

RESEARCH · DESIGN connections

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Aural Architecture

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In our techno-visual culture, the ascendancy of vision as the primary means for sensing the physical world has undermined the importance of hearing. Yet the aural experience of an environment is critically important to the social and emotional well-being of the inhabitants. However, we tend to only recognize the aural architecture of a space when its hostile and corrosive acoustics transform background sounds into a deafening roar. We then become functionally deaf to local sounds, as if actually deaf. But before we explore the concepts of aural architecture, let us reexamine the social properties of sound.

The Unique Power of Sound to Connect

Sound arises from dynamic events – a static world never produces sound. Sound results from mechanical vibrations that arise from some natural or man-made actions, and hearing is simply the means by which we connect to those activities. We become consciously aware of an unhappy baby by the sound of crying, of an automobile moving at excessive speed by the sound of screeching tires, or an approaching storm by the sound of distant thunder, of the approaching predator by the sound of soft footsteps, or of a dangerous fire that threatens our house by the sound of a crackling from intense combustion. We can sense the internal emotional state of our lover by the intonation and inflection in the general sound of their speech, regardless of language content. Actions and internal state broadcast their existence by radiating sound, which we then hear. Sound transports the external world into our consciousness.

The Survival Value of Hearing

Of all of our sensory systems, hearing is simply the best means for connecting and recognizing dynamic events. When deaf, we have more difficulty experiencing those events because vision has limitations. Vision requires us to first voluntarily focus on the target; vision is easily obscured by intervening objects; vision requires a light source; and vision is not particularly good for sensing fast movements or rapid change. In contrast, sound flows through space, around obstacles and into crevices. Our hearing is always on, even when we sleep – mammals do not have earlids to selectively block sonic broadcasts. From an evolutionary perspective, hearing made a critical important contribution to survival. Communicating information and enjoying entertainment are not necessarily the most relevant aspects of hearing.

Listeners and Sounds Exist in a Space

Everyone must be somewhere, and every location has acoustic attributes that both change the properties of sound and influence the region in which sonic broadcasts are receivable. Pure sound does not exist apart from spatial acoustics because every event and every listener must be located in some environment. Aural architecture then becomes those acoustic attributes of the environment that influence our social and emotional experience of sonic broadcasts. Imagine a friend clapping his hands, and consider how the spatial acoustics changes that experience in a marble bathroom, a well-upholstered plush living room, a majestic 17th century cathedral, a beach on a quiet Sunday morning, a street of a metropolitan city at rush hour, an isolated underground cave, or a dense forest at dusk. Each of these spaces has an aural architecture, and we can sense that architecture in addition to the sound of clapping hands. An aural architect then becomes someone who chooses the attributes of a space based on the needs of the inhabitants.

Aural Boundaries are Invisible

When we think of a spatial region, we automatically picture an area that has visible boundaries, which restrict movement, namely walls. But if we think of space in terms of hearing, boundaries are often unrelated to walls. An open window couples two visual spaces fusing them into a single space. A high noise level shrinks the area in which the ear can sense events. An aural space is thus an area where inhabitants can hear sonic events, and this definition of space is often unrelated to the visual experience. Sound does not recognize the rights to private property, entering however it can without permission. Open a window to enjoy a summer afternoon and all events on the street have the right to enter.

Acoustic Horizons and Acoustic Arenas as Aural Space

This leads us to two spatial concepts of aural architecture: acoustic horizon and aural arena. Analogous to a visual horizon, an acoustic horizon is the distance limit from which a listener can hear sonic events. Beyond that horizon, there is no ability to hear events that produce sound. From the listener's perspective this defines an area of space, and the acoustic horizon is the aural boundary of that space. Obviously, that area has no visible boundaries. If we invert the listener and the sound source, we have the concept of an acoustic arena. This is the area in which all listeners can hear a sound source. In 19th century French villages, the acoustic arena in which the town's bells could be heard determined the town's limits. The size and shape of both the acoustic arena and horizon are determined by its acoustic properties and by background sound.

Contrast Between an Aural Architect and Acoustic Architect While it may be difficult to identify who serves the function of aural architect, there are respected acoustic engineers and architects who have the special technical expertise needed for implementing spaces—as for example, designing a concert hall optimized for 19th century romantic classical music. There is, however, a major difference between an aural architect and an acoustic architect. The former is a social scientist with the skill to determine the aural attributes appropriate to the needs of the inhabitants. In contrast, the latter is a physical scientist who understands how to create a space that has the attributes previously selected by the aural architect. In a few cases, a single person can function in both capacities.

Aural Architecture Remains Unrecognized and Unappreciated

Why has the concept of aural architecture not yet become a major component of those professions that

concern themselves with designing space? Even if we accept the importance of the aural architect, we are still faced with the observation that across cultures and throughout history, there is no evidence that this function was ever recognized. There may not be a single explanation, but the following suggestions contribute to the answer. Firstly, the aural architecture of a space cannot be experienced without also having dynamic events that produce sounds and inhabitants who complete the aural architecture. The designers are only part of the committee of architects who determine the aural experience. Second, sound is ethereal, instantly disappearing and even now there is essentially no good means to record the aural experience of a space. In contrast, the visual representations can be captured with graphic sketches and photographs. Cultural ratcheting (the building on the works of previous generations) is not possible with aural architecture. Thirdly, for most people, the aural memory of a space and the vocabulary to describe that memory are weakly developed. This may in fact be an evolutionary artifact. As with many abilities, we evolved an ability to use a skill, but without necessarily being able to consciously describe how we use it. And fourthly, as a profession, prominent architects are rewarded with prizes based on their visual portfolio, and they in turn train the next generation of architects to focus on the visual experience of a space. The judges of such prizes would have to travel to a space and would therefore have to select sonic activities in order to experience aural architecture.

The Consequences of Failed Aural architecture

When the aural architecture of a space is badly designed, the inhabitants experience themselves as being socially isolated, as if they were encapsulated within invisible walls. Virtual boundaries can appear in the aural domain even though they are not visible. In a poorly designed elegant restaurant, individuals cannot converse with their companions across the table because each exists in a separate acoustic arena. Conversely, with sonic leakage, your neighbors aurally enter your private living space as if they had full rights to invade your privacy. A luxury automobile with excessive sound absorption isolates riders from the traffic environment, leaving them unable to hear the truck entering the driver's blind spot. And finally, student teenagers listening to loud music on headphones are transporting themselves out of the classroom and into the music space created by the recording engineer. By recognizing the language of aural architecture, and without much effort, we can make a modest contribution to improving social cohesion.

Aural Architecture in Practice

Do not be intimidated by experts since there are none in aural architecture. Trust your instincts. Unlike visual architecture, we all, as inhabitants of a space, create and influence our experience of space because the relevant properties are local: (a) the density of people in a space, (b) the choice of furniture, (c) opening or closing windows and doors, (d) selecting which kind of sonic events are to be encouraged, or even selecting and positioning loudspeakers in a home theatre, and finally, (e) protecting our ears so that we can experience the world throughout our life.

About the authors: As a former professor at MIT and a founder of the digital audio field, Barry Blesser has spent the last 40 years working at the junction of audio, acoustics, perception, and cognitive psychology. He is the author, with Linda-Ruth Salter, PhD, of Spaces Speak, Are You Listening? Experiencing Aural Architecture (MIT Press, 2007). Dr. Salter is an independent scholar who has spent the last 25 years focusing on the interdisciplinary relationship of art, space, culture, and technology.