

Dissonance: scientific paradigms underpinning the study of sound in geography

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 The objective of this article is to approach the different conceptions of sound – and its relations to the underlying scientific paradigms – that emerged throughout the history of geography. There has been a growing interest among geographers in understanding the spatialities of sound, and geographies of sound have become an emerging subfield of the discipline. For this reason, it is the right time to address how the discipline has approached sound throughout its history. Several theoretical perspectives influenced geography in the twentieth century, changing its methodologies and how its subjects were conceived. Sound, like other subjects, has been conceived very differently by geographers of competing paradigms. Concepts such as noise, soundscape, or sound as affect, among others, have dominated geographies of sound at specific periods. Due to the marginality of the subject in the discipline, assessments of these conceptual shifts are rare. I tackle this issue in this article as I provide a first attempt of writing a history of sound in geography. The article reviews debates regarding the name of the subfield, and the conceptions of sound in the successive and competing scientific paradigms in geography.

Keywords: sonic geography, geographic perspectives, noise, soundscape, listening, performance

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Introduction

More than 20 years ago, Rodaway (1994) adverted geographers to the fact that, despite a growing body of studies, there was little agreement over what a geography of sounds would be called. He distinguished between aural geography, which would be “a sensuous geography derived from the ears” (Rodaway 1994, 84); and sonic geography, which “would refer to the spatial organization of sounds and characteristics of places in terms of sound” (*ibid.*, 84). He also proposed “auditory geographies”, which would address “the sensuous experience of sounds in the environment and the acoustic properties of that environment through the employment of the auditory perceptual system” (Rodaway 1994, 84), encompassing both hearing and listening. He did not consider the term acoustic, which has been used by geographers (Gandy & Nilsen 2014; Revill 2014) and others (LaBelle 2010), generally in a similar manner to what Rodaway called ‘sonic geography’. In French geography, the term ‘bruit’, which can be translated both as sounding or noise, has been employed, along with the term ‘géographie des milieux sonores’ (geography of sonic milieux or geography of sonic places; for both

uses, see Roulier 1999). In other communities, 'geography of sounds' has also been used (Alves 2016), roughly meaning the same as sonic geography. Since Rodaway's discussion, the term 'sonic geography' seems to have become more common in the Anglophone community (e.g. Matless 2005; Boland 2010; Boyd & Duffy 2012; Gallagher & Prior 2014), but the term 'listening geographies' also emerged (Gallagher *et al.* 2017), meaning roughly the same as what Rodaway meant by aural geographies.

The choice of the term must not be taken lightly. While 'sonic' refers to sounds themselves – and in consequence their temporality, spatiality, and sociality –, the term 'acoustic' also refers to the physical properties of spaces that affect how sounds are made and propagate (e.g. in terms of echo or resonance), which is important if geographers wish to grasp how spaces shape and change sounds, and how this affects natural ecologies, landscape experience, social relations, political structures, cultural communities, economic spatialities, among others. Both terms may encompass the experience of sounds, so aural, auditory, or listening geographies would be a subfield of sonic or acoustic geographies. On the other hand, other possible terms seem to have been left out, such as noise geographies, or geographies of resonance.

The little agreement over what the field of the study of sound in geography should be called is both a consequence and a reminder that sound has not been a major concern of geographers until recent years. For this reason, while there have been significant theorisations of sound in geography in the last years (Gallagher & Prior 2014; Doughty *et al.* 2016; Revill 2016; Gallagher *et al.* 2017), there is still no significant discussion to how sound has been conceived throughout the discipline's history. In order to tackle this issue, in this article, I approach the different conceptions of sound – and its relations to the underlying scientific paradigms – that emerged through the history of geography. In doing so, I attempt to reunite and compare the conceptions of sound from different times and spaces, as geographical studies on sound are scattered historically and geographically. In the next section, I will address the paradigms that have underpinned geographical research on sound. After this, I briefly discuss the dissonance in the conceptions of sound in geography.

Paradigms underpinning geographical research on sound

It has often been noticed that the visual has been a hegemonic sense in geography, and that this is the reason why sound has been a poorly studied subject over the course of the discipline (Tuan 1979; Porteous 1982; Pocock 1989; Smith 1997). Despite its marginality in the discipline, sound has been explored by geographers as a spatial, social, cultural and political phenomenon for some time, although this history is often not acknowledged in the reviews of the subject. In this section, I will present three historical moments for the study of sound in geography. First, I will approach the first approaches to sound within regional geography and theoretical geography, which had very different conceptions of sound. Secondly, I will present behaviourist and humanistic approaches to sound that have focused on the perception of sound by humans. Thirdly, I will approach performative approaches to sound including structuralism, poststructuralism and postphenomenology.

Geography starts to listen

Sound has been present since the birth of modern geography. von Humboldt (1850), in his descriptions of natural geographic processes, sporadically made reference to the sounds of places, as Malanski (2017) notes. However, the first geographer to have published a study of sound in geography seems to be Granö (1929), with a cartographic study on the sounds of the island of Valosaari in Finland, as Pocock (1989) and Revill (2016) refer. Beyond this contribution, the studies of the paradigm of regional geography have privileged the visual study of landscape. While it has often been argued that the hegemony of the visual is the reason for regional geography to have overlooked sound, it should also be acknowledged that sociological (e.g. Simmel 1981 [1912]) and ethnographical (see Howes 2003; Pink 2009) studies were already approaching the senses and music at the time, so geographers might have taken sound to be outside of the discipline's framework.

Over the course of the twentieth century, the several new paradigms that emerged in geography provided new perspectives on sound. Theoretical or quantitative geography never really grasped the

issue of sound in a general manner. The few geographical studies under this paradigm occurred late in the discipline and focused mainly on the issue of noise. There are a number of works that were published across Europe during the 1970s. Labasse (1972) studied the geographies of airports and the issues of aircraft noise in European cities. Barceló Pons (1975) attempted to undertake a social geography of noise, as he studied the effects of air traffic noise from three European airports on human health and property values, departing from the studies of noise by acoustic engineers and studies on the effect of noise on real estate by economists. Ohlson (1976), on the other hand, focused on rural landscapes and studied the effects of climatic and topographic elements on the dispersion and level of different sounds. His main concern was however also traffic noise, in this case originating from boats, ferries and snowmobiles.

The conception of sound in these studies is often poorly developed. Sound is reduced to noise, which is defined as a nuisance that can be perceived quantitatively. Sound, therefore, is taken as an abstract entity often reduced to numbers, and understood as objective and homogeneous. That is, this notion of noise cannot conceive different responses to the same sounds, or even differences in sound beyond volume or signal, such as timbre or rhythm. Geographers have since then seldom produced studies on noise, usually traffic-related (e.g. Birnie & Hall 1981; Kariel 1990; Tadeu *et al.* 1995; Bennett 1997; Muscar Benasayag 2000; Lam *et al.* 2010; Szeremeta & Zannin 2015; Dobryakova & Kolesov 2016). Once again, a possible explanation for this is the significant development of quantitative approaches to sound and noise in other scientific disciplines, in this case engineering (Ingerslev 1952, 1972; Schultz 1978), architecture (Maekawa & Lord 1993), and psychology (Kryter 1970). The production on noise or quantitative approaches to sound continues to be dominated by engineers, architects and psychologists to this day (Kang 2007).

Geography listens with people

In the 1970s, with the advent of behaviourist geography, humanistic geography, and time-geography, geographers were increasingly attentive to the spatial perspective of humans in their everyday life. During this period, a behaviourist approach to sound received some attention in geography, focusing mainly in urban environments. A first seminal study was that of Southworth (1969) in urban planning, who conducted a field study on the perceived variety and character of city sounds and its influence on the perception of the visible city, which provided a starting point for behaviourist geographers. Southworth (1969) based his perspective on environmental psychology, thus establishing a behaviourist approach which was scarcely reproduced over time in geography.

Works that followed this perspective mostly focused on the relation between the perception of sounds and the behaviour of individuals, using quantitative surveys to establish determinist causal relations between certain sonic stimuli and the behaviour of individuals. Some studies have approached how individuals perceive the sonic environment, such as Kariel's (1980) study on the difference in the perception of sounds by mountaineers and the general public, and López Barrio's (2001; López Barrio & Carles 1997) studies on the sonic environment as a symbolic or signifying medium that influences human behaviour. Others have focused on how the perception of sounds alters individual or collective behaviour. For instance, Hall and colleagues (1981) explored community responses to road traffic and aircraft noise; Lam, Chau and Marafa (2007) researched individual responses to noise in natural spaces; and Boubezari (2003) classified the strategies and techniques that individuals employ in order to seek for sonic comfort. This approach seems to have been abandoned in recent years.

It was with the advent of humanistic geography, which focused on the experience of places, that sound gained a more central role in geographic thought. Tuan's (1974) seminal book on environmental perception, attitudes, and values focused on the senses as the fundamentals of perception, and as such approached hearing. Despite this, Tuan's take on the links between environment, culture, and personal perception and ethics remained primarily focused on visual cues such as landscape, architecture, colour, and symbols. Buttner (1976, 291) also argued that geography needed a "sensitivity to nature, sound, smell, and touch" to grasp the dynamism of the lifeworld, and Seamon (1979) argued that the sound of the rhythms of place, which he called 'place ballets', could invite (or pull away) individuals to participate in social life.

This interest in sound was certainly not unrelated to the work being done in the emerging field of acoustic ecology at the time. During the 1960s and 1970s, at the Simon Fraser University in Vancouver, a number of scholars, led by R. M. Schafer, created the World Soundscape Project, an educational and research group. The group was concerned with the rapid changes in urban soundscapes, mainly with the increase in noise pollution. Their approach, however, partially differed from the studies on noise by engineers and architects, as they were primarily interested in understanding sound as a quality and not as a mere nuisance. Besides collecting and publishing the recordings of environmental sounds (e.g. World Soundscape Project 1973), Schafer (1977) was dedicated to create and develop a series of concepts to address sound qualitatively, most notably the concept of soundscape (originally presented by Southworth 1969) which refers to the set of sounds hearable at a certain location. For Schafer, soundscapes, like musical works, have a dominant keynote that gives them a sense of place, as well as recognizable soundmarks, which are the sonic version of landmarks. Besides this, soundscapes also contain a series of signals which provide environmental information. This issue was further developed by Truax (1978, 1984). The prime method of research developed by the acoustic ecology school was the soundwalk, which are excursions with the purpose of actively listening to the environment (Westerkamp 1974). Schafer's perspective was not only inspirational for geographers, but issues of space and geography were also central to Schafer's perspective on sound (see Schafer 1985). The first geographer to have engaged with the acoustic ecology school was Lowenthal (1975, 1976) on his works on landscape and memory where he questioned the possibilities of recapturing soundscapes from the past.

After the calls of humanistic geographers, a number of geographers engaged in the study of sound as experience, but these also resorted to the concepts and language of Schafer's soundscape studies. The most significant approaches are those by Porteous and Mastin (1985), and Pocock (1989) in English, and by Nogué i Font (1983, 1985) in Catalan. Porteous and Mastin (1985) and Nogué i Font (1983, 1985) reflected upon soundscape and related concepts, and about how these could be used to expand landscape studies. On the other hand, Pocock (1989) provided a more significant discussion about the study of sound in geography from the point-of-view of experience. Pocock reflected upon different aspects of sounds: its physical and cultural properties, its experience and the role that sound plays in environmental sensitivity, and the difficulties inherent to the description of environmental sound as a non-verbal phenomenon. These insights underpinned studies on sound as an aesthetic property of spaces linked to experience, contemplation, emotion, but also a sense of history (Johnston 1986; Pocock 1987, 1988). Soundscape was understood as the sonic equivalent of landscape, which would be a visual phenomenon. This relation was not criticized during this period, and a multisensorial understanding of landscape (such as the one that can be found in Prior 2017) was absent from these works. Later, Smith (1994) also approached the concept, arguing for a broader attention to sound in space, but with little dialogue with Schafer's arguments.

During the 1980s and 1990s, French geographers, working together with architects and urban sociologists, also engaged with the concepts of soundscape (Cahen Salvador *et al.* 1980; Augoyard & Torgue 1995). These works were however more closely related to issues of identity. Amphoux (1993, 2003) worked on the sonic identity of European cities, and Montès (2003) worked on the weaving of sound and collective identity. Amphoux also worked on the application of the concept of soundscape (translated into French as *paysage sonore*) in urban areas (Amphoux 1997). More recently, in Germany, Wissmann (2014) focused on classifying and mapping types of sounds in urban spaces. The concepts of keynote, signal and soundmark also remain relevant for geographers today when the focus is on aural representations (Wissmann 2008; Wissmann & Zimmermann 2010; Hones 2015).

Geography listens to everything

During the 1990s, as geography turned to poststructuralism, attention has turned to the performativity of sound. Rodaway's (1994) reflection on auditory geographies was an important mark insofar as he discussed the concepts of the acoustic ecology school and highlighted its limitations. Rodaway (1994) pointed out that the concept of soundscape is anthropocentric as it focuses on sound from the viewpoint of the human listener. He also criticized the language of acoustic ecology for its proximity to

visual phenomena; for example it substitutes landscape with soundscape, or landmark for soundmark. Rodaway (1994) argued that it is not accurate to use a visual terminology to address sounds because while visual phenomena tend to be objects for contemplation, the sound experience is more of a “process of engagement with the environment”, for three reasons. First, sounds change as individuals move through space. Secondly, sounds may change in the same space over time. Thirdly, the presence of the individual’s body always participates in the production of sounds in a given environment. Although he does not propose alternative concepts, Rodaway’s criticism of soundscape and related concepts is a significant act during a period in which the focus of social and cultural geographers switches from representation to performance. After Rodaway’s work, Smith (1997, 2000) was one of the main contributors to think about sound in geography as performance. Although Smith (1997, 2000) focused on music, her discussion of performativity in musical acts was an important starting point to think about the performativity of sound in general. In her study on Renaissance Venice, Smith (2000) argued that performance matters in the study of music, and addressed musical acts in everyday life and ceremonies, and the political, economic and emotional implications of these events. Duffy (2000, 2003, 2005) was likewise interested in the performativity of music, and studied participation in music festivals as a practice of identity and community. Within this framework of performance, geographical studies start to focus on sounds beyond music, and eventually turned to the non-representational affects of everyday sounds (Anderson 2005; Anderson *et al.* 2005).

With this, post-phenomenology became the most recent theoretical approach underpinning geographical studies of sound. Post-phenomenology gathered a fair amount of attention by geographers in the last decade (Ash & Simpson 2016), especially due to the interest in exploring the significance of non-representational phenomena for explaining everyday life practices (Thrift 2011). As the geographical studies of sound started to explore the performativity of sounds, moving away from the study of sound as representation and identity, post-phenomenology became one of the dominant perspectives. The works of philosophers Nancy (2007) and Ihde (2007) on the phenomenology of sound are the most relevant references. Nancy (2007) was concerned with the differentiation of the act of listening from the act of seeing, arguing that while visual forms are objective, persistent and mimetic, the practice of listening is always subjective, resonant, and methexic. Furthermore, he distinguishes between the act of hearing and listening as passive and active forms of the sense. Nancy inverts the common understanding of listening as a distracted form of the sense and hearing as an attentive mode. He argues that hearing, even if in an attentive stance, is the passive mode of the sense, while listening (in French, *écouter*, which can also mean to eavesdrop, or to spy) is the active mode, when it is attentive to what he calls the ‘beyond-meaning’ of sound, which is to say the affective and more-than-representational aspects of sound. While Nancy is more concerned with the affectivity of sound, Ihde (2007) worked on the temporality and spatiality of sound. He argues that while sound has been understood by scholars as primarily temporal, it is significant to look at how sound is a product of space, as it emerges from shapes, surfaces, and fields. He approaches the experience of sound as a polyphony which resonates within the subject and shapes the representation of the world in what he calls the ‘auditory imagination’.

Simpson (2009) debated the significance of Nancy’s perspective to investigate presence and being-with, arguing that thinking about sound leads us to a decentralised subject that is “the relation with others itself”. Revill has approached Ihde’s thoughts on the auditory imagination, along with Schafer’s (1994) and Nancy’s (2007) idea of sound as a ‘touch at a distance’ to argue that sound plays a role in the mediation of social life, as “multiple registers which situate and shape existence and experience [which] can simultaneously help open up the black boxes of both affective and representational political processes” (Revill 2016, 253). To put it simply, postphenomenological perspectives on sound have pointed out that the cognitive-affective state of each individual body-mind is a product of the multiple relations he or she maintains with the environment. In this regard, sound mediates the relation between each individual body-mind and the surrounding environment by transmitting information, meanings, and affects across bodies and spaces. Sonic affects, or sound as affect, becomes a central concept (Duffy & Waitt 2011; Boyd & Duffy 2012). It has been pointed out that this means that sound has important social (Boland 2010; Kanngieser 2012) and political (Barns 2014; Waitt *et al.* 2014) significance, besides its aesthetic role. Within this perspective,

Gallagher, Kanngieser and Prior (2017) proposed the concept of 'expanded listening' to grasp the multiple effects of sound in the spatio-temporality of social life. Expanded listening "refers to the varied ways in which bodies of all kinds – human and more-than-human – respond to sound", and the purpose of this is to look

"outwards from the dominant anthropocentric understanding of listening, beginning by deepening and expanding human listening (in relation to landscape), then considering how sound moves bodies beyond cochlear listening and human consciousness (as affects and atmospheres), and finally exploring forms of listening in which human bodies are marginal (vibrations in earth materials and machines)" (Gallagher *et al.* 2017, 618).

This concept has become popular to address the generative role that sounds plays in social interaction and micro-politics, by focusing not only on sound itself, but in how it relates individuals, objects, spaces, and events (MacPherson *et al.* 2016; Mills 2017; Wilkinson 2017; Kerr *et al.* 2018; Peters 2018). The intention of going beyond a dominant anthropocentric understanding of listening, however, seems poorly achieved in these studies.

Some authors have employed other perspectives to address sound and listening as performative acts. The works of Waitt with other authors (Duffy *et al.* 2010; Waitt *et al.* 2014, 2017) have applied the feminist concept of visceral politics to sound experience. Affect theory (e.g. Massumi 2002; Clough 2007; Gregg & Seigworth 2010) has also been significant for conceptual advances focused on the atmospheric and affective nuances of sonic environments such as Kanngieser's (2012) and Revill's (2016).

A structuralist/post structuralist approach to sound has also been present in studies that seek to understand the significance of sound for political processes, events, and beliefs. A common philosophical starting point has been the post-structuralist writings of Rancière (2004) on the sensible, and the structuralist/phenomenological writings of Lefebvre (2004) on rhythms. To put it simply, Rancière (2004) advanced the concept of distribution of the sensible which refers to the system of perception and senses that reveals something in common and defines the structure of the parts and positions of what is common, distributing them through spaces, times and activities. For Rancière (2004), the distribution of the sensible creates a regime of identification, that is, it delimits what is visible and invisible, hearable and unhearable, in a common space. He argues that some practices, such as artistic practices, can have a political effect even if they have no explicit political content, because they act on this distribution of the sensible (Rancière 2004, 2011). Revill (2016), for instance, has applied this concept to the geographies of sound. On the other hand, Lefebvre (2004) advanced the notion of rhythmanalysis, that is, the study of bodily and spatial rhythms with the purpose of unveiling how power structures are reproduced in everyday life. He distinguished between cyclical natural rhythms and linear capitalist rhythms, arguing that the former have been progressively substituted by the latter with the aid of modern technologies. His views on the relation between rhythm and social structures have been criticized for its rigidity (Simpson 2008), yet some authors still found his insights on the relation between body, rhythm, and power valid (Edensor 2010; Tiwari 2010; Reid-Musson 2017). While Lefebvre's writings seem to have had a considerable impact on geographies of sound shortly after his work was translated into English (e.g. Simpson 2008; Wunderlich 2010, 2013; Duffy & Waitt 2011; Boyd & Duffy 2012; Lehtovuori & Koskela 2013; Revill 2013), in more recent years his influence seems to have faded. However, in South American geographies, we can observe a growing number of works that mix structuralist and poststructuralist perspectives in the study of inequalities and social divisions regarding sound and sonic spaces (Alves 2013, 2016; Cruz 2014).

These two lines of works – postphenomenological and structuralist/poststructuralist – have been influenced by a number of works in the multidisciplinary field of sound studies that have addressed issues of space and sound (e.g. Carlyle 2007; Goodman 2010; LaBelle 2010; Born 2013; Belgiojoso 2014). Gender and postcolonial perspectives have mostly been absent from the geographies of sound, unlike in the multidisciplinary field of sound studies. A notable exception in gender is Waitt, Harada and Duffy's (2017) recent study on car mobility, where they investigate the feelings of men and women for cars and the motivations for driving them. Saldanha's (2007, 2014) long work on musical communities in India is the notable exception regarding postcolonialism.

Conclusion

This short overview is a first attempt of writing a history of sound in geography. While it is by no means an exhaustive work, it amplifies for the first time the different perspectives that geography had over sound, a work that had not been done yet. We have seen that throughout the history of geographical research on sound, there have been significant changes in how sound is conceived in the discipline.

In quantitative geography, sound was only thought of as noise – a nuisance that could be reduced to an abstract and quantitative measurement. But in the 1970s, the immense diversity of human responses to sound was approached by geographers through different perspectives. While behaviourist studies privileged the quantitative analysis of perception and behaviour change regarding sound, humanistic geographers were concerned with the overlapping of soundscape and landscape and the experience of both. The marginality of the theme in the discipline meant that the main concepts were being produced by other scholars, and often not thoroughly criticised. This took place only in the 1990s, as the discipline became more interested in performativity, following the emergence of poststructuralism in geography. Since then, the concept of soundscape has been augmented by Central European and South American geographers, while Anglophone geography has turned to a notion of sound as affect and expanded listening.

Probably due to the marginality of the theme in the discipline, the dominant concepts were rarely critically assessed by more recent perspectives (with the exceptions of Rodaway 1994; and Smith 1997), up until recently (Boyd & Duffy 2012; Bennett *et al.* 2015; Gallagher *et al.* 2017; Revill 2016; Prior 2017). For this reason, the conceptual vocabulary of sonic geographies remains scattered and at times unclear. The relations between concepts such as soundscape, acoustics, aurality, noise, silence, and listening must be addressed in further detail if the recently established field of sonic geographies is to have a common language.

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