



Field recording of urban sonic environments: a framework for qualitative analysis

Nicola Di Croce & Catherine Guastavino

To cite this article: Nicola Di Croce & Catherine Guastavino (30 Jun 2026): Field recording of urban sonic environments: a framework for qualitative analysis, The Senses and Society, DOI: [10.1080/17458927.2026.2672773](https://doi.org/10.1080/17458927.2026.2672773)

To link to this article: <https://doi.org/10.1080/17458927.2026.2672773>



© 2026 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



[View supplementary material](#)



Published online: 30 Jun 2026.



[Submit your article to this journal](#)



[View related articles](#)



[View Crossmark data](#)

Field recording of urban sonic environments: a framework for qualitative analysis

Nicola Di Croce ^a and Catherine Guastavino ^b

^aDepartment of Architecture and Arts, Università Iuav di Venezia, Venezia, Italy; ^bSchool of Information Studies, McGill University, Montreal, QC, Canada

ABSTRACT

Field recording is the most common method used to capture the acoustic qualities of an environment with one or more microphones. It proved to be particularly useful in supporting qualitative researchers in engaging with the sonic situation they study, providing opportunities to playback and re-listen to the recording and also to share them with others. In this article, we introduce a framework to support the qualitative analysis of urban field recordings taking into account the personal experience of the recordist, the use of written notes taken during recording, the editing, playback and airing of the recordings. By testing the framework in the context of a study on the sonic environment of Montreal's entertainment district (Quartier des Spectacles), we discuss how it can be used with flexibility to address different research goals and to explore multiple approaches for the qualitative analysis of field recordings within social sciences.

KEYWORDS

Field recording; sonic environment; social sciences; soundscape research; media studies; urban studies; music

Introduction

In Antonio Skármeta's novel *The postman* (2008), a young postman is working during the 1970s in the Chilean fishing village of Isla Negra. There he becomes friend with the famous poet Pablo Neruda, who spends long periods in the small village as he finds its environment to be a profound source of inspiration for his poetry. Unable to return to the island for a long time and deeply missing its environment, the poet sends a tape recorder with a letter to the young postman asking him to record what he found to be the most representative elements of the place and to send the tape back to him. The task of using a microphone to describe a place (to a friend who already knows it well and wants to relive it) is the beginning of the postman's diving into the Isla Negra's sonic environment; an environment he had taken for granted for his entire life, which now started unfolding its everyday yet profoundly evocative sonic dimension.

Audio technologies conceived during the last century gave artists and researchers opportunity to document and reenact sonic perception. Field recording¹ is the most common method used to capture the acoustic qualities of an environment using one

CONTACT Nicola Di Croce  ndicroce@iuav.it

 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/17458927.2026.2672773>

© 2026 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

or more microphones. Recordings can then be played back to reproduce the sonic environment. Field recording has been largely used by artists and musicians (Lane and Carlyle 2014), ethnomusicologists (Western 2018), and became foundational for the rise of soundscape research (Schafer 1977) as well as within contemporary music composition (Schaeffer 1966; Truax 1996). Beyond a music-oriented approach, field recording started to play a role in anthropology (Feld and Brenneis 2004) and more recently in social sciences and urban research (Fong 2016; Gallagher 2015a) as it proved to be particularly useful in supporting researchers to engage with the sonic situation they study, providing opportunities to playback and re-listen to the recording and also to share it with others (Cusack 2013). Critical reflections around field recording practice are also increasingly used to approach post-human ecologies (Vallee 2020; Wright 2022), postcolonial sound studies (Akiyama 2019; Robinson 2020), and contribute to the discussion on ableism of listening (Drever and Hugill 2023; Sterne 2021). More generally, urban sounds and listening practices have lately gained momentum within qualitative research (Daza and Gershon 2015; Hall, Lashua, and Coffey 2008). Qualitative researchers have in fact implemented different methods to investigate the many dimensions (e.g. social, cultural) of the urban sonic environment – including soundwalks (Gallagher and Prior 2014) or sound diaries (Bild and Guastavino 2022; Waitt, Buchanan, and Duffy 2020) – and have explored sounds through diverse approaches (e.g. phenomenological, nonrepresentational, post-human, etc.).

Building upon these works, this article seeks to draft a framework to support the qualitative analysis of (urban) field recordings to provide meaningful and complementary insights to social sciences. By beginning to merge the art of listening and the analytic modes of social sciences, the proposed framework aims to support the different phases and challenges of field recording: the personal experience of the recordist and his or her positionality, the use of written notes taken during recording (when deemed useful), the editing, playback and airing of the recordings (when collaborative approaches are undertaken). This framework is built upon a literature review on the analysis of (urban) sounds as related to human experience. Most notably, we focus on three bodies of research: (i) Soundscape research; (ii) Music, Sound art and Media studies; and (iii) Urban studies, with a focus on the modes through which humans listen to the sonic environment (“how” we listen), rather than on the objects of listening (“what” we listen to). In this sense we consider spatial, social, cultural, emotional and affective aspects embedded in listening practices, and we thus emphasize the personal perspective of the listener/recordist. We believe this organization of thinking about the ways to listen or attune across disciplines, far from being prescriptive, can help researchers and artists engage with different approaches to field recordings as well as offer a resource for further critical reflections. We also seek to illustrate the flexibility of this framework in addressing different research goals and approaches – primarily in social sciences but also within artistic research.

After summarizing the main threads within the current debate on sound and listening practice in qualitative research, we outline the framework as derived from our threefold interdisciplinary literature review, and then test it in the context of a study on the sonic environment of Montreal’s entertainment district (Quartier des Spectacles). We conclude

with a commented and revised version of the framework and discuss how we used and adapted it for our specific research goals in the Montreal case study.

Sonic inquiry in qualitative research and the emergence of field recording practice

Beyond “ocular inquiry”: sound and the everyday in qualitative research

Trying to make sense of a world that is increasingly “complex, diffuse and messy” (Law 2004, 2), social sciences have started in the last decades to engage and embrace such complexity by means of new methods. This is particularly relevant if we consider how qualitative researchers² began to challenge the primacy of the sight by exploring sound and listening as alternative tools to gain an insight into the world³ (Gershon 2013). Among others, qualitative methodologists interested in education and posthuman research started going “beyond ocular inquiry” (Daza and Gershon 2015) and questioned “what is traditionally considered to count as data” (Mazzei 2003, 357), drawing attention to sound methodologies as interesting avenues for “acquiring the messy is-ness of the everyday that carries within braided signals of values, ideas, ideals, and processes” (Daza and Gershon 2015, 641). Sound and listening have thus begun to be considered an entry point for engaging with the multifaceted dimensions of the contemporary lifeworld. Accordingly, recorded sounds have been integrated within pedagogical inquiries (see Pearce, Patterson, and Rushton 2014) and posthuman geographies (see Gallagher 2019) to capture the aural dimension of interviews or to investigate what exceeds transcriptions, such as background noises (eg. during an outdoor interview) that strongly characterize an urban environment (Flint 2021). Bridging the gap between theory and practice, the attention on sounds and listening in qualitative research has also been foundational for the rise of “sonic ethnography” (Feld and Brenneis 2004; Pink 2015) as both a methodological and theoretical field focusing – through the use of sound itself as a tool for knowledge production and dissemination – on the relationship between culture, society and the sonic.

Along these lines, sonic inquiry has emerged as a valuable approach to examine the “everyday” within cultural and social theory and practice (Hall, Lashua, and Coffey 2008; Labelle 2010), while alternative methods such as soundwalks have been experimented with as a “creative disturbance” (Hall, Lashua, and Coffey 2008, 1019) to conventional interviews. Drawing from the growing interest given to senses in social sciences, geographers Gallagher and Prior (2014) bring attention to field recording practice. The scholars argue that “audio recording produces distinctive forms of data and modes of engaging with spaces, places and environments which can function in different (and complementary) ways to more commonly used media such as written text, numbers and images” (268). Their understanding of audio recording thus indicates how this practice can meaningfully support more consolidated methods employed in social inquiry. Also, it moves the conversation within qualitative research from a phenomenological to a post-phenomenological perspective, in which a recorder cannot simply be considered as a tool for “capturing” the “essence” of a place, but more problematically as a mediator of human experiences (see Ritter 2021), and thus as a device that contributes to the production of place (Western 2018).

Field recording and the social production of space

A critical perspective on field recording is crucial as the practice implies a subjective stance – the act of listening, the selection of spatial and temporal locations to record, the embodied process – while proposing to “capture” and “represent” through a medium the sonic environment of a given situation externally with a quasi objective stance (Seaward 2015). Field recording involves the presence of the listener/researcher within a place for a certain amount of time, it entails that the recordist engages with the scene (eg. catching the eyes of the passersby) and therefore modifies it through their action. Furthermore, field recording is not limited to the act of listening and recording, as it embraces the reenactment of the recorded sounds, giving prominence to playback activity (its setting, its audience, its duration, etc.). In this sense, with reference to Lefebvre’s (1991) understanding of the “production of space,” Gallagher (2015a) further argues that: “field recordings might be thought of as a form of spatial production” (572).

This reflection is generative of a theorization of space and place in which assumptions embedded in researchers’ orientation toward the experience and analysis of the sonic environment are strictly embedded in their analytic framework. Here, geographer Western (2018) argues that: “Field recordings do not only produce place. They have also been employed by folklorists, ethnographers, ethnomusicologists and recordists of other stripes to produce race, gender, class, ethnicity and identity [...] forging associations in the ears of listeners and playing active roles in processes of racialization, nationalization, segregation, spatialization and more” (24). It is thus crucial to shed light on the variety of standpoints through which field recording is approached (e.g. phenomenological, narrative, post-structural, nonrepresentational, etc.) and therefore to the diverse analytical outputs emerging from such a variety of approaches. In our view, this is a very important posture to adopt when drafting a framework that aims to support the qualitative analysis of field recordings. This posture unfolds innovative orientations toward the sonic environment, and has lately brought forward seminal insights on decolonizing literature, the ableism of listening practice, as well as posthumanist literature.

On the first point, scholar and artist Akiyama (2019) reflects on how field recording reveals a political stance as it always involves the decision of what “deserves” more attention and which perspectives (which places, communities, genders, etc.) are therefore ignored. Challenging the lack of a deeper political understanding in early soundscape research (Schafer 1977; Wright 2022), Akiyama (2019) considers how field recording contributes to the social production of space by analyzing the work of militant sound collective Ultra-red (2014), which made extensive use of field recording in the past 30 years as a creative and radical form of social intervention. Through Akiyama’s (2019) words, for the collective “the content of a recording was never nearly as important as the very effect that the act of extending a microphone might engender” (115). This attention given to the modalities and effects of field recording further recalls how artist, curator and writer Dylan Robinson (2020) defines critical positionality through listening. Examining the inclusiveness of the music and performance world in an effort to “move beyond settler colonial structures of classical music composition, presentation, and listening” (10), Robinson argues that “engaging in critical listening positionality involves a self-reflexive questioning of how race, class, gender, sexuality, ability, and cultural background

intersect and influence the way we are able to hear sound, music, and the world around us.” (10).

This emphasis on the way sound and field recording contribute to the production of space has also been recently developed by scholars and artists interested in challenging the ableism of listening practice. In his *Diminished Faculties*, sound and media studies scholar Jonathan Sterne (2021) outlines a political phenomenology of impairment aimed at exploring power dynamics embedded in the experience of a subject that is not “in command of their own faculties” (12). What happens when the experience of self is unstable or even not available? Sterne asks. A similar questioning on the phenomenology of impairment is discussed in the book *Aural Diversity* (Drever and Hugill 2023), which engages listening practice as a spectrum of different experiences, and thus challenges a unique and “normative” listening experience in an effort to raise awareness on aural diversity so as to inform research and design methods, and not least field recording practice itself.

This last point is pivotal also from a postman perspective, and in particular regarding the issue of attunement of human-nonhuman assemblages (see Wright 2022). Considering sounds as “infrastructures of audibility” (Vallee 2020), field recordings have in fact been used by a diverse range of bodies and materialities: performed by non-humans (such as birds where microphones are attached to their bodies to monitor their behaviors), by mountains (through vibrations to prevent landslides), or even by sound technologies programmed to use sounds as computational inputs.

How to approach the qualitative analysis of field recordings

Acknowledging the fertile theoretical and empirical grounds on which listening and field recording are rising, we concentrate on the potential uses of field recording in social sciences seeking to support multiple approaches for its qualitative analysis. In this regard, Gallagher (2015a) claims that field recording should not be considered simply as a representational or narrative tool, somehow conflicting with nonrepresentational theories that give prominence to embodied experiences (see Vannini et al. 2010; Vannini 2015 on sound-based ethnographic and nonrepresentational methods). In this sense it is crucial, he suggests, to emphasize field recording’s performativeness without overshadowing its representational and narrative aspects. This (post-structural) view reinforces – and does not conflict with – the affective potential of a recording: “Rather than being mutually exclusive, the representational and affective functions of field recordings are simultaneous and can reinforce each other” (Gallagher 2015a, 574). Drawing from the deep political and social stance of field recording, and building upon a possible coexistence of representation and affect within field recording practice, we explore avenues for combining the possibility to “represent” a given situation, while giving a unique perspective on cultural and political dimensions, as well as the emotional and affective intensities, related to the experience of the sonic environment. This raises the question of how to address and analyze field recording as a qualitative method within social sciences.

Gallagher and Prior (2014, 272) illustrate two broad methodological approaches to field recording within qualitative inquiry: the first is sonic ethnography, which includes written and more-than-textual representations, the second is soundscape research, which encompasses a number of methods such as soundwalk, field studies, and listening tests using

audio recording. While we will focus on soundscape research in the next section (2.1) we concentrate now on the possibilities and limits of sonic ethnography for the qualitative analysis of field recordings. Considering how to report field recording in a textual format, contemporary literature scholars Benson and Montgomery (2018, 24) challenge the alleged limits of “translating” sounds into words, potentially losing the “thickness” of a sonic description of a place (Feld and Brenneis 2004). In this regard, the authors argue that textual description of field recording adds an additional and much needed layer of complexity to the sonic analysis, claiming that the text format can support and expand the understanding of a sonic situation rather than limit it. Along similar lines, artist and scholar Uetz (2019) argues for the importance of complementing the act of listening/recording with note taking during the recordings, to bring together the in-person sonic experience and the written “description” of the recorded situation. This can be used to analyze a given recording, but also to compare it with other recordings. Artist and musician Peter Cusack (2016) further describes field recording as a form of “sonic journalism” in which a “subjective engagement and intuitive understanding” (1) of the built environment is given to the listener/recorder (see also Cusack 2013), who can use written notes to critically reflect on their sonic experience.

Approaching recorded sounds: the challenge of analyzing the sonic environment

We present now a literature review aiming to assemble an articulated yet flexible framework to support researchers in the qualitative analysis of field recordings. Building on sound methodologies within qualitative research, acknowledging the role of field recording in the social production of space and keeping together the representational and nonrepresentational possibilities of this practice, we seek to reflect on listeners’ orientation toward their experience of the sonic environment. To do so, it is crucial to investigate, across fields interested in sound and listening, the different *modes* through which humans listen – drawing attention not only to the sources and meanings of sounds, but more broadly to the ways listening encompasses the cultural, spatial and affective understandings of sounds within the sonic environment. Through our framework, we thus aim to support qualitative researchers to make explicit their personal analytic frame according to their research goals. Using this “modes of listening” approach to guide our review, we articulate the following section around three broad fields of study: (i) Soundscape research; (ii) Music, Sound art, and Media studies; and (iii) Urban studies. We have selected a few representative contributions to these broad fields as they provide, through different and often complementary approaches to field recording, a diverse scenario of the modes of listening that will support our analytical framework.

Soundscape research

The experience of everyday sonic environment

First introduced by planner Micheal Southworth (1969) and further developed by composer Murray Schafer (1977), the term “soundscape” has been defined as the sonic environment perceived by people in context (ISO 2014). In the last two decades, soundscape emerged as an interdisciplinary research field focusing on the intersection between

human sonic experiences and (both natural and built) environments. Moving away from the traditional noise control approach, soundscape researchers have contributed to considering sound as a resource that can contribute to the quality of living environments, promoting healthier, more enjoyable, and livable environments (Steele and Guastavino 2021). We concentrate here on key theorizations developed within soundscape research that can help us frame field recording as a qualitative method and inform its analysis.

A key figure in soundscape research, Schafer (1977) made extensive use of field recording practice over the second half of the 20th century for the documentation of urban, social and cultural transformations in North America and Europe, which eventually led to the composition of music pieces and to further socio-cultural speculations. While never explicitly proposing a method for analyzing audio recordings, he introduced three main categories of sound to examine soundscapes. The first, “keynotes” includes background sounds that are often perceived unconsciously and are generally taken for granted; the second, “signals” refers to foreground sounds that attract attention; and the third, “soundmarks,” encompass sounds that are unique and significant to a particular community or setting.

More recently, other researchers have proposed different principles for categorizing sound sources and actions within outdoor acoustic environments (see: Gaver 1993a; 1993b; for a review see Brown, Kang, and Gjestland 2011; Guastavino 2018). Most notably, Dubois, Guastavino, and Raimbault (2006), investigating the “different cognitive representation of acoustic phenomena” (869) from a semantic perspective, focused their analysis on the sound “source identity and semantic values” (866). They argued that soundscapes cannot be reduced to a set of physical parameters (e.g. sound levels), or even a set of sound sources, but rather as experiences in context, mediated through social activities, and involving interpretations. Since experiences cannot be observed directly, they rely on analysis of free-format verbalizations (through psycholinguistic analyses) to make inferences about people’s experience of everyday sonic environments (see Guastavino 2007). Using this approach, linguist Manon Raimbault (2006) identified two modes of listening for urban soundscapes; namely “descriptive listening” focusing on sound sources, and “holistic hearing” focusing on the soundscape as a whole.

Sound descriptors and quantitative approaches to field recordings

Another approach is to present participants with recorded or in-situ sound environments, and ask them to rate them along scales corresponding to sound descriptors – such as *eventful*, *exciting*, *pleasant*, *calm*, *uneventful*, *monotonous*, *unpleasant*, and *chaotic* (Axelsson, Nilsson, and Berglund 2010). This approach has been used extensively in soundscape research to describe everyday sounds, particularly in conjunction with quantitative acoustic measurements (Nilsson, Botteldooren, and Coensel 2007). Within soundscape studies, recorded sounds are mostly considered as quasi-objective representation, often analyzed only quantitatively, with scant attention given to the qualitative inquiry of field recordings. The International Organization for Standardization (ISO 2016) recommends to employ a binaural measurement system (Hong et al. 2017; Roginska and Geluso 2018): a pair of omnidirectional microphones are used to replicate human ear functioning and are located on an artificial head (or directly placed on the recordist’s head). No further details are provided on how to proceed with a qualitative analysis of recordings; the qualitative guidance given by ISO (2016) only distinguishes between “background

sounds” (continuous or very common sounds on which other more distinct sounds overlap) and “foreground sounds” (noticeable sounds drawing listener’s attention and easily associable to a precise source). A few more details are also provided (ISO 2019) to specify that the “binaural data analysis” is meant to be quantified through psychoacoustic indicators (loudness, sharpness, roughness etc.), visualized through maps, and further triangulated with other methods (including interviews and questionnaire).

Recording for documentation and preservation efforts

Soundscape researchers have also understood field recording as a key tool for documentation and preservation efforts. Recording natural and animal sounds as well as the sonic environment of ecosystems has been a central activity for naturalists and ecologists (see Krause 2002). In this framework “soundscape ecology” (Pijanowski et al. 2011, 1214) stands as an emerging area of research focusing on the relations between the different sound sources overlapping within soundscape – “biophony” if from a biological origin, “geophony” when geophysically created, and “anthrophony” when produced by humans.

Soundscape scholars further used field recording to document urban cultural heritages, considering specific sounds as highly representative (holding an iconic or symbolic meaning) and therefore deserving to be safeguarded. For example soundscape researchers Huang and Kang (2015) reported from a case study developed in Lhasa, a UNESCO world heritage located in Tibet (China), where they investigated its sound sources aiming for a “soundscape preservation” (671) of the site. Using a combination of quantitative and qualitative measurements, the authors used field recordings however limiting their analysis to a basic description of the sources – distinguishing between what they identified as ambient, informative, religious, natural, and traffic sounds. This example illustrates a common approach within soundscape research, in which field recording is in most cases considered as a complement to other methods, and its analysis is often limited to the identification of sound sources.

Drawing from this first framework, we can outline a scheme to describe the main modes of listening proposed within soundscape research. In Figure 1 (column 1, “Soundscape research”) we indicate five modes of listening that summarize the different approaches used by soundscape researchers to analyze the sonic environment, namely: (i) causal mode; (ii) semantic mode, (iii) cultural mode, (iv) atmospheric mode, and (v) salient mode.

Music, sound art and Media studies

Individual and collective ways of listening and recording

Music, Sound art and Media studies approach field recording practice differently from soundscape research. While considered an artistic practice on its own (see *Filigrane Journal* 2021), recordings taken “outside the studio” are also considered as potential materials for music composition (eg. music *concrète* or soundscape compositions), sound performances, and installations.

A first thematization emerging within Music and Sound art deals with the individual and collective ways of listening and recording. Focusing on the figure of the listener/recordist, sound artist and researcher Findlay-Walsh (2019) explored the embodied

Modes of listening	Soundscape Research		Music, and Media Studies		Urban Studies	
Reduced			<i>Chion (2019) via Schaeffer (1966) * <u>Reduced</u></i>	A mode of listening unbound from causes and meanings, which refers instead to the inherent qualities of sounds	<i>Gallagher (2015b) / via Chion and Schaeffer * <u>Reduced</u></i>	A mode of listening unbound from causes and meanings, which refers instead to the inherent qualities of sounds
					<i>Amphoux (1993) * <u>Environmental listening</u></i>	Deals with the objective qualities of the acoustic environment (eg. measurable sound levels)
Causal	<i>Schafer (1977) * <u>Sound Signals</u></i>	Sound “signals” covers those sounds that are consciously and attentively listened by people in context	<i>Schaeffer (1966) * <u>listening</u></i>	The “listening” mode refers to the active identification of sound sources	<i>Gallagher (2015b) / via Chion and Schaeffer * <u>Causal</u></i>	The “causal” mode refers to the causes that produce a sound
	<i>ISO (2018) * <u>Foreground sounds</u></i>	“Foreground sounds” are sounds that draw listener’s attention and are easily associable to a precise source	<i>Chion (2019) * <u>causal</u></i>	The “causal” mode refers to the causes that produce a sound		
	<i>Pijanowski et al., (2011)</i>	Soundscape ecology distinguishes between three main sound sources: “biophony” if from a biological origin, “geophony” when geophysically created, and “anthrophony” when produced by humans	<i>Clarke (2005) * <u>source of stimulation</u></i>	Listening as a tool for the identification of the sources of stimulation		
		Focus on sound sources				
	<i>Raimbault (2006) * <u>Descriptive listening</u></i>					
Semantic	<i>Dubois et al. (2006)</i>	Sound “source identity and semantic values” (866)	<i>Schaeffer (1966) * <u>Comprehending</u></i>	“Comprehending” refers to a semantic mode of listening, when sounds carry a specific signification.	<i>Gallagher (2015b) via Chion and Schaeffer * <u>Semantic</u></i>	Meaning of the sounds listened / recorded.
	<i>Huang and Kang (2015)</i>	Description of the sources: ambient, informative, religious, natural, and traffic sounds	<i>Chion (2019) * <u>semantic</u></i>	The “semantic” mode identifies the meanings embedded in the sound, and entails a semantic level of understanding		
Spatial			<i>Tuuri and Eerola (2012) * <u>Kinesthetic</u></i>	Sense of movement triggered by sounds	<i>Gallagher (2015b) * <u>Spatial</u></i>	Sense of spatiality (eg. direction and distance) of the sound sources
Associative					<i>Gallagher (2015b) * <u>associative</u></i>	Special memories and associations evoked by sounds
Cultural	<i>Schafer (1977) * <u>Sound marks</u></i>	“Soundmarks” include sounds that are acknowledged by individuals or groups as part of their culture			<i>Amphoux (1993) * <u>Milieu listening</u></i>	Concerns the qualities emerging from the geography of a place and its anthropic activities
	<i>Huang and Kang (2015) * <u>Soundscape preservation</u></i>	Highly representative sounds, holding an iconic or symbolic meaning, are those that deserve to be safeguarded			<i>Waite et al. (2020) * <u>Semiotic</u></i>	The “semiotic” (representational) dimension of listening combines the semantic and cultural modes
Critical			<i>Wright (2022) * <u>Listening with / posthuman listening</u></i>	Listening as a way to reflect on the positionality of the recordist, attune to human-nonhuman assemblages, and critically address, disentangle and reassemble the complex assemblage of meanings emerging through sound.	<i>Gallagher (2015b) * <u>Critical</u></i>	The “critical” listening attends to the social, political, economical and historical context of sounds
Affective			<i>Findlay-Walsh (2019) * <u>embodied listening</u></i>	Field recording practice as a tool to grasp the emergent perceptions and embodied experiences of the listener	<i>Gallagher (2015b) * <u>Affective</u></i>	Bodily feelings triggered by sounds
			<i>Tuuri and Eerola (2012) * <u>Reflexive and connotative</u></i>	feelings and affects evoked by sounds	<i>Waite et al. (2020) * <u>Affective</u></i>	Embodied experiences triggered by sounds, non-representational dimension of listening
Atmospheric	<i>Raimbault (2006) * <u>Holistic hearing</u></i>	Focus on the soundscape as a whole. More broadly: overall impression of the sonic environment. How the intensities and relations between sounds contributes to shape the atmosphere of the listened / recorded place.				

Modes of listening	Soundscape Research		Music, and Media Studies	Urban Studies	
Salient	Schafer (1977) * <i>Keynotes</i>	“Keynote” sounds include those background sounds that are often perceived unconsciously and are generally taken for granted by the majority of people	Schaeffer (1966) * <i>Hearing + Attending</i>	“Hearing” deals with the way people listen without paying attention to the informations embedded in sounds	
	ISO (2018) * <i>Background sounds</i>	“Background sounds” are continuous or very common sounds on which other more distinct sounds overlap		“Attending” concerns the selective attention activated when searching for a specific sound within a complex scene	
Collective			Ultra-red (2014) * <i>Collaborative</i>	Amphoux (1993) * <i>landscape listening</i>	refers to the perception and collective (inter-subjective) experience of the sonic environment.
			Findlay-Walsh (2019) * <i>sharing in-person field rec</i>	Augoyard (2001) * <i>écoute réactionnelle</i>	Involving participants in a discussion focused on their impressions and reflections triggered by field recordings

Figure 1. Summary of the modes of listening derived from the literature review. The chart includes (i) modes of listening used by soundscape researchers (column 1); (ii) the modes of listening used by music, sound art and Media studies (column 2), and (iii) the modes of listening used by urban studies (column 3).

experience linked to conducting in-person field recordings. He argued for in-person recordings (usually using a binaural system) as a tool for “capturing and mediating the emergent perceptions and embodied relations of a recordist-listener’s (auditory) experience, and for presenting these for subsequent engagement by another listener.” (31) Connecting the embodied experience of the recordist with the experience of future listeners, this understanding draws attention to the possibility of in-person recordings (taken by a sound artist) to triggering reactions through recording playback.

Building on this relational perspective, other artists, activists and scholars have explored participatory approaches to field recording practice. Notably, the militant sound collective Ultra-red (2014) has created several projects involving marginalized and vulnerable communities, inviting them to listen and comment collectively on sounds recorded by the artists in problematic environments. Developing a protocol for participatory listening sessions, Ultra-red has raised discussion on sensitive topics such as the AIDS crisis throughout the 90s and the early 2000s, or struggles against evictions in many suburbs across US and Europe.

“Ways of listening” music and films

A second thematization includes insights from Music and Media studies scholars on different “ways of listening” performed by people in the fruition of music and films. In his seminal *Traité des Objets Musicaux*, French composer Pierre Schaeffer (1966) describes four different modes of listening, namely: “hearing” (*ouïr*); “listening” (*écouter*); “attending” (*entendre*), and “comprehending” (*comprendre*).⁴ “hearing” deals with the passive listening everyone performs without paying attention to the information embedded in sounds, while “listening” refers to the active identification of the sound sources. “attending” concerns the selective attention people can activate when searching for a specific sound within a complex sonic environment; and finally “comprehending” refers to a semantic mode of listening, when sounds carry a specific signification.

Along the same lines, media theorist and composer Chion (2019) focused his research on the role of sounds in audiovisual productions. Building on Schaeffer (1966), Chion defines three main listening modes: “casual,” “semantic,” and “reduced” listening. The first (*casual*) deals with the causes that produce a sound (the sound sources); the second (*semantic*) identifies the meanings embedded in the sound, and entails a semantic level of understanding; the third (*reduced*) describes a special way of listening that is unbound from causes and meanings and refers instead to the inherent qualities of sounds (such as the texture or timbre of a music instrument). A similar perspective was proposed by musicologist Clarke (2005) who, in his ecological approach to musical meaning, describes the auditory experience as a process of “constant search to optimize and explore the source of stimulation” (19).

Musicologists Tuuri and Eerola (2012) have also developed a taxonomy for modes of listening making inferences for cognition and perception research in music and sound theory. They identify three broad categories: “reflective” (critical and reduced listening), “denotative” (causal, empathetic, functional, and semantic listening) and “experiential” (connotative, kinesthetic, and reflexive listening). Building on Chion’s and Schaeffer’s legacy (especially for the “reflective” and “denotative” categories), the authors expanded it to include meaningful complementary perspectives. In particular, what they define *experiential* listening category is key to describe the sense of movement (kinesthetic) as well as the feelings and affects evoked by sounds (connotative and reflexive) – modes that have not been sufficiently investigated elsewhere within Music and Media Studies.

Posthuman listening

A final thematization includes insights from sound artists and sound studies scholars who are addressing sound and listening from a posthumanist perspective (see Crone, Nightingale, and Stanton 2022), and have started to challenge the positionality of the listener/recordist by questioning the neutrality of any recording (and recordist) in an effort to include the multiplicity of ears, bodies and perspectives. This implies exceeding the consolidated understanding of recordings as merely representational tools, which opens up for a “listening with,” a mode that artist and researcher Wright (2022) introduces to acknowledge the “complexity and the consequent demand placed on the ear of the recordist as much as the elsewhere listener, to disentangle and reassemble meaning as an ongoing process . . . an appreciation that all signals, lost and found, enact responsibility in the process of audition” (Wright 2022, 5–6). This helps attune to human-nonhuman assemblages, listening and recording are thus pivotal for envisioning an expanded understanding of coexistence, and for experimenting with trans-species “ethical” relations and communities (Vallee 2020). This point further recalls LaBelle’s understanding of listening as a mode through which to achieve a “critical and creative togetherness” (2018, 5). The artist and sound studies scholar expands the notion of listening toward a “sensitivity for what goes unheard” (2018, 24) – be it the way a marginalized community or a public demonstration are silenced, or the sense of loss for the disappearance of a nonhuman sonic presence threatened by the current ecological crisis.

Drawing from these contributions, in Figure 1 (column 2, “Music, Sound art and Media studies”) we summarize the different modes of listening discussed in this section: we thus report seven modes, namely: (i) reduced; (ii) causal; (iii) semantic; (iv) spatial; (v) affective; (vi) salient; (vii) collective. While some of these modes have

been already introduced within Soundscape research (causal, semantic, and salient), their definitions reflect complementary understandings of these notions. Also, the thematization on posthuman listening has been integrated in the critical mode to stress its critical way of challenging more consolidated and taken for granted understandings of listening.

Urban studies

How urban studies investigated the sonic environment through field recordings

In the past decades, sound has gained increased interest in Urban studies (Adams et al. 2006; Atkinson 2007) but with little attention on urban field recordings.⁵ A pioneering body of research on the investigation of sonic environment within Urban studies was initiated at CRESSON, a research group founded in 1979 at the School of Architecture of Grenoble, France. Architect and geographer (Amphoux et al. 1991; 1993); see also (Hellström 2002) conducted a study on the sonic identity of European cities, proposing three modes of listening, namely: the “environmental listening” (*l’écoute environnementale*), the “milieu listening” (*l’écoute mediale*), and the “landscape listening” (*l’écoute paysagère*). The first deals with objective properties of the acoustic environment (as described by e.g. measurable sound levels); the second takes into account the qualities emerging from the geography of a place and its anthropic activities, while the third refers to the subjective and collective (inter-subjective) experience of the sonic environment. This last listening mode is particularly relevant to explore listeners experience of field recordings (Amphoux 1993, 25; Augoyard 2001) through “reactivated listening” (*écoute réactivée*) where recordings are shared with participants to explore their impressions of the area under study as well as reflections triggered by the recordings.⁶ This approach has been used by soundscape researchers to investigate mainly urban sound environments (see also Guastavino 2018, and Guastavino et al. 2005).

From representational to affective listening

In an effort to identify broader conceptualizations of sound, in the last decade urban studies scholars and who have started using field recording in combination with other methods. Investigating the relation between everyday sounds and urban liveliness in Wollongong, (New South Wales, Australia), geographer Waitt, Buchanan, and Duffy (2020) engage with “sonic affects” related to feelings and emotions emerging from sonic experiences. Using sound diaries, participants reported their reactions to everyday sonic experiences over time, and also conducted field recordings to provide an additional layer of understanding. In the study, the scholars seek to find a mediation between the semiotic (representational) dimension of listening and the affective (nonrepresentational) one. Echoing Gallagher (2015a), they thus propose a “semiotic-affective assemblage approach” (2134) to inquire into “the cultural norms that condition how people listen, the regulatory regimes that condition bodily dispositions as well as the materiality of sound, bodies and the broader built context” (2144). The attention to affects, feelings and emotions embedded in the listening practice is of great importance for the present study, as it adds a crucial dimension to our modes of listening approach.

A framework for the analysis of field recordings based on written fieldnotes

We end this review by introducing a comprehensive framework developed for the qualitative analysis of field recordings. In his *Audio Methods: Analysing Field Recordings of Electronic Voices in Athens and Glasgow*, geographer Michael Gallagher (2015b) reflects on the different steps of field recording practice: listening, recording, writing ethnographic notes, playing back, editing and airing in public the recordings. Highlighting the crucial part played by each of these steps, the scholar builds on the three “listening modes” proposed by Chion (2019; via Schaeffer 1966) – *causal*, *semantic*, and *reduced* – to formulate a more complex scheme. In particular, the scholar introduces what he calls: “associative,” “affective,” “spatial,” and “critical” listening. The “associative” listening refers to special memories and associations evoked by sounds; the “affective” listening deals with bodily feelings triggered by sounds; the “spatial” listening concerns the sense of spatiality (eg. direction and distance) of the sound sources; and finally the “critical” listening attends to the social, political, economical and historical context of sounds. Arguing that the act of listening usually entails a constant shift between these listening modes, Gallagher adopts this framework as a coding scheme for the organization of the written field notes taken while recording, to document the situation being recorded.

In Figure 1 (column 3, “Urban studies”) we report the main “modes of listening” discussed within Urban studies. Most of these modes have been already introduced in the previous sections (although from slightly different perspectives); while the “associative” and “critical” modes are introduced for the first time by Gallagher.

Recording Montreal’s Quartier des Spectacles

Context and research goals of the study

Reviewing different perspectives on field recording practice, we have highlighted several “modes of listening” that can support a qualitative analysis of field recordings. Building on the overview presented in Figure 1, we thus believe that this organization of thinking through the ways of listening and attuning across disciplines can help approach and analyze field recordings from multiple perspectives to tackle diverse research goals. It can, in other words, orient listeners / researchers when navigating such analysis, and provide empirical and theoretical trajectories to explore different data analysis approaches and their impact on the research results.

In an effort to keep this framework versatile, we illustrate how we have operationalized it for our specific research purpose in the context of a case study developed in Montreal in 2021. The study focused on the sound environment of Montreal’s Quartier des Spectacles (QDS), investigating the neighborhood’s liveliness, attractiveness and livability through field recording. We explored the potential of the framework to: code ethnographic notes taken during recordings, organize information gathered during the playback of recordings, and also help frame a participatory discussion during the public dissemination of recordings we have organized during our research. Ultimately, we relied on the framework to select representative excerpts for public airing of the recordings, but also for further academic presentations (e.g. as supplemental materials for journal articles) and knowledge mobilization events (outreach activities, audio examples streamed online,

etc.). This combination of uses, far from being the only way to approach field recordings, represents a possible avenue for their qualitative analysis.

A vibrant and touristic yet also residential neighborhood (Bild, Steele, and Guastavino 2021), QDS is undergoing constant transformation. A unique entertainment district in North America, QDS is hosting a high number of public spaces, venues and a large number of festivals and events throughout the year (Quartier des Spectacles Montreal 2021). However, over 2020 and 2021 the uses of public space within QDS were particularly affected by the pandemic (Bild, Steele, and Guastavino 2021), which resulted in a completely different – and less attractive – atmosphere and sonic environment (DI Croce et al. 2022). Seeking to investigate the uses of public spaces in QDS over the summer and beginning of fall 2021 (when a reduced version of the normal festival season took place), we developed a study using field recording practice as the main research method. The study followed an iterative process, whereas each phase was informing the next one (see Figure 2).

Methodology of the study

The research started by selecting 6 recording spots, chosen to be representative of the different public spaces within QDS based on previous research. The recordings took place between September and November 2021; using wearable binaural microphones, 5-minute-long recordings were taken for each spot over 23 recording sessions for a total number of 115 recordings. While doing all the recordings, the first author took also ethnographic notes to document the listening experience; the recordings were then played back after each recording session and the notes were adjusted and expanded during multiple listenings.

When the first phase ended, all the recordings were played back again, and the notes were expanded and coded using our framework (reported in Figure 1) as the coding scheme. The framework was operationalized – customized – to address the research goals (see section 3.3). The coding process finally led to the formulation of emerging themes, which were instrumental for the final step of the study (a workshop involving participants

Steps	Articulation
Step 1 <i>In-person field recordings</i>	- 1. a Selection of the recording spots - 1. b In-person field recordings and writing of ethnographic notes during the recordings - 1. c Listening to the recordings after each session and adjusting the field notes
Step 2 <i>Coding</i>	- 2. a Multiple listening to the recordings, coding and expanding of the notes using the scheme - 2. b Analysis of the coding process (how the coding scheme was appropriate and exhaustive)
Step 3 <i>Analysis</i>	- 3. a Formulation of the main emerging themes - 3. b Selection of the most representative recordings / Selection of excerpts
Step 4 <i>Collaborative analysis</i>	- 4. a Participatory listening session / discussion with participants - 4. b Discussion on emerging themes through focus groups - 4. c Analysis of the results from the listening session and focus group

Figure 2. Methodology used for the case study on the sound environment of Montreal's Quartier des Spectacles (QDS).

from QDS). Through a focus on the sonic environment, the emerging themes addressed several issues affecting the everyday life of residents, city users, and visitors within QDS, and therefore contributing to the attractiveness and livability of the neighborhood. It is worth mentioning, among the main themes, the impact of concerts and other cultural events, construction work and traffic nuisance, pedestrianization projects, informal uses of public space, and the use of broadcasted music throughout the main streets of the neighborhood.

Drawing from the results of the coding process, a collaborative listening session was held with the research team to select the most representative recordings, and single out short excerpts for each recording (around 1 min each). Here again, the customized framework was instrumental to focus on specific aspects deemed relevant to be shared during the participatory events and listening session. The excerpts were in fact selected to represent different activities taking place, variations of the sound environment over time in each location, and finally to illustrate how sounds contribute to shape the overall atmosphere of the recorded locations (e.g. triggering certain reactions).

For the last step of the study (April 2022), we organized a workshop involving residents and users from the QDS to investigate their sonic experience of the neighborhood. During a listening session we played back the short excerpts previously selected, and discussed them with in relation to their everyday experience of the QDS. Through the listening session, we therefore sought to add a “collective” level of understanding to the analysis. After the listening session, participants were divided into small groups for focus group discussions centered around the main themes identified. We finally analyzed the results of the listening session and focus group using again the customized framework for collecting and organizing participants’s reactions to the recordings aired during the listening session.

The analytical process: customizing and using the framework

While an in-depth analysis of the results is beyond the scope of this article, we report on the analytical process undertaken, and specifically on the operationalization of our framework. Given the amount and richness of sonic and textual “data” collected, we decided to proceed with a rather classic coding process to identify results to share with workshop participants and with collaborating institutions (including the City of Montreal and the Quartier des Spectacles Partnership). In particular, we selected the modes and within the modes the definitions and perspectives that could better support our investigation of the attractiveness, livability and inclusiveness of QDS. To this end, we operationalized the framework by acknowledging to what extent the modes and definitions we choose made certain everyday practices visible – e.g. the more consolidated uses of public space performed by visitors and families, on the one side, and those uses challenging the status quo, for example when performed by people experiencing homelessness. In doing so, the analysis sought to highlight the causes, sources, spatiality and temporalities of the sounds encountered, but at the same time the feelings, emotions and affects triggered by those sounds – the embodied experience of the listener/recordist. In [Figure 3](#) we return to the framework presented in [Figure 1](#), this time highlighting how we navigated and used the framework. Calling attention to its flexibility, we discuss a few issues emerging during our the process, thus emphasizing both the significance and biases of our analysis.

Modes of listening	Soundscape Research		Music, and Media Studies		Urban Studies	
Reduced			<i>Chion (2019) via Schaeffer (1966)</i> * <i>Reduced</i>	A mode of listening unbound from causes and meanings, which refers instead to the inherent qualities of sounds	<i>Gallagher (2015b) / via Chion and Schaeffer</i> * <i>Reduced</i>	A mode of listening unbound from causes and meanings, which refers instead to the inherent qualities of sounds
					<i>Amphoux (1993)</i> * <i>Environmental listening</i>	Deals with the objective qualities of the acoustic environment (eg. measurable sound levels)
					<i>INSIGHTS FROM THE CODING PROCESS (QDS research)</i>	We found the “reduced” mode to be not particularly helpful in our specific analysis. The lack of vocabulary to describe sounds beyond their sources and meanings, and the expected transferability of the outputs from our study made it difficult to use this mode.
Causal	<i>Schafer (1977)</i> * <i>Sound Signals</i>	Sound “signals” covers those sounds that are consciously and attentively listened by people in context	<i>Schaeffer (1966)</i> * <i>listening</i>	The “listening” mode refers to the active identification of sound sources	<i>Gallagher (2015b) / via Chion and Schaeffer</i> * <i>Causal</i>	The “causal” mode refers to the causes that produce a sound
	<i>ISO (2018)</i> * <i>Foreground sounds</i>	“Foreground sounds” are sounds that draw listener’s attention and are easily associable to a precise source	<i>Chion (2019)</i> * <i>causal</i>	The “causal” mode refers to the causes that produce a sound		
	<i>Pijanowski et al., (2011)</i> * <i>Biophony</i> * <i>Geophony</i> * <i>Anthrophony</i>	Soundscape ecology distinguishes between three main sound sources: “biophony” if from a biological origin, “geophony” when geophysically created, and “anthrophony” when produced by humans	<i>Clarke (2005)</i> * <i>source of stimulation</i>	Listening as a tool for the identification of the sources of stimulation		
Semantic	<i>Raimbault (2006)</i> * <i>Descriptive listening</i>	Focus on sound sources				
	<i>Dubois et al. (2006)</i> * <i>Semantic values</i>	Sound “source identity and semantic values” (866)	<i>Schaeffer (1966)</i> * <i>Comprehending</i>	“Comprehending” refers to a semantic mode of listening, when sounds carry a specific signification.	<i>Gallagher (2015b) via Chion and Schaeffer</i> * <i>Semantic</i>	Meaning of the sounds listened / recorded.
	<i>Huang and Kang (2015)</i> * <i>Sources description</i>	Description of the sources: ambient, informative, religious, natural, and traffic sounds	<i>Chion (2019)</i> * <i>semantic</i>	The “semantic” mode identifies the meanings embedded in the sound, and entails a semantic level of understanding		
					<i>INSIGHTS FROM THE CODING PROCESS (QDS research)</i>	In our analysis we found that the “causal” and “semantic” modes were usually operating in tandem. Therefore, for our specific research target The “causal” and “semantic” modes could be merged
Spatial			<i>Tuuri and Eerola (2012)</i> * <i>Kinesthetic</i>	Sense of movement triggered by sounds	<i>Gallagher (2015b)</i> * <i>Spatial</i>	Sense of spatiality (eg. direction and distance) of the sound sources
Associative					<i>Gallagher (2015b)</i> * <i>associative</i>	Special memories and associations evoked by sounds
					<i>INSIGHTS FROM THE CODING PROCESS (QDS research)</i>	The “associative” mode could be broadened toward an “emotional” level, which includes memories and associations triggered by sounds, encompassing also those <i>feelings</i> and <i>sensations</i> that would have otherwise remained undervalued in the analysis.
Cultural	<i>Schafer (1977)</i> * <i>Sound marks</i>	“Soundmarks” include sounds that are acknowledged by individuals or groups as part of their culture			<i>Amphoux (1993)</i> * <i>Milieu listening</i>	Concerns the qualities emerging from the geography of a place and its anthropic activities

Modes of listening	Soundscape Research		Music, and Media Studies		Urban Studies	
	<i>Huang and Kang (2015)</i> * <i>Soundscape preservation</i>	Highly representative sounds, holding an iconic or symbolic meaning, are those that deserve to be safeguarded			<i>Waitt et al. (2020)</i> * <i>Semiotic</i>	The “semiotic” (representational) dimension of listening combines the semantic and cultural modes
Critical			<i>Wright (2022)</i> * <i>Listening with / posthuman listening</i>	Listening as a way to reflect on the positionality of the recordist, attune to human-nonhuman assemblages, and critically address, disentangle and reassemble the complex assemblage of meanings emerging through sound.	<i>Gallagher (2015b)</i> * <i>Critical</i>	The “critical” listening attends to the social, political, economical and historical context of sounds
Affective			<i>Findlay-Walsh (2019)</i> * <i>embodied listening</i>	Field recording practice as a tool to grasp the emergent perceptions and embodied experiences of the listener	<i>Gallagher (2015b)</i> * <i>Affective</i>	Bodily feelings triggered by sounds
			<i>Tuuri and Eerola (2012)</i> * <i>Reflexive and connotative</i>	feelings and affects evoked by sounds	<i>Waitt et al. (2020)</i> * <i>Affective</i>	Embodied experiences triggered by sounds, non-representational dimension of listening
Atmospheric	<i>Raimbault (2006)</i> * <i>Holistic hearing</i>	Focus on the soundscape ad a whole				
Salient	<i>Schafer (1977)</i> * <i>Keynotes</i>	“Keynote” sounds include those background sounds that are often perceived unconsciously and are generally taken for granted by the majority of people	<i>Schafer (1966)</i> * <i>Hearing</i>	“Hearing” deals with the way people listen without paying attention to the informations embedded in sounds		
	<i>ISO (2018)</i> * <i>Background sounds</i>	“Background sounds” are continuous or very common sounds on which other more distinct sounds overlap	<i>Schafer (1966)</i> * <i>Attending</i>	“Attending” concerns the selective attention activated when searching for a specific sound within a complex scene		
						During our analysis, we noticed that the “salient” mode could include some noticeable occurrence marking the sonic environment during the recording. Therefore we complemented the salient mode with a “comparative” understanding to describe the experience and information gathered during the in-person recording phase as compared to the following playbacks of the same recording. This also concerns the way a listener / recordist compares the saliency of the different moments field recordings are taken in a given location over time, especially during a long and iterative process.
Collective			<i>Ultra-red (2014)</i> * <i>Collaborative</i>	Listening and commenting collectively to recorded sounds taken by the artists	<i>Amphoux (1993)</i> * <i>landscape listening</i>	refers to the perception and collective (inter-subjective) experience of the sonic environment.
			<i>Findlay-Walsh (2019)</i> * <i>sharing in-person field rec</i>	Listening to in-person field recordings taken by others as a way to share their embodied experience of listening	<i>Augoyard (2001)</i> * <i>écoute réactive</i>	Involving participants in a discussion focused on their impressions and reflections triggered by field recordings

Figure 3. Visualization of the way the framework presented in Figure 1 has been operationalized for the Montreal case study. In this chart we highlight in green all the modes (and within the modes the definitions) from Figure 1 that best helped us through our analytic process. We also highlight in red the modes and definitions that has not been operationalized as not fully supporting our analysis. The table also provides insights from the coding process that addressed the main targets of the QDS study.

Our customized framework builds mainly on Gallagher's (2015b) one, which follows the legacy of Schaeffer (1966) and Chion (2019). Gallagher's contribution was key for our understanding of the "causal," "semantic," "spatial," "cultural" and "critical" modes; these notions gave us the opportunity to focus on the sound sources, their meaning and cultural value – their "appropriateness" and "deviation" from the status quo – which triggered further "critical" reflections on the uses of public space in QDS. Here, the posthuman perspective on critical listening (Wright 2022) helped us reflecting on our positionality as researchers and recordists, and on how sound can be considered in all respects an "agent" of the commodification of public space within QDS – manifesting through concerts, outdoor installations and music broadcasted along the pedestrianized streets, all tailored on visitors's experience. The attention on the sources and cultural value of the sounds encountered also draws from Soundscape research (see especially Schafer's definition of *soundmarks*), and Urban studies (see Amphoux's definition of *milieu listening*). When coding our data, we found that the "causal" and "semantic" modes were usually (and not surprisingly) operating in tandem (as also suggested by Chion 2019); e.g. the siren's sound (the source) would be associated to the warning signal of an ambulance (the meaning). Therefore, for our specific research target, we believe the "causal" and "semantic" mode could be merged.

While we followed most of the modes proposed by Schaeffer (1966) and Chion (2019) through Gallagher (2015b), we found the "reduced" mode to be not particularly helpful in our specific analysis. The lack of vocabulary to describe sounds beyond their sources and meanings, and the expected transferability of the outputs from our study made it difficult to use this mode. For example, the "uuuaaaahhhooo" sound of a siren was found to be more interesting to be investigated from a semantic, cultural, or affective perspective than from a "reduced" one. In this sense, the "reduced" mode was not fully operationalized within the analysis. This choice influenced the results of the study, and further questions the limits of the coding process itself, as it potentially loose the sense of "wonder" emanating from the relationship between data and researcher (MacLure 2013) – in other terms the "astonishment, mystery, and breakdowns" (Brinkmann 2014, 722) or abduction of researchers' experiences as forms of data.

However, we found that other modes of listening could potentially compensate for this limitation, specifically the "associative," "affective" and "atmospheric" modes, for which we draw from Sound art and Media studies (see in particular Findlay-Walsh's 2019 *embodied listening*) and Urban Studies (see Waitt, Buchanan, and Duffy 2020 *affective listening*). While the "affective" mode was key to supporting our attention to the embodied experiences of the listener (the nonrepresentational dimension of listening), we found the need to broaden the "associative" mode toward an "emotional" level, which certainly includes the memories and associations triggered by sounds (as described by Gallagher 2015b), yet encompassing those feelings and sensations that would have otherwise remained undervalued. On the same page, drawing from Raimbault's (2006) definition of *holistic hearing*, we expanded the atmospheric mode to encompass the overall impression of the sonic environment; that is how the intensities and relations between sounds contributes to shape the atmosphere of the listened / recorded place.

During our coding process, we noticed that the "salient" mode could include some noticeable occurrence marking the sonic environment during the recording. This helped, in our case, highlight when and how a change in the situation under study corresponds to

a shift of the sonic environment, and most importantly when such shifts draw (or not) the recordist's attention. Therefore we complemented the salient mode with a "comparative" understanding to describe the experience and information gathered during the in-person recording phase as compared to the following playbacks of the same recording. This additional understanding of the salient mode also concerns the way a listener / recordist compares the saliency of the different moments field recordings are taken in a given location over time, especially during a long and iterative process.

Overall, operationalize the framework for our research goal was a very instructive exercise, which allowed us to test its relative comprehensiveness (when no new listening modes needed to be added to the coding) and at the same time to identify its limitations (above all the coding process itself, especially for addressing different research goals). We found however that the scheme, far from being an all-encompassing prescriptive model, is a useful reflexive and flexible tool to support researchers' analysis for a wide range of research goals.

Conclusions

In this article, we propose a framework to support the qualitative analysis of field recordings. In an effort to help researchers and artists explore different approaches to field recordings, we first presented the different phases and challenges of the practice: the in-person experience of the listener/recordist, the practice of taking written notes during and after the recording, the playback, the editing and finally the public airing of the recordings. Beginning to merge the art of listening and the analytic modes of social sciences, the framework derives mainly from three bodies of literature: Soundscape research, Music, Sound art, Media studies, and Urban studies. To illustrate the flexibility of the framework, we operationalized it in the context of a case study investigating the sonic environment of Montreal's Quartier des Spectacles. In this context, we used it to code ethnographic notes taken during recordings, organize information gathered during the playback of recordings, and also frame a participatory discussion during the public dissemination of recordings. Discussing how we customized the framework to better meet the goals of our study, we illustrate its potential to address different research goals and approaches in social sciences and within artistic research.

More generally, considering field recording within the broader field of sonic methodologies (Daza and Gershon 2015), we discuss to what extent sounds can "count as data" (Mazzei 2003) within qualitative research, and how such practice functions in practice (Gershon 2013). More precisely, we illustrate how field recording can be a valuable tool to investigate the "everyday" (Hall, Lashua, and Coffey 2008), as we have shown how it can produce special forms of data (written notes, audio documents, etc.) as well as suggest a unique approach to places and environments (Gallagher and Prior 2014) – just think of the embodied experience of the listener/recordist (Findlay-Walsh 2019). Building on Gallagher and Prior (2014), we bring together sonic ethnography (especially the use of written notes, when deemed useful) and soundscape research (particularly the focus on meanings and cultural interpretations), not forgetting sonic affects (Waitt, Buchanan, and Duffy 2020) and the collective dimension of listening (Augoyard 2001; Ultra-red 2014). Our study has thus demonstrated how field recordings can be usefully "described" (Benson and Montgomery 2018) insofar as the different facets of the listening experience are taken into account.

Beyond our urban research perspective, the operationalization of our framework illustrates its flexibility and potential within different research fields and contexts. We invite researchers interested in experimenting with field recording to use and tailor the proposed framework to their research needs. We further hope to trigger a wider discussion among qualitative researchers on the theoretical and methodological implications of the analysis of field recordings within social sciences. Finally, we wish to shed new insights on the practice of field recording, namely on its potentials to gain useful and likely alternative knowledge among qualitative methodologies. In this regard, we trust that field recording could be considered not only as a complement to other methods, but rather also as a “sound” method in and of itself.

Notes

1. We will use the term “field recording” (singular) to refer to the practice of listening, recording, and further editing and playback, the (urban) sonic environment; we will use the plural, “field recordings,” to mention the audio recordings taken in the field.
2. In this and the following sub-sections (1.2 and 1.3) we report key points of the conversation that has lately emerged from qualitative researchers dealing with sound and sonic methods. Drawing from the main contributions from the last decade in this and similar journals, we depart from a more pedagogical perspective to further include a trans-disciplinary approach that covers human geography, sound studies and cultural studies.
3. Among the scholars who contributed to such challenge within social sciences, it’s worth mentioning Lefebvre’s “rhythmanalytical” project. Seeking to document and analyze the rhythm of the city, Lefebvre paved the way for a new interest in the different perceptions and experiences of the researcher, whose body acquires a central role.
4. We refer here to the English translations proposed by Hellström (2002).
5. For example, in the recent *Handbook of sonic methodologies* (Bull and Cobussen 2020), field recording is briefly discussed only in the context of the production and spread of music in contemporary cities (see Stirling’s chapter, 115–140) and within ethnographic methods (see Battesti’s chapter, 755–778); not as a proper research method.
6. Besides the use of field recordings, other scholars from CRESSON explored qualitative methods to investigate the sonic environment. Notably, Augoyard and Torgue (2005) introduced and operationalized the concept of “sonic effects” to describe the manifold ways sounds propagate and are received by humans’ hears within the built environment (eg. resonance, or reverberation). Through the investigation of sound effects, the researchers found unique way to analyze how sounds impact the perception and behavior of people and how such analysis can inform social sciences and urban research.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No [881822].

Notes on contributors

Nicola Di Croce is a researcher and sound artist. He holds a PhD in Regional Planning and Public Policies from Università Iuav di Venezia and has been a Marie Skłodowska-Curie Fellow at Iuav and McGill University as well as a member of the Sounds in the City team. His research deals with the relationship between Urban Studies and Sound Studies; he is interested in collaborative and participatory approaches to urban policy analysis and design. A founding member of SSH! Sound Studies Hub Research Center at Iuav, he is assistant professor of urban planning at the same institution.

Catherine Guastavino is a Professor at McGill University and a member of the Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT). She directs the Sounds in the City partnership, which brings together diverse academics, professionals, artists, and citizens to rethink the role of sound in cities. She has published extensively on urban soundscapes, sensory experience, auditory perception, and music psychology. She also has extensive experience collaborating with industry partners, cultural institutions, and municipal and provincial governments.

ORCID

Nicola Di Croce  <http://orcid.org/0000-0002-2086-6480>

Catherine Guastavino  <http://orcid.org/0000-0002-5750-2015>

References

- Adams, M., T. Cox, G. Moore, B. Croxford, M. Refaee, and S. Sharples. 2006. "Sustainable Soundscapes: Noise Policy and the Urban Experience." *Urban Studies* 43 (13): 2385–2398. <https://doi.org/10.1080/00420980600972504>.
- Akiyama, M. 2019. "Nothing Connects Us but Imagined Sound." In *Sound, Media, Ecology*, edited by M. Droumeva and R. Jordan, 113–129. Cham: Palgrave Macmillan.
- Amphoux, P. 1993. *L'Identité Sonore des Villes Européennes (Research Report No. 26)*. CRESSON, IREC: Institut de Recherche sur l'Environnement Construit.
- Amphoux, P., C. Jaccoud, H. Meier, H. P. Meier-Dallach, M. Gehring, J. L. Bardyn, and G. Chelkoff. 1991. *Aux écoutes De La Ville : La Qualité Sonore Des Espaces Publics Européens, Méthode D'Analyse Comparative. Enquête Sur Trois Villes Suisses (Research Report No. 20)*. CRESSON, IREC: Institut de Recherche sur l'Environnement Construit.
- Atkinson, R. 2007. "Ecology of Sound: The Sonic Order of Urban Space." *Urban Studies* 44 (10): 1905–1917. <https://doi.org/10.1080/00420980701471901>.
- Augoyard, J. F. 2001. "Entretien Sur écoute Réactivée." In *L'Espace Urbain en Méthodes*, edited by J. P. Thibaud and M. Grosjean, 127–152. Marseille: Editions Parenthèses.
- Augoyard, J. F., and H. Torgue. 2005. *Sonic Experience: A Guide to Everyday Sounds*. Montreal: McGill-Queen's University Press.
- Axelsson, Ö., M. E. Nilsson, and B. Berglund. 2010. "A Principal Components Model of Soundscape Perception." *Journal of the Acoustical Society of America* 128 (11): 2836–2846. <https://doi.org/10.1121/1.3493436>.
- Benson, S., and W. Montgomery, eds. 2018. *Writing the Field Recording: Sound, Word, Environment*. Edinburgh: Edinburgh University Press.
- Bild, E., and Guastavino, C. 2022. ListenUpMTL: sonic cohabitation in downtown Montreal. *Annual Conference of the Society for the Study of Architecture in Canada (SSAC)*, Montreal, Canada, May 25–28.
- Bild, E., Steele, D., and Guastavino, C. 2021. At home in Montreal's Quartier des Spectacles festival neighborhood. *Journal of Sonic Studies*. <https://www.researchcatalogue.net/view/1278472/1278473>.

- Brinkmann, S. 2014. "Doing Without Data." *Qualitative Inquiry* 20 (6): 720–725. <https://doi.org/10.1177/1077800414530254>.
- Brown, A. L., J. Kang, and T. Gjestland. 2011. "Towards Standardization in Soundscape Preference Assessment." *Applied Acoustics* 72 (6): 387–392. <https://doi.org/10.1016/j.apacoust.2011.01.001>.
- Bull, M., and M. Cobussen, eds. 2020. *The Bloomsbury Handbook of Sonic Methodologies*. New York: Bloomsbury.
- Chion, M. 2019. *Audio-Vision: Sound on Screen*. 2nd ed. New York: Columbia University Press.
- Clarke EF. 2005. *Ways of Listening: An Ecological Approach to the Perception of Musical Meaning*. New York: Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195151947.001.0001>.
- Crone, B., S. Nightingale, and P. Stanton, eds. 2022. *Fieldwork for Future Ecologies*. Eindhoven: Onomatopee.
- Cusack, P. 2013. "Field Recording as Sonic Journalism." In *On Listening*, edited by C. Lane and A. Carlyle, 25–29. Axminster, Devon: Uniformbooks.
- Cusack, P. 2016. "Field Recording as Sonic Journalism." *Hearing Landscape Critically*, Faculty of Music, University of Oxford, 21–22 April 2016. <https://ualresearchonline.arts.ac.uk/id/eprint/9451/1/Cusack%2C%20Sonic%20Journalism.pdf>
- Daza, S., and W. S. Gershon. 2015. "Beyond Ocular Inquiry: Sound, Silence, and Sonification." *Qualitative Inquiry* 21 (7): 639–644. <https://doi.org/10.1177/1077800414566692>.
- Di Croce, N., Bild, E., Steele, D., and Guastavino, C. 2022. A Sonic Perspective for the post-pandemic Future of Entertainment Districts: the Case of Montreal's Quartier des Spectacles. *Journal of Environmental Planning and Management* 67 (1): 131–154. <https://doi.org/10.1080/09640568.2022.2100247>.
- Drever and Hugill (eds.). 2023. *Aural Diversity*. Abindgon and New York: Routledge.
- Dubois, D., Guastavino, C., and Raimbault, M. 2006. "A Cognitive Approach to Urban Soundscapes: Using Verbal Data to Access Everyday Life Auditory Categories." *Acustica united with Acustica* 92:865–874.
- Feld, S., and D. Brenneis. 2004. "Doing Anthropology in Sound." *American Ethnologist* 31 (4): 461–474. <https://doi.org/10.1525/ae.2004.31.4.461>.
- Filigrane. Musique, esthétique, sciences, société. 2021. "À L'Écoute Des Lieux: Le Field Recording Comme Pratique Artistique Et Activisme Écologique." Accessed October 12, 2022. <https://revues.mshparisnord.fr/filigrane/index.php?id=1044>.
- Findlay-Walsh, I. 2019. "Hearing How It Feels to Listen: Perception, Embodiment and First-Person Field Recording." *Organised Sound* 24 (1): 30–40. <https://doi.org/10.1017/S1355771819000049>.
- Flint, M. A. 2021. "More-Than-Human Methodologies in Qualitative Research: Listening to the Leafblower." *Qualitative Research* 22 (4): 521–541. <https://doi.org/10.1177/1468794121999028>.
- Fong, J. 2016. "Making Operative Concepts from Murray Schafer's Soundscapes Typology: A Qualitative and Comparative Analysis of Noise Pollution in Bangkok, Thailand and Los Angeles, California." *Urban Studies* 53 (1): 173–192. <https://doi.org/10.1177/0042098014562333>.
- Gallagher, M. 2015a. "Field Recording and the Sounding of Spaces." *Environment & Planning D* 33 (3): 560–576. <https://doi.org/10.1177/0263775815594310>.
- Gallagher, M. 2015b. "Audio Methods: Analysing Field Recordings of Electronic Voices in Athens and Glasgow." In *SAGE Research Methods Datasets Part 1*, Thousand Oaks: SAGE Publications, Ltd. <https://doi.org/10.4135/9781506324524>.
- Gallagher, M. 2019. "Voice Audio Methods." *Qualitative Research* 20 (4): 449–464. <https://doi.org/10.1177/1468794119867549>.
- Gallagher, M., and J. Prior. 2014. "Sonic Geographies: Exploring Phonographic Methods." *Progress in Human Geography* 38 (2): 267–284. <https://doi.org/10.1177/0309132513481014>.
- Gaver, W. W. 1993a. "What in the World Do We Hear?: An Ecological Approach to Auditory Event Perception." *Ecological Psychology* 5 (1): 1–29. https://doi.org/10.1207/s15326969eco0501_1.
- Gaver, W. W. 1993b. "How Do We Hear in the World? Explorations in Ecological Acoustics." *Ecological Psychology* 5 (4): 285–313. https://doi.org/10.1207/s15326969eco0504_2.
- Gershon, W. S. 2013. "Vibrational Affect: Sound Theory and Practice in Qualitative Research." *Cultural Studies ↔ Critical Methodologies* 13 (4): 257–262. <https://doi.org/10.1177/1532708613488067>.

- Guastavino, C. 2007. "Categorization of Environmental Sounds." *Canadian Journal of Experimental Psychology* 61 (1): 54–63.
- Guastavino, C. 2018. "Everyday Sound Categorization." In *Computational Analysis of Sound Scenes and Events*, edited by T. Virtanen, M. D. Plumbley, and D. Ellis, 183–213. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-63450-0_7.
- Guastavino, C., Katz, B. F., Polack, J. D., Levitin, D. J., and Dubois, D. 2005. Ecological validity of soundscape reproduction. *Acta Acustica united with Acustica* 91 (2): 333–341.
- Hall, T., B. Lashua, and A. Coffey. 2008. "Sound and the Everyday in Qualitative Research." *Qualitative Inquiry* 14 (6): 1019–1040. <https://doi.org/10.1177/1077800407312054>.
- Hellström, B. 2002. "The Sonic Identity of European Cities: A Presentation of the Work Conducted by the Swiss-French Researcher Pascal Amphoux." *Soundscape Studies and Methods* 1:59–82.
- Hong, J. Y., J. He, B. Lam, R. Gupta, and W. S. Gan. 2017. "Spatial Audio for Soundscape Design: Recording and Reproduction." *Applied Sciences* 7 (6): 627. <https://doi.org/10.3390/app7060627>.
- Huang, L., and J. Kang. 2015. "The Sound Environment and Soundscape Preservation in Historic City Centres—The Case Study of Lhasa." *Environment and Planning B* 42 (4): 652–674. <https://doi.org/10.1068/b130073p>.
- ISO (International Organization for Standardization). 2014. Acoustics — Soundscape — Part 1: Definition and Conceptual Framework. ISO/FDIS 12913-1:2014. Geneva: International Organization for Standardization.
- ISO (International Organization for Standardization). 2016. Acoustics - Soundscape - Part 2: Data Collection and Reporting Requirements. ISO/CD 12913-2:2016(E). Geneva: International Organization for Standardization.
- ISO (International Organization for Standardization). 2019. Acoustics - Soundscape - Part 3: Data Analysis. ISO/CD 12913-3:2019(E). Geneva: International Organization for Standardization.
- Krause, B. L. 2002. *Wild Soundscapes: Discovering the Voice of the Natural World*. Berkeley: Wild Sanctuary Books.
- Labelle, B. 2010. *Acoustic Territories: Sound Culture and Everyday Life*. London: Bloomsbury Academic.
- Labelle, B. 2018. *Sonic Agency. Sound and Emergent Forms of Resistance*. London: Goldsmith Press.
- Lane, C., and A. Carlyle. 2014. *In the Field : The Art of Field Recording / Cathy Lane & Angus Carlyle*. Axminster, Devon: Uniformbooks.
- Law, J. 2004. *After Method: Mess in Social Science Research*. Oxon and New York: Routledge.
- Lefebvre, H. 1991. *The Production of Space*. Oxford: Basil Blackwell.
- MacLure, M. 2013. "The Wonder of Data." *Cultural Studies ↔ Critical Methodologies* 13 (4): 228–232. <https://doi.org/10.1177/1532708613487863>.
- Mazzei, L. A. 2003. "Inhabited Silences: In Pursuit of a Muffled Subtext." *Qualitative Inquiry* 9 (3): 355–368. <https://doi.org/10.1177/1077800403009003002>.
- Nilsson, M., D. Botteldooren, and B. D. Coensel. 2007. "Acoustic Indicators of Soundscape Quality and Noise Annoyance in Outdoor Urban Areas (Invited Paper)." In *Proceedings of the 19th International Congress on Acoustics*, 2–7 September 2007. Madrid.
- Pearce, C., R. Patterson, and I. Rushton. 2014. "Re: Silences—: The Sensing of Sound." *Qualitative Inquiry* 20 (5): 690–698. <https://doi.org/10.1177/1077800413513726>.
- Pijanowski, B. C., A. Farina, S. H. Gage, S. L. Dumyahn, and B. L. Krause. 2011. "What Is Soundscape Ecology? An Introduction and Overview of an Emerging New Science." *Landscape Ecology* 26 (9): 1213–1232. <https://doi.org/10.1007/s10980-011-9600-8>.
- Pink, S. 2015. *Doing Sensory Ethnography*. London: SAGE Publications Ltd. <https://doi.org/10.4135/9781473917057>.
- Quartier des Spectacles Montreal. 2021. "Re-Imagining Urban Spaces and Culture During a Global Pandemic." Accessed October 12, 2022. <https://www.quartierdesspectacles.com/en/media/re-imagining-urban-spaces>.
- Raimbault, M. 2006. "Qualitative Judgements of Urban Soundscapes: Questioning Questionnaires and Semantic Scales." *Acta Acustica United With Acustica* 92 (6): 929–937.
- Ritter, M. 2021. "Postphenomenological Method and Technological Things Themselves." *Human Studies* 44:581–593. <https://doi.org/10.1007/s10746-021-09603-5>.

- Robinson, D. 2020. *Hungry Listening. Resonant Theory for Indigenous Sound Studies*. Minneapolis and London: University of Minnesota Press.
- Roginska, A., and P. Geluso. 2018. *Immersive Sound: The Art and Science of Binaural and Multi-Channel Audio*. Oxon and New York: Routledge.
- Schaeffer, P. 1966. *Traite des Objets Musicaux: Essai Interdisciplines*. Paris: Éditions du Seuil.
- Schafer, R. M. 1977. *The Tuning of the World*. New York: Knopf.
- Seaward, M. R. 2015. "Urban Soundscapes as Narrative: Intentions and Interpretations of Field Recordings." *Journal of Radio & Audio Media* 22 (2): 299–303. <https://doi.org/10.1080/19376529.2015.1083362>.
- Skármeta, A. 2008. *The Postman*. New York: W.W. Norton & Company.
- Southworth, M. 1969. "Sonic Environments of Cities." *Environment & Behavior* 1 (1): 49–70.
- Steele, D., and C. Guastavino. 2021. "Quieted City Sounds During the COVID-19 Pandemic in Montreal." *International Journal of Environmental Research and Public Health* 18 (11): 5877.
- Sterne, J. 2021. *Diminished Faculties. A Political Phenomenology of Impairment*. Durham and London: Duke University Press.
- Truax, B. 1996. "Soundscape, Acoustic Communication and Environmental Sound Composition." *Contemporary Music Review* 15 (1): 49–65. <https://doi.org/10.1080/07494469600640351>.
- Tuuri, K., and T. Eerola. 2012. "Formulating a Revised Taxonomy for Modes of Listening." *Journal of New Music Research* 41 (2): 137–152. <https://doi.org/10.1080/09298215.2011.614951>.
- Uetz, A. 2019. "Comparing Field-Recordings: Listening In and Listening to Hong Kong." *Contour*. Accessed October 12, 2022. <https://contourjournal.org/index.php/contour/article/view/90>.
- Ultra-red. 2014. *Ultra-Red: Nine Workbooks 2010-2014*. Berlin: Koenig.
- Vallee, M. 2020. *Sounding Bodies Sounding Worlds an Exploration of Embodiments in Sound*. Singapore: Palgrave Macmillan.
- Vannini, P., ed. 2015. *Non-Representational Methodologies. Re-Envisioning Research*. New York and London: Routledge.
- Vannini, P., D. Waskul, S. Gottschalk, and C. Rambo. 2010. "Sound Acts: Elocution, Somatic Work, and the Performance of Sonic Alignment." *Journal of Contemporary Ethnography* 39 (3): 328–353. <https://doi.org/10.1177/0891241610366259>.
- Waite, G., I. Buchanan, and M. Duffy. 2020. "Lively Cities Made in Sound: A Study of the Sonic Sensibilities of Listening and Hearing in Wollongong, New South Wales." *Urban Studies* 57 (10): 2131–2146. <https://doi.org/10.1177/0042098019871170>.
- Western, T. 2018. "Field Recording and the Production of Place." In *Critical Approaches to the Production of Music and Sound*, edited by S. Bennett and E. Bates, 23–40. London and New York: Bloomsbury Academic.
- Wright, M. P. 2022. *Listening After Nature. Field Recording, Ecology, Critical Practice*. London: Bloomsbury.