

SONIC SCORES MIMETIC BEHAVIOUR: TWO CASE STUDIES

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ABSTRACT

In this paper, I point out questions that have arisen from my practice of sonic scores. This music writing is based on sound. A sonic score is an aural notation that encodes, in a phonographic manner, a musical work in a sound file. By doing so, it places the sonic experience at the heart of musical notation. However, this approach also presents challenges and benefits in musical projects. Sonic scores expand and enhance the musical creativity of performers by freeing them from *graphocentric* approaches. They present musical pieces in a radically different way, offering an alternative perspective on notation and composition. Sonic scores can be used to coordinate musicians and provide a tangible experience with extended instrumental techniques in mixed music. In this paper, I will study the mimetic approach to the performance of sonic scores. I will examine the historical evolution of sonic scores and present an initial analysis of data collected during two sessions of performances of two sonic scores: *Metaction* and *C'est de l'encre*. I will use this experience to make a preliminary evaluation. The goal of this research is to understand the suggested conveyance mode of the proposed sonic scores and to consider them in a broader context.

1. INTRODUCTION

What is a musical relationship? Is interpreting a score comparable to developing a relationship? What exactly is a score? Are scores and notations interchangeable terms? Scores are assemblages of symbols, while notations are methods of writing that link sight and action. Scores are tangible artefacts, while notations are techniques. A score is the arrangement of visual and abstract tools, while instructions for playing are contained within the notation. Scores are published, notations result from centuries of epistemological reflection [1]. Scores are functional to the market, notations are graphical representations. In

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Gregorian chant tradition, notation has a goal: to coordinate a text and a melodic line [2, p. 32]. Those notations are not scores. Scores resulted from an historical and economic process that affected musical production, tastes, and education. The rationalization of music passes through notation [3], and it's nowadays in transformation because of economical and technical development [4]. Scores are a part of this process. They identify the author [5] and give orders thanks to musical education that is industrialized in conservatories. Notation proposes the coordination of visual signs and acoustic facts and signifies musical relationships, pointed out Ligeti [6, p. 154]. However, the listening and performative process cannot be reduced to scores [7]. Notation could be invented and renewed in order to question the standard approach: it is what I try to propose. Now, electronic music modifies the standard approach of musical writing. Fixed media proposes an intermediate format, fixed but not graphical, that allows to create musical works and, meanwhile, demands an open-oral approach to performance that is in between notation and design, considered as the "representation of procedures that allow to produce music and the realization of music through associations." [6, p. 154]

2. THE STANDARD APPROACH

Scores prescribe as an algorithm the construction of a performance [7]. The performer needs to know how to interpret the signs: he must be trained to elaborate a mental act that links visual marks to acoustic occurrences through an instrument [8, p. 50]. The training of the performer is essential for the interpretation of the score. In particular, this kind of training is adapted to scores that indicate the result (*notation of the result*) [6, p. 161]. This last one is a notation that is dedicated to the instruments that are produced by the industry and learned in the conservatories: "the miracle of musical writing [...] depends entirely of the social organization that starts with the industry of the musical instruments, passes through the education and selection of performers [...]" [9, p. 41]. The performer interprets the pitches, the gestures, and the temporality of the piece. This practice defines the tastes and the criteria

of a good performance. Musical writing, differently from articulated languages, is mandatory from the point of view of time. You must read the signs respecting the proportionality and the tempo indicated by the author. The notation used in electronic music indicates the realization of the music from the point of view of its production. It does not indicate the result, the sounding event. Scores must be read and realized in front of a public. Those aspects characterize the standard approach to musical writing, that is *graphocentric*. Composers realize scores as a deferred performance, acts that will be played in the future [10]. Through this approach composers build the “illusion of a possible construction of a language of timbres” [9, p. 29].

2.1 New perspectives

Since 1880, recording techniques and electronic music have opened up new and unexpected compositional spaces. Electronic music allows us to conceive of sound as a composed object, and to record it in the finest detail. Since its beginning, electronic music is an alternative to instrumental music [11]. This evolution responds to the crisis of music in the first part of the 20th century, allowing to control sound as a material [12]. Notions of morphology [13], energy, profile, directionality [14] and sonic images [15] characterize the contemporary compositional vocabulary, determining the new horizon of its control, radically changing the utilization of musical writing. Scores are arrangements of sounds and constructs of sonic sculptures. Each note is an “atom” of music [16]. In this context, notes are used to control much larger and more complex sonic elements. They are signs in the context of software; they coordinate an encoded architecture: they control what you want, such as samples, synthesis, neural networks, and spectra. You can decipher a score or use it to create your desired output. Producing a sound with a computer means to control the vibrations of a loudspeaker membrane [17]. Musical writing means must be performative [18, p. 3]. Writing technologies can represent what is perceived and generate sonic events from those signs.

3. SONIC SCORES

Sonic scores use aural notation and encoding, in a phonographic manner, the musical work in a sound file. This approach is a recent tradition, starting in the 1990, but has been present in electronic music practices since the 1970s. In 1978 Denis Dufour transcribed Pierre Schaeffer’s *Étude aux sons animés* for the synthesizer group TrioGRM+. The piece *Souvenir de Pierre* was performed live and is based on the fixed-media piece realized by Pierre Schaeffer in 1958. Schaeffer has the same idea since 1948. He planned to write a new work starting from *Étude noire* and *Étude pathétique* (1948) [19, p. 35]. These pieces could be used as models for instrumental writing. The porosity of instrumental and

electronic practice defines the relationship of the musical tradition with new technologies. Alain Savouret conceived the “loudspeaker pieces” (*pieces haut-parlantes*). These pieces have a pedagogical objective. They confront the musician interpreter with “very different sonic energy sources” [20]. Sandeep Bhagwati invests this field conceiving *audio scores*. This term “denotes a type of score that uses headphones as its interface to the musician and conveys musical information primarily via acoustical messages.” [21, p. 25]

I have created my own method in this field, harnessing the expressive power of electronic music. I challenge the performer to a critical threshold, prompting them to invent novel instrumental sounds and techniques. Electronic music has the ability to shift perspectives and liberate artists’ creativity. Performers must play what they hear, not what they read. The sonic score is an invisible score with sound affordances, ‘morphocons’ [22]. I realized sonic scores with electronic sounds in order to engage the limit of mimesis [23]. This “conveyance mode” asks the performer to imitate a “sound heard in the headphone” [21, p. 28]. This choice creates a fascinating divide between the sonic symbol and the musical outcome, a divide that cannot be bridged, leading to a powerful tension in the performance. This approach reminds the results of the notation in “new complexity” [24]. This musical concept is presented in a way that is both meticulous and enigmatic, inviting infinite interpretations. I prescribe a sound through a sound; the performer must play the sound that I would like to hear, acknowledging that it is utopian. This writing technique enhances the artist’s creativity, leading to an unanticipated bond between the composer and the performer [25].

Compositional criteria underpin this approach. I created the sound scores by seeking to activate the link between sound and gesture. I am thus part of this line of thinking that cuts across musicology and musical practice in the 20th and 21st centuries. Denis Smalley designs gestural archetypes that form the basis of his spectromorphological theory [26]. Denis Smalley emphasises the relationship between bodily gestures and sounds, which are initially involuntary, then instrumental and electronic. Sounds are increasingly distant substitutes for everyday bodily movements and those of the environment. This hypothesis links sound, movement and context, allowing us to think about the score within this chain of concepts. It is also based on cognitive science: according to Schleidt and Kien [27], the average duration of human actions is three seconds, which, for Godøy, corresponds to the duration of the ‘balanced’ sound objects indicated by Pierre Schaeffer [28, p. 57]. These objects determine a temporal dimension that has the same duration as human movements, different from that expressed by “eccentric sounds” [29, p. 437] which, on the other hand, exceed this deep structure linking sound to the body. Based on this interpretation of Smalley’s spectromorphology, I prepared electroacoustic

sequences that could be interpreted by instrumental gestures as scores.

4. TWO CASE STUDIES

Since 2019, I have applied this approach in various ways. The most ambitious project to date is *Ora* (2024), a commission and performance by the ensemble HanatusMiroir. I specifically designed the sonic score for flute, violin and percussion, with the percussion part written to achieve a range of timbres and materials. In this paper I will discuss *Metaction* composed for flute, harp and viola in 2020 and *C'est de l'encre*, written for viola and piano in 2023, performed by Grazia Giacco and Raffaella Valente [25].

4.1. Methodology

The analysis of these excerpts is based on the recording that the musicians and I made. I looked for the connection between electronics and the instrument in both cases. In the first case, the performers had to play the score, imitating its sounds: just as notes, they were signs. I tried to understand the type of relationship between the electronic part (the sonic score) and the instrument. I propose that we analyse mixed sounds as a conservative emergent property by using the concept of functional partitioning [30, p. 57]. This concept describes how the organization of instrumental and electronic sounds works harmonically and temporally. The elements are divided and have a function in the resulting sonic whole. The temporal functional division is the horizontal arrangement of both electronic and instrument components. The vertical axis also has a spectral functional division. This methodology allows the understanding of the functional partitioning of both sound dimensions and their role in the sound. A similar remark characterised an approach proposed by Laura Zattra as well [31]. This relationship can be interpreted as *isomorphic* or *heteromorphic* [30]. Recording sessions were held with participants. *Metaction* was performed thirteen times, while *C'est de l'encre* was performed four times. The first one is played by soloists while the second by a group of ten musicians.

4.2. Metaction

Organized by Ensemble l'Itinéraire, OpusOne is a music academy for performers interested in trying their hand at composition. They can test their first sketches and pieces with other musicians. The participants are all professional performers looking to incorporate musical writing into their practice. For this reason, most of them are improvisers. I had the opportunity to serve as a tutor in the 2025 edition of the Musical Academy. One of the tasks I assigned to the students was to interpret a sonic score, specifically *Metaction*. The score consists of three parts: the first for plucked or bowed strings, the second for

bowed strings, and the third for winds and brass. The musical composition consists of two distinct parts:

1. Sudden electroacoustic gestures and environmental noises (birds in particular);
2. A progressive and slow glissando towards the lower register;

The score is designed to elicit different extended instrumental techniques through various sound configurations. Originally written for flute, viola and harp, it is open to interpretation by any musician. The musicians were given two weeks to submit their interpretations of the score.

GD: Singer. The performer uses the score to create something unique, playing each part and then mixing them. The performer realized a very detailed interpretation, preserving gestures and pitches proposed by the sonic score. [*Isomorphic*]

FF: Cellist and singer. The performer realized the score with the cello and the voice. The modality of the interaction emphasized the dynamic contrasts and the figures of the piece. The performance was expressive and the cello and voice created a unified texture. [*Isomorphic*]

AF: Saxophonist. The performer played the score precisely, capturing all the sonic details that the score proposes. [*Isomorphic*]

EL: Pianist. The performer chooses the part conceived for plucked instruments and plays the score, alternating between interpreting it with the keys and the piano's soundboard. [*Heteromorphic*]

FM: Tubist. The performer creates a unique version using the contrasting registers of the instrument. The performer follows the score, forcing the instrument and its techniques to play the prescribed sound. [*Isomorphic*]

GM: Trombonist. The performer uses, differently from the others, electronic treatments and amplification. The player performs the score as prescribed. [*Isomorphic*]

AN: A pianist. As EL, the artist attempts to investigate the soundboard and the keys, combining these two methods. [*Heteromorphic*]

DN: Pianist. The performer delves into the expressive potential of the piano, deviating from the notated gestures. The resulting sounds are distinctly different from the intended sonic output. [Heteromorphic]
ON: Pianist. The performer plays a study that focuses on the soundboard, exploring its resonance and the density of the movements. The performer uses extended piano techniques, such as clusters on the keys. The piece is intense and aggressive, ending with whistles. [Heteromorphic]
MP: Trumpet player. The performer expands the techniques of the instrument from the lowest to the highest register, mutating the traditional timbre of the instrument. [Isomorphic]
DT: Flutist. The performer realizes a poetic version of the piece, independent of the result. The result is partially detached from the prescribed sound but respects the form and the global dynamic. [Heteromorphic]
TP: Guitar. The performer uses a guitar and plays slight glissandos on the strings, rough notes, pointillistic tones. [Isomorphic]
XS: Violinist. The performer plays following the score, alternating the techniques and gestures. [Isomorphic]

Musicians playing the piano adhere to the gestures, creating a metaphorical version of the score. Due to the concrete limits of the instrument, the outcome is heteromorphic compared to the intended sound. The other musicians, taking advantage of their instrument's versatility, perform the sonic instructions as directed. The proposed composition alternates between loud and quiet sections, seamlessly blending movements and sounds with the original score.

4.3. C'est de l'encre

The piece, initially written for viola and piano, is used in the context of a group free-improvisation. In the winter of 2025, I recorded four impromptu sessions with a group of ten musicians as part of a lesson on arranging a new composition. This approach is inspired by improvised music with tape [32]. To introduce the group to the world of extended techniques, while their knowledge of contemporary music was still nascent, the use of sonic scores was employed to facilitate improvisation and the discovery of new techniques. The composition, lasting six minutes, consists of four distinct parts, each alternating between gestural and textural segments. The first section,

marked by a gradual and directional movement, is characterized as being gestural.

1. The second part consists of long, sustained, synthesized sounds.
2. The third part blends the first two, based on a steady rhythm: movements and textures.
3. The final part is melodic, with a repeated motif in the upper register.

The group's instrumentation includes a flute, trumpet, saxophone, two electric guitarists, an electric bass, a cello, and two pianists.

Performance I. In this performance the group starts listening to the piece for the first time. They try to coordinate themselves. As they uncover the musical notation, they realize that they must perform by mimicking this reference point. The sonic score encourages the musician to ad-lib in an environment that provides tonalities, outlines, and motions. In response, the performers interact with one another, creating a musical feedback loop.

Performance II. Players know the score already and start to play with the recording and the new musical configurations. The plucked-string instruments provide a contrasting counterpoint to the first section with their short, staccato events. The second part is characterized by repetition, long notes and pitch variations. The group follows the crescendo of the tape. The dynamic progression has an important impact on improvisation. In the final part, the musicians follow the melody of the tape.

Performance III. In this performance the musicians improvise, creating noises; the performance is more complex. Players know the score and anticipate its form. They align with the music of each part, counterpointing the tape with noisy gestures in the first segment and following the textural evolution of the music from a register and content perspective in the second. The third rhythmic part is performed with counterpoints and repetitive gestures. This part finishes with a climax of the group making noises and verses with their voices. After a pause, the final section consists of fragmented sound events following the melodic profile proposed by the electronics. In this part, the musicians engage in instrumental dialogue and counterpoint with the electronics.

Performance IV. The last improvisation is characterized by counterpoints and gestures, especially in the first section. Now that the musicians know the score, they

play with it, fully respecting the form. Musicians realize inside jokes and free their playing. In the second part, they interpreted the music based on texture. The third part is characterized by melodic counterpoints that prepare for the final part. In this performance, the final part is melodic and high-pitched, and it is accompanied by dense harmonies and gestures in the lower register, giving a new version of this final part.

5. CONCLUSIONS

The performances I reviewed shed light on the practice of sonic scores. In Metaction, the sonic score encourages the performer to modify their instrumental technique. The main “sonic behaviour” [21, p. 29] is characterized by mimesis. Performers play the sonic score, trying to realize something utopic on their instrument. The instrument used by the musician changes the approach. Instruments that can produce microtonal modulations and alterations in sound over time have the ability to mimic. For the piano, the relationship is metaphorical and requires more invention. The sonic score expands the possible range of instrumental notation. In *C’est de l’encre*, the performers play in groups improvising. As the experience progresses, the group becomes aware of the score. If, at the beginning, they try to understand the form and the sounds, at the end they know it and play the score playing between them. The result is a composed improvisation based on the trace of the electronics. Electronics create an environment for interaction, forcing the performer to find solutions. Sonic scores propose an alternative to graphocentric approaches, obliging the performer to coordinate their playing with an often unrealizable sound. This expands their creative potential. Sonic scores can be viewed as a component of the creative process for musicians, providing them with the autonomy to generate music within the framework of a predetermined musical composition. This expands the boundaries of the composer’s function, facilitating the creation of open musical pieces and innovative notation that incorporate the multimedia aspects of musical writing.

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