Vancouver differently. Having been an avid rider of Vancouver's public transportation system for many years, I had become comfortable with the sounds of transit merging with whatever album I was hyper-fixated on. However, instead of zoning out from point A to point B, I found that on my bike I was actively listening to the sounds of places I cycled past. I could hear people chatting on the street, bikes and cars whizzing past, the wind between the trees, birds chirping, and dogs yapping. When I was cycling in Victoria to be at work at 9 A.M. sharp, the sounds I would listen for would be ones that would expedite my commute, such as the warning beeps of the crosswalk. Listening was imbued with a distinct purpose. How do I get to work as quickly as possible? I would listen, not to the wider environment around me, but rather to sounds that directly impacted my ride. In contrast, cycling in Vancouver without a time limit allowed me to notice more of the nuances of the streetscape, as well as the ways that neighbourhoods connect. Deep listening to the space around us takes time, something that I was afforded during those first six months of the pandemic. While I still had to listen for signals of safety anywhere that I went, I did not have the same obligation to timeliness. While I had previously been a commuter cyclist pre-pandemic in Victoria, primarily using my bike to get to work, I never translated that cyclist energy in Vancouver. When I lived in Victoria, I cycled and rode public transportation in tandem so the differences in sensory perception did not feel as stark. Moreover, the concern about being late for work affected my ability to listen to the greater soundscape around me. By switching to cycling in Vancouver, I was relearning and rediscovering the city. New paths, new sounds, and new senses emerged.

During the pandemic period, cycling revealed itself not only as a "safe" form of transportation due to its private nature but also one that allows people a small sliver of pleasure. Cycling forces the rider to connect to the street due to the illegality of playing music/podcasts while cycling ("CITY OF VANCOUVER," n.d.; "Cycling with Earphones - Service de Police de La Ville de Montréal (SPVM)," n.d.). The cyclist is in a position where controlling one's sonic environment via the MP3 is not advisable. Even in pre-pandemic times, "the boundary between work and leisure is blurred, and the concept of what constitutes leisure is redefined" (Freudendal-Pedersen 2015, 38), as noted in a past study regarding the practice of cycling culture in Copenhagen. In this study, the practice of cycling in Copenhagen reveals how a strong cycling culture can coexist with an urban design that ultimately centers on the automobile (Freudendal-

Pedersen 2015, 30) Cycling serves as an everyday escape from work, allowing one to experience the joys of the city at ground level. Being above ground and unplugged, one can notice the way neighbourhoods flow into one another as well as the blurred boundaries between different spaces. Unlike driving a car where you are enclosed in a box, the openness of cycling makes it a hyper-immersive form of transportation. This rich sensory experience allows the rider to feel like a tourist in their city. They can experience more sensory joy in a single ride than one may experience in an entire workday. The sounds and other sensations encountered on a bike ride can be both invigorating and overwhelming depending on where you are cycling.

Examining cycling through sound gives an alternative perspective on how space is perceived differently. This is due to sound's inherently multisensory nature, as sonic waves are felt by the full body, such as dancehall concerts that feature loud bass (Henriques 2010). Sound is something that is also felt while biking, with the resistance from the wind affecting both the cyclist's speed and hearing. To look more deeply into the context of sound, it is helpful to think about soundscapes. The term soundscape was first used by Michael Southworth (1969), to describe how sound can be utilized to unlock certain aspects of the Boston urban landscape. The term was popularized by R. Murray Schafer in his seminal work "The Tuning of the World" (1977), in which the author argues that soundscapes can be used to measure the health of an area and can be curated to amend the issues of noise pollution. This assertion by Schafer is not incorrect as soundscape theory has been utilized by those in urban studies to address perceived sonic disturbances (Radicchi et al. 2021; Lacey et al. 2019). Additionally, the concept of soundscapes has been used to acknowledge and challenge immaterial issues present in the landscape (Dillane, Power, and Devereux 2017; Radicchi et al. 2021).

Reflections upon the soundscape, however, change based on context. With cycling, the rate of listening changes, which changes the interpretation of the landscape dramatically. As you are moving faster on a bike as opposed to walking, it makes for a greater amount of sounds that one needs to interpret at one time. The differing sensory experiences that can be accessed when cycling have inspired my research-creation project. This project showcases a multi-layered sound map that utilizes sound recording and illustration to draw attention to the sonic complexities unique to the cycling experience. For my research-creation project, I developed an interactive sound map that is accompanied by three sound mixes showcasing typical auditory experiences of Southwest Montreal on a mid-week summer's day (albeit with limited sample size). On Tuesday, June 14, 2022, Wednesday, June 15, 2022, and Thursday, June 16, 2022, I cycled through the Montreal neighbourhoods of Verdun, Griffintown, and Old Port, taking notes on the sounds that I encountered. Additionally, I also recorded the bike rides using a RODE Lavalier mic that was attached to the back of my helmet. From there, I took these notes and recordings to illustrate a sound map.

The sound map is subdivided into three smaller maps that reveal three different levels of sonic engagement. The first level is sounds created by the cyclist, the second level is sounds that help the cyclist navigate and travel safely, and the third level is ambient sounds that imbue the landscapes that cyclists pass by with meaning. The chosen route traverses various environments, including pedestrian zones, bike lanes, multi-use pedestrian/cycling tracks, and a brief segment on car-only roads. The route was crafted to test whether different infrastructure influences cyclists' perceptions of the surrounding soundscape and what that impact might be. Each of these smaller sound maps is paired with an accompanying sound mix that comprises sounds that are representative of each level.



This composite map and accompanying tracks reveal a unique listening positionality. Borrowing from Robinson's (2020) concept of listening positionality, wherein listening as a process is inherently imbued with the politics of one's existence, I argue through these sound maps/mixes that there is an existence of specific cycling listening positionality, or cyclist ear. Through these maps, I consider cycling as an under-researched mode of transportation that affects our listening, with movement being critical to understanding spatial relations as suggested by scholars like Thibaud (2011), Jacobs (2011), Westercamp (2011), and De Certeau (1988). My methods are influenced by the careful autoethnographic attunement to the environment as exemplified by scholars such as Stewart (2011), Krobath (2021), and Myers (2019). The maps are inspired by a classic sound mapping exercise (Sensory Trust, n.d.), while the mixes are influenced by the research-creation work of Thulin's (2012) master's dissertation.

This project highlights cycling as a vehicle to connect to a deeper political conversation (Dunlap et al. 2021, 91). The amount of urban space we dedicate to cycling speaks to the reprioritization of what a city represents: leisure, enjoyment, and a vibrant streetscape. After all, do people enjoy sitting in traffic in their cars or is there just no better option? Throughout the pandemic, the boom in cycling has led to a period of re-imagination of where our time and spatial priorities lie and how they have shifted. These micro shifts in the landscape as experienced by a cyclist were a core feature I captured in my project. Ultimately, through the creation of my sound maps and accompanying mixes, I seek to answer the following question: while cycling, are our listening habits and practices impacted by the mode of transportation itself? In other words, how does the way we move change the way we listen, and how does cycling specifically factor into that? Secondarily, I want to explore within that positionality, how a cyclist sorts through different sounds (through utility, aesthetic value, etc.)

To engage in this work, I developed a more critical listening ear. This critical listening ear is more than just listening deeply, it is listening with the context of the space in mind. How I listen to space is not just dependent on personal factors - it is also influenced by external urban design. Which areas are designed to ensure safe cycling? How does one's experience change when riding along the Lachine Canal bike path in Montreal with clearly demarcated lines for cyclists vs. biking on a street with no clear lane for cyclists? While time is no longer the largest factor in influencing my cycling listening position, the dangers of moving vehicles remain. Through more attentive listening, a hierarchy of sounds begins to emerge. The sounds most relevant to the safety of the rider are noticed first, and irrelevant sounds are filtered out subconsciously. This critical form of listening can help process the full extent of sounds that can be found in a landscape. There are some spaces where deeper listening is impossible due to safety concerns; for example, turning left on a busy road. In contrast, bike paths with concrete barriers gave way to a less stressful cycling experience, allowing other "non-necessary" cycling sounds to be heard acutely. Paying attention to what we hear and when we can listen to reveals the sonic design of a space. Refining our cyclist listening ear can help us create more intentional cyclescapes.

Thoughtfully designed cyclescapes can not only improve safety for cyclists but also allow deeper listening. Cyclescapes that are easier to navigate allow cyclists to connect to the greater sonic narratives occurring in the places they pass by every day. Of course, this is only part of the equation, as formal design only affects the cyclist soundscape so much. Part of creating a honed cycling ear is listening to how the material world (i.e. infrastructure, built/unbuilt environment) affects the soundscape, but also the way that immaterial cultural norms are made material

through the soundscape. For example, the effects of a 9-5 workday can be heard by the increased number of cyclists and vehicles on the road, as well as the increased level of aggression from commuters during “rush-hour”.

The external design of cyclescapes is not the only factor with the type of bike that you ride affects your cycling routes, as well as what sounds you hear. In Montreal, where my research took place, in addition to cyclists who own their bikes, there is also an extensive private-public cycling system called BIXI. BIXI is a non-profit bike share system that has been owned by the City of Montreal since 2014 (“Who We Are,” n.d.) These bikes, which typically have three gears and are limited in their top speed, have a specific creak to them while moving. BIXIs are also limited in their routes due to the location of docking stations. This means that their unique creakiness can be mapped out within a certain area. Additionally, higher BIXI usage occurs when there are more BIXI docking stations (Faghih-Imani et al. 2014). The Montreal neighbourhoods with a higher concentration of these docking stations such as the Plateau, Mile End, and Downtown will feature this bike’s distinctive sound more frequently and in higher numbers (“BIXI Montréal | Carte Des Stations,” n.d.). Finally, there are electric bikes within the BIXI system, which can run much faster as well as maintain a more even top speed when ascending hills. These pedal-assist (bikes that automatically turn on electric assistance when the user pedals) create distinct sonic patterns and in turn, affect a particular type of sonic listening.

We can also note the prejudices in urban planning by comparing which areas get safe cycling routes to neighbourhoods that are left underdeveloped. Using a critical cycling ear can help us accurately understand the lived experiences, both positive and negative, of moving through space on a bike. Honing a critical cycling ear is not only a benefit to our understanding of space but can help us articulate how a landscape works for or against cyclists. The critical cycling ear could potentially be used similarly to the way that Antonella Radicchi utilizes the sound walk (Radicchi, n.d.), as a methodology to reorganize sonic balance in our city landscapes. A critical cycling listening perspective can allow us to diagnose how listening is bounded and held hostage by the environment.

With the concept of cycling as a form and sound mapping to represent and transduce lived experiences, I also engage with autoethnographic methods to translate what it feels like to ride a bike in Montreal. Taking inspiration from scholars like Natasha Myers (Myers 2019), whose used autoethnographic research to examine the complexities in the Anthropocene as it pertains to gardens, I similarly take my intuitive ways of engaging with space and hone in on those embodied realities. I look at how It is not just about how these ideas connect, but about how we can use these concepts to think critically about space and analyze how transportation mediums fundamentally transform our conceptualization of space. To begin doing this, I work through three main questions in what remains of this introductory chapter: What is a soundscape? How do we move through it? How does our mode of movement affect our listening practices?

## Chapter 2: Sound, what do we hear and how do we hear it?

### 2.1 What Makes a Soundscape, a Soundscape?

The term soundscape was first popularized by R. Murray Schafer in his seminal work “*Our Sonic Environment and the Soundscape: the Tuning of the World*”, in which he described the soundscape simply as “any acoustic field of study” (Schafer 1977, 9). In the case of his study, the soundscape in focus is the world landscape, the primary tensions of the world soundscape being sound/not sound, technological sounds/human sounds, artificial sounds/natural sounds, continuous sounds/discrete sounds, low-frequency sounds/mid-or high-frequency sounds. These binaries can be used to attribute value to certain sounds, through which he argues that the main issue with the modern world is sonic pollution. The counter to the central issue of too much noise is not the total absence of sound, but its curation. He lays the groundwork that sound is something that can be engineered through the concept of the “acoustic designer” (1977, 29), where Schafer notes that alongside the principles of music, the acoustic designer must have:

1. “a respect for the ear and voice-when the ear suffers a threshold shift or the voice cannot be heard, the environment is harmful;
2. an awareness of sound symbolism-which is always more than functional signaling;
3. a knowledge of the rhythms and tempi of the natural soundscape;
4. an understanding of the balancing mechanisms by which an eccentric soundscape may be turned back on itself (1977 239)”

Central to determining the perceived quality of a particular soundscape is defining the binary of sounds that exist. For Schafer, this core binary can be described as a hi-fi soundscape vs. a lo-fi soundscape. A hi-fi soundscape is one with a “favourable signal-to-noise ratio” (1977, 43), or a soundscape in which ambient noise is balanced with sounds that give space a distinct identity. Sounds that denote placeness in a hi-fi soundscape Schafer titles “soundmarks”, in which he combines the terms sound and landmark together. A hi-fi soundscape is not the complete absence of noise – rather it is one where noise is balanced, dynamic, and gives spatial awareness. This awareness is not simply cultural but one that gives the listener a sense of dimension and distance. (1977, 43) In contrast, a lo-fi soundscape is one in which sounds blur together to the point where unique sounds are rendered indistinguishable. In other words, sound loses meaning. For Schafer, the unintentional and careless cacophony of urban life can often produce lo-fi soundscapes that render auditory signaling useless. The overt hustle, bustle, and constant movement overshadow sounds that give way to placemaking efforts. The designed world does not need to be a strict binary of silence or cacophony, but rather one that embraces sonic variance.

This hi-fi/lo-fi binary way of listening to space continues today albeit with a different language. At the Soundwalk Symposium (2022) that occurred April 2022 at Concordia University, Antonella Radicchi presented how sound walking and sound recordings are utilized to create quiet oases in the city. In her presentation, she highlights the creation of the Hush City Map and Hush City app, which is a participatory map project that allows people to notate quiet areas in the city. Sound mapping a soundscape can also be used as a tool for understanding and enhancing space for users (Radicchi et al. 2021). There are also advocacy groups such as “No More Noise” Toronto (“No More Noise Toronto,” n.d.), which aims to highlight the lo-fi woes of urban soundscapes. However, for all its merits, the Hush Map project and groups such as “No

More Noise Toronto” continue the legacy of fetishizing quiet as opposed to focusing on the purposefulness of sound itself.

Sound does not need to be imbued with such strict moral declarations. Thibaud (2011) proposes a more embodied, triple-tiered way of understanding a soundscape or as he refers it to, the urban ambiance. Thibaud states “ambiance can be defined as a time-space qualified from a sensory point of view” (2011, 43). For Thibaud (2002, 4), the ambiance accounts for context and how space can be both felt sensorily and emotionally at the same time, a more affective description compared to Schafer’s outline of the soundscape. An urban ambiance is not broken down into good or bad sounds, it is just filled with sounds – ephemeral in their brief existence! The subjectivity embedded in the definition of the ambiance only lends itself further to its nebulous conceptualization. The ambiance of an urban space is constantly in motion and is highly dependent on who is in that space at that time. Of course, this is influenced by who/what occupies that space at a given time and at what intervals, which is something that Thibaud explains by breaking down three components of what comprises an ambiance (Thibaud 2011, 44).

The three aspects of ambiance that work in conjunction to form our understanding of a soundscape are: acclimatization, variation, and alteration (Thibaud 2011, 44). The first aspect, acclimatization, refers to the process of settling into an ambiance and understanding the nuances of what makes a space, a place with specific meaning. The second aspect, variation, and its related process of modulation, refers to how the nuances of the ambiance are revealed through more comfortable listening (2011). Finally, there is alteration, which is when the ambiance is injected with sounds outside of the established sonic variance. When cycling, the pace of movement is quick, the acclimatization, modulation, and alteration of space happen simultaneously, but also in and out of sync with one another like an anarchistic orchestra.

In Thibaud’s work we find an immediate contrast to Schafer’s understanding of soundscapes – with Schafer emphasizing how sound exists in a soundscape as a siloed and separate entity. Rather, Thibaud calls attention to how sound exists as an embodied experience that is intertwined with the subjectivity of one’s experience of everything all at once. In my reading, these three aspects of Thibaud’s concept of urban ambiance have been articulated through slightly different words in the architecture realm. Barbara Erwine (2017) writes,

“Perhaps the most interesting difference for the designer is that whereas the architect sees light space as his or her creation. The occupants have a major influence on the experience of its aural architecture. No single designer owns the aural architecture because without events in the space, then there is no sound” (144)

This quotation highlights the precarious nature of sound itself. A soundscape is at its core dynamic and moving. The conceptualization of an ambiance as a soundscape gives more agency to all beings within it (human and more-than-human) than simply declaring it a lo-fi or hi-fi soundscape waiting to be curated by man, which ends up being an unintentionally colonial-patriarchal approach to sonic ecology. Additionally, this specific narrative of quiet superiority plays into the legacy of erasing Indigenous sonic impacts that have shaped the soundscape from time immemorial (M. Akayami 2015).

Hildegard Westercamp (2011) also discourages the binary of lo-fi (bad) and hi-fi (good) noting that certain sounds are stigmatized as noise. City sounds such as air conditioner draft,

people's voices, and car horn sirens are often viewed as interference, not sound (2011, 22). This use of interference rather than sound imparts an implicitly moral interpretation of sound. The discussion between interference vs. sound can be seen as descendant terminology to the binary of lo-fi/hi-fi, noise pollution/nature sound that Schafer initially proposed. Westercamp notes “life in your neighbourhood is sound. Listen.” (2011, 22), encouraging readers to counter the narrative of sound’s dualistic qualities. Meanwhile, later scholars such as Andra McCartney (2016) and Helena Krobath (2021) take the notion of interference vs. sound and instead of wishing it away, lean into the social dilemmas that are inherent to space and sound itself. Mitchell Akayami (2019) notes that the lack of diversity can impact what could even be determined as a sound that demarcates placeness, as the othering of certain groups leads to specific othered soundscapes. Additionally, Dylan Robinson (2020) highlights through the written/text metaphor of the palimpsest, how listening itself is a practice that should be examined, as soundscape interpretation can never be heard neutrally.

Through sound, the metaphor of place as an acoustic palimpsest<sup>1</sup> is made apparent where listening is situated “within the strata of sound and historical context” (Robinson 2020, 59). Pulling from Martin Daughtry’s article “Acoustic Palimpsests and the Politics of Listening”, Robinson describes the “palimpsest as a metaphor to envision listening to layered histories and agencies in soundscapes, including faint sound-traces that may be less discernable, or not audibly present at all.” (Robinson 2020, 58). As different street sounds like car honks, turning wheels, and chatter layer on top of one another in a streetscape, this process enfolds the competing histories and ideologies that can be found in any given place. Additionally, as Robinson analyzes Daughtry (2014), listening is not just about what you hear, but also about what you don’t (Robinson 2020, 60). Daughtry proposes an idea of layered listening, which delves into the concept of sounds stacked on top of one another competing for listening space. However, Daughtry admits that this metaphor is far from perfect -- most notably it does not account for the dimension of space and motion in sound (2014, 29). To make the metaphor more adaptable to the spatial aspect of sound, I bring in the first law of geography as proposed by Tobler: “everything is related to everything else, but near things are more related than distant things.” (1970, 236). In the case of the acoustic palimpsest, “near” sounds that impact the user are heard whereas less relevant sounds go unheard or barely heard. This frames the metaphor of the acoustic palimpsest as an active one, something that is in sync with the listener themselves. Sounds are never just sounds, history is never just history and what we choose to hear says much about ourselves as well as the spaces we inhabit.

The concept of the acoustic palimpsest is similar to McCartney’s (2016) conception of ecotones. Ecotones, which is “derived from the Greek word *tomos*, meaning tension, and refers to the competition for resources that happens, especially in contested marginal areas. It is also possible to think of the connection with musical tones, and tonalities, of shifts in time and spatial practices that become audible in sounding places.” (McCartney 2016, 163) At the heart of this term is conflict - the overlap of different communities and interests intersecting in a single

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<sup>1</sup> From the Canadian Geographic: “While palimpsest often refers to a writing material on which the original script has been erased (though not completely) and written over again, in geography, the word means a place or landscape in which something new is superimposed over traces of something preceding it. (“Geography Word of the Week: Palimpsest,” n.d.) In this particular context, Robinson notes that this layering effect also occurs sonically as well as visually in our landscapes.

soundscape. Through ecotones, the cacophony of everyday life is heard. McCartney (2016) and Krobath (2021) further complicate the idea of the soundscape as a mere binary but also protest the idea of sonic morality itself. As an example, the jangling of cans can inspire ire from nearby brewery goers yet are the sound of resistance from elderly women collecting cans to cash in on the waste of East Vancouver gentrifiers (Krobath 2021, audio recording). The differing interpretation of the sound of shaking cans calls to the importance of one's positionality in comprehending the livability of a space. Instead of attributing moral judgment to certain registers of sound (lo-fi/hi-fi), the concept of ecotones is grounded in the idea that multiple sounds engrained in multiple contexts exist simultaneously (McCartney 2016) and that this is normal and desirable – unavoidable, even.

Ecotones are sonic gateways to understanding simmering tensions found in all spaces. Any single area is the site of multiple, simultaneous changes (Zimmermann and De Michiel 2017) - tensions that then clash with global pressures (Patterson 2016). What are the sounds that are being made and how do they shape our understanding of the place around us? How are stereotypical associations of hi-fi sounds (quiet) as sparse naturescapes and lo-fi sounds (loud) as busy city streets flipped on their head once sounds are contextualized? While some of the tension in ecotones can be attributed to the hi-fi/lo-fi divide, moving beyond “volume politics” will allow us to perceive the nuances in a space more clearly (Li 2011). Soundscapes can thus be used as an entry point to sound the contradictions that exist within a space (Krobath 2021). Ecotones function as a sonic battleground, the fight for gentrification is not just theoretical, it can be heard. The sonic ignorance that Schafer aims to combat is not undone within a binary of lo-fi/hi-fi but can be found through a deeper investigation of sonic contexts.

Using the idea of ecotones to politicize ambiances, we can imagine a way to listen to soundscapes that is critical in three-dimensions: comparing structures of: (1) social inequity along the axes of (2) time (Krobath 2021) and (3) space. I would also like to propose a fourth dimension which scholars such as Thibaud (2011), Jacobs (2011; 2016), Westercamp (2021), and De Certeau (1988) imply: i.e., (4) movement itself. Through cycling, a unique way of examining the soundscape emerges.

## *2.2 Change the Mode of Movement, Change the Mode of Listening*

In “Downtown is for the People”, Jane Jacobs argues that the city is designed and planned from the perspective of the block, yet is experienced as a street unit (2016, 117). She notes this dissonance comes from how planners analyze buildings and zones, yet much of the vitality of a neighbourhood cannot be derived from a single building or block, but rather from how they connect and blend. Sound accentuates this concept but also blurs it (literally) as sound from inside the block can be heard outside of it. Depending on the sound design of the built environment, this can also be reversed - the street can enter the private block through sound.

Jacobs (1958), along with many other scholars (De Certeau 1988; Harries and Rettie 2016; Thibaud 2002) highlights walking as a method for understanding the street unit. However, when moving on foot, one is often confined to one neighbourhood at a time. With cycling, the concept of the street becomes even more critical: unlike a pedestrian, the cyclist never enters ‘the block’, which is the typical unit for urban planners to create distinct “zones”. Instead, cyclists operate at the level of the street unit, with the pace of cycling itself allowing a more holistic understanding of street systems. How does the street unit evolve and flow into new

neighbourhoods? How does the character of the street shift as you cycle down it? In other words, how can we examine the clash between the intended design of the city planner with the lived experience of the neighbourhood dweller? Whole neighbourhoods are often defined by a major street (Jacobs 1958 117), but even these streets often crossover and merge with other neighbourhoods. The shining example in Montreal – the site of my research -- would be Boulevard St. Laurent--moving up this street, one passes through many neighbourhoods moving from Old Port Montreal, to Chinatown, to the Plateau, to Mile End, to Mile-Ex, to Park Ex.

By understanding the city as comprised of streets and street systems as opposed to blocks, focus is shifted from private city zones to more explicit public spheres. We can also hear the contradictions that the city offers. A single street block can dramatically shift in demographics depending on the time of day (Krobath 2021, audio essay). Even on the main street of the neighbourhood where I lived in Montreal, Wellington Street, you can hear the sounds of gentrification against the humbler roots of the historically working-class area. Sounds of mom-and-pop grocers can be heard in one ear, with the sounds of coffee talk chatter from third-wave cafés in the other. As Brandon Labelle (2011) states, the street “expresses the conflicts and contradictions of individual freedom as it exists collectively.” These contradictions in the soundscape tend to mimic the micro-geopolitics of space (Krobath 2021, audio essay). Through the street, not the block, we can fully understand the sublime complexity of the urban soundscape and no mode of transportation lends itself to deepen that understanding better than cycling.

Of course, cyclists are not the only folks on the road. Cyclists share road real estate with motorized public and private transportation, a relationship fraught with hierarchies of power and domination. The term “automobility” underscores how modes of transportation submit themselves to hegemony (Sheller and Urry 2000; Urry 2004). In a Western context, the hegemony of automobility privileges cars and subsequently, their users (Urry 2004, 28; Merriman 2009, 589). In the system of automobility, the landscape and the economy are shaped to privilege the private car user, which is then legitimized and consented to through the media. This creates justification for the negative environmental and social impacts that come with mass amounts of private car-users including increased air pollution and urban disturbance (Sheller and Urry 2000, 739; Urry 2004, 26).

The prioritization of the private car-driver blurs the line between public and private, with private vehicles and drivers deemed the legitimate public (Sheller and Urry 2000, 738). Those who do not have cars are delegitimized in the public eye and segregated into relatively small slivers of the landscape (Sheller and Urry 2000, 755). Meanwhile, public transit use is stigmatized along class and racial lines, with people of colour and lower-class people, often pushed towards alternative modes of transportation by design (Sheller and Urry 2000; Urry 2004; Sheller 2015; Frohardt-Line 2014). This means two people going to the same destination will be attuned to the ambiance of space differently based on the intersections of their identity as well as the mode of transportation itself. In Montreal, cycling and public transportation infrastructure are particularly lacking. In a report by Lefebvre-Ropars, Morency, and Negron-Poblete (2021), they examine the needs-gap difference in multiple modes of transportation including walking, cycling, motorized public transportation and private motor vehicle traffic in the 11 different Montreal boroughs to compare the passenger kilometers-travelled (PKT) and how this lines up with the dedicated street allocation space (Lefebvre-Ropars, Morency, and Negron-Poblete 2021, 159). They determined that in the City of Montreal, overall, cycling is

particularly underrepresented spatially (Lefebvre-Ropars, Morency, and Negron-Poblete 2021, 162).

In the year 2022, the relative lack of cycling infrastructure in Montreal results in a varied listening experience that reflects the uneven biking experience (Lefebvre-Ropars, Morency, and Negron-Poblete 2021, 166). Cycling is particularly interesting in the city of Montreal, the city that invented a widespread and usable, private-public biking system called BIXI (Lefebvre-Ropars, Morency, and Negron-Poblete 2021) and has a relatively connected cycling network. Of course, even the locations of BIXI stations show geographic biases, with many of the stations being concentrated in neighborhoods such as the Central Business District and the Plateau, where cycling infrastructure is built. This adds another layer to the listening ear of the cyclist, the ear you hone is dependent on the bike you ride.

All of this is to say while cycling, walking, and motorized public transportation are all marginalized by the hegemonic dominance of the private car in North America, each mode produces a very specific experience of the landscapes and soundscapes traversed. For example, with motorized public transportation, the passenger is closed off from the road. There is also a separate culture of automobile soundscapes wherein the “mediated sound becomes a component of what it means to drive” (Bull 2003, 362). Automobile soundscapes give drivers a totalitarian utopic sense of control over their space which emphasizes the mundane through the privatization of listening. This phenomenon is further enhanced by the type of motorized public transportation. A bus or tram will still be on street level, for example, with specific instances of the doors opening revealing slivers of road/street sounds.

However, as a cyclist is always exposed to the street level, the unevenness of the built environment can be heard acutely throughout the entirety of the journey. The quicker pace (in comparison to walking) also impacts the sonic interpretation of space as it increases the Doppler effect. The Doppler effect refers to the change in frequency that occurs when an object moves toward the listener (Neipp et al. 2003, 497). The Doppler effect application to cycling is twofold: it privileges the sound of motion itself (wind resistance) as well as blurs ambient sounds together. The continuous exposure to the street, combined with a quicker pace of movement, are material factors that make cycling an interesting transportation medium for analyzing listening processes.

There are also immaterial reasons that cycling creates a different listening ear, most notably the specific affects that cycling brings out. Different modes of transportation can result in vastly different affective experiences (Löfgren 2008; Sharma 2008; Freudendal-Pedersen 2015; Pesses 2010; Calvert, Jain, and Chatterjee 2019). Cycling can have a strong effect on one’s emotional and physical well-being due to cyclist’s intimate interaction at the street level (Dunlap et al. 2021; Freudendal-Pedersen 2015; McIlvenny 2015). Something as simple as a change in topography, such as encountering a downhill portion of a ride, can illicit visceral reactions (McIlvenny 2015, 72). The affects experienced through our movements shape us on both large and small scales (Löfgren 2008).

The precarious position of cycling between privileged and unprivileged populations, where cycling functions as both a leisure activity for upper-middle classes as well as a relatively accessible form of transportation for folks in more precarious financial situations, shows how cycling holds a complicated position due to unequal racialized transportation development (Sheller 2015, 72). Cycling is an activity and mode of transportation used by folks across racial



and class lines, however, who is prioritized in cycling design is often not as diverse. Cycling as critically positioned within the transportation landscape (as I have attempted to do in the preceding paragraphs) illuminates the possibilities that the mode provides for deepening our understanding of the complexity of our urban environments.

### *2.3 Using Cycling Positional Listening as Research Methodology*

Urban soundscapes are complicated, contradictory, and uncontrollable. Something that makes urban soundscapes (particularly in everyday urban landscapes) notable is that, instead of delving into the exceptional, understanding them requires us to pay attention to the mundane, or sounds we typically overlook. Deep listening to urban soundscapes requires us to listen past the generic language of “noise” “buzz” and “city hum”. What makes a city sing or croak? When discussing aural architecture, Barbara Erwine (2017) notes that sound in space is relational between the built environment and the occupants who fill it (144). Sound “waves” imply a verb within the noun, as they describe something that is perpetually in motion. From an urban planning perspective, this shiftiness increases because there are more formal cooks in the kitchen; it is not a single designer influencing the urban streetscape: architects, urban planners, and local lawmakers all play a part in creating the infrastructure that sounds reverberate in. This does not even begin to account for the equally important, yet ephemeral, presence of human and more-than-human actors who move through space.

The chaotic nature of aural architecture is increased tenfold when on the move. When in motion, the sound waves created by the mover clash with the soundwaves created by external forces, like two trains on parallel tracks passing each other. Listening positionality, as defined by Robinson, is something that requires both the acute awareness of normative listening patterns whilst developing a sense of attunement (Robinson 2020, 60). Kimberlé Crenshaw (1989, 140) defines intersectionality as many parts multiplying into new wholes as opposed to single facets of our identity being siloed separately. Similarly, when compared to an intersectional understanding of identity, our listening practices as individuals are equally imbued with a sense of overlapping forms of attentiveness, or identification. There are many types of listening positionalities, which are formed through our background and experiences (Robinson 2020, 3). For example, hungry listening comes from the settler positionality wherein the ear has an endless need to consume all things (Robinson 2020, 3) which Robinson asserts as the dominant listening positionality of post-colonial Turtle Island. The hungry ear, situated in settler-colonialism is the dominant contemporary listening positionality. While Robinson primarily writes within the binary of settler vs. Indigenous listening habits he notes that “hungry listening must be understood on a continuum of listening practices that includes subtle and significant gradations of normativity; shxwelítémelh xwélalà:m is not the same practice for an Asian American settler as it is for a person who is Cree, two-spirited, or transgender.” (2020, 3)

Cycling too provokes a unique positionality and creates a specific filter for sound. Specifically, the positionality of commuter cyclists creates a listening position that resembles a sieve, filtering out the unnecessary. The leisure cyclist can engage in this form of listening as well, but the commuter cyclist’s ear is explicitly shaped by the flows of traffic which are also shaped by the traditional 9-5 workday and thus the demands of a capitalist society. Three distinct scales of sound affect the cyclist’s listening positionality: 1) the sounds produced by the cyclist, 2) the sounds that directly affect the cyclist, and 3) the sounds that are filtered out. It is important to note that the cyclist listening ear is not necessarily separate from the hungry settler ear or

Indigenous forms of listening, but rather constitutes another layer to the palimpsest of acoustic listening.

The first level, and the sound level closest to the cyclist, is self-produced sounds or Level 1 sounds. The cyclist self, following Haraway (1991), is a cyborgian creature – human and non-human merged into one, both confronting and assimilating Western dualisms head-on. Metal and flesh combine to create one sound-making machine. Or to adopt a more critical disability studies framing, the tools that help one navigate the world such as a wheelchair work with the wheelchair user, rather than define them (Kafer 2013, 120). Wheels turning, pedals moving, breath rapidly going in and out, the whooshing sound of the momentum – these sonic phenomena are all a part of the cyclist cyborg. As referenced earlier, Tobler notes that near things tend to be of more importance than far (1970 236). However, sound and listening are not bound to the same spatial boundaries as presumed in this “law”. The ear functions in a different spatial arena than the eye, as sound can also be felt (Henriques 2010, 76). Despite being the sounds closest to the cyclist, they are not the most privileged sounds. That would be for the second level of sounds, or the “sounds that concern me” level.

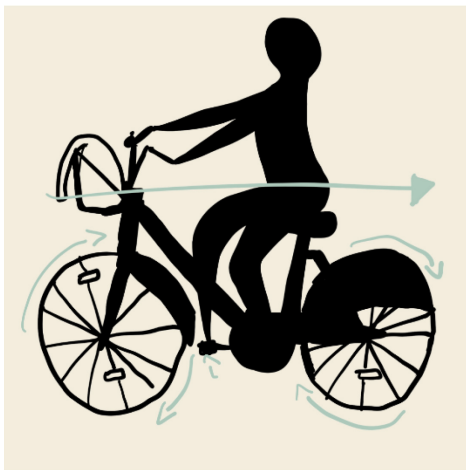


Figure 2.1 Illustration that models cyclist-bike cyborg sonic movements.

The second level relates to the immediate vicinity that a cyclist is passing by. By this I mean the sounds heard that directly affect the cyclist’s riding experience. Sounds that fall onto this level include streetlight beeps, cars honking, and pedestrian steps. This Level is often the least sonically diverse of the three levels which reveals the uncomfortable truth: the listening ear is a sieve. While the hungry ear from the settler positionality consumes and consumes and consumes, the cyclist's ear is like a miner during the gold rush, shaking out and ignoring sounds that do not directly benefit their immediate need. From my own experience engaging in autoethnographic research, I found myself slowing down my pace of cycling to attune more closely to the environment around me, to the detriment of other folks traveling around me. The cyclist ear can be imagined as a picky eater, who only consumes what they want and carelessly throws out the rest. The counterargument to the picky eater analogy is that the cyclist's ear is more akin to a hunter-gatherer sorting red berries from green leaves – in other words using their sensory sorting systems as a survival mechanism.

The third level is ambient sounds - these are the sounds that could be heard by a cyclist but often are filtered out as they are not utilized for direct navigational/safety purposes. These could

include the footsteps of pedestrians parallel to the cyclist, and friends chatting on a park bench. These sounds serve as parallel universes, co-existing physically in the same space as the cyclist but not necessarily being experienced cohesively. These ambient sounds reveal many truths and quirks about the space around the cyclist and are more easily accessed through the pedestrian scale. In my research-creation project, this level included a wide spectrum of sounds people talking in different languages, other cyclists, dogs yapping, the wind rustling leaves, and even the sound of a soda can opening. Often these are the sounds that reveal the battlegrounds that are happening in a space, where the complex ecotones lay, where the smallest of spaces can be heard. This level is by far the richest and layered in itself: no matter the depth of listening it will be impossible to consume all the sounds around you - no matter how hungry you may be. Additionally, this is the layer of sounds where a place's unique identity, politics, and struggles can be found.



Figure 2.2 A GIF of all Level 3 sounds that can be heard. This gif shows the wide variety of sounds that encompass this Level including animal sounds (cats meowing, dogs barking, birds chirping, cars moving, pedestrians walking, cyclists biking, skateboarders skating, dogs being walked, children playing etc.)

The contradiction of applying deep listening to a shifting soundscape is what makes sound mapping a fascinating way of recording memory. At its best, it etches the ephemeral as something worth remembering. Sound mapping as a verb involves converting one sensory experience to another. It is the art of connecting thunder back to lightning. Through the translation of senses, one furthers their listening practice as one that extends beyond the ears and reverberates throughout the whole body. The embodied complexities that can be heard with the cyclist's listening ear are difficult to capture within a single ride. Moreover, attempting to exemplify what palimpsests of listening (as proposed by Daughtry (2014) could look like in motion would be much more dynamic if displayed in a similarly multi-sensory way. Therefore, I propose using media-enhanced sound mapping to embolden our understanding of our cycling positionality itself.

#### *2.4 Sound Mapping: a Tool to Reimagine and Reflect*

Sound mapping, when applied to cycling, seems counter-intuitive - after all, one cannot materially map while cycling (except through automated means like a GPS-based app). While recording can never truly mimic the experience of listening to a place in real-time (Westercamp 2021), this process can help jog the memory while sound mapping and contrast the more

“objective” technological capture in contrast to the affective sounds that linger stronger in memory. Sound mapping, as an inherently multi-sensory practice, allows what Jonathan Sterne calls “sonic imaginations” to bloom. Here sound is used as the primary method and vehicle from which thought is derived (2012, 6). Additionally, the sonic temporality of sound mapping “serves as a useful reminder that looking at a visual map is also a temporal experience” (McMurray 2018, 112). Sound studies is inherently interdisciplinary as well as temporal; in this case, I am using curated chaos of city sounds to guide me towards spatial conclusions.

When one typically thinks of mapping, one thinks of a piece of paper that shows us how to get from point A to point B, however, it is so much more than that. Maps help us understand the world around us, from a perspective that is distinctly different from living (Brotton 2014). While mapping, “[t]he map’s dissimulating brilliance is to make viewers believe, for just a moment, that such a perspective *is* real, that they are not still tethered to the earth, looking at a map... here is one of the map’s most important characteristics: the viewer is positioned simultaneously inside and outside it” (Brotton 2014, 9). Sound maps “can provide basis for historical inquiry, context for negotiating urban space, insights into urban renewal and livability, and a myriad of other applications” (Droumeva 2017, 343). Sound mapping a soundscape can also be used as a tool for understanding and enhancing space for users (Radicchi et al. 2021). Creative sound mapping can reinsert the “left out fundamental aspects of how places are shaped by human presence” (Germano 2021, 292). Visual sound mapping is inherently multisensory, as it transduces sound to sight. Our lives are processed in a multisensory format, although there is a preference for ocular-centrism. Sound maps allow us to confront our ocular-centrism as centers spatial perception from an alternative position, the ear. Brandon Labelle notes that “[s]ound works to unsettle and exceed arenas of visibility by relating to us the unseen” (2018, 2) and a sound map with subjective visual components works to transduce this knowledge into other forms of sensing. This can be seen in practice in fictional artistic renditions such as OÅZE by Una Lee (Lee, n.d.), where Lee mixes abstract visual mapping with sonic cues to speculate upon alternative realities.

Of course, sound maps, like any media, are not entirely neutral. Sound mapping is reliant on the mapper’s ability to listen, which is never neutral, as I have discussed above (Robinson 2020). Pre-biases around what constitutes hi-fi (or desirable, healthy) sounds and linked visuals can hinder the listening experience (McCartney 2016). There is also a fetishizing of nature and rural aesthetics impacting the listening experience (Waldock 2011), which could affect what a sonic cartographer records. After all, the technology is “democratic”, but who is using the technology and what they find worth listening to/recording will be impacted by their gender (Waldock 2011) as well as their race and the geographic context they come from. What is a notable sound to someone in a neighbourhood depends on their relationship to the neighbourhood itself, with sound being an event that is perceived individually (Crossetti 2019, 43) influenced by political positionality (Yoganathan 2021). For example, someone who has been living in Verdun (a neighbourhood in the greater Montreal area) their whole life would be able to notice longer-term patterns of sonic change more acutely than I, someone who had only lived in the neighbourhood for a little more than a year,

As a primarily visual learner and thinker, my intention with my sound map practice was to bridge the gap between the ocular and the auditory, to make affective imaginaries as tangible as possible. While many sound mapping projects (“Hushcity,” n.d.; “Montréal Sound Map,” n.d.; “Sound Map of the World and Field Recordings by Cities and Memory,” n.d.) rely on GIS style

mapping to highlight where sound comes from, I wanted to incorporate cognitive cartographic illustration<sup>2</sup> techniques to showcase the more affective aspects of sound. Artistic mapping has been used to counter objective/subjective binaries, as well as redefine what mapping can be (Nold 2009; O'Rourke 2013). In other words, it is possible to convey spatial data that does not adhere to conventional mapping techniques. For one, not everyone needs the visual component due to visual disability (Anderson 2016). Additionally, grid maps do not always allow the full story to be told (Anderson 2016). More specifically, grid maps are best suited to understanding where sounds are placed, but not how they are felt. In my mapping practice, I embrace the soundmarks of the ride as opposed to illustrating where the streets are to each other.

Embracing subjectivity in the visual component of sound mapping is not only for aesthetic purposes but can also serve as resistance to dominant research discourses (Loveless 2019, 50). Borrowing from queer theorists, Loveless conceptualizes the idea of 'polydisciplinamory' as the ability to borrow from multiple disciplines without diminishing the academic rigor of the project as a whole (Loveless 2019, 64). It isn't in the what or who, but it is about how one applies the disciplinary interests (Loveless 2019, 62). Additionally, the polydisciplinamorous nature of incorporating multiple senses into one project is that it best highlights the blurred emotional lines of places (Poplin 2017, 298). Soundscapes are inherently imbued with emotions, meaning, and politics (Krobath 2021, 135), so having an additional visual component can help convey complex auditory qualities such as depth and spatiality. Additionally, this polydisciplinamorous approach incorporating visual cues utilizes our ocular-centrism to more easily relate to the soundscape. This allows for cross-modal associations, enhancing our understanding of sound itself.

To better frame the subversive nature in which my sound mapping practice exists, I will be utilizing the framework of Owen Chapman and Kim Sawchuk's four subcategories of research-creation (Chapman and Sawchuk 2012): research-for-creation, research-from-creation, creative presentations of research and creation-as-research. Research-for-creation is engaging in research to prepare for creative output, such as researching 1930s fashion for a period film (Chapman and Sawchuk 2012, 18). In a Canadian academic context, this could mean film, visual art, sound art, etc. - any presentation that is outside of a more stringent academic form of writing. Research-from-creation is when the practice of art itself generates intellectual insight (Chapman and Sawchuk 2012, 16). Creative presentations of research experiments with standard discourse thesis writing itself, wherein the written portion of the research takes a non-typical form in the context of academia (Chapman and Sawchuk 2012, 12). Finally, there is creation-as-research as "elaboration of projects where creation is required for research to emerge." (Chapman and Sawchuk 2012, 19). Loveless adds "What implicitly distinguishes this last category is that it requires multimodality; it requires that more than one of the previous categories be mobilized in service of the project." (2019, 56)

I would define my own research process as creation-as-research. As my project is presented as visual sound maps as well as sound mixes, there is a real artistic creation coming from the prior research of both theory and form. I would argue that my research also functions as creation-as-research as the act of creating is integral to the methodology itself, which comes back and

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<sup>2</sup> Cognitive mapping refers to "[t]he process of perceiving, encoding, storing, internally manipulating, and representing spatial information." (Golledge 2005, 329)

influences the act of creating simultaneously. My methods borrow heavily from the CRESSON model of situated city walking where the act of mobility (in the case of CRESSON walking), perceiving, and describing are all happening simultaneously (Thibaud 2013, 6). Additionally, my work plays upon an intro-to-sound mapping exercise as described by the Sensory Trust (n.d.), which centers the user's experience of space and translates their sonic experiences into a visual medium. Much of the thought derived from my research would not have been possible without the relistening, reworking, and reimagining of the data gathered (sound recordings) into different media formats (sound mixes, sound maps). Whatever the exact expression of research-creation I take, ultimately what I aim to do while sound mapping is to engage in "cultural analysis that troubles the book, the written essay, or the thesis, as the only valid means to express ideas, concepts and the results of experiments" (Chapman and Sawchuk 2012, 7)

## Chapter 3: Methods

For my research-creation project, I created four sound maps with accompanying sound mixes highlighting common sounds heard during three bike rides. These rides took place on Tuesday, June 14, 2022, Wednesday, June 15, 2022, and Thursday, June 16, 2022, in the afternoon (between 2 PM – 4 PM). The route I chose goes through a pedestrian zone, bike lanes that share the road with cars as well as multiuse bike/pedestrian paths that are completely off-road, and a small part that was purely on car designated road. I designed the route to highlight how different infrastructure spaces would impact cyclists' interpretation of the soundscape. It is an important caveat to note that at the time of living in Montreal, I could have technically made this route entirely on cycling infrastructure. However, it was important to me to test the variances in wildly different zones and the auditory impact<sup>3</sup>.

One of the primary concerns with dealing with sound research is the ephemeral nature of sound itself. To mitigate this factor, I rode in the mid-afternoon for all three rides. I cycled between 3 PM and 5 PM on Tuesday and Wednesday, while the Thursday ride was between 2 PM and 3 PM due to extreme rain warnings on that day. While this is only an hour difference, I acknowledge that I am passing through school zones, so the difference between children being in school and out of school may have affected the soundscape and what sounds were captured. During all three rides, the weather was mostly sunny with a few clouds with similar temperatures across the board. With sound's transitory nature, no exact ride sounds the same. However, as all three days that I cycled were mid-week and with similar weather, I was able to gather an "average" impression of what a weekday summer day in Montreal would sound like in the year 2022.

Each cycling exercise was framed with each level of sound in mind: the first ride with the first level, the second ride with the second level, and the third ride with the third Level.

Trip 1 Intention: Listening to Level 1 - self-produced sounds.

Trip 2 Intention: Listening to Level 2 – sounds concerning safety and immediate navigation.

Trip 3 Intention: Listening to Level 3 – ambient sounds, sounds that are utilized for immediate safety purposes but give form to the soundscape the cyclist is passing through.

Before starting every trip, I would attach a RODE Lavalier™ mic to the front left side of my helmet to record the entire ride, from just before I took out a BIXI to when I docked the BIXI. I then cycled that route as I normally would, with the specific listening intention in mind. I would then jot down my initial interpretation of the soundscapes I had encountered by writing it down as well as illustrating any sounds of interest. Afterward, I would listen to the sound recording and note any discrepancies between what I remembered hearing vs. what I captured in the recording.

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<sup>3</sup> Additionally, as there is a year-and-a-half gap between the time I initiated data collection and the time I submitted this thesis. In that time Montreal has changed quite a bit, the cycling network has expanded, BIXIs make a different sound when they dock, and the market for e-bikes have boomed.

During the initial planning of my methods, I had only intended one straight ride-through, listening only for the first intention. The second and third listening intentions were planned to be on the same path but with more breaks in between to record what was going on in those spaces. However, I realized that the way I structured my research suggests that the three levels of sound are separate entities, as opposed to sounds carrying more than one meaning. While it is theoretically neat to sort sounds into three categories, these categories bleed into one another. This will be described in more depth during the analysis section. Unintentionally I ended up cycling slower during the Level 3 listening intention ride, with the unconscious bias placing importance on trying to capture the sounds around me as opposed to capturing my very listening habits.

As I am naturally a visual learner, it was important to incorporate ocular elements into my research-creation process. This served two purposes. First, it allowed me to process sound in a way that is compatible with my style of learning. Secondly, as we live in an ocular-centric society, more people are trained to gather and interpret information visually. Having visual components would allow folks like me to glean information through a more familiar avenue.

To create these visual elements, I made crude illustrations at the end of every ride. After I had completed the three rides, I then compiled the three crude maps into one larger map on Adobe Fresno. After drawing each of the individual elements onto the larger map, I then began to sort and colour code the different images based on what level of sound I associated them with (a light blue for Level 1 sounds, a burnt orange for Level 2 sounds and a dark red for Level 3 sounds.) I wanted to pick colours that were not only high contrast enough to be distinct from one another but ones that with loose colour associations. I used a light blue for Level 1 – Self-produced sounds as it implies intuition, the same ways in which these sounds are integral to the cyclist. I used Orange for Level 2 – Safety Sounds, because of orange’s association with safety. Red is a dynamic and active color, which is why I used it for Level 3 – Ambient Sounds, which despite its title, is both a highly animated and diverse level. I then made some gifs that highlighted specific nuances in each level to further translate sonic processes to visual media.

Finally, I made three accompanying sound mixes along with the visual map. These mixes aim to highlight the key sounds of each level. To create these mixes, I reviewed the initial notes that I took during the three rides as well as relistened to the recordings that I made to note down any common sounds that were heard during the ride. I listened to the recordings and took samples that best resembled each level. After listening to recordings from all three days, I created different tracks where I could add the various common sounds. For example, for Level 1, I sampled sounds that I had created during the ride – such as pedaling and sneezing. After clipping relevant sounds for each section, I organized the sounds in a way that best represented when I would have heard those sounds during the ride. I then took all the relevant sounds and – with one second corresponding to one minute for the Level 1 and Level 2 mixes, and two seconds corresponding to the Level 3 mix.



## Chapter 4: the Cyclist Ear Sounded and Illustrated

The following section has been adapted from the interactive map that I created on Genial.ly ([link here](#)). As a part of my research-creation, I made 4 sound maps – one which compiles all the sounds that I had listened to, and additionally 3 maps for each level of sound. Embedded in the interactive map are also the three sound mixes and additional notes and observations about the process of listening while cycling itself. Observations made about the further research-creation process of creating the interactive map and all the components including sound mixes and the illustrations, can be found in the analysis section of the paper. This chapter will primarily focus on the different levels of sounds and nuances of each that were found during the research-creation process. Much of this text was derived from the Genial.ly link.

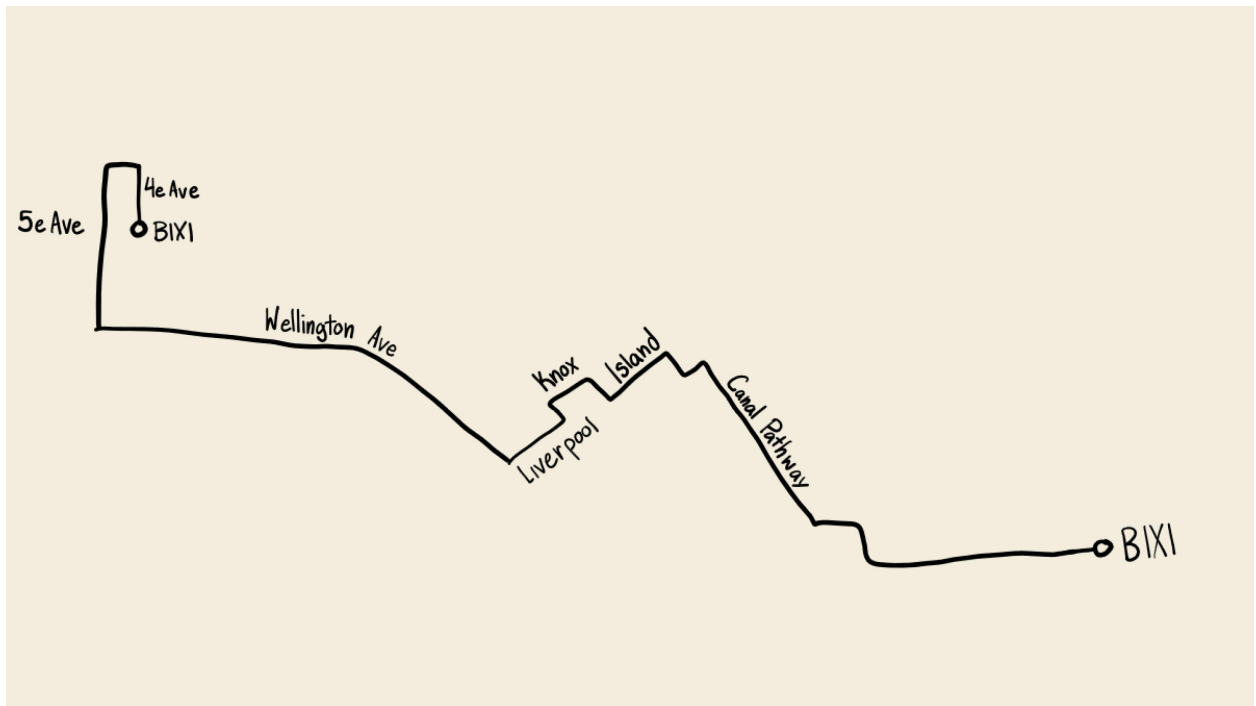


Figure 4.1: Map of route

This map is based on three bike rides from Verdun to the Old Port of Montreal that took place on Tuesday, June 14, Wednesday, June 15, and Thursday, June 16, 2022, (see above for a more detailed description of my method). I interpreted the sounds that I heard repeatedly through all three rides and illustrated them here. This map serves as a transduction of what I heard and how I experienced those sounds when cycling.

#### 4.1 Level 1 Sounds, or Self-Produced Sounds



Figure 4.2: Level 1 – Self-Produced Sounds Map



Level 1 sounds.wav

(Double click for sound)

Figure 4.3: Link to Level 1 Sound Mix

Within Level 1 sounds, there two main categories in which Level 1 sounds fall into. The first is the aforementioned human-bike cyborg sounds as described in Chapter 2, Section 3. There are also sounds that are only occur due to the cyclist interacting with the bike itself. This sublevel of sound becomes even more complicated when the human-bike cyborg interacts with the terrain as every ground texture provides a different sound. This highlights the blurred lines between sonic actors. The second category of sounds are conscious cycling sounds, which can be argued as just general human noises like breathing, talking, choosing to play music etc. These are sounds that could happen if one is not cycling.



*Figure 4.4 A GIF illustrating the different types of Level 1 sounds that can occur outside of cycling*

I found that, while cycling, I could get in my way by listening to the environment around me, rather than my Level 1 self-made sounds. This is made even more clear by listening to the three recorded soundscapes. With the mic situated at the tip of my helmet, I found that it was not just recording what I heard, however, it was also centering me as a noise producer. Specifically, sounds that were made close to the mic rang clear, like a sneeze or breathing. When listening to the recordings, it became obvious that there was a clear difference between the sounds I conveyed using my cyclist ear vs. the sounds that were captured by the mic attached to my helmet. Of course, breathing and sniffles during allergy season weren't the only sounds I produced. When I rode the bike, it became an extension of myself – now a cyclist as a cyborg -- the sounds of the wheels spinning, the sound of the bike hitting a ditch in the ground, the different textures of gravel, cement, and uneven brick that the tires went over -- all of these sounds were me. Without my taking the BIXI out of the station and pedaling, this vessel would not be making any noise at all. After all, what is sound but the by-product of two things interacting?



*Figure 4.5 A GIF illustrating the different types of terrain that a cyclist can bike on, implying that each of these different terrains interacts with the human-bike cyborg to create unique sounds*

## 4.2 Level 2 Sounds, or Safety Sounds



Figure 4.6: Level 2 - Safety Sounds map



Level 2 sounds.wav

(Double click for sound)

Figure 4.7: Level 2 - Safety Sounds Mix

These are sounds that directly impact me as a cyclist. This mainly comprises those who share the road/path/lane - in this case, pedestrians, motorists, and other cyclists. These are the sounds that I listen to that directly help me navigate safely from point A to point B. It is not just limited to moving targets. For example, in other places, Level 2 sounds might also include audio crosswalks that indicate when it is safe to cross an intersection.

Immediately, this map provokes the question of why some cars are red and some are orange. When looking at this map one of the first things that jump out is that certain elements of this map are both orange and red (indicating safety sounds and ambient sounds, respectively). Most notably, moving targets such as cars, cyclists and pedestrians are color-coded both red and orange.

This is where the role of transportation infrastructure affects our relationship to listening as a cyclist. When cycling on a protected bike lane, the cyclist is given a sense of comfort and safety which gives space to listen more leisurely — allowing moving targets to be ambient sounds. It also allows the cyclist a chance to pay attention to sounds further away. Conversely, the fewer built-in protections for cyclists, the more critical the sense of sound is to navigate safely around the city. When cyclists are in less segregated spaces, the sounds of other people in transition –

such as motorists, pedestrians, and other cyclists become a much more imminent threat due to spatial design making their movements less predictable. Dedicated infrastructure brings order and a feeling of ease as a cyclist, which creates a more relaxed listening experience. This less stressed position that the cyclist ear finds itself in makes it easier to listen to Level 3 sounds.

#### 4.3 Level 3 Sounds – Ambient Sounds



Figure 4.8: Level 3 Ambient Sounds Sound Map



Level 3 sounds.wav

Double click for sound

Figure 4.9: Level 3 - Ambient Sounds Sound Mix

Level 3 sounds are those that exist in the environment and do not directly impact the cyclist's safety/direct navigation. This can include people chatting in the background, birds chirping and the breeze passing between branches. Like Level 2 safety sounds, this can also include the sounds of frenetic folks that one might encounter directly, such as motorists, pedestrians, and other cyclists. The difference, of course, is that these moving targets do not affect my direct sense of navigation or safety at that specific time of listening. I associate ambient sounds with placemaking. Despite the title of "ambient sounds", these are the sounds that are critical to giving me a sense of where I am, as these sounds are relatively stationary. Sound is an ever-moving target, but its source can be relatively fixed. The rows of people sitting and chatting outside of cafes and restaurants along Rue Wellington do not impact my immediate safety as a cyclist, but they give me a sense that I am situated in a lively neighbourhood that encourages people to engage with each other on the street.

Another large component of the Level 3 sound map are people and pedestrians. On my ride, I could hear people talk, hear people walk, and during certain parts of my ride, even heard them eat and drink!

One of the most obvious differences was language. Starting my ride in Verdun, a more francophone neighbourhood, the sound of the French language is much more prominent than near the end of the recordings where I ended up passing by Griffintown and Old Port. In these neighbourhoods, more anglophones can be heard.

The type of activity-based sounds also differs from neighbourhood to neighbourhood. On Wellington Street, a commercial area that was blocked off for pedestrians, you can hear people enjoying life at a leisurely pace, drinking, eating, and talking. Meanwhile, in the middle of the recordings, the sounds of people running and cycling can be heard more prominently as I cycled along the canal, a popular recreational route.

## Chapter 5: the Creative and Critical Tension that the Auto-ethnographer Finds Themselves In (Analysis)

One of the more immediate observations I made on this journey, was that listening takes time... literally. Without stopping intentionally, I still found myself physically slowing down while cycling during the rides when I focused on a more expansive form of listening. For example, the first ride took 35 minutes, the second ride took 37 minutes, and the third ride took 41 minutes. This means that the third ride, which focused on atmospheric and ambient sounds that happened outside of the immediate concern of cycling, was by far the most taxing category to listen to. All the urban landscapes that I had traveled through, whether it be pedestrian-oriented, car-oriented, or even cycling-oriented were too rich sonically for the cycling ear. In other words, there is a limit to how much of the ambiance one can “consume”. No matter how hungry I am as an auto-ethnographer there are more sounds than my ear can process at a given time.

The inability to consume the rich urban soundscape in its entirety on a bike reinforces the idea of listening as a full-bodied process. When one is engaged in deep listening, it becomes the focus so other kinetic processes such as cycling, active watching/smelling/feeling, and even regular breathing fall into the background. The body and the brain can only focus on so much at one time -- if one is partially spending their energy on moving their body forward that means they cannot be spending 100% of their energy processing auditory information. The Doppler effect of passing by one another can affect how you interpret the nuances of other sound waves. As a cyclist, due to the speed of movement, the nuances of the ambiance might be missing in comparison to walking or someone sitting/standing still. However, the general concept of sound marking, and sound landmarks is still present in cycling, it is just less defined. For example, on a busy pedestrian street, the sounds of people talking, drinking, eating, and mingling generally serve as a sound mark of a commercial area but the intricacies of a specific conversation, for example, might be missed. The cycling ear is akin to a shoegaze cover of a song, in which the distortions and reverb can blur the instrumentals and vocals of a song, but the different tracks (vocals, drums, bass, guitar) still exist and can be heard, but perhaps not clearly.

Another observation made during this process was that the three levels of sound, while distinct in theory, are much more blurred in practice. The three tiers are a useful theoretical construct to help us understand how sound can be perceived, but in practice, sounds cannot be siloed so cleanly, specifically Level 2 safety sounds and Level 3 ambient sounds. One example of how a car sound can function as both a Level 2 and Level 3 sound simultaneously is the sound of a car coming from a perpendicular angle to the cyclist. The sound of the car coming from this angle is important for the cyclists to determine whether they should a) stop to avoid being hit by the car or b) the car is far enough away to keep going. While the sound of a car moving is important for understanding how traffic flows are going and where one should orient oneself, cars are also just a critical part of the North American landscape. Throughout all my recordings, there is always a faint whisper of the sound of a distant car rumbling at some point, further proving this sound an iconic sound mark of an urban North American soundscape. Just because the sound of a car whirring by helps you stay alert to certain dangers does not mean it doesn't also play a part in creating the urban soundscape. Sounds can be multifunctional and can host multifaceted identities.

This leads me to my next point, which is that cycling infrastructure itself has a role in discerning what can become a Level 2 or Level 3 sound. For example, when I am cycling along the water that is on a separate lane away from cars, I am not listening to the sound of cars to help me navigate through space or consider my safety, rather the car simply produces Level 3 ambient sounds that are just something in the atmosphere. In contrast, when I am on a shared road space, the sound of a car moving can be both a Level 2 and Level 3 sound. I must closely listen to ensure that I am a safe distance away from the car, while the sounds are at the same time atmospheric and ambient.

A rich and engaging high-fidelity soundscape from a pedestrian ear can be interpreted as a low-fidelity soundscape from a cyclist's perspective. Busy streets blur sounds into a low-fidelity soundscape for cyclists, contrasting with the high-fidelity experience for pedestrians. This is, again, due to the Doppler effect, as sounds come at a cyclist at a much higher pace than they would if one were standing still. In such cases, there is too much sonic interest to process at the speed of cycling.

The above phenomenon can be noticed in my ride through a pedestrian-specific zone on Rue Wellington. While this made for an engaging soundscape, it was much tougher to sort out which auditory input was navigational vs. what auditory input was ambient while cycling. For recording purposes, I cycled closer to the pace of a pedestrian, which allowed me to hear/capture more of the sonic nuances of the streetscape – for example, the sound of bottles popping, of conversation, of people chewing even. This adjustment was essential for enhancing the quality and interest of my recordings, as I held the subconscious desire to maintain a somewhat high-fidelity composition. This deliberate alteration not only affected my listening/recording experience but also reshaped my interaction with the environment.

If I had ridden to a pace more akin to a cyclist on a dedicated cycling track, these distinctive sound marks would blur together more and become less distinctive and more overwhelming. Cycling through pedestrian zones presents challenges in distinguishing navigational sounds from ambient noise, leading to sensory overload. Ultimately, when a street becomes too busy, sounds blur together once more into a low-fidelity soundscape – albeit one that would be experienced as a high-fidelity soundscape if one was walking. On Rue Wellington, as a cyclist traversing a pedestrian zone, I adopted aspects of the pedestrian listening positionality. However, riding a bike still influenced how I was perceived, navigated, and engaged with the surrounding environment. As a cyclist in a pedestrian zone, I was still a greater threat to other road users than I would be if I was just a pedestrian, marking me and the sounds I was creating as the safety sounds that people needed to be alerted to. Cycling at a pedestrian's pace also demanded more from me physically, particularly engaging my abdominal muscles to maintain a slower speed. Maintaining this slower speed also created sonic effects, while this was a mostly flat route, I could be heard physically panting in the raw recordings. Finally, I had to weave and bob much more than I normally would if I were on the road.

Moreover, the role of the auto-ethnographer in crafting a multimedia sound involves a profound shift in the cyclist's perspective. This positionality entails not only documenting the environment but also reflecting on the unique sensory experience of navigating on a bike. It prompted an internal conflict between my identity as a sound artist, an urban researcher, and a cyclist. The conflict of capturing the cyclist's listening ear vs. listening to the environment as in-depth as possible while still moving through space on a bicycle can be found in both the



recordings and the map. This external creation issue reveals the internal struggle for the desire for accuracy in capturing the environment's soundscape with the need to convey how those sounds are perceived from a cyclist's standpoint. The conflict was most pressing in spaces that had the potential to be engaging and high fidelity with a pedestrian ear, such as Rue Wellington. The conflict of privileging the cyclist ear vs. the sound artist/urban researcher ear, for example, did not exist in spaces primarily dedicated to automobiles. Generally, my approach to recording evolved beyond mere documentation of cyclist listening positionality to delving deeper into the nuanced relationship between the multiple listening positionalities that I hold and how those manifest materially in my interactions with the larger urban landscape.

## Chapter 6: Conclusion

The pandemic catalyzed a profound shift in my transportation habits as well as many others, from relying primarily on public transportation to embracing cycling. This shift fundamentally transformed sensory interactions with the urban environments, as there is no on/off switch to engaging with the soundscape around you, it simply is. I embarked on a research journey delving into urban soundscapes as they relate to cycling, while also examining how affect is processed auditorily. Extending on the concept of intersectionality, I pulled from Robinson (2020) and Thibaud (2002; 2011) to argue that a distinct listening positionality exists when one cycles. I argue that this cycling listening positionality sorts sounds into three distinct categories – self-created sounds, navigational/safety sounds, and ambient sounds. These three distinct levels of sound are processed simultaneously, making the cyclist ear inherently multi-tasking.

Through my investigation, I took a multimedia approach, incorporating written annotations, hand-drawn visual elements, and sound mixes as the most effective method for conveying the nuanced experience of the cycling ear. By creating a multi-dimensional sound map, I sought to capture how cycling affects our sonic perceptions in the urban environment. In doing so, I not only showcased how cycling affects our auditory processing, but how moving through differently designed zones (for pedestrians, cyclists, and cars) can affect both the listening and the kinetic processes of cycling. As a cyclist, the engagement to soundmarks and ecotones found in a landscape was not as crisp as they would be if one was simply standing or even walking through space, but the general vibe and ambiance of a neighbourhood could still be experienced sonically, albeit in a more abstracted way.

This autoethnographic-led research-creation project proved that a cycling ear does indeed exist. However, the lines between Level 1, Level 2, and Level 3 sounds can be blurred depending on the context in which a particular sound is heard. Furthermore, the existence of multiple cycling ears could be explored in more depth. As I was collecting this research from the specific positionality of a student-researcher and sound artist who had been biking on a near-daily basis, these intersecting identities affected the way that I cycled through space – more specifically how slowly I biked through space. While collecting and creating from self-created data does display the clear limits of my research, it also shows the possibilities for future research on the cycling ear going forward.

More specifically, it would be interesting to explore the cycling ear as a non-monolithic identity. As a full-circle moment, one of the shifts that made me most interested in researching cycling, the benefit of time to engage in more leisure biking, was under-researched in my study. Different types of cyclists with different time constraints can form different listening processes. As of April 2024, I have been working at a hybrid job in Downtown Toronto with a ½ hour commute. While I often don't have the luxury of time to sink into sounds the same way I did when I was gathering my research, over the past year I have developed a keen awareness of the soundscape/neighbourhoods I ride by, nonetheless. A rush hour cyclist commuter may be listening to the same route differently than a cyclist who is not bound by the constraints of time, but the cycling ear still persists. This dimension of time constraint is even greater if the cyclist is biking *for* work and not simply *to* work, such as a food courier.

Another intersectional identity that may affect how a cyclist listens to space is the cyclist's skill of biking. As I am someone who has been biking since childhood, I can quickly sort through the different levels, but that might not be the same experience for another cyclist who learned

how to bike recently as an adult. This also implies that cycling could not only exist as a temporal identity that occurs when one is cycling, but also as a more permanent identity. If one bikes enough, their very attunement to the environment can be altered to some degree of permanence.

In terms of practical applications of my findings, one could spend eons going down the rabbit hole of exploring how to use different sounds such as filtering out unnecessary noises to allow people with low attention span to navigate a street more safely by being able to focus on primary dangers. However, that is still a more complicated solution than the easiest solution which is to just have better cycling infrastructure. When cyclists ride in areas that are dedicated to cycling only, it allows for the cyclist to listen to the broader context of the area that they are inhabiting. Cycling through high-fidelity soundscapes is not only more pleasurable but engages in the navigational aspects of aural processing. Cycling through areas that are specifically not designed for cyclists such as pedestrian zones or car-only road spaces can both pose sonic confusion to the cyclist's ear.

Additionally, building more cycling infrastructure may enable cyclist's ability to listen to "ambient" sounds of their neighbourhood. This in turn has the potential to develop a cyclist's attunement and empathy to the everyday life practiced in the communities that they are passing by. This is much easier to do when you are cycling through somewhere where you are neither posing a threat to more vulnerable road users nor at risk due to cars. By enhancing the safety, accessibility, and frequency of cycling-specific routes, we can create more sonically significant landscapes. In other words, a hi-fidelity soundscape to a cyclist is not simply aurally aesthetic but often reflects the design of cycling-specific pathways. Ultimately, a cyclist's unique way of traversing through space is also mirrored through their listening practices, and continuing the practice of auto-ethnographic sound mapping can help us better understand and represent these complex relationships.

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