SoundEffects

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An acoustemology of streaming media and information and communication technologies

Abstract

This article will discuss how information and communication technologies (ICTs) are reshaping our soundscapes and, in the process, also ourselves. Streaming, as a self-directed experience of music listening, can be an important part of the construction of identity, and ICTs have been recognised as the most powerful 'technologies of the self'. This article will argue that the ubiquitous presence of ICTs in the acoustic environment to which someone is exposed over the course of their lives is an important element in the construction of the self. In this process, ICTs operate by managing notifications, memories, and soundscaping. As hearing is a cultural construction, changes to the soundscape promoted by ICTs are discussed in terms of their role in the development of a 'sonic self'. Muzak (background music), largely present in urban soundscapes as streaming music, plays an important role in this construction and is described from the point of view of its different uses and connotations. Finally, the sonic apprehension of the world and of our self is approached in light of the space-time shift promoted by the new digital environment created by ICTs.

Michel Foucault discussed the role of reading and writing in the construction of the self, and much earlier than that, Plato had recognised how writing had reshaped humanity. Organising knowledge was no longer a task of memory, but a task of reminding. Writing is one of the first 'technologies of the self', as Foucault would put it, in the sense that it can, on some level, affect the individuals'

> own bodies and souls, thoughts, conduct, and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality. (Foucault et al., 1988, p. 18)

It can be useful to talk about the self in terms of the '3C' model proposed by Luciano Floridi: The corporeal, the cognitive, and the consciousness phases are 'membranes' whose healthy development makes the self possible. Therefore, 'any technology capable of affecting any of [these membranes] is *ipso facto* a technology of the self' (Floridi, 2015, p. 221). Information and communication technologies (ICTs) are powerful technologies of the self in their ability to manage memories. Particularly in the case of ICT-mediated sounds – via smartphones, computers, and any device equipped with software or hardware for music listening – which participate in the acoustic aspects of the construction of the self, personal memories of sounds and music are manageable in a way that our personal identities are affected. The relationship between ICTs, identity, and sound has been largely neglected in studies on acoustemology or soundscape ecology. ICTs are, however, ubiquitous in urban areas across the planet and they exercise a significant impact on the perception of both acoustic environments and our self. Building on Stephen Feld's notion of acous-

temology as local conditions of sonic sensibilities (Feld & Basso, 1996), this article will discuss how ICTs are reshaping these perceptions. Moreover, this article will argue that the acoustic environment to which someone is exposed over the course of their life is an important element in the construction of the self.

The sonic self

Foucault notes that the Greek precept known as 'Know yourself' (*gnothi seauton* or γνῶθι σεαυτόν) should be interpreted as 'Do not suppose yourself to be a god'. The principle is a piece of practical advice that reminds us of our human condition, particularly given the relationship described by Foucault between self-care and self-knowledge. 'One had to occupy oneself with oneself before the Delphic principle was brought into action' (Foucault et al., 1988, pp. 19-20). Taking care of oneself means giving attention to our actions, thoughts, and attitudes. On a sensorial level, this evokes the question of the roles of 'listening' (the sounds we listen to and how we listen to them) and 'sounding' (the sounds we generate as human beings) in that process. There is a difference, in the philosophy of mind, between our personal identities – who we are – and our self-conceptions – who we think we are (Floridi, 2014, p. 60). Listening and sounding impact our self both ways. Not only might we be people who enjoy the sound of the rain – we might even define ourselves as 'people who enjoy the sound of the rain' as being different, on some significant level, from 'people who do not enjoy the sound of the rain'. It might also be the case that our self-conception is crucially distorted as to who we really are, as when someone believes themselves to be less or more skilled in a musical activity than they really are.

The social self – who we are told to be and how we wish to be perceived – can shape our self-conceptions and 'is the main channel through which ICTs, and especially interactive social media, exercise a deep impact on our personal identities' (Floridi, 2014, p. 60). The social self is therefore another sense in which listening and sounding exercise an impact. It is worth stressing that our personal identity, our self-conception, and our social self can all be taken as equivalent to 'our self', depending on the context. Moreover, these different facets of the self are somewhat fluid and mutually influenced. If people repeatedly praise your punctuality (social self), you are likely to think of yourself as a punctual person (self-conception) and then strive to be always in time for your appointments, effectively becoming a more punctual person (personal identity). Likewise, this could all be affected by your next trip to a country where people have a very different attitude towards punctuality than the one you are accustomed to.

Our music preferences and habits might be perceived as a significant sociocultural trait which could encourage a sense of belonging. The links between music and social identity have been discussed at considerable length (Bakagiannis & Tarrant,

2006; Paredes, 2006; Tekman & Hortaçsu, 2002). In fact, music preference is so strong in the constitution of the social self that it might even be construed as *the* self. Music preference is seen as one of the most meaningful signals to infer someone's identity, more meaningful even than preferred clothing, food, and sitcoms (Berger & Heath, 2007; Rentfrow & Gosling, 2003). A growing body of research has been establishing connections between music preference and personality (for a review, see Rentfrow & McDonald, 2010). There also seem to be strong social associations between music preference and racial identity, notably in the sense that music preference is perceived as a criterion by which someone's race can be accurately judged (Marshall & Naumann, 2018). To some extent, such strong links could explain why criticism of our favourite music can be perceived as a personal insult. One person with a particular taste for music can be socially seen as being fundamentally different from another person, even if these two people share a great deal of relevant, and perhaps more meaningful, characteristics. Music preference can be perceived as a measure of social status, intellectual worth or lack thereof, economic status, beliefs, or ideology (Negut & Sarbescu, 2014; Reyna, Brandt, & Tendayi Viki, 2009; Trotta, 2018) While such perceptions tend to be biased and prejudicial (to someone's reputation or social integration, for example), it may also be the case where music preference does indeed stem from an association of the individual with specific attitudes, as in religious practice (Lamont, 2010), musical practices connected with the construction of national or ethnic identity (Biddle & Knights, 2016; Dorsch, 2017), neo-Nazi white power and black metal music (Dyck, 2017), gay anthems (Hubbs, 2007; Lippek, 2008; Portwood et al., 2017), and protest music (Farzana, 2011), for example. Political decision-making can affect whether the music we make or enjoy is to be valued by relevant agendas (Benvenuti, 2018, p. 16), thus affecting our social self. Protest songs might be forbidden by authoritarian regimes and certain music genres might be either banned or state-protected, depending on the circumstances. Censorship and protection by a status of intangible cultural heritage are opposing extremes in the policy spectrum, and both directly affect the identities of the groups involved.

Music preference is but one manifestation of our sonic self, which can be understood as a composite sonic 'profile' formed of our 'listening self' – our modes of listening, listening habits, music preferences, memories involving sound – and our 'sounding self'. Our sounding self consists of sounds originated directly from our actions – as opposed to sounds produced around us, but with no direct relation – and with enough degree of individuality:

- The sounds produced by our bodies, such as: snapping and popping of joints; the sounds we make when chewing our foods; when we walk; when we have sex; our voice when we speak and sing; the unique way each one of us sneezes, whistles, coughs, burps, and yawns; our flatulence; the pace and

heaviness of our footsteps when climbing stairs; non-verbal expressions of tiredness, joy, anger, and a vast range of emotions and sensations.
- The sounds produced by our actions in the environment, such as those triggered by our personal interactions with: ICTs (ringtones, favourite notification sounds, streaming music, and so on); music instruments; domestic appliances; water (how we bathe or shower, how we wash up the dishes); and any other objects.

The list above is not intended to be exhaustive, but it gives an idea of the sonic diversity of human activity. Our sonic self helps us be recognis*able* and recognis*ed* because it tends to be a distinctive and unique construct of sonic phenomena. Moreover, it tends to be confused with our own personal identities. For instance, many musicians manifest the perception that failing as an artist also means failing as a person, which can make them prone to anxiety (Chesky & Hipple, 1997). This is particularly true for professional musicians, whose bond between self-esteem (perceived self-worth) and self-efficacy (perceived musicianship) is notably strong (Kemp, 2006). Due to the perception that a distinct musicianship is something personal and non-transferable, performing style is also often a cue to identity (Carr, 2016; Gingras et al., 2016; Repp & Knoblich, 2004).

By being a facet of the self, the sonic self also tends to change temporarily according to context. Whether we are in the presence of familiar or unfamiliar people, in informal or formal settings, alone or with company – the sonic self will be informed by our social self and adapt accordingly. We might, for instance, speak over the phone to a stranger with a voice or intonation that is somewhat different from the one with which our friends are acquainted, or walk in an unusual way so as not to disturb the sleeping baby downstairs. If we are in a meeting, we can set our mobile phone to vibration only, no sound notifications. When commuting back home, we might listen to a favourite playlist over headphones,[1] so the other passengers on the bus would not be annoyed by the unsolicited soundtrack. The stereotypical dominant and loud person might ring the doorbell several times in order to convey the idea of urgency, while an introvert, discreet person might barely press the button. These examples suggest that our sonic self modulates between sonic presence and sonic absence, much like our social self modulates between extrovert and introvert states.

The assertive attitude of a driver who impacts the soundscape with exceedingly loud low-frequency sounds produced by the large subwoofers of her/his tuned car stands out starkly against the low-profile passenger wearing headphones in the above example. The sonic presence of the passing car is felt to a degree that, due to sound pressure, it might even trigger some car alarms on its way, leaving a sonic 'trail' behind. In contrast, the sonic absence of the passenger with headphones means that it is very difficult to determine whether the person is listening to music

at all. In fact, introvert behaviour often involves wearing headphones to avoid social interaction (de Castella, 2011; SOL REPUBLIC, 2014), since people will tend to display a courteous restraint on the impulse to interact with someone if that means disrupting his or her sonic absence. Surely, sonic presence/absence is highly context-dependant and its perception will vary across time, space, and cultures.

Acoustic environments are formed of sounds of different sources didactically categorised into *anthropophonic* (sounds generated by human activity), *biophonic* (biologically originated sounds, such as birdsongs and insects), or *geophonic* (sounds that are not generated by any living organism, such as waves, wind, thunder, rain) (Gage et al., 2004). While this categorisation separates human beings from the animal kingdom, at least from a taxonomical perspective, it is nevertheless useful in that it puts particular emphasis on the sonic presence of human activity. Conversely, soundscapes may have sonic absences characterised by their limited human participation. When the Big Ben bells were deactivated for the maintenance of the clock at Elizabeth Tower in London, there was widespread response from the press and passers-by:

> Almost as one, the crowd that had gathered in Parliament Square and on the pavement outside the Palace of Westminster pointed their mobile phones up towards the famous clock. The passing traffic paused, and as the last of Big Ben's bongs sounded … cheers broke out. (BBC, 2017)

The event was significant in that the absence of the bongs would impact anyone involved – affectively or otherwise – with that soundscape. It also meant the collective recognition of the ensuing silence, as the crowd was aware of a sonic absence that would linger until 2021. Perhaps more importantly than being a landmark, the tower's bells have been generating what is arguably the most important 'soundmark' of London. Soundmarks are sounds specific to a place or region (Schafer, 1977), characterising and distinguishing a soundscape. In the case of Big Ben, the tolling of its bells can even be perceived as a symbol of comfort, security, and national identity (Deutsche Welle, 2017), meaning that its sonic absence is also an absence, at some small, but relevant level, of the comfort, security, and national identity it conveys. This points to the conceptual difference between soundscape and acoustic environment: The former is a perception and allows sonic absences, while the latter is physical and does not change according to our perception.

On a more individual level, streaming music over headphones operates, except for the one person wearing the headphones, like sonic absences in the soundscape. As W.H. Auden wrote in his poem Prologue: The Birth of Architecture, 'Some thirty inches from my nose / The frontier of my person goes'. Personal space is demarcated by the invisible barbed wire created by headphones. The experience of wearing headphones encourages the reinforcement of the sonic self in a private world

which may be perceived as an enhancement, rather than an impoverishment, of the 'mundane outside world' (Bull, 2000, p. 36). When we listen to music in the sound bubble of our headphones, others will be prevented access into our music experience, therefore being unable to evaluate our music preferences, which means minimal, if any, interference with our social self. Moreover, the acoustic environment where we find ourselves will be deliberately muted for us. Therefore, at least in this case, sonic absence is bidirectional.

Michael Bull notes a dialectical understanding of headphones as facilitating the 'experience of being "cocooned" by separating the user from the outside world' (Bull, 2000, p. 32), but, at the same time, enhancing 'the experience providing the mundane with an exciting, sensual or spectacular soundtrack ... users describe use as enhancing their sense of *control*, both internally and externally' (Bull, 2000, p. 24; emphasis added). The sonic self is empowered by the construction of its own subjectivity. The user, who has control over the stream of sound as if constructing her or his very own soundscape, has the potential to create a sonic narrative which is much less fragmented and more personally relatable than the surrounding acoustic environment.

ICTs and streaming media

The most powerful sonic impact of ICTs stems from their inherent ability to manage notifications, memories, and soundscaping. Notifications operate as codified messages which are intended as a call-to-action (prompting active response) or as an informative report (prompting passive response). Through the symbolic vocabulary of notifications, much of which can be personalised according to our preferences (a 'guitar chord' for incoming email, 'chimes' for a daily alarm clock, a specific ringtone for each of our favourite contacts, and so on), ICTs communicate with us through sound. This way, ICTs take part in what could be described as the rise of a non-verbal lingua franca, except that their language presents dialectal variations from device to device. Some notifications might be hard to decode if their meaning is known only to the user of the device. Moreover, instead of being hard-wired to the ears of specific individuals (except, again, if headphones are being used), notifications are broadcast to everyone in the shared acoustic environment, which does not mean that everyone will respond in the same way. Any sound requires cognitive effort to be decoded (Snyder, 2000) and the acoustic fabric of a modern urban soundscape, ICTs included, will often be punctured by sounds not directly targeted at us. A personalised symbolic vocabulary of notifications is as much a part of our self as the way we decorate our homes, and its sound events signify something about our personal identities. As a technology of the self, when our smartphone is set to notify us about events from Facebook, Instagram, Google or Apple applications, LinkedIn,

messaging applications, other social networks, and ordinary phone calls, the sensory flux of individuals in the same acoustic environment is disrupted – however discreetly – by our sonic self.

Many sounds of our soundscape, even when directly involving our own ICTs, do not require any action on our part. A desktop PC might make a beep when booting in order to inform us that it is currently unavailable but will shortly be up and ready. In this case, while the beep is not a call-to-action, it is directed at us as an informative message. The grinding sound of a now obsolete dial-up modem handshake, on the other hand, is not even directed at humans: Two machines are exchanging protocols in order to communicate, while we are simply not needed. A less obvious example is the recent controversy involving Burger King and Google. In a short TV advertisement, a man in Burger King's work uniform asks Google for more information about a Burger King cheeseburger by enunciating 'OK Google', thus prompting any Google device which happens to be in the vicinity of the TV. The Google device would then automatically provide the answer, via speech synthesis, using information from Wikipedia. This would occur right after the question had been asked at the end of the 15-second slot (Maheshwari, 2017). The feat was accomplished by a message being transmitted from one ICT to another, not via any information exchange protocol understood only by machines and technicians, but via a sound event – a simple question – in the acoustic environment shared by those two ICTs. The significance of specific sounds produced by ICTs in human experience might not even represent human actions. We were left out of the loop – and 'being out of the loop could mean being out of control' (Floridi, 2014, p. 39).

As ICTs become obsolete and are replaced with other ICTs, some sounds are introduced while others are cast aside. Microsoft Windows start-up sound and Apple Mac OS start-up chimes have already been phased out. Notifications and ringtones from mobile phones 10 years apart can be quite, if not completely, different. From video arcades to crowded workspaces, it is clear that a change in the available technology can also mean a change in the acoustic environment. In their essence, ICT sounds are disappearing sounds. The nostalgia ensuing from their relatively ephemeral nature reveals something about their significance to our self-continuity,[2] which stems from our affective relationship with our memories relating to sound. Sonic characteristics from past ICTs seem to be sought after purely for the evoked nostalgia, connecting our past (our memories) with our present (the soundscape where we find ourselves). These are extinct soundscapes that are often brought back into existence, albeit in a somewhat deconstructed fashion, through digital recreations. Some examples of these vanishing ICT sounds are those generated by computers (floppy disk drives, tape recorders, physical or virtual keyboards, boot beeps, cooling fans, cathode ray tube monitors, voltage stabilisers, and so on), rotary dial telephones, typewriters, fax machines, printers … Videogame music that is not available

on 'traditional' music media (vinyl record, CD, DVD, streaming) – existing only on tape, floppy disks, or console cartridges which rely on very specific hardware for the purpose of retrieval – depends on people who make the effort to 'port' these musical data on to shareable media for accessibility of the nostalgics. The crackle and needle drop associated with vinyl records can trigger nostalgic responses in audiences of an appropriate age (Bartmanski & Woodward, 2013; Thorn, 2017) and are inherent to this music-listening experience.

As shown by Juslin et al. (2008) nostalgia is an emotion which tends to occur when the listener is alone, while happiness, for example, occurs more frequently when the listener is with friends. This points to the social aspect of music, but also to the introspective gaze facilitated by music listening with headphones. In line with Tom Rice's observation about sounds in the hospital environment being 'central to the patients' experience of themselves as "patient selves"' (Rice, 2003, p. 4), we can understand the perception of sounds as a symbol of the construction of our identities. In times of high availability of personal memories, how we define ourselves may be deeply affected by soundscapes both present and past.

In the first half of 2017, 184.3 billion streams of on-demand audio were logged in the United States (Nielsen Music, 2017). The streaming platform Spotify reported having 191 million active monthly users in the third quarter of 2018 (Vogel, 2018). The Spotify 'nation' has a population larger than Russia. Given the ubiquity of playback devices in their wide range of applications and uses, it is difficult to overestimate the impact ICTs exercise over the construction of identities, particularly of the so-called 'digital natives'. A survey commissioned by the SOL REPUBLIC brand shows that 62% of the respondents (most of them millennials) would find it better to spend a day without human interaction than without music. Moreover, 73% of the millennials admitted to wearing headphones in order to avoid social interaction. They are the true 'headphone generation' (SOL REPUBLIC, 2014), and since streaming is now the dominant form of media in playback devices (McCourt, 2018), they typify what it means for a 'digital native' to be a music listener. While 'digital immigrants' saw the early development of personal identities online, digital natives were born into it and, therefore, tend to put a different (generally higher) emphasis on the importance of their online self. A personal profile on, let us say, Spotify can be used to share custom-made playlists and to announce the song currently being streamed by sharing it on Facebook, Messenger, Twitter, Telegram, Tumblr and Skype. Several online profiles on different social networks pointing to the same individual will form one such online (social) self. Floridi makes the following observation on the relationship between memory retrieval and the understanding of the self:

> '[R]epeatable' memories cannot but have a deep impact on how subjects exposed to them shape their understanding of their past, the interpretation of what has happened to them, and hence how they make sense of who they are. We are the first

'replay' generation, and our *madeleines*[3] are digital. (Floridi, 2015, p. 223; emphasis in original)

While the quantity and availability of streaming media definitely facilitate the discovery of new or previously unheard music and videos, replaying our favourite media is still at the core of focussed, introspective listening. Managing personal memories of sound – our 'sonic madeleines' – through ICTs may reinforce our self-conceptions and the gaze (seeing how people see ourselves). The self can now look at its digital profiles in order to carefully curate its online social self and try to make sense of its own identity, as if staring into a digital mirror.

In addition to the private experience of wearing headphones, music is also present in collective spaces as muzak (background music). Gary Gumpert famously described Muzak as 'just a kind of amniotic fluid that surrounds us; and it never startles us, it is never too loud, it is never too silent; it's always there' (as quoted in Lanza, 2004, p. 5). Current ICTs made muzak possible as a product with unprecedented portability and affordability. While the history of muzak predates streaming, the main providers of muzak for businesses such as US-based Mood Media and Pandora and Japanese Sound Craft currently provide their services as streaming (Mood Media, 2019; Pandora Media, 2019; Plourde, 2017, p. 19). Muzak epitomises the considerable effort made by companies and individuals in presuming a positive effect from sensibly created playlists. Mood Media is responsible for soundscaping 560,000 locations around the world (Hulyer, 2018) with the help of their 'music designers'. A study co-commissioned by the company with more than 1,000 customers and 50 employees claims that 56% of customers '(particularly in banking) felt more comfortable having confidential conversations with music playing', against 26% who felt comfortable with no music playing (Mood Media, 2017). According to the study, 76% of customers waiting in line felt that time passed faster with music than when music was absent. Mood Media ends the report with a strong takeaway message:

> Retailers should avoid silence in store. Each location welcoming an audience should intend to play music, because <u>music is a fundamental part of customer experience!</u> (Mood Media, 2017)

Lorraine Plourde, in a study conducted with white-collar workers in Japan, points out that muzak 'has long been used in Japan's consumer spaces to create specific mood-scapes in bars, restaurants, stores, and shopping arcades; however, only recently has BGM [background music] been deployed to heal and affectively manage office workers through a background music-streaming program' authored by Sound Craft (Plourde, 2017, p. 19). The company promotes the understanding that a work environment without intentional music can be 'physically detrimental', therefore com-

pelling 'workers to cultivate different somatic modes of engaging with the sonic' in the already sound-saturated Japanese society (Plourde, 2017, p. 30). Such engagement, however, is not intended to evoke personal memories. Sound Craft engineers its music streaming service

> such that workers are dissuaded from actively listening to the music since 'sustained listening reveries can drift with various degrees of attentiveness from an ambiguous and objectless mood state to the nostalgic unlocking of nests and private memories and associations' … Sound Craft's programming is structured … without allowing for the possibility of the worker deeply listening. (Plourde, 2017, p. 31)

Sound Craft's ICTs, instead of participating in nostalgic engagement (the 'repeatable memories' discussed above), are there to manage the office workers' mood and productivity. Sound Craft's sensory engineering and Mood Media's claims to 'the emotional power of in-store music for business' are in stark contrast to movements such as Pipedown, the 'campaign for freedom from piped music':

> Do you detest the way you can't escape [background music]? … in pubs, restaurants and hotels; in the plane, train or bus; down the phone; ruining decent television programmes; adding to the overall levels of noise pollution in public places. (Pipedown, 2018)

Pipedown provides a number of reasons, via relevant research, polls, and case studies, why muzak is actually *negatively* valenced by customers. As an example, the British retailer chain Marks & Spencer stopped playing background music in their shops in response to continued protests and after 'extensive research and feedback from [their] customers and colleagues' (Press Association, 2016). There are probably important negative implications of background music for many individuals with a wide range of health conditions. While it is not the purpose of this article to discuss positive or negative effects of muzak, it is nevertheless an imposed sound in acoustic environments to which we have little, if any, control. Muzak is largely present in urban soundscapes, and under many circumstances it may fit the criterion for noise as defined by the European Union Directive 2002/49/EC as 'unwanted or harmful outdoor sound created by human activities, including noise from road, rail, airports and from industrial sites'. A study conducted by the World Health Organization on the burden of disease from environmental noise, including community, residential and domestic noise, has revealed a significant link between noise and cardiovascular diseases, sleep disturbance, tinnitus and cognitive impairment in children (Fritschi et al., 2011). Every component of a soundscape, noise or otherwise, is processed in the brain regardless of our conscious awareness, and the accumulation of sound layers from the environment and headphones may well become a health hazard (Epstein, 2016, p. 110).

The 'sensory marketing' promoted by Mood Media assumes some knowledge about the music preferences of habitués of specific venues. A similar attitude to clientele expertise – but with a radically different goal – was shown by Germany's rail operator Deutsche Bahn (DB) in its choice of background music. In an attempt to make the Hermannstrasse station in Berlin an inhospitable place for drug consumption, DB announced plans for playing atonal music over its loudspeakers (Knight, 2018). As pointed out by a Mood Media client responsible for hundreds of pubs in the United Kingdom: 'What we don't want is customers walking in, listening to the music and saying: "What's that all about?"' (Hulyer, 2018). However, to the incredulity of many passengers, this is exactly the type of response DB expected to obtain from drug addicts who had turned the station into a meeting point.

The space-time shift

Cyberpunk novelist William Gibson commented on the strong impact of the Walkman on the music listening experience through space:

> What are you talking about? The Sony Walkman has done more to change human perception than any virtual reality gadget. I can't remember any technological experience since that was quite so wonderful as being able to take music and move it through landscapes and architecture. (Gibson, 1993)

Music listening is not bound by specific 'places of listening' or 'times of listening', a reality to which we have been familiar since the advent of recorded music. Aside from the obvious point that there is no longer the need for instrumentalists to perform every time we want to listen to music, the fact that we can listen to W.A. Mozart on our smartphone while jogging, on our stereo at home, as muzak in a cafeteria, as a soundtrack in the cinema and in the concert hall means that the same music might require very different listening attitudes depending on the context. As hearing is culturally constructed (Ree, 1999), so is our understanding of sound in place and time. Fernando Iazzetta notes that 'recording media, by placing music from different periods to be played back the same way and inside the same environment, have forced the establishment of a new understanding of music repertoire' (Iazzetta, 2009, p. 41. Translation is mine).

The emergence of affordable powerful ICTs for music listening means that there are more listeners, and there are specialised listeners (as 'curators' and 'recommenders', which might be human or algorithmic) – although they are increasingly far from being music makers. Whatever the case may be, sound recording eventually promoted radical changes to the sonic self of humanity. The time of performing the sound and the time of listening to the sound were no longer in synchrony, a dissociation which R. Murray Schafer termed *schizophonia*: 'Sounds have been torn from

their natural sockets and given an amplified and independent existence' (Schafer, 1969, p. 44). An ontological detachment was possible, and for the first time we were able to listen to the voices and sounds of people who no longer lived. We can call that the 'time shift'. The place of listening eventually became truly free from our homes and performance venues when music listening became truly portable, as in the Mozart example above. We can call that the 'space shift'. It might happen that we listen to the end of a piece of music very far away from where we started it. We might press play on the first movement of L.V. Beethoven's Ninth Symphony when taking off from Denmark and hear the final Prestissimo movement when landing in France. A shift in time is only bound by the longevity of storage media. A shift in space is only bound by as far as humanity can travel. As of this writing, the longest-lasting storage media commercially available is the M-Disc™, with a promised longevity of 1,000 years (Harris, 2013), while the furthest from Earth ever reached by a human being is still 400,171 km, the distance travelled by the Apollo 13 mission in 1970 (NASA History Office, n.d.). In what we can call the four-dimensional 'space-time shift', our technologies of the self are only bound by other technologies.

Acoustemological approaches to 'ways in which worlds are sonically apprehended' (Feld & Basso, 1996, p. 94) bear renewed relevance in the space-time shift of ICT-ridden societies where ICT-mediated experiences are increasingly free from constraints of time and space. Apprehending the world through the faculty of hearing means that sound 'is central to making sense, to knowing, to experiential truth', and that 'the experiences of place potentially can always be grounded in an acoustic dimension' (Feld & Basso, 1996, p. 97). In Feld's acoustemology, emplacement – place as sensed or as sensation – implies a deep connection between sound and space in perceiving. However, in the 'infosphere' inhabited by us and our ICTs, place takes on a different, evolving, and more inclusive meaning. 'ICTs invite us to consider the intrinsic nature of increasing portions of our world as being inherently informational', that is, in ICT-friendly terms (Floridi, 2014, p. 40). The infosphere denotes 'a concept that can also be used as synonymous with reality, once we interpret the latter informationally. In this case, the suggestion is that what is real is informational and what is informational is real' (Floridi, 2014, p. 41). It follows that the 'threshold between *here* (*analogue*, *carbon-based*, *offline*) and *there* (*digital*, *silicon-based*, *online*) is fast becoming blurred' (Floridi, 2015, p. 8; emphasis in original).

The new digital environment created by ICTs operates, for all intents and purposes, as place. Floridi convincingly makes the case for the magnification, through ICTs, of the distinction between presence and location of the self. This detachment means that sonic apprehension of the world will rely on the kind of experience in which the self is more meaningfully engaged in a given moment. As a result, the sonic self might be cognitively more aware of wherever it is that it is present (e.g. a music video stream on YouTube) than of its locus, strictly speaking (e.g. an under-

ground train). Physical place is therefore merging with virtual place in an informational ecosystem. The phenomenon of telepresence very often means, according to the International Society for Presence Research (ISPR), that 'the individual can indicate correctly that s/he is using the technology, but at *some level* and to *some degree*, her/his perceptions overlook that knowledge and objects, events, entities, and environments are perceived as if the technology was not involved in the experience' (International Society for Presence Research, 2000; asterisks in the original). The epistemic failure of perception in acknowledging the mediation of an ICT device (e.g. momentarily forgetting that the YouTube video is being streamed over a mobile phone) only magnifies presence over location.

Final thoughts

Streaming can convey the impression of relying on a fully emancipatory practice, in that the listener would be in total control of the experience. This illusion of control is challenged by highly sophisticated algorithms, known as recommender systems (Vall et al., 2017), which major providers of streaming music have been developing to suggest music based on the user's data. Recommender systems embedded in streaming platforms basically decode our social self and re-encode it in the form of music preferences, gently reminding us that we are being watched. The information collected may include streaming habits, geographical location, age, gender, and other private data, whose processing by third parties might have important ethical implications (Milano, Taddeo, & Floridi, 2019). Recommender systems could, for example, 'force' suggestions in order to promote specific artists or be subject to breach of privacy. In the first example, the sensory flux is affected by whether sounds are hand-curated by the individual as a reflection of her or his identity or otherwise brought forward by an algorithm. The interplay of self, sense of place, and recommender systems is an important issue still awaiting further research.

Reality is created partly as a result of the sonic structure where we find ourselves. ICT-mediated sounds permeate modern life and, by continuously seeking our attention, are attributed relevant meanings and functions. These sounds are added as extra layers in already complex soundscapes and are perceived as cues to understanding the world. By being constantly evaluated against this reality, the sonic self can be reinforced or undergo an adjustment through a kind of gaze, 'taking care of itself' in line with Foucault's reflection. In this article, I have sought to discuss the pivotal role of ICTs in effectively changing how we understand our existence as beings who navigate through sound. With the advent of richer modes of listening and sounding in the infosphere, there is a need to understand and constantly re-evaluate the ever-increasing sonic presence of ICTs in the construction of the self.

Acknowledgements

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Notes

1   I shall be referring to headphones as an umbrella term for small loudspeakers worn as headsets or in-ear devices.
2   Self-continuity is the notion that our past is connected with our present and is something that seems to be facilitated by nostalgic feelings (Sedikides et al., 2016).
3   This is a reference to Proust's famous example in his *Remembrance of Things Past* of the taste of madeleines as an involuntary 'trigger' to past memories.