Aural spaces in architecture: An approach to sensory perceptions in a site-specific event

Espacios aurales en arquitectura: Una aproximación a las percepciones sensoriales en un evento específico del lugar

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ABSTRACT/ The work documented here is based on a site-specific music event conceived and implemented at a 19th century brewery. The project involved the exploration of space as a signifier, using creative methods drawn from electronic music, architectural design, and performance of music in theater settings. This paper discusses reactions to the event, captured by means of surveys carried out after the event with attendees and artists from various disciplines. Survey results showed that site-specific music events can provide a stimulating and engaging framework for new audiences. It closes by signaling possible future lines of development for this research project. **RESUMEN/** El trabajo que se documenta aquí se basa en un acontecimiento musical de un lugar específico, concebido e implementado en una cervecería del siglo XIX. El proyecto implicó la exploración del espacio como significante, utilizando métodos creativos extraídos de la música electrónica, el diseño arquitectónico y la interpretación musical en escenarios de teatro. En este artículo se analizan las reacciones al acontecimiento, capturadas mediante encuestas realizadas a posteriori entre asistentes y artistas de diversas disciplinas. Los resultados de la encuesta mostraron que los acontecimientos musicales específicos para un sitio pueden proporcionar un marco estimulante y atractivo para públicos nuevos. El texto termina apuntando a posibles líneas futuras de desarrollo de este proyecto de investigación.

1. INTRODUCTION

The project described in this article was conceived as a collaboration among practitioners from different fields, motivated by the need to explore innovative ways of presenting electronic and experimental music to new audiences. The project's concept stems from the notion of aural architecture proposed by Blesser and Salter. This notion suggests that every location has its own unique sonic landscape, created by a combination of the overall design, the construction materials involved, and the way in which that space is used by its occupants (Blesser and Salter 2007). Starting from the exploration of the acoustics of a 19th Century brewery that has been turned into an art gallery, a site-specific event was conceived around the concept of auditory spatial awareness. In the remaining sections of this paper, we discuss the various creative strategies that inspired this event from the perspective of electronic music, architectural design, and music performance.

2. SITE-SPECIFIC SOUND

Site-specific sound works involve the use of sound in a particular location, in ways that are informed by historical, cultural, or aesthetic relationships (Hayes 2017, Schäfer and Krebs 2003). During the past few decades, artists Robin Minard and Brandon Labelle have been exploring the concept of site-specificity by using building sites as a sonic creative canvas where audiences and artists can interact freely (LaBelle 2006, Minard and Lejeune 2004).

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Working at the crossroads of sound art and acoustic design, Minard devices and implements site-specific installations that explore listeners´ relationships with acoustic spaces, and environmental noise. His works, realized in both open and enclosed spaces, explore the indivisible relationship among three elements: the source of sound (sound material); the method by which sound is broadcasted (loudspeakers), and space (room) (Minard and Lejeune 2004). In a similar fashion, Labelle's site-specific installations use the architectural attributes of buildings as a creative framework to explore relationships between sound and space (LaBelle 2006). With this purpose in mind, LaBelle began investigating the relationship between sound and space. He did so by staging social spatial interventions motivated by the idea that 'the work arrives at specificity through its actual realization in front of an audience' (LaBelle 2004). Inspired by LaBelle's and Minard's approaches, the authors of the present paper conceived a site-specific event at an old, refurbished brewery in the chilean city of Valdivia; taking the architectural and acoustical attributes of the building as starting points. The project aimed at exploring ways of enhancing the audience's sensory experience by exploring the role of space as a signifier. We used creative methods borrowed from electroacoustic music, architectural design, and music theatre performance (Mavash 2007).

3. ARCHITECTURAL SPACE
The concept of *transposition* was adopted as an overall framework for the event, taking as a premise the idea that the acousmatic and architectural space share similar spatial attributes. Transposition here refers to the action of reflecting an attribute from the acousmatic realm over the architectural space, where both theoretical boundaries may remain purposely diffuse (Foster 2011). Attributes such as a sense of both intimacy and exteriority, given the recorded insights of a certain degree of either enclosure

or openness (Kranzfelder 1999) were transposed from the sonic framework to the architectural spatial design. As described above, the selected venue in this case was a hall in a 19th century brewery building. The hall is 3.7 meters high, and its floor plan consists of a 16 meter by 25-meter rectangle. It contains eighteen square cast-iron columns, arranged in three rows of six, which organize the space into a rectangle-based grid. Its surface materials consist of exposed vaulted masonry in the ceiling, plaster-rendered walls, and flushed concrete flooring. As the architectural sense of space is connected to relationships among rigid geometric shapes, we decided to avoid the existing orthogonality in the room, by trying to make such analog relationships disappear (Le Corbusier 1978, Eisenman and Koolhaas 2009). In order to achieve this, the loudspeaker configuration and the seating arrangements in the hall were aligned to a new diagonal axis, out of line with the orthogonality of the grid delineated by the columns. This was done aimed at reinforcing the idea of multiple aural perspectives in the room and to a lesser extent, to compensate for the hall's high reverberation time. With this idea in mind, a specific atmosphere for each sensorial environment was designed using arrays of lighting colors, as a way of enhancing a sense of intimacy in the room whilst accentuating a new boundary. This was achieved using a combination of red and yellow light concentrated on the performance area –following Le Corbusier's Architectural Polychromy (2015) principles– thus leaving the audience and its surroundings lit in dark tones of blue and green, as suggested by Rasmussen (1962) and Pallasmaa (2005). These polychromic resources were deployed to accentuate the contrast between the interior and exterior virtual sonic atmospheres and timbral nuances created by means of the projection of specific sounds over sets of loudspeakers during the performance. Finally, a set of rectangular mirrors, measuring 0.4 by 1.2 meters, were mounted vertically on certain

columns, facing the audience (figure 1 and 2). This was done in an attempt to reinforce a sense of intimacy in the room, as well as to make the building's existing structure less visible during the show (Frampton 2007, Pérez 2014).

4. ACOUSMATIC SPACE
The use of space has been an important aspect of electroacoustic music in its different forms since its early developments, shaping its aesthetics and distinctive
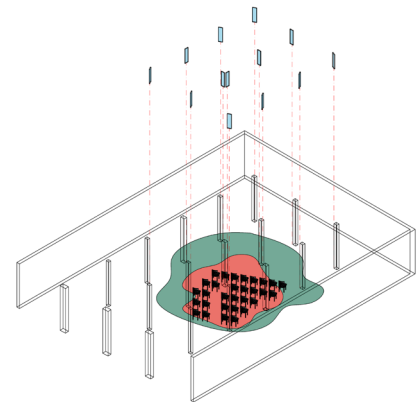

Figure 1. Isometric view of combined set of mirrors and lighting colors that shaped the spatial design conceived for the event (source: Emil Osorio, 2018).
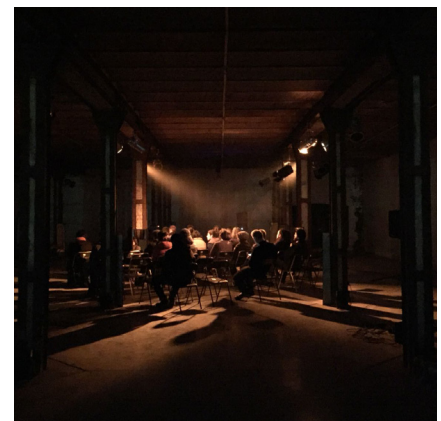

Figure 2. General view of one of the specific atmospheres conceived for the event (source: Felipe Otondo, 2018).

character when performed (Otondo 2008). The presentation of electroacoustic music involves an acousmatic experience: listeners are confronted with sounds detached from their original sources projected through multiple loudspeakers (Schaffer 2004). Acousmatic composers work regularly as aural architects, designing auditory experiences not necessarily confined to physical spaces, by effectively controlling musical spatiality in a piece. In electroacoustic music, designed virtual spaces are not only compositional elements but listening experiences extracted from buildings, field recordings, soundwalks and the like (Blesser and Salter 2007). By using sound processing and spatialization techniques, acousmatic composers can create the illusion of sounds moving across the audience space at different speeds. They can also create immersive virtual sonic environments (Otondo 2008). Site-specific works are nonetheless uncommon in electroacoustic music, where, in most cases, the acoustical attributes of venues where

concerts take place are either dismissed or considered a hindrance (Stefani 2010). In this case, the relationship between the external and internal space proposed by Smalley provides a better match than in a traditional concert situation where sound materials are adjusted in a studio with a well-balanced acoustic treatment and later played in a concert hall with very different acoustic properties (Smalley 1997).

With this in mind, the decision was made to implement an 8-channel asymmetrical loudspeaker rig, adapted to the shape and acoustics of a large hall in the brewery building. Loudspeakers were arranged asymmetrically in the room, with the double aim of breaking up the rectangular symmetry of the hall and –to some extent– reducing the impact of standing waves created by the room's parallel walls and high reverberation time (Figure 3 and imagen 1). In order to compensate for these issues, frequency response measurements were carried out using a dual-channel sound analyzer followed by a detailed

equalisation process to compensate for strong resonances in the hall (Toole 2008). Sound checks followed, using acousmatic works that would be played as interludes during the concert, as source materials. The goal of these tests was to find the most suitable placings for the eight loudspeakers around the audience. A balance had to be struck between the desire to obtain the best acoustic coverage, thereby allowing for a truly immersive listening experience for the audience, and the need to have loudspeakers not too close to the edges of the seating area.

5. PERFORMANCE SPACES
Inspired by LaBelle's notion of spatial intersections, the role of the performance space in the project was conceived of as an open framework that would allow multiple forms of listening (LaBelle 2006). In line with theatre performance intervention methods, the goal in this case was to allow listeners to experience music freely in a less formal and constrained environment
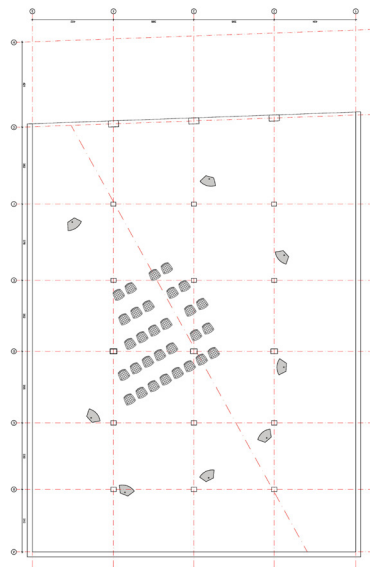

Figure 3. Plan view of eight-channel loudspeaker setup proposal (source: Emil Osorio, 2018).

Image 1. General view of eight-channel loudspeaker setup implemented at the old brewery building (source: Felipe Otondo, 2018).

than a concert situation, by enhancing their immersive sensory experience (McAuley 2000). The overall structure of the event involved the performance of four five-minute excerpts of stereo acousmatic pieces, composed by Felipe Otondo. The excerpts were interspersed (alternated) with three live performances, discussed below. The acousmatic pieces were created using gamelan sound recordings as source materials. They were spatialized through the eight-channel sound system using various types of electroacoustic music diffusion techniques (Otondo 2018). The first live performance of the event was *Your guitar is not your guitar*, a piece for amplified acoustic guitar, composed by Felipe Pinto d'Aguiar and performed by Patricio Araya. This piece was designed for microtonal tuning on the instrument, to enhance the timbral articulation within the chosen space. The second performance was a live-electronic improvised piece, performed by the trumpet player Benjamín Vergara, using real-time processing and amplified sounds. This performance was inspired by the acoustic attributes of the space, and the use of iterations and various extended performance techniques. The third, and final, live piece of the event was the music theatre composition *Polen*, by Rodrigo Castellanos, conceived and performed in collaboration
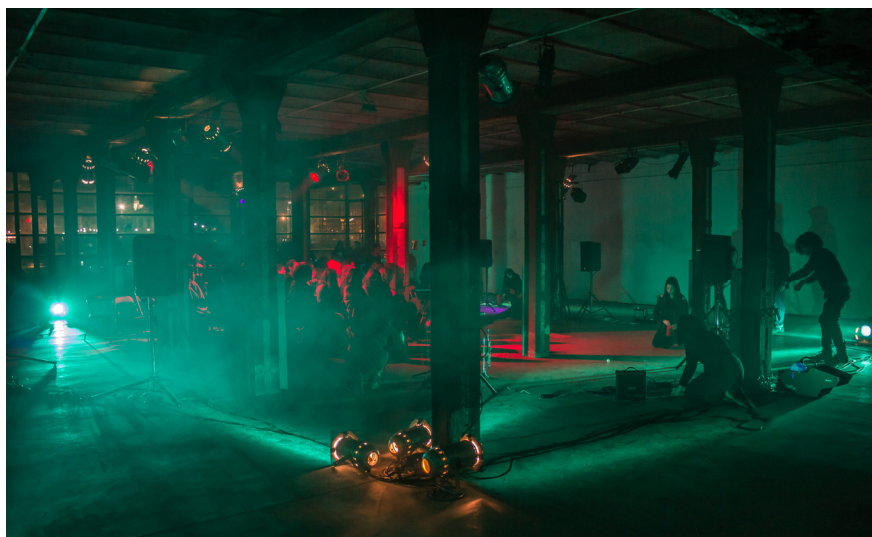

Image 2. General view of the live performance of Rodrigo Castellano's music theatre piece Polen (source: Felipe Otondo, 2018).

Figure 4. *Isometric of overall spatial design for the performance of Rodrigo Castellano's music theatre piece Polen (source: Emil Osorio, 2018).*

with music students from Universidad Austral. In line with Harry Brant's approach, this work explores various levels of spatial interactions. It involves the use of travelling performers throwing small resonant objects against the venue's walls, plus various types of feedback noise generated by three small stationary loudspeaker units strategically placed around the audience (Brant 1967). Figure 4 and Image 2 show some of the performer's movements –red silhouettes across the hall– as outlined in the piece's score, compared with the position of stationary sound sources –black spots located around the audience. Overall, the performance strategy for each of the aforementioned three pieces was selected to provide spatial contrast at three levels: (1) virtual sound sources, moving in front of and around the audience, generated using an immersive eight-channel sound system; (2) amplified and processed sounds, played in front of the audience, and (3) acoustic sounds, generated by performers travelling around the audience. In this case, the multi-loudspeaker setup was used as a way to

enhance these spatial contrasts adding a sense of depth and motion to the amplified sounds through the system.

6. AUDIENCE FEEDBACK

The authors designed a three-question follow up survey, sent by email, asking audience members about the impact of the acousmatic, spatial, and performative design on their overall experience during the event. The questions addressed the immersive role of the eight-channel sound system; lighting and spatial design, and the role of performance aspects of the event. Sixteen attendees, from a range of backgrounds and of various ages, replied to the survey. Amongst them were experts from the following fields: Events management, design, and music and audio engineering. When asked about the sonic spatial design created by the multi-channel loudspeaker array in the room, most respondents highlighted the noticeable immersive effect that the system had on the audience, reinforcing timbral and dynamic aspects of the music. Nevertheless, several
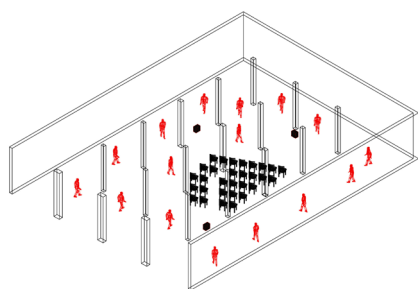
participants also noted that this immersive effect was to some extent dependent on the position of listeners within the audience seating area. Attendees seated close to the loudspeakers had been unable to hear the inputs from the other sound sources in the room and –in some cases–reported dramatic dynamic variations during the performance. When asked about lighting design, most respondents highlighted the role played by visual atmospheres during the event, which refers to the environmental quality of spaces that is determined by the incidence of light (Zumthor 2006). According to some responses, the various shades of color generated by the lighting system created visual atmospheres that added further depth to the overall sonic immersive experience. The effects were described by survey participants using words such as 'boundary', 'night', 'textures', and 'temperature'. A few responses also mentioned the fact that the overall effect of the lighting was also very dependent on the position of each audience member within the room. When asked about the role of mirrors in the room, most respondents stated that these objects had also played an important part, by concealing the presence of the building columns and adding a greater sense of perspective to the overall experience. Some reported that the inclusion of mirrors as part of the performance reinforced a sense of intimacy in the room, since it allowed audience members to see themselves,

and others, reflected in the glass from different angles. The final survey question explored the role played by the performance elements mentioned above during the event. Most respondents expressed enthusiasm about the diversity and details of the sonic spatial design involved in each of the live performances. The contrast between static and moving performers was highlighted as a salient feature. In line with the issue discussed above regarding the proximity of loudspeakers, some respondents raised similar issues about limited visibility during performances, due to the hall's columns. While the role of real-time timbral and spatial transformations of live instruments during the show was positively evaluated, some respondents expressed the view that the nature of these variations was limited, and at times monotonous. Survey respondents also emphasized the original nature of the spatial design of Castellano's music theatre piece as one of the interesting features of the display.

7. CONCLUSION
The project reveals that the implementation of site-specific music events can be an effective way of engaging wider audiences with contemporary electronic and experimental music. In line with the findings of Fiebig et al., the project presented here shows that the use of historical sites as an architectural framework for music performances can have a stimulating effect

on concert audiences (Fiebig et al. 2017). The main drawback of this approach is that in many cases, the nature of the sonic spatial design conceived for each event could be seriously compromised by the acoustics and shape of the venues where the show takes place. In line with the outcomes of previous research carried out by the authors, the project also showed that the use of the physical space as an interdisciplinary collaborative framework helps in the process of integrating ideas and practices from different disciplines (Otondo 2013). The main challenge for this approach is to achieve the right balance between the overarching interdisciplinary conceptual framework that has been developed and the performance identity of the various disciplines involved in each event. This process should be based on an understanding of performance practices' shared ideas in order to avoid affecting the distinctive nature of the specific disciplines involved.
Future developments of this project will explore the use of smaller halls with a suitable acoustics, allowing greater flexibility and artistic ambition when working with multi-channel sound systems and a mix of live performance acts. The possibility of including dance or theater performers as part of the events will also be considered, as a way of adding a sense of corporeality to the show and creating closer links with audiences. AUS

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