

Audiating Timbre: From “Inside the *Materia*” to a Textural Prototype

Abstract. Timbre is usually left out the scope of audiation topics. This deficiency may be related to a historically-rooted habitude to treat timbre as an auxiliary or supplementary factor in the realm of musical practice. Although nowadays compositional reality manifests as a completely different picture in regard to timbre usage, because of the lack of conceptual purity it often gets lost in the ocean of multifarious yet narrowly-oriented studies. This paper attempts at drawing conceptual guidelines for a better understanding of compositional approaches in respect of timbral manipulation as well as their possible audiative origins.

Respecting both psychoacoustic specifics and culturally-determined factors, the functional potentiality of timbre is generally reduced to two basic aspects: manifesting as a pure quality on one side or as a delineator (based on its contribution to identifying a sound source) on the other. In addition to this ever-lasting ambiguous implication, a hierarchical gradation is suggested for a deeper comprehension of timbre, entrenching its meaning underneath and beyond the prevailing treatment as an equivalent to a musical instrument. Two instances – Helmut Lachenmann’s *Dal Niente (Interieur III)* (1970) and Tristan Murail’s *Ethers* (1978) – are examined as reflecting polar audiative approaches in accordance with the drafted theoretical frame: one (Lachenmann) permeating deeply “inside the *materia*” of a sounding body and thus fracturing the unity of timbre related to one musical instrument; the other (Murail) treating timbre as a prototype for conceiving superior levels of musical structure (fused timbres, textures, illusory sound images) implemented by several levels of fusion procedures.

Keywords: audiation, timbre, psychoacoustics, instrumental *musique concrète*, spectralism, Lachenmann, Murail, fused timbre, texture, illusory sound image.

Introductory inquiries

Audiation appears to be one of the most secret phenomenon of musical experience. Audiation in regard to timbre is even more submerged in cognitive opacity. However, clarifying a concept overflowed by speculative manifold in theoretical field may contribute to a more transparent and conscious consideration.

What would work as guidelines that could help to orient oneself as a researcher, listener or a composer seeking for elaboration of his/her compositional strategies in respect of timbre? What could be the basic pillars trying to draft a more general theoretical framework for the audiative perspectives of timbre? Taking into consideration psychoacoustic, cultural as well as conventional discourses referred to music theory, the following chapters aim at drawing some indicative directions for a more deliberate comprehension of this intricate subject-matter.

Concerning timbre as an equivalent to a musical instrument: underneath and beyond

There are deep historical roots of associating timbre (or whatever its historical or contemporaneous synonymic equivalents such as tone, sound, tone colour, sound quality, *Klangfarbe*, etc.) with musical instruments from the first documented records showing the existence of the concept.¹ Despite questioning such a generalisation, this connexion of timbre to a musical instrument remains notably viable among different discourses taking into account an overall awareness regarding timbre. The reasons for this habitual prejudice is evidently in pertinence with the widely acknowledged tendency to bind sounds to their sources and causes, which actually exceeds the domains of the specific musical context.

Binding sounds to their sources and causes is a relevant ability essential in encounters with any kind of environmental phenomena: nature, cultural products or activities (music as one of them), intercommunication (e.g. speech) (Erickson 1975: 1; Slawson 1981: 132; Smalley 1994: 37; 1997: 110; Houtsma 1997: 111). According to Robert Erickson, this mental operation may simply be noticeable in many situations of daily life (such as recognition of a warning signal, mother’s voice etc.) (Erickson 1975: 1) sometimes playing a crucial role in case of danger (e.g. recognising the roar of a lion). This conjuncture of a sound to its source is sometimes so strong and abrupt that they can even be assimilated in human consciousness, as a common locution, noticed by Cornelia Fales, illustrates: “I hear a cricket; not – I hear a sound that may indicate the presence of a cricket” (Fales 2002: 63). Thus timbre, as a sonic physiognomy (Chion 1986: 7), functions as a crucial indicator, a direct link referring a sound to its possible source or a related process.

¹ The historical retrospective regarding the evolution of the concept of timbre is exhaustively discussed in dissertation by William James McGee (1982: 25–58).

This common mental procedure substantiates the traditional treatment of timbre in musical contexts as well. Although timbre has long been put aside conventional theoretical inquiry compared to the elaborated analytical tradition in respect of pitch organisation, in everyday usage timbre and its association or even assimilation with a sound source (i.e. musical instrument) is strong and widespread among both musically-educated and musically-uneducated people. Analogously to the previously quoted statement, a common utterance “I hear violin” is no less popular. For the vast majority of people, the recognition of a sound source (musical instrument) is accomplished relatively fast and requires much less efforts compared to the structures based on other musical parameters (such as modes, melodies, rhythmic patterns, etc.) do (Erickson 1975: 9–10).

The habit discussed is reflected or at least related to the application of timbre in compositional organisation as well, especially in the case of traditional instrumentation/orchestration. Linking sounds to their sources and also linking sounds that originate from the same (or similar) source between themselves (Smalley 1997: 110) is a great perceptual potentiality and serves as an effective compositional vehicle. In general, this property allows to sustain continuity of particular structures (a melodic line or several distinct lines in polyphonic situations) and to separate ones from the others (appearing sequentially or simultaneously). Summarizing the existing research into the perceptual contribution of timbre (as an indicator of a sound source) to compositional organisation, several prevalent strategic possibilities can be distinguished:²

- 1) linear grouping of sequential sounds; the continuity of one timbre is an important factor to form a coherent line due to the aptitude to track a sound source over time (singer’s voice, clarinet, set of carillon bells; McAdams, Giordano 2008: 72). This principle ensures coherence of a melodic or rhythmic structure or other consistent patterns (the sounds of a melody do not usually jump from instrument to instrument, contrariwise – the pitches change while the constant timbre integrate them into united construction; Erickson 1975: 12).
- 2) simultaneous grouping; timbre can be an effective means to divide simultaneous musical elements into separate layers/blocks. It can be applied to form polyphonic structures, separating melodic line from accompaniment, etc.
- 3) segmentational grouping; some timbral combinations may contribute to the segmentation of musical material into structural constructs of different levels (from small elements to parts or even characterise entire movements of a piece).
- 4) forming orchestral gestures; i.e. creating characteristic sound images, which are comprehended as experiencing timbral evolution (e.g. orchestral augmentation, descent, sudden attack, sound wall, downfall etc.).

Behind this habitual induction of a source, a certain sound quality is firstly sensed, which invokes a particular association. A sound is being caught by the human sensory system and later being linked to the objects or situations, which are already known from the past experiences. The paradox here is that the sensed physical reality is indeed neither uniform, nor stable regarding one and the same sound source in its various appearances. Here we face the phenomenon of categorisation, which means we refer a sound to its source despite the variability in its qualitative nature. That is also called a subjective constancy (Erickson 1975: 11–12), when the multifarious sensations are ordered into defined classes in accordance with one’s experience, education, sociocultural environment etc. In other words, it is an ambiguity between fixed timbre (as a trigger of the already known) and dynamic timbre (an actual realisation here and now; François 1990: 117–118). From the perspective of acoustic accuracy, “if a particular constant timbre would be associated with the sounds of a musical instrument, the relationship between timbre and physical sound attributes would become very loose or non-existent” (Houstma 1997: 111). Actually, as acoustic analysis would show, there does not exist “the bassoon timbre”, but rather a bassoon timbre at a given pitch and dynamic, produced with a specific articulation and playing technique (Siedenburg, McAdams 2017).

In general, we tend to categorize sounds in many different levels, ignoring more or less palpable differences, such as:

- individual characteristics of each instrument (we tend to categorize timbre of a particular instrument to its entire family, ignoring the differences that appear from instrument to instrument);

² Although this summarisation embraces insights of various researches, the classification is mainly based on types distinguished by Stephen McAdams (2013).

- registers (one instrument shares different timbral qualities in respect to its particular register; as the most common example is the case of clarinet's registers which feature extremely different qualities in its low, middle or high registers; Slawson 1981: 132);
- dynamics (dynamics also makes a ponderable influence to a resultant sound quality; Ambrazevičius 2012: 13–14);
- articulation (changes of attacks, position of tongue or hand, etc. highly contribute to timbral characteristics);
- playing techniques (a range of playing techniques from conventional ones to extended means expands the diversity of timbral quality to hardly circumscribed areas).

All this diversity of qualities is actually perceived by human sensation, only our former experience, habits, intellectual properties are inclined to classify them into categories which are largely assumed in contact to practical incentives.

The sensory reality is conditioned by the configuration of factors on even a deeper level, which is actually beyond our direct perceptual accessibility and is only acquired by employing technological devices. In this approach, every perceived quality is indeed determined by a complex sound structure, which is a focus of acoustic and psychoacoustic research. The phenomenon that interests psychoacousticians most is the transition between data of physical reality analysed by hearing organs and their result in a perceptual system. The emergency of a particular sound quality appears after analysing and fusing many acoustic elements apparent in nature (Shouten 1968, in: Erickson 1975: 9), or in Fales' words "timbre must wait until signals from all elements reach the auditory cortex where they are grouped and subjected to the process of perceptual fusion into the unitary sensation of tone quality" (Fales 2002: 62). This process is described using different names according to several authors such as subjective sound experience (Erickson 1975: 9), perceptual fusion (Fales 2002: 62), perceptualization (id: 63–65), emergent quality (Wright, Bregman 1987: 64–65), emergent property (Cutting 1976; McAdams 1982, in: Wright, Bregman 1987: 64–65), spectral fusion (Cutting 1976; McAdams 1982, in: Wright, Bregman 1987: 64–65), but all of them address a perceptual nature of timbre phenomenon.

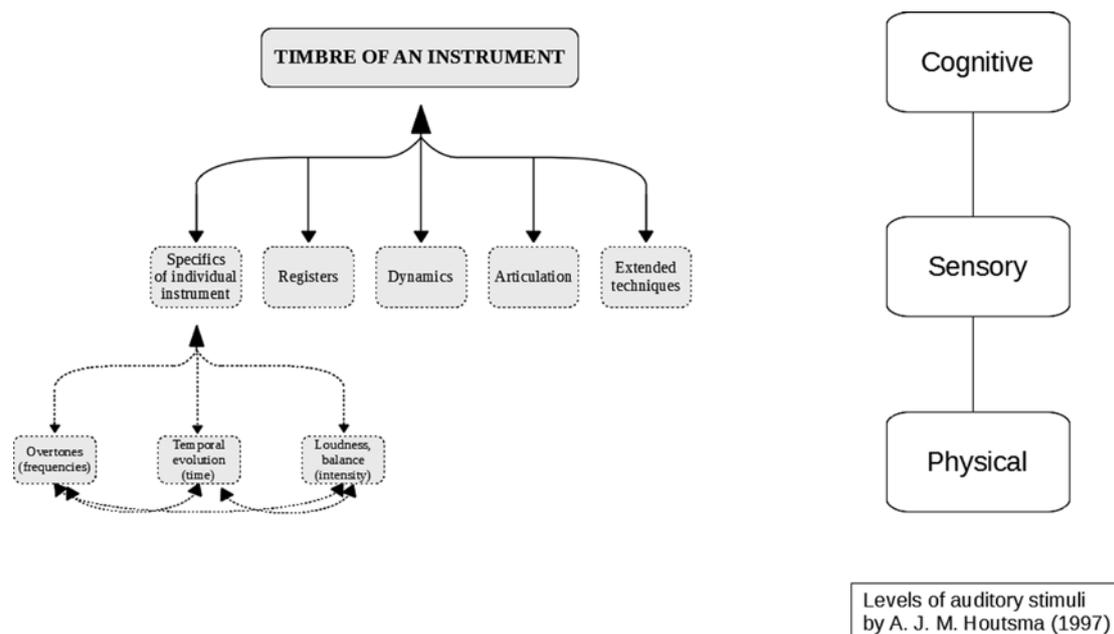
Nevertheless, physical factors that may contribute to the perception of a specific sound quality are also intensively explored. The overtone spectrum (namely the balance between partial tones in a steady condition) was initially found as a main factor determining the experience of particular timbre.³ Later, many other factors were involved as also relevant in the final perceptual result, such as spectral envelope, temporal envelope, absolute frequency position, various characteristics of onset and steady states, etc.⁴ On the most primitive level, however, we can reduce all these aspects into several primary elements, which may actually be attributed to parameters of different origin: frequencies (overtones), time (temporal evolution), loudness (absolute or relative intensity), as well as combinations and interactions between them all (balances, formations, shaping etc.).

As it was just stated, this deep acoustic level is indeed hardly accessible by human senses. However, it is worth mentioning that we can merely perceive the traces of it in cases when the distinct components can be achieved by raw hearing. It may happen in very deliberate situations such as overtone singing (when several overtones are extracted from an overall sound), or multiphonic techniques of woodwind instruments, also the sound of a bell (when the sound splits because of inharmonic partials therein) and other.

After delving deeply into the timbral inner constitution lying underneath its casual treatment step by step, we can schematise the discussed points into a kind of hierarchical gradation framework. The treatment of timbre as an equivalent to a musical instrument, which is mostly historically-established, is a point of departure in this proposed schema. The established unity of timbre as bound to one instrument is queried by a more subtle qualitative nature, which manifests the variability of timbre in regard to different registers, specifics of a particular instrument, articulation, playing techniques, etc. In the meantime, the latter are the results of perceptual processing of various acoustic elements in even a deeper dimension (see Scheme I).

³ The recognition of the crucial role of sound spectrum to sound quality is accredited to the pioneer of psychoacoustics Hermann von Helmholtz and his pivotal study "On the Sensations of Tone as a Physiological Basis for the Theory of Music" (1862) (McGee 1982: 33–34); however, with a lot of modifications and additions, it was further pursued or developed by majority of psychoacoustics researchers.

⁴ A concentrated survey of psychoacoustic research in regard of timbre perception is presented in the study of Caroline Traube (2006).



A parallel between the proposed framework and the levels indicated by Houtsma (1997: 111–112) may be drawn. In his gradation, he distinguished physical, sensory and cognitive areas. The latter is characterised as dependent on the learned habits through cultural experience. It is important to note that the content of this cognitive level may change when the interpretation of perceptual givens is changed. It is the most flexible sphere adjusting to the shifts of cultural or social trends.

As we were exploring the inner nature of timbre, the perspective towards an opposite direction can also be drawn. From the orchestration field, it is a well known practice when several instruments, or groups of instruments, are combined together in order to create a new fused timbre. This phenomenon is also called “emergent quality” (McAdams, Bregman 1979: 39; McAdams, Giordano 2008: 77; Wright, Bregman 1987: 64; which recalls the mentioned psychophysical nature of timbre) as a perceptual fusion of many different elements into a particular quality. It is a psychoacoustic occurrence when several different timbres combined together lose their discrete features and identifiability – instead they blend into a newly emerging quality as an inseparable unity. There are some important factors contributing to the phenomena of a blend of different timbres attributed to various musical instruments. Mostly discussed in psychoacoustic studies are those:

- frequency relationships derived from simple ratios (McAdams, Bregman 1979: 39);
- synchronicity of attacks and decays (McAdams, Bregman 1979: 39; McAdams, Giordano 2008: 77), or elimination of clearly audible attacks (McAdams, Bregman 1979: 34);
- spectral similarities (especially regarding the shaping of attack) (McAdams, Bregman 1979: 39; McAdams, Giordano 2008: 77);
- relations between spectral centroids, and the overall centroid of the combination (McAdams, Giordano 2008: 77);
- spectral affinities between noise and tone (Fales, McAdams 1994).

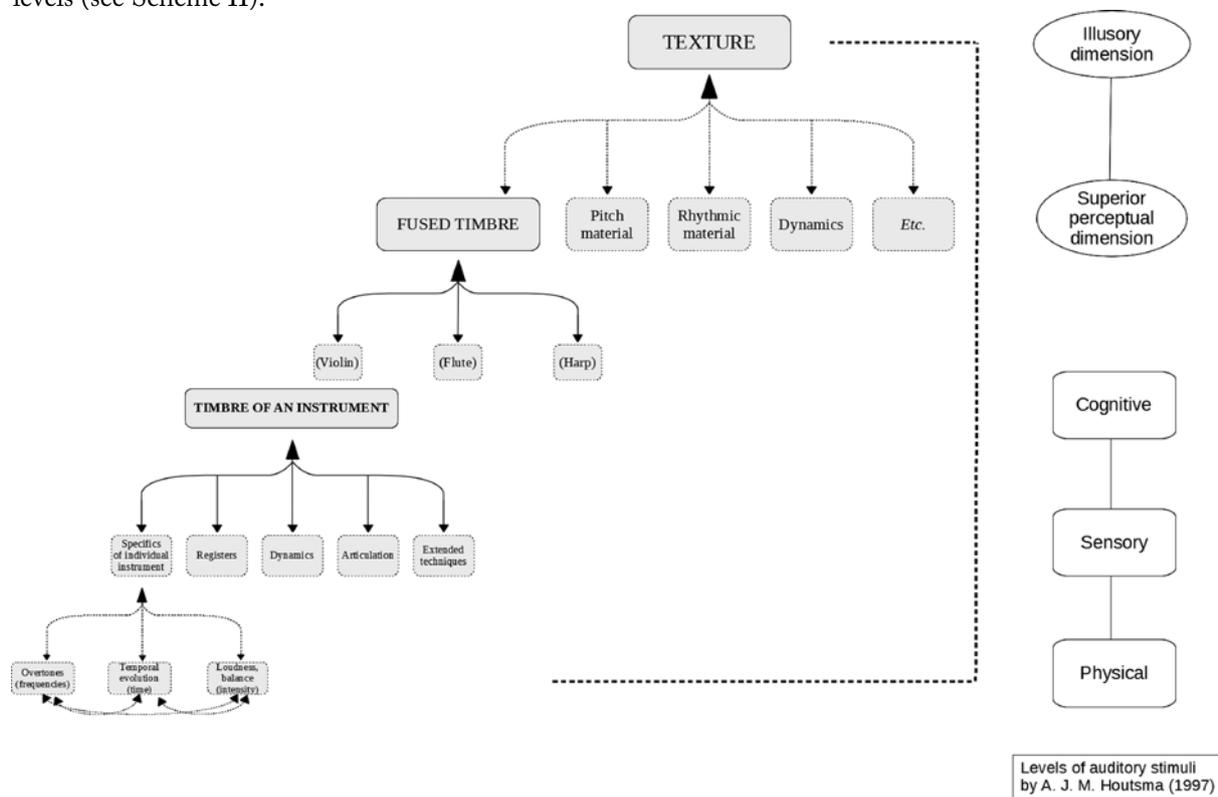
Some tendencies of composing practices offer us a further step in this merging – fracturing chain. It is a level where other parameters may also be employed in order to create a unique composite quality. This process can be called textural formation – a realisation of any sonic illusion or image conceived by the composer. As it is pointed out by psychoacoustic researchers, “the perception of a homogeneous musical texture requires a grouping of many events across pitch, timbre, and time into a kind of unitary structure, the textural quality of which depends on the relations among the events that are grouped together”⁵ (McAdams, Depalle, Clarke 2004: 276).

⁵ It is mostly apparent in the manifestations of spectral music, where the scores themselves are like representations of spectral sonograms of particular timbre (e.g., Gérard Grisey *Periodes*). However, this principle is supposed to encompass all compositional realisations where the separate musical elements (be timbres, pitches, or rhythms) blend into a unitary formation while losing or obscuring their distinct identification (as we observe in the works by Ligeti, Xenakis, Penderecki, and others).

Here we can draw of a parallel between two opposite poles of our proposed framework. This textural level, where different parameters (such as pitch, rhythm, intensity) are combined together in order to create a new quality, is like a mirror of the deepest physical level, where timbre is conditioned by the combination of the several distinct parameters.⁶

However, as Shlomo Dubnov insightfully noticed, in the meantime it is sufficient to state that we define “musical texture as the principle of organization of sound which is not derived from learned schemes and as such it requires a probabilistic approach for its description.” In addition, he claims that “the most salient difference between texture and timbre is the perceptual non separability of timbre versus the separability of texture into several sources and segmentation in time” (Dubnov 1996: 5). The perceptual features and potentialities of textural combinations is still a large space for further research. However, we can generally claim a prototype for this textural level lying deeply inside the acoustic nature of timbre itself.

The perspectives revealing the merging potential allow us to extend the hierarchical gradation schema to the opposite direction at least by two levels, respectively called timbral fusion and textural formation. Timbral fusion may allude to the new resultant colour appearing after combination of distinct primary colours in visual art; thus we can refer to as a superior perceptual dimension. The textural level may be referred to imaginary illusions and thus may be called illusory sound images. After all this broad theoretical inquiry, timbre may be characterised an emergent phenomena in its essence – a key tenet which links all the distinguished levels (see Scheme II).



Scheme II. Hierarchical gradation schema of timbre concept

The suggested hierarchical framework reveals the depth of the potentiality of timbre in regard to compositional consideration. Moreover, it invokes a space of numerous directions in the process of audiation. Unfortunately, the world of a composer’s inner-reflections during the act of creation is hardly accessible by verbal expressions. However, the reflections of this intimate process can be traced in notated representations as well as sonic results themselves. Thus the inner processes may be pursued retrospectively. Such retrospective inquiries of two musical instances and their representations are attempted in the following chapters.

⁶ We can designate several attempts to relate the intrinsic acoustic level of a sound to the extrinsic structural level of music throughout the 20th century. Henry Cowell pursued conceptualization of time proportions based on relations between overtones of the sound spectrum (1969/1930). The analogous parallel was highly elaborated in Stockhausen’s conceptualisation of time (1959/1957). However, we can hardly equate these attempts to the current meaning of texture, which not always seeks for a mathematical accuracy of the proportions regarding time or pitch.

... From “Inside the Materia”: Helmut Lachenmann’s *Dal Niente* (*Interieur III*)

Helmut Lachenmann’s *Dal Niente* (*Interieur III*) for one clarinet player (1970) – from the traditional perspective approaching timbre as equivalent to a musical instrument – should be considered as mono-timbre-like piece, mostly based on pitch and rhythmic material. We can notice elaborated pitch and rhythmic structures in this particular score as well; however, one certain moment alters the ordinary course significantly.

From the first impression, the first line of the piece seems as a very coherent, consistent melodic line. A uniform rapid movement of adjacent (or close) pitches in clear directions seems as an obvious example of continuous passage. However, a dimension of timbre is a factor that brings new circumstances into this apparent consistency. Diamond shapes mark a presto-movement in the “extremist *pianissimo*” of very delicate key-noises mixed with audible pitches, while round shapes mark ordinary pitches. Because of the considerable difference in regard of timbre and dynamics as well, a line actually divides into separate elements from the perspective of listening experience (see Figure 1).⁷ This statement is reaffirmed by the explanation note of the composer himself in the *Performance instructions* of the score, where he explicates that “the notes with stems and normal heads strewn among the square notes on Page 1 should burst in as rapid and more or less surprising ‘fade-ins’ (just as quasi fragments of a broadcast become audible through the sudden turning-on of a radio).”

SCORE	
AUDITORY RESULT	

Figure 1. Separation of two layers in Helmut Lachenmann’s *Dal Niente* (*Interieur III*), line 1

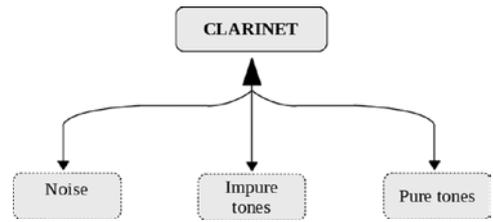
In the interplay of these two dominating timbres, a third quality is introduced into the process: pure breath represented by square shapes apparently differs from the previous two prevailing qualities significantly and thus stands apart as one more independent layer (see Figure 2). These three layers featuring different timbral qualities evolve their independent roles quite elaborately, and seem to be dominating parts throughout the entire piece.

SCORE	
AUDITORY RESULT	

Figure 2. Separation of three layers in Helmut Lachenmann’s *Dal Niente* (*Interieur III*), line 6

⁷ This particular analysis is influenced by the author’s listening experience of the performance by clarinetist Alain Damiens. Internet access: https://www.youtube.com/watch?v=Gxbsdy_fYrA

The extraction of these three timbres from one clarinet timbre can be explained by taking the extremes based on the qualitative scale from pure tone on one pole and pure noise on the other. The discerned layers correspond to the extreme points of the indicated scale: pure breath (as noise) and ordinary pitches (as pure tones) while vague *pianissimo* sounds locate somewhere in the middle of this range (call them impure tones). The greatest possible distances in respect of spectral characteristics as well as independent strategies of evolving material assigned to those timbres determine the effect of hearing three different instruments instead of one at the same time (see Scheme III).



Scheme III. Fracturing timbre of clarinet into 3 sub-timbres in Helmut Lachenmann's *Dal Niente (Interieur III)*

If we take a closer look at the first line once again, we can notice one more subtle yet important detail. Some *pianissimo* sounds are covered with an additional mark above, which signifies loud key-noises, while the rest of notes are continuing without it (see Figure 3). This shows that even one of the already distinguished timbral categories is not completely uniform itself but contains different nuances instead.

Figure 3. 2nd level of separation of timbre layers in Helmut Lachenmann's *Dal Niente (Interieur III)*, line 1

If we investigate the score attentively, we find that each of the three distinguished timbral categories is further divided into various sub-categories. Here a systematised graph is suggested representing the range of qualitative types apparent in the piece (see Scheme IV).

What is even more important, they function neither accidentally, nor as auxiliary colourations; instead, contradictory relations are being developed between them that eventually result in a complex multi-level polyphony. In the following example, we notice an interaction between the layers extracted only from breath category: frullato – non frullato, wide mouth cavity (circle) – normal mouth cavity, inhalation (triangle bracket) – exhalation (square bracket) (see Figure 4).

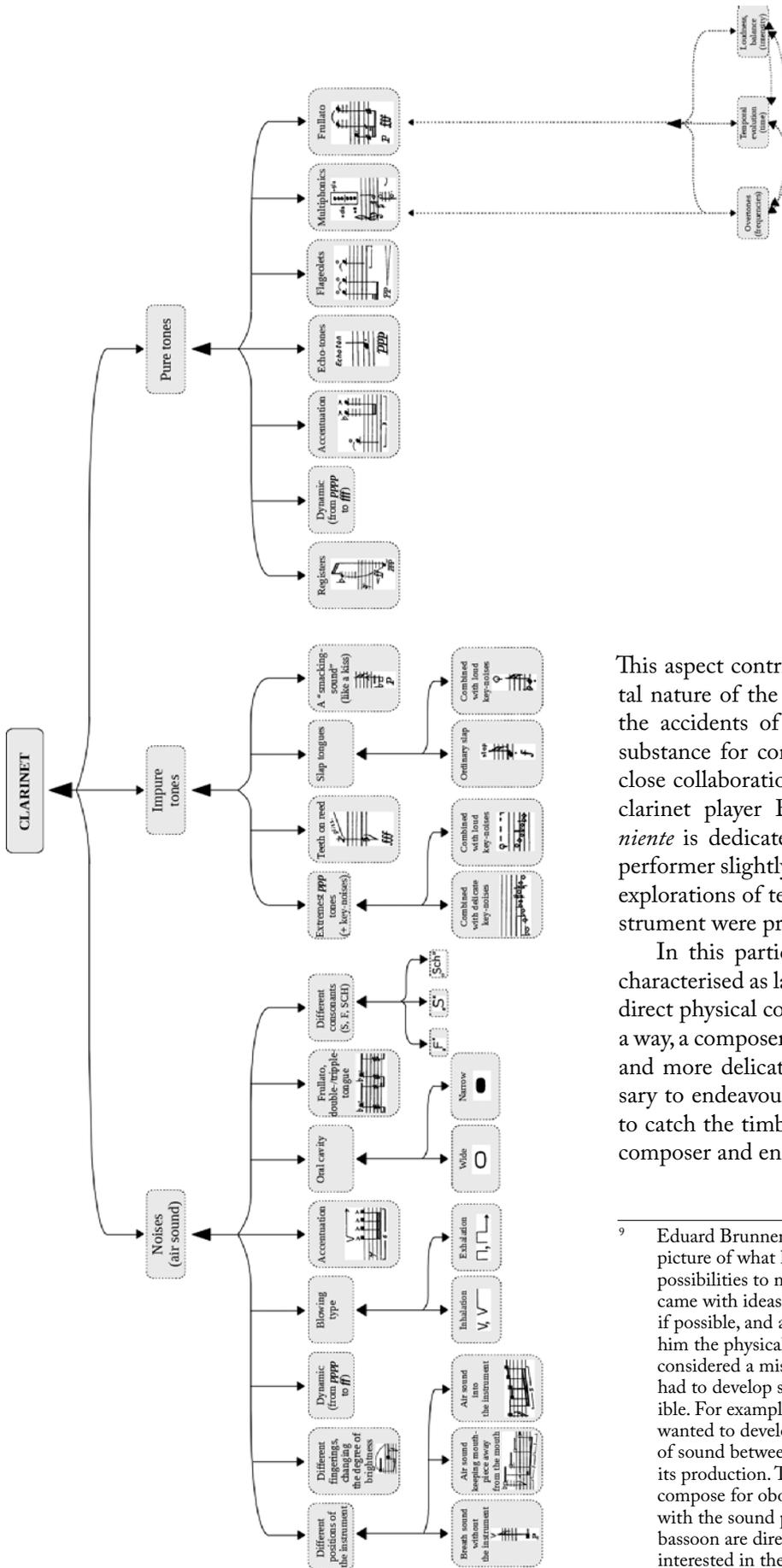
Figure 4. Multi-level polyphony in Helmut Lachenmann's *Dal Niente (Interieur III)*, line 60

One note may be added to this systematisation. As we move inwards the sound quality level by level, we eventually arrive at the primary acoustic area, which, as it was proposed, is beyond the perceptual abilities of human. However, some traces may be noticed, which refer to that deep acoustic origin. When a complex (or multiphonic) sound is produced, some of the overtones become apparent and heard, which initially belongs to the inner structure of a sound (see Figure 5). Thus, we encounter a border between unitary timbral quality and its disassembling into the primary elements.

Figure 5. Multiphonic sound in Helmut Lachenmann's *Dal Niente (Interieur III)*, line 42

This process of extracting “shades of shades” can be interpreted as going deeper and deeper “inside the *materia*” of one particular instrument well as the body of a performer who is exploiting it, or in Lachenmann's words, “the instrument becomes a device: a characteristically manipulated filter for the players breath as controlled by the composition and its interpretation”.⁸ The possibilities of this interaction may be limitless. The audiative process of the composer is thus very strongly dependent on the familiarity with material constitution of the objects he is working with.

⁸ Description found in the introductory notes of Breitkopf publication of Lachenmann's *Dal Niente (Interieur III) für einen Solo-Klarinetisten*, internet access: <https://www.breitkopf.com/work/3857/dal-niente>.



Scheme IV. Fracturing of sub-timbres across several levels in Lachenmann's *Dal Niente (Interieur III)*

This aspect contributes to a largely experimental nature of the compositional process, when the accidents of experiments may become a substance for composition. It is witnessed by close collaboration between Lachenmann and clarinet player Eduard Brunner whom *Dal niente* is dedicated to. Remembrances of the performer slightly disclose the process how the explorations of technical possibilities of the instrument were proceeded.⁹

In this particular case, audiation may be characterised as largely guided or influenced by direct physical contact and experience. In such a way, a composer is stipulated to develop more and more delicate hearing; the same is necessary to endeavour for the listener too in order to catch the timbral delicacy conceived by the composer and encoded in the piece.

⁹ Eduard Brunner: "... he [Lachenmann] had a clear picture of what he wanted and asked me about the possibilities to make his idea sound. Lachenmann came with ideas that I had to translate into sound, if possible, and after making it I would explain to him the physical process. Sometimes what was first considered a mistake would turn into resources I had to develop so they could become reproducible. For example at the beginning in "*dal niente*" he wanted to develop the expressive feeling in the band of sound between sound and no sound, so to say, its production. That is the reason why he could not compose for oboe or fagot. Helmut was fascinated with the sound production process, and oboe and bassoon are direct. Due to that interest he became interested in the clarinet!" (Agundez 2011: 30).

...to a Textural Prototype: Tristan Murail's *Ethers*

Another instance chosen for investigating audiative strategies of timbre is Tristan Murail's *Ethers* for flute (in C/in G/bass flute/piccolo), five instruments (tenor/bass trombone, violin, viola, cello, double bass) and continuum of maracas (1978). This set-up of multifarious timbres presupposes colourful textures as well as elaborated timbral diversity reflected in the musical structures – with maracas as a source of noise, four qualitatively akin instruments of the same string family, several types of melodious woodwind instrument, and brass instrument featuring harsher qualitative characteristics compared to others.

The piece is initiated by the continuous drone of maracas sound. After a short introduction of noise, the strings start to enter successively. This moment of entering deserves a particular inquiry. The strings start to enter *dal niente* (i.e. from silence, extending the attack so that it is barely palpable), and depressing the string with the finger of the left hand very lightly in order to produce a harmonic tone. That means that the beginning of a sound is very indefinite and containing a big portion of noise because of the light pressure and slow bow proceeded at the same, which prevents a sound carrying clear pitch from appearing at the beginning. All these factors contribute to the maximum kinship of such different kinds of instruments as maracas and the strings. Because of the noise component in the sound and indefinite attack, the strings approach maracas' sound as much as possible and gradually evolve as its inherent continuation. Further, string players strengthen the fingering pressure in order to produce ordinary pitch (not a harmonic tone anymore), and reduce the amount of noise to a minimum. This progression goes along all the strings, until they reach a moment of synchronization at the loudest dynamic of the first wave (which is *pp*), and then dissolve towards *ppp* dynamic (see Figure 6).



Figure 6. Tristan Murail's *Ethers*, section A, page 1

This process evidently corresponds to the already seen progression from noise toward pure pitch. First of all, it is traced at a raw timbral level: maracas sound is blending with the indefinite attacks of the strings and moving towards ordinary pitches of the strings. However, if we make a more profound inquiry, we can notice some parallels of the similar processes going through other parameters as well. From the temporal perspective, the strings enter and progress individually and independently until they are coordinated into a synchronized unit and finally spread out. Thus asynchronicity and synchronicity may be treated as a temporal metaphor of noise and pitch respectively. Dynamics is also inherently involved in this process – starting from silence (or barely audible) to a relatively clearly perceptible sound and finally dissolving into silence again. The analogous principle can be detected in the area of pitch either, moving from very high partials corresponding to fundamental $C\#_1$ (which are hardly perceived in real situations) towards lower partials (more apparent and relevant in timbral perception) and thus approaching the fundamental sound and finally returning to the high partials (Pastor 2007: 6) (see Figure 7).

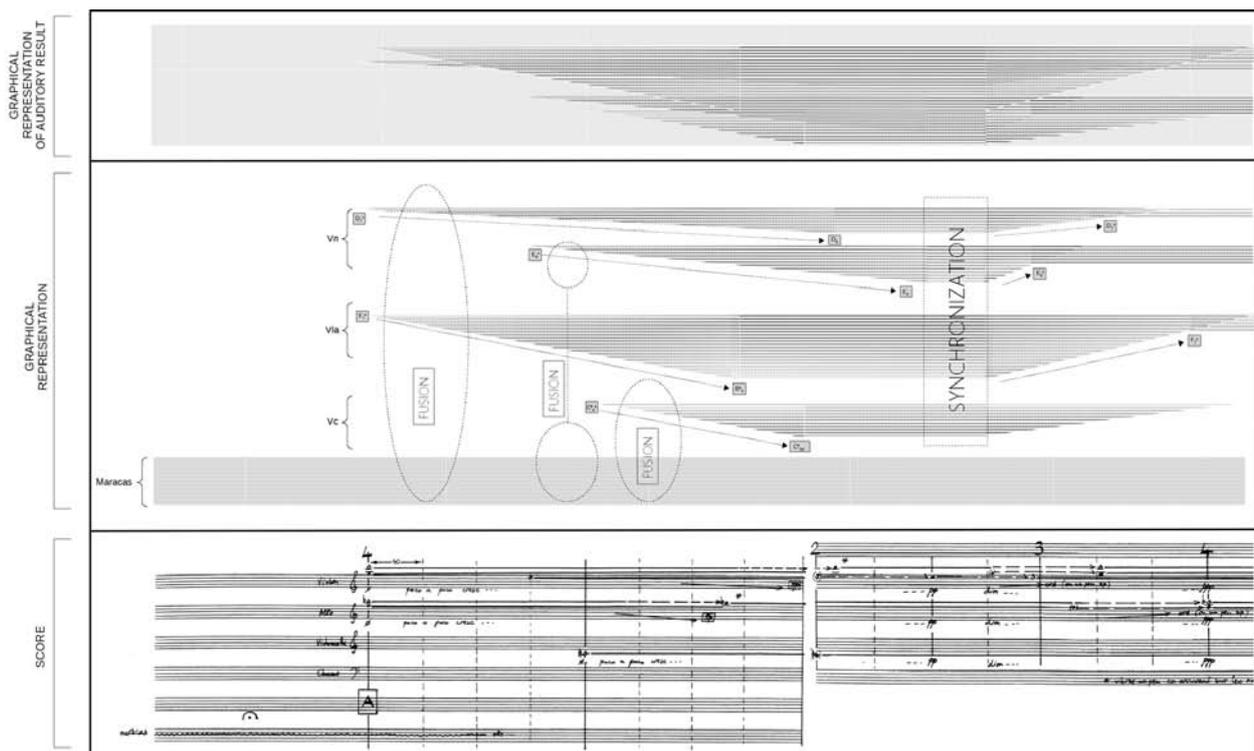


Figure 7. 3 level representation of Tristan Murail's *Ethers*, section A, page 1

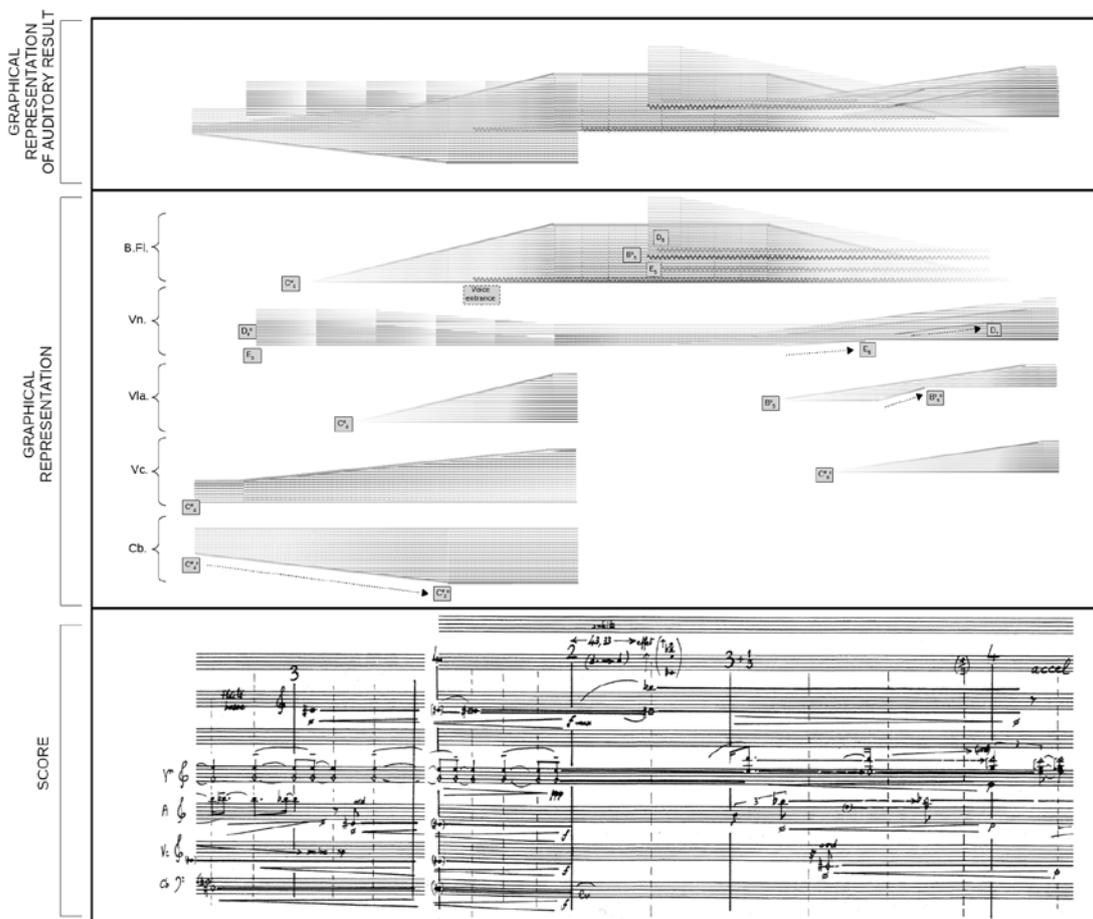


Figure 8. 3 level representation of Tristan Murail's *Ethers*, section A, page 3

Consequently we can see how the whole textural formation, in a more abstract level, reflects the image of sound development from noise to tone and again to noise. We can notice a conceptual analogy of timbral progression with the one found in the piece of Lachenmann, though implemented in completely different ways.

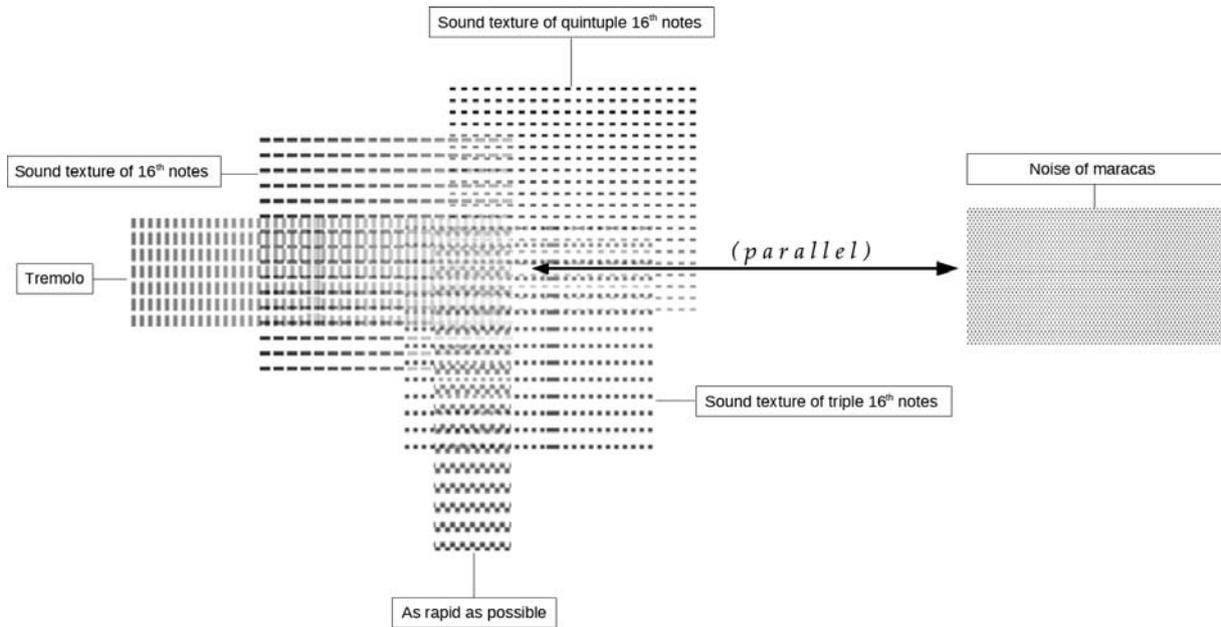
This textural cycle is repeated several times each time progressing towards the image of more and more clear pitch until the sixth phase, when the development of progression reaches its full realization. When the strings evolve to the ordinary pitches at $C\#_{4/2}$ (except the violin playing harmonic sounds), a flute is added to this compound sound at $C\#_4$ and finally is left to sound almost alone after all the strings except the violin are withdrawn from the texture. When the flute sound is exposed, the voice of a performer is involved in combination with the flute sound. The collection of pitches is not accidental: $C\#_4$ of voice and $B\flat_5$ of the flute originate from the same spectrum of $C\#_1$; their simultaneous combination should theoretically result in appearance of difference and sum tones (which are actually indicated in the score as well) (idem: 9). Re-emergence of the strings conform to this sonic effect precisely, as they appear as a natural continuation, featuring the same constitution of pitch structure as the discussed complex sound (Figure 8). This moment can be indicated as the epitome of ambivalence between unity and multiplicity, which is a key impetus, an essential quandary characterising a spectral/post-spectral kind of music. Furthermore, it retrospectively confirms the principle of development of the preceding textural material.

So far, we have seen an evolving progression starting from maracas (as a source of noise) and gradually moving towards textures implementing the images of clear pitch realised by combinations of different instruments. There are various realizations of fusing–fracturing processes throughout the piece. However, a reverse of these functions is also indicated. At the moment of culmination, we see some scattered elements throughout the different instrumental parts: chaotic rhythmic patterns, quasi-accidental accentuation, pitches deviating from the area of spectral structure (idem: 36–39) (Figure 9).

Figure 9. Tristan Murail's *Ethers*, section G, page 27

The resultant effect of the overlap of all these elements together may be described as a shimmering mass delineated by the piccolo *tremolo* at the top and trombone *tremolo* at the bass. Through a combination of these elements, a prototype of maracas noise is possibly invoked (see Scheme V and Figure 10).

After the investigation of the key moments of the piece, we can notice a completely different realisation compared to the previous analysis though corresponding to a similar conceptual idea. In this case, an image of timbre becomes an impetus for audiating the whole texture and even long-term segments of the piece. This instance evidently follows the upward direction in our schema of hierarchical gradation by fusing timbres into new qualities and, at a conceptual level, creating illusory sound images implemented by complex textures and involving all the parameters into the process.



Scheme V. Graphical representation of complex texture combined of various elements in Tristan Murail's *Ethers*, section G, page 27

GRAPHICAL REPRESENTATION OF AUDITORY RESULT

Picc. { E₁ D₁ C₁

Strings (Vn, Vla, Vc, Cb)

Tbn. { A₁ B₁ D₁

SCORE

Figure 10. 2 level representation of Tristan Murail's *Ethers*, section G, page 27

Concluding Remarks

After raising both theoretical and practical inquiries, timbre itself as well as its relation to audiation contexts are evidently complex and multifarious phenomena. Certain theoretical tools may, however, be employed in order to even partially extricate this complicated subject-matter.

In accordance with both psycho-acoustic and cultural discourses, two key properties appear as being critical in respect of compositional functionality of timbre: i.e. a qualitative aspect (referring to the inner nature of particular sound) and an identificatory aspect (linking a particular sound quality to its possible sound source). The first may be invoked by exposing miscellaneous timbral attributes in compositional circumstances, the other may be employed as a means for delineating particular musical structures.

Additionally, the schema of hierarchical gradation is proposed in order to show a conceptual volume approached as a vertical dimension of timbre. It entrenches consideration of timbre as an equivalent to a musical instrument into two polar directions: (1) permeating deeper and deeper inside its qualitative nature and gradually fracturing the unity of traditionally-established category of one instrument's timbre; multiplicity of sub-timbres may be extracted level by level keeping this direction, while disassembling a sound into its primary elements at the acoustic level (spectral constitution) would represent the final stage; (2) new qualities may be obtained through fusing processes of several superior levels following the opposite direction.

In light of the drawn theoretical framework, two musical instances were put under investigation in regard to timbral strategies. Lachenmann's *Dal niente* was indicated as representing the inward direction in respect of the proposed hierarchy as compositionally-substantiated permeation deeply "inside the material" of a sounding body. Murail's *Ethers* exemplified the upward direction by elevating a prototype of raw timbre into superior levels of musical structures (timbral fusion – textural formations – strategies of long-term development).

In accordance with a multifarious and rich conceptual potentiality, it may be stated that audiation of timbre is an intricate phenomena, and no unilateral principles may be defined. It may be dealt only as a complex picture of socio-cultural, perceptual, individuality of the composer and other factors.

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Audijuojant tembrą: nuo materijos gelmių iki faktūrinio prototipo

Santrauka

Paprastai tembras lieka už audiacijos temos akiračio ribų ir tai gali būti susiję su istoriškai įsišaknijusiu įpročiu tembrą traktuoti kaip pagalbinį, papildomą muzikos praktikos veiksnį. Nors šių laikų kompozicinė realybė operuojant tembru visai kitokia, koncepcinio grynumo stoka dažnai sąlygoja klaidžiojimą tarp įvairialypių, tačiau labai specifiskai orientuotų tyrinėjimų. Straipsnyje stengiamasi nubrėžti orientacines gaires aiškesniam kompozicinių strategijų tembro atžvilgiu supratimui bei jų galimos audiacinės kilmės indikavimui.

Atsižvelgiant tiek į psichoakustinę specifiką, tiek į kultūriškai nulemtus veiksnius, funkcinis tembro potencialas gali būti redukuotas į du pamatinius aspektus: viena vertus, tembras yra kokybė, kita vertus – žymuo (remiamasi polinkiu atitinkamo tembro garsą sieti su jį skleidžiančiu šaltiniu). Kompoziciniu požiūriu, pirmasis orientuotas į įvairialypių tembrinių savybių eksponavimą ir operavimą jomis, antrasis pasitelkiamas tam tikrų muzikinių struktūrų pabrėžimui (sujungimui, atskyrimui, segmentavimui ir t. t.).

Be to, hierarchinės gradacijos modeliu siūloma atskleisti konceptualų tembro tūrį – tarsi vertikalią jo dimensiją. Jis praplečia tembro, tapatinamo su muzikos instrumentu, supratimą dviem kryptimis: 1) vis labiau gilinantis į kokybinius garso niuansus, įsitvirtinusi „vieno instrumento tembro“ kategorija palengva skyla į daugiau subtembrų; pirminių tembrą lemiančių elementų akustiniu lygmeniu (spektrinės garso struktūros) pasiekimas yra galutinė stadija einant šia frakcionavimo kryptimi; 2) judant priešinga kryptimi ir vykstant įvairių lygmenų garsinio lydymosi procesams, išgaunamos naujos, išvestinės tembro kokybės.

Pagal nubrėžtas teorines gaires nagrinėjami du tembrinių strategijų muzikiniai pavyzdžiai. Lachenmanno „Dal Niente“ (1970) reprezentuoja judėjimo gilyn kryptį, kompoziciškai pagrįstą skverbimąsi į vidinę skambančio kūno materialinę struktūrą. Tristanto Murailio „Ethers“ (1978) iliustruoja judėjimą aukštyn, kai gryno tembro prototipas iškeliamas iki aukštesnių lygių struktūrinio prototipo (tembriniai lydiniai – faktūrinės formacijos – ilgalaikės vystymo strategijos).

Atsižvelgiant į įvairialypį ir turtingą koncepcinį potencialą, galima teigti, kad tembro audijavimas yra sudėtingas fenomenas, todėl negali būti paaiškintas vienareikšmiais principais. Jis gali būti suvokiamas tik kaip kompleksinis sociokultūrinis, percepcinių, individualių kompozitoriaus veiksmų nulemtas rezultatas.