Transcription of Vale do Ave into sound:
creation of a spatial auditory language

Cidália Ferreira Silva & Eugénia Aguiar Leite

Abstract

The transcription of Vale do Ave into sound (Leite, 2014) emerges from the intersection of the visual display of both territory and sound, applied to the interpretation of two samples from Vale do Ave – the Guimarães city centre and the "between Brito and Silvares" – through the creation of ambivalent graphic notations, which simultaneously represent space and sound. This article presents the transcription process created in response to the question *"how to transcribe urban space into sound?"* What is traditionally called soundscape (Augusto, 2014; Schafer, 1993) reflects on the existing sounds in a given place. This article reverses this proposition and aims to transcribe spatiality into sound. So in this context, the term "listening to" the territory does not refer to the sounds produced by cars, wind, tree leaves, etc., but to the sound resulting from the spatial composition. The research results have proven the link between space and sound, since the musical composition corresponding to each sample is not only distinct, but also refers us to its spatiality, opening up an interdisciplinary field, subject to further intersections in other areas, with mutual possibilities of innovation in both spatial and musical composition.

Keywords

Grammar; sound and space; territory; transcription

Resumo

A transcrição do Vale do Ave em som (Leite, 2014) surge do cruzamento da representação do território com a representação sonora, aplicada à interpretação de duas amostras do Vale do Ave – o centro de Guimarães e o "entre Brito e Silvares" –, através da criação de notações gráficas ambivalentes, que simultaneamente representam o espaço e o som. Neste artigo, apresenta-se o processo de transcrição criado, o qual tem como questão geradora: como transcrever o espaço urbano em som? Aquilo que tradicionalmente se denomina de paisagem sonora (Augusto, 2014; Schafer, 1993) reflete sobre o som existente nos lugares. Este artigo inverte esta proposição, pretendendo transcrever a espacialidade dos lugares em som. Assim neste contexto, o termo "ouvir" o território não se refere aos sons reproduzidos pelos carros, pelo vento, pelas folhas das árvores, etc., mas sim ao som resultante da composição espacial. Os resultados da investigação comprovaram o vínculo entre o espaço e o som, uma vez que a composição musical correspondente a cada amostra não só é distinta, como nos remete para a sua espacialidade, abrindo um campo interdisciplinar passível de novas interseções em outros lugares, com possibilidades mútuas de inovação tanto ao nível da composição espacial como da composição musical.

Palavras-chave

Gramática; som e espaço; transcrição; território

INTRODUCTION

This research emerges from the intersection of the visual display of both territory and sound as an operational tool of interpretation, through the intersection between music and architecture as an expanded field (Silva, 2011). Recognising that it is possible to graphically represent both sound and space, the research process generated a language of intersection between the "real" space of two samples from Vale do Ave and the corresponding sound composition. *What is the sonority of the spaces of each place? How to find a common language?* The conducted experimentation was undertaken in order to answer these questions, enabling the investigation on the intersection of the visual display of both territory and sound and corresponding development of its transcription methodology and strategy. This strategy approached both the understanding of the links "between" space and sound – systematised in the language explored through the created intersection grammar and alphabet – and the breakdown of the transcription method applied to the selected samples.

This article is structured into three fundamental parts: (1) in the state-of-the-art part, this research is framed by the references of Vale do Ave's territory, the key concepts relating to the soundscape are discussed, and the pre-existing references that are relevant to the design of the created transcription methodology are explored, namely by investigating the possibilities of mutual graphical representation; (2) in the methodology part, a common language between space and sound is developed through its application to two samples from the Vale do Ave's territory with distinct spatialities, with the objective of testing the existence of a specific correspondence between spatial and sound composition; (3) in the results' analysis part, the sonorities resulting from the two transcribed samples are discussed. The article ends with the discussion of the main conclusions and prospects for future research.

The chosen samples stem from the recognition of the morphological variation of Vale do Ave, characterized by two models of settlement[1]: the compact model and the diffuse model (Silva, 2007, p. 4). Thus, the Guimarães city centre was selected from the compact fabric of Vale do Ave[2] (Figure 1), while the sample "between Brito and Silvares" was selected from the diffuse fabric[3] (Figure 2).

---

[1] In a previous work (Silva, 2007), we explained that the Vale do Ave has two settlement models: the compact and the diffuse model. The compact model corresponds to the urban fabric of county towns (Guimarães, Vila Nova de Famalicão, Santo Tirso, Vizela, and Trofa), and the diffuse model corresponds to the urban fabric "between" county towns. The selection of samples for this research results from recognising this, ensuring not only its relevance to a deeper study of this territory, but also the possibility of creating a language that incorporates a more diverse range of urban morphologies, thus revealing its applicability potential to other contemporary urban settings.

[2] The compact fabric from the Guimarães city centre is characterised mainly by its dense and hierarchical mesh, as well as by its continuous façades characterising its public space, in particular squares, streets and gardens.

[3] The diffuse fabric dominant characteristics are identified in "between Brito and Silvares", namely the fact that construction has no preponderance in territory occupation, which is deployed in a dense infrastructural mesh and results from the proximity and interdependence of activities – industry, complementary-purpose housing and agriculture – which make use of the territory's resources, especially water and soil, in their specific purposes. The parcel has a generative capability in this urban fabric, and the morphological relationship system in the diffuse model is described by the articulation between parcels that adapt to different uses and uses.

Revista Lusófona de Estudos Culturais / Lusophone Journal of Cultural Studies, vol. 5, n. 1, 2018

Transcription of Vale do Ave into sound: creation of a spatial auditory language · Cidália Ferreira Silva & Eugénia Aguiar Leite

Figure 1: Santiago Square, Guimarães

Figure 2: Couto Street, Brito

STATE OF THE ART

The current state of the art is developed in three parts. Firstly, this article is framed within the existing research on the Vale do Ave territory, and key concepts are discussed in the context of soundscapes; second, the graphical references for sound that support the created graphical notation are presented; and last, the examples that served as a basis for the sound design of the space are explored.

CONTEXT

The territory of Vale do Ave and its respective urban, economic and social dynamics have been the subject of intense research, especially since the 1980s. Notable works include those developed by architects and geographers such as: Magalhães (1984); Domingues (1986, 2012); Portas (1986); Sá (1986); Domingues and Marques (1987); Marques (1987); Sá and Domingues (2002); Portas, Domingues and Cabral (2003); Silva (2005, 2007, 2010); and Labastida (2013). It is also worth mentioning the research work developed since 2001 at School of Architecture, University of Minho about this territory, which has been researching alternative forms of recognition of its specificities, as a basis for its potential transformation (Silva et al., 2017; Silva & Pereira, 2017). This article is integrated into the previous studies and gives them continuity through the transcription of Vale do Ave into sound.

In the context of soundscape studies, there is one that stands out: the seminal book *Soundscapes* (Schafer, 1993), which coined the term "soundscape" itself, defining it as the sound of day-to-day life; in Portugal, it is worth mentioning the book *Sons e Silêncios da Paisagem Sonora Portuguesa* (Augusto, 2014). This article, however, presents

a research that is the inverse of the previous references, since it goes from space design to its transcription into sound. In this sense, concepts of soundscape (sounds that surround us) and the interdependent concept of sonosphere (concerning the individual acoustic experience of the soundscape that envelops us and invades our sensory body) have to be reinterpreted in this research. The displayed soundscape is the sound as the final result of the transcription process, and not the starting object experienced *in situ* or via its recording (sound map), i.e. the sound that exists in the landscape, as is the case in the previously cited research works. The sound maps generated for this article correspond to the musical compositions resulting from transcription.

Exploring the drawing of sound

> For millennia, sound was used to sing, play and dance. This was the first music, which was only transmitted orally. But one day someone wished to make one of those songs permanently transmissible, in a form that was not oral, i.e. written. At the time, there was no method or instrument to do so. (...) They had to be represented through intelligible elements. (Le Corbusier, 2010, p. 32)

Musical notation is based on a system of writing that represents sounds and sound compositions in a graphical system. The advantages of the graphical system relate to the ability of an interpreter to perform a given sound composition without having heard it. In the same way,

> a plan, a project drawn on paper is not architecture but merely a more or less inadequate representation of architecture, comparable to sheet music. Music needs to be performed. Architecture needs to be executed. Then its body can come into being. And this body is always sensuous. (Zumthor, Oberli-Turner & Schelbert, 2006, p. 66)

The graphical notation system, as a visual representation of sound, has undergone changes and developments until arriving at the notation system which is currently most used. This system uses symbols which have a stave comprised of five lines as a foundation. The set of symbols for each composition, along with the set of staves, is called a score. The basic element of musical composition that is part of its notation system is the note, the main symbol which has the properties of duration and pitch. However, other elements are represented in notation systems, namely intensity and expression, among others.

The concept of graphical notation relates to the addition of information regarding how composers want the musical piece to be performed. Ideas, concepts and experiments from various composers who chose to reproduce their ideas and sound perceptions through unorthodox representation methods are then synthesised.

The Seikilos epitaph (González de Tobia, 2007) is one of the most ancient examples of western musical notation, and is characteristic of melodies played in Ancient

Greece and recorded on tombstones. The representation system was based on symbols and letters, which represented the notes, accompanied by the lyrics.

Already into the 20th century, it is worth highlighting: composer Krzysztof Penderecki (Hoek, 2007; Meder, 2006), who wrote *Polymorphia* (1974) which, as the name itself indicates, implies form variation, where he pursues new sound possibilities; David Bedford, who used new forms of composition, for example in his *Scientific American piece for John Tilbury*, through a graphical representation that uses forms and collages on staves, with the goal of making them accessible to children and people who don't know how to read the conventional graphical notation; and finally, Dick Higgins, who created graphical notation from machine gun shots on stave sheets, reproducing various artistic expressions and conception of new sound ideas, as is the case of the his *Symphony No. 357, from The thousand symphonies* (1968).

In the 1950s, experimental composers challenged the canons of musical notation through the denial of composition in five lines, therefore creating more expressive forms of graphical notation, which not only becomes visually richer but also stimulates freedom in musical interpretation.

Known for indeterminate and experimental compositions, Cornelius Cardew composed, among other works, *Treatise*[4] (1963-1967). Composed and designed by symbols and geometric shapes or abstract elements which depart from traditional musical notation, the piece is represented by a score composed by musical graphics in 193 pages, where one can find the most diverse symbols, lines and geometric and abstract shapes that depart radically from traditional notation.

John Cage explored the use of indeterminacy in order to pay attention to the subjectivity conferred by the interpreter, regardless of how sound is graphically represented. As stated by the author (1973, p. 10), "letting sounds be themselves instead of expressions of human feelings or vehicles for theories conceived by men". *Fontana Mix*[5] (1958) is a composition by Cage (Holmes, 2012), where drawing and overlap are elements used to represent sound. It is a graphical score composed of several sheets, some of which are transparent with drawings of random dots, one of them has a straight line, another a perpendicular mesh and the others have curved lines. The purpose is to overlap the images in different ways so as to produce dissimilar graphical images, by creating a transparency system that aims to function as an open-combination tool from which sound matches are determined, leaving the rest to the interpreter's discretion.

The 480-second piece *Poème électronique*[6] (1958), composed by Edgard Varèse, was created with the purpose of designing a release of sounds and associating it with a new graphic representation of those same sounds. The graphical notation created represents a method that is built by a set of lines that resemble sound waves. These lines vary between solid and dashed lines.

---

[4] Retrieved from https://www.youtube.com/watch?v=JMzIXxlwuCs

[5] Retrieved from https://www.youtube.com/watch?v=05wBPhWD44U

[6] Retrieved from https://www.youtube.com/watch?v=R-R3F3ZVbi8

The composer Roman Haubenstock-Ramati developed work characterised by the creative innovation of graphical notation, with a strong artistic relationship in the visual sense. *Multiple 1 for 2 players* (1969) *Alone*[7] (1965) and *Konstellationen*[8] (1971) are the highlights of the works he composed while experimenting with new sounds and ways of representing them.

Anestis Logothetis believed that the new musical expression corresponded to polymorphic representations of sound and noise and that new variations and sound ideas would arise through experimentation of new forms of representation. He alleged thus that the traditional visual representation of sound composition was limiting and didn't allow for the infusion of new ideas. Furthermore, he granted the musician freedom of interpretation in the reading of his graphical scores, which consequently imbued the sound composition with more dynamism and unpredictability. In the author's words:

> what fundamentally distinguishes graphical notation from traditional notation is the aforementioned polymorphism, which clearly allows artists to maintain their reaction times subjective. The composer takes into consideration the divergence between the different actors in the composition and expects a certain degree of surprise by the new formalisation of each performance's musical form.[9]

The work on the composition *Artikulation*[10] (1958), By Rainer Wehinger, is relevant for the projection of the graphical punctuation and for the language and system of rules that it creates. *Artikulation* is characterised by a graphical notation that shows the drawings of the sounds performed. A few years later, Rainer produced a system that represented different sounds and sonorities through graphic symbols. A new element in the field of graphical representation of sounds (computer systems) is thus brought to the fore, and which allows a middle ground between representation of sound and directing. This way, one can perceive a correlation between the graphical image and the sound reproduced.

Earle Brown, despite having used traditional graphical notation, also created innovative ones, which he named "time notation" or "proportional notation", where the rhythms were determined by the symbols' horizontal lines, but always with the option of flexible interpretation. In the composition December[11] (1952), he uses graphical methods for his sense of music to show through. His experimentation and improvisation proved to be a relevant theoretical basis in contemporary composition.

Karlheinz Stockhausen developed a system of representation of electronic music, notably *Studie I*[12] (1953) and *Studie II*[13] (1954), in the search for new sounds, through

---

[7] Retrieved from https://www.youtube.com/watch?v=WpbxxbQccIY

[8] Retrieved from https://www.youtube.com/watch?v=Brlfz4WfY2c

[9] Retrieved from http://anestislogothetis.musicportal.gr/the_graphic_notation/?lang=en

[10] Retrieved from https://www.youtube.com/watch?v=71hNl_skTZQ

[11] Retrieved from https://www.youtube.com/watch?v=WlGkaP4u2cw

[12] Retrieved from https://www.youtube.com/watch?v=1GoUzk6fQAA

[13] Retrieved from https://www.youtube.com/watch?v=_qi4hgT_doo

reproduction in technological tools. The author develops a new approach to the basic elements of music and their organisation, through new experimentations and representations.

Ben Patterson (1934) composed *Duo for voice and string instrument* (1961). The graphical method used in this work consists of a set of symbols and two sheets of tracing paper, in which the composer draws circular and rectangular contours to transmit his sound ideas.

The various authors introduced earlier broke barriers and asked new relational questions between musical notation and visual art, allowing, at a certain moment, sound recording itself to mutate and to be seen as a visual artistic expression. This new visual expression corresponds to the innovative character of their musical compositions which contrasted with traditional canons. One thus realizes the relational dynamics between the composer as a sound artist and as a visual artist. Furthermore, the ambiguity of musical notation as visual art stimulates the interpreter's creative freedom, allowing music to be reproduced with a greater number of variable components and creating new styles of interpretation, which automatically produce different musicalities.

From the moment music displays the variation of representations described, the possibility of representing the sound according to different parameters opens up. The various examples of graphical notation that are presented result from the need to register sound, to draw what is heard, and what one wants others to listen. The appeal of associating artistic drawing to the graphical representation of sound can be projected onto the association of that same drawing with the representation of the territory. To go further into this intersection, it is now relevant to explore the reverse process through the research of authors who worked on the sound representation of space.

Exploring the auditory drawing of space

In addition to the previously mentioned notations, this article shall now present and analyse other approaches – associated with musical representation as a creative process – which are directly related to the representation of space. Several authors have addressed this intersection and its specificity (Muecke & Zach, 2007; Ripley, Polo & Wrigglesworth, 2007), and have produced relevant essays. Prominent authors include Mikesch Muecke and Miriam Zach; Michael Rasbury; Galia Hanoch-Roe; Kourosh Mahvash; Kim Chow-Morris; and Tomek Smierzchalski, among others. Preeminent among the authors who directly contributed to the construction of the criteria of correspondence between sound and space of our methodology are Kim Chow-Morris and Galia Hanoch-Roe. It is upon them that the present topic shall focus.

Kim Chow-Morris, who specialised in ethnomusicology, developed an essay on the rhythms of the streets, which she named *Sounding the structures of the city* (2007). In partnership with the architect Ian MacBurnie, she explored the visual approach in relation to sound, as well as the interpretation of sound through the city's visual structures, using the city of Toronto as a reference. So, after "discussing to a certain extent the

translatability of several parameters of urban structure and music, we decided that the construction of the streets of the city itself would become our primary focus" (Chow-Morris, 2007, p. 147). From this perspective, the authors selected a path through a sub-section of the city, "since the fragile environment of music necessarily exists in time, and is hence more easily translated into a linear format" (Chow-Morris, 2007, p. 149). After preparing the mappings of the city, they selected 501 Queen Street due to the variability and event dynamics that take place there. Chow-Morris instinctively read the mappings as if they were a graphical notation and, drawing from the street's multiplicity and richness, began the correspondence process by selecting the various instruments that would represent it. The highlights of the correspondences created by the team are: the association of the guitar with south streets and of the piano with narrower streets; and the increase of sound intensity in the street's main junctions. According to the author, the creation of a musical composition that represents the structure of the city (the street) reflects a creative dualism between the two areas – territory and music.

The experimentation of the representation of space through linear sequences was also addressed by Hanoch-Roe (2007), for considering that this type of representation adds components associated with movement, which is akin to dance, music and cinema. According to the author, plan, cross-section and perspective are static visual representations of the design, revealing limitations with respect to the reference of the temporal dimension – that is associated with the action of walking. Through her research, she refers back to various authors who, in one way or another, synchronise movement, graphical representation and experimentation in space, with the study conducted by Kevin Lynch being particularly relevant.

In 1964, Kevin Lynch developed, in partnership with Appleyard and Myer, a system of representation of visual sequences, captured through a car trip. The authors state that

> the direction of a spatial sequence is similar to that of large-scale architecture: the continuity and insistent flow of time are on par with music and cinema. The kinaesthetic sensations are like those of dancing or the amusement park, albeit rarely so violent. These are all the arts and situations from which the motorway designer can begin to learn their craft. (Appleyard, Lynch & Myer, 1964, p. 4)

They conduct an exercise in which they use different symbologies and maps, where they represent specific components of the territory: distance focus; element static; texture; colour of the route elements; road width; speed; light; among others.

The performed analysis reveals to be pertinent, in so far as it progresses, with a representation of the different points of views, through one's perception of the place while travelling through it, as well as it represents the experiences in linear sequences. These and other tests allowed Hanoch-Roe to develop and design a system of representation of the territory, as a tool of interpretation, producing a sequence of symbols that reveal its characteristics, which albeit contrasting, is complementary to traditional interpretation tools. The created symbols are superimposed on a stave, so that the reading of the

Revista Lusófona de Estudos Culturais / Lusophone Journal of Cultural Studies, vol. 5, n. 1, 2018

Transcription of Vale do Ave into sound: creation of a spatial auditory language · Cidália Ferreira Silva & Eugénia Aguiar Leite

route is performed and equated to the process of reading a sound, i.e., to the following of processes in time.

> Architecture is appreciated by the eyes that see, by the head that rotates, by the legs that walk. Architecture is not a synchronous phenomenon, but successive, composed of performances, which combine themselves with each other, and occurring in time and in space, as does music. (Le Corbusier, 2010, p. 95)

The aforementioned representation characterises the route as a dimension observable through the seasons, the environment, directions, scents, auditory stimuli, among others. Verifying the absence of a system of representations that interpenetrates both representation systems (of the territory and of music), Hanoch-Roe's work gives clues to the creation of a common graphic language that represent both the interpretation of the territory and the sound composition, which this article will delve into in the second part.

Methodology of transcription of space into sound

This work's main objectives are creating a common language between territory and sound representation, as an intermediate link; creating a transcription methodology applicable to another territory; producing a territory representation format (the sound composition) that will expand and add information to the conventional formats; enabling the possibility of listening to the territory, which derives from its special composition specificities and the observer's lived experience; and finally, stimulating interdisciplinarity to give impetus to new readings about the territory and musical composition.

The main research questions are: *how to create a common language, which simultaneously represents the space of a territory sample and is viable as a sound graphical notation? How do structures and specific urban forms reveal themselves in differentiated sound presentations? What is the process of transcription of spatial elements that compose the territory into elements that are organised in time – the sounds?*

In order to find answers to these questions, the following part details the methodology that led to the creation of the common language, structured in four points: the strategy of transcription; the grammar; the alphabet; and the method of application, exemplified in a portion of the "between Brito and Silvares" route. Regarding the breadth of the research work undertaken, the parameters that were used are linguistically ambivalent, i.e., the graphical language developed represents both the territory being studied and the sound.

The transcription strategy

How to create a common language, which simultaneously represents the space of a territory sample and is viable as a sound graphical notation? It was soon realised that conventional musical notation (the stave) was impossible to use as a means of representing the territory, since it uses system of symbols which correspond only to sound, hence

unilateral. The first challenge of language to be created lied in the requirement of being bilateral, i.e. to be the "between" space and sound, the space/sound link.

If the territory has graphical representations that present it and music has graphical systems that express it, it means that both have a feature that can be shared – graphical representation. This common particularity unveils the relevance of creating a graphical representation that presents the territory and at the same time is a graphical notation of the sound that corresponds to it.

The word transcription means "the action or process of transcribing something; a written or printed version of something; a transcript; a form in which a speech sound or a foreign character is represented"[14]. The word transcription has its roots in the Latin verb *transcribere*, composed by "trans" which means "beyond", and "scriber", which means "to write out from speech"[15].

"Transcription" means, in this research, the transfer of one language[16] to another, that is, to transcribe as an act of interpretation. To do this, it is necessary to create links and points of contact between the two areas. That is to say, a system of rules that allow the writing – in this case, the transcription – between two elements of representation.

The composition of the territory and musical composition share elements which are at the basis of their characterisation, such as height, proportion, weight, density, distance, rhythm, silence, melody, among others. These are elements that give them shape and define the uniqueness of each space or sound. From these elements, the territory is organised in space and the sounds in time.

As mentioned in the introduction, the process of experimentation is applied to two samples of the Vale do Ave territory, conceiving a new approach to this territory, catalysed by the dissonances associated with the multiplicity of this place.

The selection of two samples is justified by their specificities and unfolds in its compositional dissonance, corresponding to two settlement models which will be subjected to the same analysis criteria. The relevance in exploring two samples with different morphological systems is related with the objective of proving the initial hypothesis of the link between space and sound. *How do structures and specific urban forms reveal themselves in differentiated sound presentations?*

> Tell me (since you're so sensitive to the effects of architecture), didn't you notice, while wandering through this city, that in between the buildings that populate it, some are mute; some do speak; and others yet – and these are the rarest – sing? (Valery, 1956, p. 82)

What is the first link found? The route became the resource for the intersection tests, for as a route, by being travelled, is a linear succession of events in space, lived in time,

---

[14] See *English Oxford living dictionaries*, available at https://en.oxforddictionaries.com/definition/transcription

[15] See *Dicionário online de Latim*, Glosbe, available at https://pt.glosbe.com/la/pt/

[16] Language: any formalized system of communication, especially one that uses sounds or written symbols which the majority of a particular community will readily understand. See *Chambers 21st century dictionary*, available at https://chambers.co.uk/search/?query=language&title=21st)

so a sound, by being heard, is a linear succession of events in time, lived in space. So time is the first link since both walking in space and music are linear processes in time. In Hanoch-Roe's words (2007, p. 77) "linear sequences incorporate notions of movement, mobile perception and rhythm, which make their experience similar to other arts such as music, dance and cinema".

The transcription process consequently focused its analysis on the interpretation of two routes (Figures 3 and 4), each one found through the action of covering the space of each selected sample.

The choice of the route as the starting point of the transcription method turns out to be essential in two factors across the investigation: the first concerns the fact that it allows a specific regard over the territory, insofar as the observer plays an active role in the process, since data collection is done while covering the space in situ; the second factor confers "time" to space, as the route is covered over a given time interval, thus emphasising that "a still eye doesn't see" (Pimenta, 1993, p. 4) the complexity of the place-territory.

Both routes share a selection principle that explores different articulations and different composition characteristics with the aim of leveraging the transcription and its scope. The selection of the routes is based on diversity, but also on specificity, in the identification of specific morphological types that, in general, are the basis for the composition of the territory's shape.

Figure 3: The route selected in the centre of Guimarães includes Rua D. João I, Largo do Toural, Rua de S. António, Rua Vale Donas, Rua João Lopes de Faria, Praça Santiago, Largo da Oliveira, Alameda de S. Dâmaso, Largo da Condessa do Juncal, Largo 25 de Abril and finishes at the end of Avenida D. Afonso

Revista Lusófona de Estudos Culturais / Lusophone Journal of Cultural Studies, vol. 5, n. 1, 2018

Transcription of Vale do Ave into sound: creation of a spatial auditory language · Cidália Ferreira Silva & Eugénia Aguiar Leite

Figure 4: The route selected "between Brito and Silvares" starts at the Rio Ave street, Rua da Liberdade, Travessa das Bouças, crosses the river until reaching Rua dos Moinhos, continues along Avenida 25 de Abril, Rua 1º de Maio, Rua dos Moleiros and finishes at a farm parcel

The grammar

What is the process of transcription of spatial elements that compose the territory into elements that are organised in time—the sounds? If one intends to transcribe a composition in space into a corresponding composition in time, a language of terms and analogies is necessary. That is to say, a system of rules that will make the writing – in this case the transcription – between two representation and presentation elements possible, and go beyond the construction rules of each area of study. The transcription is therefore based on a grammar – a system of rules – in order to achieve the transfer of information between spatial organisation and musical composition. The grammar is defined by a system of rules, which operationally exchanges information between the organisation of space and the sound composition (Figure 5).

After the analysis of the territory under study and of its compositional base units, the next step was isolating the elements relative to the composition and expression of the territory and to the sound composition. Different correspondence elements emerged then as relationally viable, allowing transcription while building the grammar and its rules. Two correspondence groups were set apart: the elements of organisation/composition and particularity/expression.

Revista Lusófona de Estudos Culturais / Lusophone Journal of Cultural Studies, vol. 5, n. 1, 2018

Transcription of Vale do Ave into sound: creation of a spatial auditory language · Cidália Ferreira Silva & Eugénia Aguiar Leite
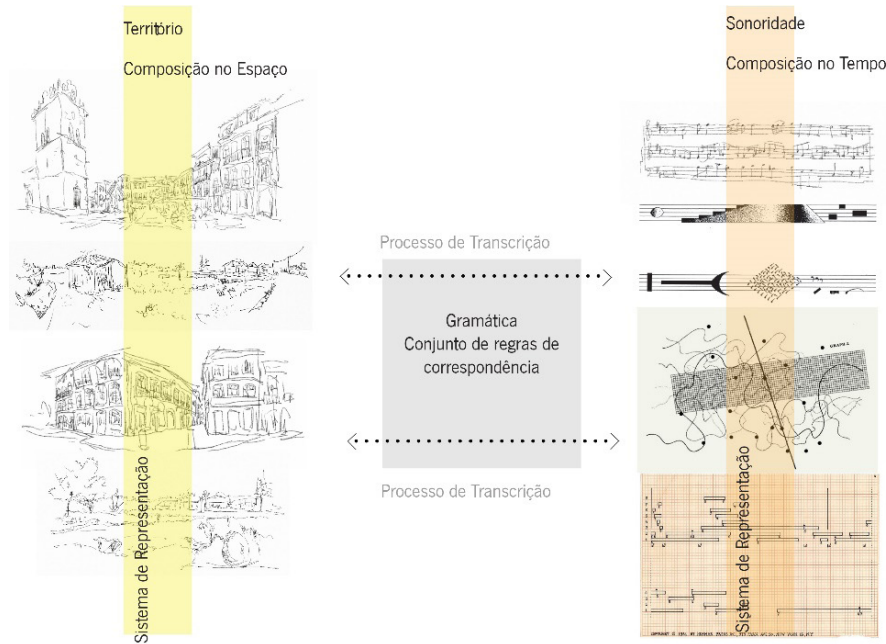
Figure 5: Diagram representing the function of grammar as a common element between the representation of the territory and the representation of sound. Left: drawings produced in visits to the territory being studied. Right: graphical notation

The correspondence group of organisation and composition refers to the characteristics and variation of the constituent elements of territory and sound – the elements which shape them. The territory organisational elements are then matched with the sounds' compositional elements. Particularity and expression are related to the organisation and articulation of the previously mentioned elements, i.e. the set of particularities that may vary with each territory's characteristics and with varied interpretations of different sounds.

To delineate the grammar, it is necessary to establish the parameters of correspondence between the territory constituent elements and the structural elements of a sound composition, thus finding the "between" links. Among these, for example, *what sound elements correspond to the territory's volumes and interstitial spaces?* Interstitial places are defined as spaces with an absence of vertical construction, i.e. squares, streets, gardens, farm parcels, among others. They are spaces defined between the elements of vertical structures.

This experience leads to a breakdown of the elements that characterise the interstitial space between the elevations along the route. These spaces are not considered empty in the context of this research because they possess specific content (Zardini, 2005). The presentation of these spaces leads to the representation of the interstitial spaces, which results in the absence of sound structure.

An urban pathway is formed by built "volumes", such as buildings, walls, etc., and by "interstitial spaces", such as squares, gardens, farm parcels, spaces "between" the volumes. So the "volume" was matched with "sound", and the "interstitial spaces" were matched with "absence of sound structure" (Leite, 2014, pp. 149-151) (Figure 6).

For that representation to render the musicality of the interstitial spaces, certain elements were also considered, such as both their vegetation and the long shots that frame them at a bigger distance from the observer, as is the case of the second shot, chosen for accompaniment (Leite, 2014, pp. 145-148).
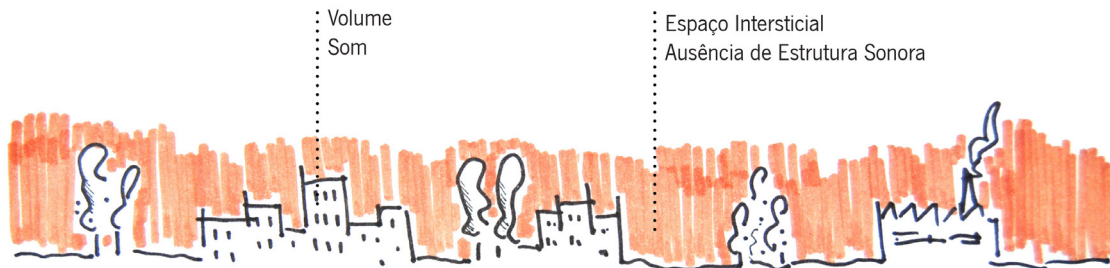

Figure 6: Schematic drawing of the correspondence of the territory's structural elements, in this case, volume and interstitial space, with audible compositional elements: sound and absence of sound structure
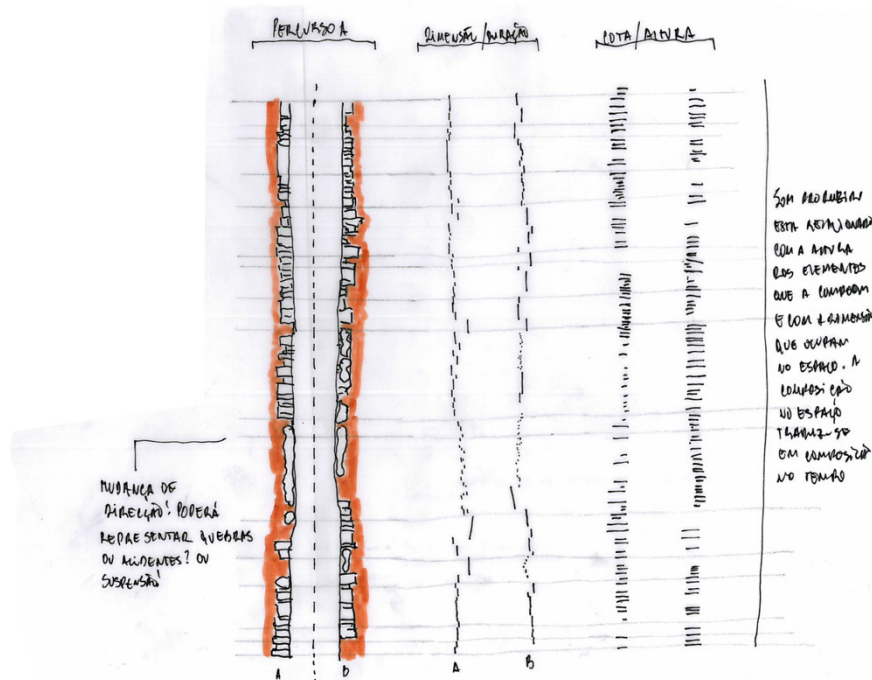

Figure 7: Right and left side route elevations and corresponding breakdown tests

The links found are applied to the two elevations from the route. The route is composed of two fronts of information, the right side and the left side, which organise and follow the space travelled, each with its specificities. The elevation transcription mirrors the stereophonic dynamic. Stereophonic sound is characterised by a three-dimensional representation of sound which is played by two different and synchronised audio sources. The aim is to attribute dimensionality to the sound through its distribution in real time and to give a sensation of space. Therefore, each route has two transcribed elevations, resulting in two sounds which correspond to two audio channels. The two synchronized

elevations bring together their contributions to the construction of a sound composition, in order to reproduce the spatial atmosphere of the space (Figure 7).

The alphabet

Once the parameters of correspondence are defined, it is necessary to create a graphical representation of the territory elements and assign them a sound, i.e. draw the "letters" of the territory and match them with their phonetic representation. The same way the letter "a" corresponds to a sound, allowing its transmission, so too the designed graphic elements correspond to a sound (Figure 8).

Abecedário	Materialidade	Timbre
	Composição compacta	Sonoridade densa
	Composição porosa	Sonoridade fluída

Figure 8: Example of the transcribed elements' representation system. Relationship between compact and porous composition and their corresponding sound (here described in words)

In this example chosen from the systematized "letters" (Leite, 2014, pp. 180-181), the black mesh is used for the representation of a built volume and corresponds to a denser sound, whereas the dotted mesh represents trees and corresponds to a more fluid sound. The rationale for this criterion of representation derives from taking into account the sound porosity of the trees as a counterpoint to the lack of porosity of the built volumes. It is intended that the differentiation, in the sounds and timbres reproduced, allows the identification of the various components that make up the territory, as well as the resulting correspondences.

The alphabet is the set of basic elements of the common language between space and sound. As letters form words, which form sentences, so too this alphabet allows the formation of sentences, paragraphs, and eventually "text" – ambivalent graphical notation – simultaneously able to represent space and sound. In summary, the alphabet is "writing and sound", which materialises the (visual/sound) representation of the defined grammar of correspondences and allows the transcription of the selected territory samples, through the methodology of transcription described below.

The transcription application method

After the correspondence parameters and its spatial-auditory writing is found, comes the definition of the method of transcription, i.e. the systematisation of both

grammar and alphabet application. This method consists of three categories: the eleva-tion, the plan and the lived experience on site. Each one of these categories is subdivided into strata that represent different points of view and layers of territory. The transcription process is applied to each of the strata, where the grammar rules and the already men-tioned alphabet representation are used. Finally, from the transcription of each stratum results a graphical notation that represents a spatial-auditory specificity.

What is the need to break down the territory analysis into various strata? Each one cor-responds to different information, not only about the place but also about a characteris-tic of sound composition; in the same way, the combined and overlapping strata make up the sounds of the route. The more variants added, the more the sound composition is going to be faithful and articulated with the place, given that different layers of complexity are transcribed. As James Corner states,

> there is a duration of experience, a serialistic and unfolding flow of befores
> and afters. Just as a landscape cannot spatially be reduced to a single point
> of view, it cannot be frozen as a single moment in time. The geography of a
> place becomes known to us through an accumulation of fragments, detours
> and incidents that sediment meaning, 'adding up' over time. Where, when,
> and how one experiences a landscape precipitates any meaning that is de-
> rived from it. (Corner, 1992, pp. 147-148)

Figure 9: Example of transcription method applied to the right and left side
elevations of a fraction of the 'between Brito and Silvares route through the
breakdown of the various spatial-auditory graphical notation strata

The schematic from Figure 9 illustrates a fraction of the "between Brito and Silva-res" route, whose left side elevation is interspersed with farm parcels, while the right is

Revista Lusófona de Estudos Culturais / Lusophone Journal of Cultural Studies, vol. 5, n. 1, 2018

Transcription of Vale do Ave into sound: creation of a spatial auditory language · Cidália Ferreira Silva & Eugénia Aguiar Leite

interspersed with housing parcels[17]. Going inwards from the outside, one can see the elevation drawings and their corresponding breakdown of the spatial-auditory graphical notation strata.

How can breaking down the territory's representation media into its elements help the construction of a sound composition? After the study of the three analysis categories – elevation, plan and lived experience – the transcription methodology is applied by using the rules of the constructed grammar. The transcription is applied to each stratum of each category, therefore producing the corresponding graphical notation.

RESULT ANALYSIS

On the whole, the transcription process analyses different compositional layers of the territory and breaks them down until arriving at a symbology/notation that represents it. At the same time, that symbology is a graphical representation of the sound resulting from the route composition.

It is pertinent to mention that the analysis carried out on the territory and the production of the drawings depend on the observer and on the moment they walked through the route. Therefore, the analysis of the recorded representation may vary with the seasons of the year, leaving the trees with more or less compact tops, as well as with the transformation of the place over time, among other factors.

The elevations are laid out in accordance with an in-situ analysis and experience, therefore, the drawings and the transcript are not eternalized, they are merely representations of a specific time.

The graphical notation, which results from the breakdown of the strata, represents the information to be reproduced in partial sounds. After its transcription, it is possible to play the sounds of each stratum, and the simultaneous playback of all strata corresponds to the sound composition of the transcribed route, resulting in the route's spatial-auditory synthesis[18]—in the 'between' the travelled space and the corresponding sound. Each route has a sound composition of 25 minutes, the combination of the five five-minute interpreted fractions. Thus, for both routes, the result is a 50-minute-long musical composition.

CONCLUSIONS

The research, based on the transcription process of the visual representation of the territory into sound representation, by addressing both a sample of diffuse territory ("between Brito and Silvares"), and a sample of compact territory (centre of Guimarães),

---

[17] Given the complexity of the transcription process, a choice was made to exemplify the breakdown applied only to the elevation category; see Leite, 2014, pp. 158-167, to study the plan category, and Leite, 2014, pp 168-175, for the lived experience category

[18] To listen to two of the sound compositions resulting from the transcription, see http://youtu.be/8GpEyrOPb8o (excerpt from the Guimarães' city centre route) and http://youtu.be/hKpISPeg4A4 (excerpt from the "between Brito and Silvares" route).

created a comprehensive methodology, enabling its application to other contemporary urban places, and its corresponding sound transcription. Its application to these distinct samples made it possible to prove the initially posited hypothesis, i.e. the existence of a link between spatial and sound composition.

This research is presented as an operational tool that enables knowledge of the territory by the exploration of its sounds, raising awareness to the perception of spaces through soundscapes created from the travelled routes, which in turn are narrated in articulated sounds. The sound compositions result from the transcription of the characteristic physical elements of a given space, providing a different scope in the study and approximation to the territory.

Consequently, this transcription process lays the groundwork for the exploration of different variants of application of the sounds created, namely the creation of ambivalent representations through spatial and musical reading, such as sound maps. Maps are tools that help comprehension of the territory, people, culture, history, and they are also sound archives of the territory and of its evolution through time, as well as being interactive tools in the relationship between the graphical representation of the territory and the sound that derives from it.

The process of understanding a space, through the transcreation of its morphology into sound compositions generates a representation of the territory, which functions as an information complement to other representation media (plan, cross-section, 3D model, scale model, photography, among others), thus contributing to the perception of the territory, in addition to the visual practice – by creating a new representation of space based on a different elementary structure: sound through time.

The relevance of this research, as an open-ended experimentation process, lies within the creation of a methodology applicable to other routes in other territory samples. That is, the transcription methodology is applicable to other places, which may not contain other components that were not mentioned in this construction experiment of the transcription process; for each place is unique. For this reason, the grammar and transcription methodology could very well be a starting point for the addition of content from new components identified in other places and by other observers, and are also open to new representations. It is also important to mention that the proposed transcription method opens up a new field of possibilities in terms of musical composition.

It is thus worth stressing that, depending on the proximity to the place, there could be further integration of new correspondence parameters such; as specific characteristics of either interstitial spaces or the buildings' architecture; light and shadow; the transformation of the territory over time; the ground floor, in its articulating relationship between public and private space, etc. Seeing space through hearing remains, therefore, a possibility, so as to be able to listen to other places and in so doing, see them.

A listener that has learnt the proposed language is able to create a mental image of the place without ever having visited it, by listening to a route's sounds. Conversely, when travelling through the territory, the observer is able to reproduce a mental soundscape, conceived by his transcription.

Revista Lusófona de Estudos Culturais / Lusophone Journal of Cultural Studies, vol. 5, n. 1, 2018

Transcription of Vale do Ave into sound: creation of a spatial auditory language · Cidália Ferreira Silva & Eugénia Aguiar Leite

This process of experimentation results from the coming together of the territory and its sound representation. It is in 'between' space/sound, draw/annotate, and see/hear that this project explores the uncertain potential of (inter)disciplinary learning.

Translation: Tiago Moita

Bibliographic references

Augusto, C. A. (2014). *Sons e silêncios da paisagem sonora portuguesa*. Lisbon: Fundação Francisco Manuel dos Santos.

Appleyard, D., Lynch, K. & Myer, J. (1964). *The view from the road*. Cambridge, Massachusetts: The MIT Press.

Cage, J. (1973). *Silence: lectures and writings*. Middletown: Wesleyan University Press.

Chow-Morris, K. (2007). Rhythm of the streets: sounding the structures of the city. In M. Muecke & M. Zach (Eds.), *Resonance, essays on the intersection of music and architecture* (pp. 145-168). Ames, Berlin, Gainesville, Tokyo: Culicidae Architectural Press.

Corner, J. (1992). Representation and the landscape. In S. Swaffield (Ed.), *Theory in landscape architecture* (pp. 144-165). Philadelphia: University of Pennsylvania Press.

Domingues, A. (1986). Economia e espaço rural. *Cadernos do Noroeste,* 39-65.

Domingues, A. & Marques, T. (1987). Produção industrial, reprodução social e território – materiais para uma tentativa de abordagem do Médio Ave [Industrial Production, Social Reproduction and Territory – Materials for an attempt of approaching the Médio Ave]. *Revista Crítica de Ciências Sociais*, *22*, 125-142.

Domingues, A. (2012). *Vida no campo*. Porto: Dafne Editora.

González de Tobia, A. M. (2007). *Lenguaje, discurso y civilización: de Grecia a la modernidade*. La Plata: Universidad Nacional de La Plata.

Hanoch-roe, G. (2007). Scoring the path: linear sequences in music and space. In M. Muecke & M. Zach (Eds.), *Resonance, essays on the intersection of music and architecture* (pp. 77-144). Ames, Berlin, Gainesville, Tokyo: Culicidae Architectural Press.

Hoek D. J. (2007). *Analyses of nineteenth and twentieth-century music*. Lanham, Maryland, Toronto and Oxford: Scarecrow Press.

Holmes, T. (2012). *Electronic and experimental music. Technology, music, and culture*. New York: Routledge.

Labastida, M. (2013). *El paisaje próximo: fragmentos del Vale do Ave*. Doctoral thesis, Universidade do Minho, Braga, Portugal. Retrieved from http://hdl.handle.net/1822/27185.

Le Corbusier (2010). *O modulor, modulor 2*. Lisboa: Antígona, Orfeu Negro.

Leite, E. (2014). *Transcrição do território em som. Processo de experimentação aplicado a duas amostras do Vale do Ave*. Integrated Masters dissertation, Universidade do Minho, Guimarães, Portugal. Retrieved from http://hdl.handle.net/1822/34516.

Magalhães, M. (1984). *A pluriactividade no Vale do Ave*. Porto: CCRN.

Marques, T. (1987). *Sistema produtivo industrial e território – um estudo da têxtil em Guimarães*. Masters dissertation, Universidade de Lisboa, Lisboa, Portugal.

Meder, R. (2006). *A study of Krzysztof Penderecki's "Credo": how it exemplifies his compositional style at the end of the 20th century*. Urbana-Champaign: University of Illinois.

Muecke, M. & Zach, M. (Eds.) (2007). *Resonance, essays on the intersection of music and architecture*. Ames: Culicidae Press, LLC.

Pimenta, E. (1993). *Arquitetura virtual*. London: ASA Art and Technology.

Portas, N. (1986). Modelo territorial e intervenção no Médio Ave. *Sociedade e Território, 5,* 8-13.

Portas, N., Domingues, A. & Cabral, J. (2003). *Politicas urbanas, tendências, estratégias, oportunidades*. Lisbon: Fundação Calouste Gulbenkian.

Ripley, C., Polo, M. & Wrigglesworth, A. (Eds.) (2007). *In the place as sound: architecture, music, acoustics*. Newcastle: Cambridge Scholars Publishing.

Sá, M. (1986). *O Médio Ave*. Porto: Escola Superior de Belas-Artes do Porto.

Sá, M. & Domingues, A. (2002). *Cidade difusa do Noroeste Peninsular*. Volume II. CEFA. Porto: FAUP.

Schafer, M. R. (1993). *The soundscape: our sonic environment and the tuning of the world*. Rochester, Vermont: Destiny Books.

Silva, C. M. F. (2005). *O Difuso no Vale do Ave*. Tese de mestrado. Porto: FAUP.

Silva, C. (2007). Saber ver o difuso no Vale do Ave. In *1st International Conference of Young Urban Researchers*. ISCTE. Lisboa. Refereed Conference Paper. Retrieved from https://tinyurl.com/y6vzfzvs

Silva, C. (2010). Beyond Buildings and Roads: An approach to the diffuse territory of Vale do Ave. In B. Pelucca (Ed.), *Viaggio Portogallo. Journey to Portugal. Dentro e fuori i territori dell'architecttura. Inside and Outside the Territories of Architecture*. (pp. 43-49). Roma: Aracne Editrice.

Silva, C. (2011). Architecture as expanded field. *The International Journal of the Constructed Environment*, 1(3), 55-70. doi: 10.18848/2154-8587/CGP/v01i03/37491

Silva, C. F., Labastida, M., Oliveira, I., Carlos, R., Riso, V. & Pereira, D. D. (2017). *On being with-it: experiências pedagógicas sobre território na EAUM*. Retrieved from http://onbeingwithit.pt/pt/.

Silva, C. F. & Pereira, D. D. (Eds.) (2017). *On being with-it: diálogo prospetivo sobre a experiência de aprendizagem através do território / On being with-it: a forward-looking dialogue on the experience of learning through territory*. Guimarães: Universidade do Minho. Laboratório de Paisagens, Património e Território – Lab2PT.

Valéry, P. (1956). Eupalinos or the architect. In J. Mathews (Ed.), *Dialogues* (pp. 63-150). New York: Pantheon Books.

Zardini, M. (2005). De la "ciudad que sube" al paisaje que avanza. In I. Solà-Morales & X. Costa (Eds.), *Metrópolis* (pp. 205-212). Barcelona: Gustavo Gili.

Zumthor, P.; Oberli-Turner, M. & Schelbert, C. (2006). *Thinking architecture*. Boston: Birkhauser.

Revista Lusófona de Estudos Culturais / Lusophone Journal of Cultural Studies, vol. 5, n. 1, 2018

Transcription of Vale do Ave into sound: creation of a spatial auditory language · Cidália Ferreira Silva & Eugénia Aguiar Leite

Biographical notes

Cidália Ferreira Silva is Assistant Professor in the School of Architecture, University of Minho, and a full member of Lab2PT. She investigates the issue of time applied to contemporary places and to the research methodologies that incorporate uncertainty in the creative process. She is editor of *The International Journal of the Constructed Environment*.

E-mail: cidalia@arquitectura.uminho.pt

Address: Escola de Arquitetura (EA), Campus de Azurém, 4800-058 Guimarães (Portugal)

Eugénia Aguiar Leite is an architect at Galbilec and is also the creative director of the firm REarquiteturas. She researches the correlation between architecture and music, namely through the exploration of the processes of transcription between space and sound, having publicly presented her work in this field, in seminars and interdisciplinary exhibitions such as the "Seminário Territórios Sociedades e Culturas", o "I Colóquio de Psicofisiologia Musical", and the exhibition *Emerging Art Now*.

E-mail: eugeniaaleite@gmail.com

Address: REarquiteturas, Rua das Doze Casas n.182, 4000-193 Porto (Portugal)