

MUSICAL SPATIALITY

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It. *Spazialità musicale*; Fr. *Spatialité musicale*; Germ. *Musikalische Räumlichkeit*; Span. *Espacialidad musical*. Musical space in its general sense can be defined as the *relational structure* of the sound phenomenon (Piana 1991, 2013), considered internally in the imaginative significance of the sound matter and externally in its relationship with the sound body and the environment. According to Giovanni Piana (2013, but see also Serra 2008 and Di Stefano 2022), the concept has two meanings. The first is a *transposed* or *internal* one, referring to sound as such, i.e. in itself, and to some qualities of sound perception, such as intervals, rhythms, melodies, and timbres, which can be interpreted in terms of spatiality. The second is a *literal* or *external* meaning, indicating the relationships between sound sources, movement and resonance in a resonant body or environment.

As a structural aspect of sound matter and, correlatively, of the ways in which it is understood, sound spatiality has been the subject of various insights in different epochs and cultures.

TRANPOSED AND INTERNAL MEANING

The sound phenomenon can be understood in various relevant ways through the spatial transposition of its main features, especially intervals and consonances. The Neopythagoreans transpose the auditory phenomenon of sounds pitches into the visual space of the monochord, reaching a discrete conception of musical space. On the contrary, Aristoxenus defines musical space with a metaphorical lexicon and with references to a continuous space (Piana 2010). For some scholars, it was only between the 9th and 11th centuries that *sound pitches* were conceptualised in spatial terms with graphic notation, for example by Guido d'Arezzo (Duchez 1979).

Concerning harmonic aspects of the internal meaning of musical space, it can be observed that, in the tonal system, musical spatiality is organised around a fundamental note that determines harmonic relationships, while in other non-tonal systems or methods, such as in dodecaphony, musical spatiality is free of any sound centre, even if it may be intrinsically articulated (Schoenberg 1950, Adorno 1949, Boulez 1963, Rognoni 1974, Melchiorre 1987).

From the second half of the 20th century, the question of music spatiality has become the subject of debate in various research fields. While Roger Scruton argues that spatiality in music has only a metaphorical sense, since sound becomes music when abstracted from its sound source (Scruton 1997, see also Bertinetto 2012), other authors ascribe to musical spatiality a meaning that is more than simply metaphorical. Carlo Ragghianti points out that spatiality in music depends on the performer's disposition in the hall, but Enzo Carli suggests that it concerns the relationships between notes (intervals) and other musical parameters, such as intensity and timbre (Carli 1998).

Giovanni Piana regards *sound spatiality* as a chapter of the more general question of the phenomenological constitution of space (Piana 2013). On this basis, Piana offers a critique of the thesis put forward by Viktor Zuckerkandl in *Sound and Symbol* (1956).

Zuckerkandl envisages *auditory space* as a specific kind of spatiality, i.e. a unitary space in which sound is everywhere, different from visual and tactile space. This perspective implies thinking of space not as a "juxtaposition" of places, but as an "interpenetration", as in the triadic chord, where the notes have intrinsic tendencies and can be heard through each other. Nevertheless, according to Piana, this idea presupposes that tonal language is the only musical language that can ensure the perception of *auditory space* (Piana 2013).

For Piana, on the contrary, *sound spatiality* reveals a *whole* constituted by a *relational structure*, open both internally and externally (Piana 1991, 2013), in which one can highlight ratios such as intervals, rhythms, timbres, intensity, and with the resonant body and the environment. The relational structure of sound matter has an intrinsic *imaginative* potential that can be expressed through spatial interpretations of the sound phenomenon, interpretations that always depend on the passive synthesis in sound matter, which determines the ways in which it can be understood. Sound space underlines a *continuity* in the perception of distances between notes intervals, rhythms, timbres, and intensities. Musical space is thus like a *continuous flow* (Piana 1991).

The translated sense of musical spatiality is another aspect on which composers have worked. A historical example is the motet *Nuper rosarum flores* (1436) by Guillaume Dufay. The architectural proportions of the Cathedral of Santa Maria del Fiore and Brunelleschi's dome provide the criteria for this musical composition (Melchiorre 1987).

More recently, Iannis Xenakis has worked extensively on the mathematical criteria and processes that bring together architectural planning and musical composition, particularly in the primacy of the continuous over the discrete, following Aristoxenus (Melchiorre 2023). Concerning the relevance of continuous musical space, one can cite *Embellie for viola* (1981), where the use of microtonal oscillations and glissandi gives the idea of sound space as a *flow* and *process*. With regard to music and architecture, *Metastaseis* (1955) and *Concret PH* (1958), composed for the *Philips Pavilion* designed by Le Corbusier and Xenakis, are compositions that also address the theoretical problem of the continuous passage between two discrete points (Melchiorre 1987).

TRANSPOSED AND INTERNAL MEANING

The sound phenomenon Giovanni Piana also underlines, among others, some essential aspects of musical spatiality, considered in its external meanings, particularly in terms of the *provenance*, *radiation*, and *movement* of sound. A sound radiates from a source, e.g. a violin, and it is amplified in the resonance body of the instrument and diffused in the hall. The sound therefore has a *provenance* that is localised and a *radiation*, but also a *movement*, if the sound source is moving around the hall (Piana 2013).

Developing some of Piana's ideas, Carlo Serra (2017) seems to identify a point where the two sides of our question can be connected, namely the relationship between sound matter, perceptual rules, and the imagination. Perception is oriented towards sound matter, which guides the intentional modes in which sound can be understood, in terms of both the spatialisation of its intrinsic features and the perception of it in the environment. For example, when our attention is caught by a song within an urban soundscape, we hear the melody, but the background stimulates us, as Husserl pointed out. Similarly, we may recognise a form (regular rhythm) in a natural material (water drops) on the basis of the specific structure of the sound material.

Another perspective comes from Charles Nussbaum (2007, see also Bertinetto 2012) who intends musical space as a *virtual* dimension in which the listener is aware of environmental *affordances*, namely context features that appear "actionable" according to "action plans". Therefore, "musical affordances" such as emotions produce in the listener's "virtual musical space" some *off-line*, or not-real, *motor schemata*.

The issue of musical spatiality in relation to the environment also involves the question of soundscape. In *The Tuning of the World* (1977), Murray Schafer highlights two new fields of research, namely "acoustic ecology" and "acoustic design". While the former also historically examines soundscapes in relation to life and society, the latter (i.e., "acoustic design") aims to improve their orchestration.

Nevertheless, according to some scholars, Schafer's perspective poses ideological and epistemic problems (radical cultural relativism and atemporal assumptions), mainly because it underestimates the imaginative, narrative and symbolic significance of soundscape, which Schafer seems to understand primarily in its informational meaning (Serra 2005).

Relationships between sound sources, resonant bodies, and the environment are also at the centre of cultural imaginative variations, as has been explored in ethnomusicological and aesthetic studies (Feld 1990, Serra 2008). One might mention Kaluli's music, for example, in which the sound of the forest is charged with imaginative meaning and constitutes a stratified soundscape in which vocal practices define a complex musical interaction pregnant with symbolic and affective meanings (Feld 1990, Serra 2008).

Phenomenological and ethnomusicological studies have also influenced the contemporary aesthetic research on *atmosphere*. Atmosphere can generally be defined as "felt spaces", "spatially effused", and "semi-objective" intersubjective feelings (Böhme 2006, Vizzardelli 2007). In addition, musical atmospheres consist of both a relational structure, conceived as a parts/whole ratio, and "atmospheric practices" that operate on sound in order to modify atmosphere (Riedel-Torvinen 2023).

In musical composition there have always been methods of sound spatialisation that lend perceptual significance to musical spatiality, as illustrated by architectural designs aimed at sound diffusion, as in the case of theatres (Pozzi 1987). Several scores consider space as a compositional element, exploring sound *provenance* and *depth*, for example in polychorality (Friar Ruffino Bartolucci, Willaert, Giovanni and Andrea Gabrieli, Claudio Monteverdi) and in Mahler's symphonies. In the First symphony, for instance, the two trumpets in the wings evoke sound depth, a "thought on the space of music representation", creating a "stratification" that suggests "a world that opens up" (Serra 2020). In the 20th century, research on sound spatialisation developed greatly, also thanks to electroacoustic music (e.g. Stockhausen in *Spiral*, 1968). Luigi Nono intensely explored musical spatiality, even before live electronics. In addition to compositions such as *Prometeo. Tragedia dell'ascolto* (*Prometheus. Tragedy about Listening*, 1985), conceived in collaboration with the architect Renzo Piano, and "*Caminantes*" ... *Ayacucho*, "*No hay caminos hay que caminar*"... *Andrey Tarkovskij*, and "*Hay que caminar*" *soñando* (1986-1989), which work on micro-intervals and on unusual local dispositions and movements of sound sources (Petazzi 1993), Nono's *Das atemde Klarsein* (1980-83) represents an interesting case of sound spatialisation, also thanks to the use of live electronics, focusing on sound *provenance* and *movement*.

Musical spatiality, rooted in its structural and relational meaning, thus allows the imaginative potentiality of sound matter to be articulated in a variety of ways. Many questions continue to arise in the aesthetic debate on this topic. Is the spatial dimension of music a structural part of sound matter or of our perception? Or is it purely metaphorical? Does it refer to invariant perceptual structures across different epochs and cultures? What are the contextual differences? Can it contribute to the reflection on the intersubjective forms of human perception and life? How can composers create a new awareness of spatiality by working with sound matter? Musical spatiality continues to be a fertile field of study even today, especially when approached through the fruitful interplay between different research fields, such as aesthetics, architecture, ethnomusicology, musicology, and compositional practice.

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