

The Structural Elements of the Orchestra: A Theoretical Approach

Abstract. The process of analysing and creating orchestral music raises a common question: what elements does the orchestra consist of and how do these elements interact with one another? It is important to determine the constituting elements of orchestral music as well as discover and articulate orchestra's structural principles, including their diversity, and, by identifying composing strategies which can be used by composers, to structure these principles into composing practice.

In order to provide a systematic understanding of the orchestra as a structure, emphasising its different types and possibly creating new ones, we have to identify the components of an orchestra, i.e. its most important, constitutional, structural elements. The structural elements discussed in this article reveal different levels of an orchestra that are likely to be found and can be analysed in various orchestras from different cultures. Because the overall structure of an orchestra is like a uniform organism that is difficult to divide, all the elements discussed are linked into a uniform system, while emphasising the most important moments of mutual interaction and interrelationship.

The argumentation and various aspects discussed in this article suggest systematic connections between separate elements of an orchestra. As a result, we are able to state that, despite the variety of orchestral music and attitudes towards it, a universal system of orchestral structural elements is possible.

Keywords: orchestra, orchestration, orchestral structure, structural elements, timbre, musical instruments, texture, orchestral groups, composition.

Introduction

Orchestra is a multifaceted and very diverse phenomenon. Its ever-changing nature reveals itself through different musical styles, acquiring new forms in each historical epoch and giving sound to new musical principles. Furthermore, an orchestra reveals itself in different ways, starting from the general attitude and musical compositions displayed by a particular culture, ending with various technical aspects, such as the logic behind using instruments and timbres or practical principles of orchestration. Along with the European symphony orchestra, which we are well familiar with, there are other orchestral cultures in the world with their unique principles and a completely different quality of sound. In this global context, a contemporary composer is faced with a vast diversity that gives rise to sound renewing and enriching opportunities. However, the orchestra phenomenon also holds many unanswered questions and uncertainties.

The process of analysing and creating orchestral music raises a common question: what elements does the orchestra consist of and how do these elements interact with one another? If the composer aims to create new models of orchestral music, as well as understanding the existing ones, it is important to know what elements to use to build these new models. We require a systemic and universal description of the orchestra's structure. In order to provide a systematic understanding of the orchestra as a structure, emphasising its different types and possibly creating new ones, we have to identify the components of an orchestra, i.e. its most important, constitutional, structural elements. This is important in establishing an effective analytical and typological tool; on the other hand, it will allow us to frame the notion of orchestra, creating an opportunity to construct new distinctive orchestral structures. The emphasis on the components of an orchestra, its structural elements and systematic relationships between these elements, is also relevant to the practice of composing as a means for creating new strategies of composing orchestral music.

1. A Brief Overview of Existent Research

Most authors, when researching the phenomenon of the orchestra (symphony orchestra or orchestras of non-European cultures), provide a rather limited discussion on the constitutional elements of an orchestra and its music. Nevertheless, the scholarship available reveals different takes on the orchestra, allowing us to discern orchestral characteristics deemed important and essential by specific authors, and thus to form an overall view of the orchestra as a structure.

When discussing an orchestra and analysing orchestral scores, different authors afford significance to different orchestral structural elements. We should start by mentioning the key texts, such as those of Nikolai Rimsky-Korsakov, who, in his analysis of orchestral works, emphasises the importance of the following orchestral elements (Rimsky-Korsakov 1964/1922):

- a) grouping of musical instruments into orchestral groups;
- b) timbral renewal in the course of the work;
- c) formation of textural layers and their characteristics (solo line, background, pedal, *crescendo*, *tutti*, balance between textural layers and separate instruments etc.);
- d) orchestral dramaturgy.

Adam Carse, when analysing the orchestral styles from different epochs, mainly highlights the instruments of an orchestra, including the variability in their usage and evolution. According to Carse, the evolution of the orchestra is largely based on how these musical instruments (as well as orchestral groups) are being used. He claims that the following two factors are closely and inseparably linked to the changes in the orchestra: “progress in the art and technique of musical composition; improvements in the construction of musical instruments, both of which are again associated with the growth of instrumental technique” (Carse 1985/1925: 1).

Similarly, Henry Raynor, when providing a historical cross-section of different orchestral styles, stresses the importance of instrumental composition of an orchestra, the emergence of new instruments and improvements to their construction, the size of an orchestra (the number of musicians), as well as certain elements of instrumental grouping and their function in the musical material (Raynor 1978).

Meanwhile, Ertuğrul Sevsay, in his analysis of twentieth-century orchestral music, emphasises the following elements (Sevsay 2009: 9–12):

- a) instruments,
- b) instrumental registers,
- c) orchestral registers,
- d) dynamics,
- e) articulations,
- f) methods of sound production.

Sevsay discusses ways of combining the above elements in an unusual and creative manner, which allows him to generate new sounds (as well as revealing the pre-existent ones) and possibly new ways to use the orchestra.¹ As a result, he not only emphasises the importance of these elements to the orchestral score and the final resulting sound, but also their potential for the creation of new composing strategies (Sevsay 2005: 607–609).

Samuel Adler’s work also provides some structural guidelines of the orchestra (Adler 2002; 2016). He draws our attention to the following aspects:

- a) timbral-instrumental structure of an orchestra (individual instruments, technical possibilities);
- b) grouping of orchestral instruments (appropriate coordination between orchestral groups and their combination);
- c) textural layering according to the function or timbres of instruments.

Finally, George Frederick McKay suggests a rather interesting and original take on the orchestra. He places all its constitutional elements into two groups, with each revealing a specific principle of orchestral formation. The first group is called the “principles of clarity” and, according to McKay, “[c]larity in orchestration results from positive (definite) organisation of sounds and structures by means of certain types of control” (McKay 2004: 106). The constitutional elements of this group (McKay also sees them as types of orchestral control) consist of the formation of orchestral groups and different types of textures, the vividness of timbre, the balance of volume of instruments and instrumental groups, the control of dynamics etc. McKay names the second group the “principles of tonal interest” which includes such elements as the contrast of timbre, instrumental motion, the merging and separation of timbres, the use of different registers, interrelationships between instrumental groups and similar. According to the author, “[p]art of the ‘allure’ of timbre comes from its association with types of motion and structure. Contrast also plays a very creative role in tone-mixing. Consciousness of register seems fundamental to the choice of ingredients for tonal blend. When these three major sources (motion, contrast and register) are studied as they combine into tonal phenomena, it will be noted that certain usages constantly recur. This frequent recurrence points to the existence of fundamental

¹ Sevsay notes that we could imagine a composition where timbral contrasts are achieved with the help of various dynamic qualities: with some instruments playing *decrescendo*, others *crescendo* and the rest maintaining an even dynamic. In order to achieve the timbral contrast, we could also create a composition where we only use the development of different registers, while the other elements remain unchanged.

processes of creating timbre interest” (McKay 2004: 197–198). To summarise, we should note that the first group mainly reveals the elements of orchestral vertical, while the second group reveals those of orchestral horizontal (the aspect of orchestral dissemination in time). This approach, while largely orientated towards the practical orchestration rather than the analysis of orchestral scores, uncovers a systemic and fairly comprehensive view of orchestral devices.

Notably, the aforementioned authors’ individual understanding of the orchestral phenomenon either only emphasises aspects they are interested in or focuses on the music of their time. Viewed from today’s perspective, such an approach lacks a systemic and multifaceted take on the orchestral structure and the phenomenon of orchestration. Rimsky-Korsakov defines the characteristics of the orchestra typical to his era and, in order to understand them, uses pretty versatile analytical aspects. However, due to the one-sided nature of this analysis, he only deals with one type of an orchestra. While this might have been his main intention, an evaluation of the changing nature of orchestral types (especially prominent in the twentieth century) requires a significantly broader approach towards the orchestra phenomenon. Meanwhile, Sevsay mainly focuses on the technical instrumental aspect of orchestration and less on dealing with the principal questions of an orchestra’s structure and orchestral thinking. Similarly, Adler limits his discussion to only the most elementary technical elements of orchestration that in many respects correspond to those provided by Rimsky-Korsakov. Carse also mainly highlights the instrumental structure of an orchestra; however, when focusing on its development and evolution, he comes closer to the more general principles of orchestral structure. Finally, McKay systematises the elements of the orchestra, thus revealing some of their interrelationships and a more complete overall view. However, while most of the elements he discusses are also described in the aforementioned works of others, their definitions continue to lack a systematic approach.

To summarise the research concerning the structural elements of the orchestra discussed above, we can highlight the following, most important and relevant, observations:

- a) music instruments merging into orchestral groups;
- b) formation of different textural layers;
- c) timbral renewal in the course of the work, timbral dramaturgy;
- d) changes of instruments, orchestral and instrumental registers, dynamics and other musical parameters in the course of musical piece; their impact on the orchestral sound and its inner structure;
- e) dividing elements into two larger groups that partially reflect a cross-section of musical vertical and horizontal.

2. A Systematic View on the Structural Elements of the Orchestra

In order to analyse the orchestra as a structure, we require a multifaceted view of its structural elements that encompasses the main aspects of an orchestra. Moreover, separate elements should also be linked together into a single system. The previously discussed insights from existent research provide a varied, yet also a rather fragmented view on the question of orchestral structure. As a result, in order to achieve a deeper, broader and more systematic definition of individual elements as well as the overall system, a significant revision is necessary. The structural elements of an orchestra presented below reveal different levels of an orchestra, explain its main components and can be used as analytical tools when examining different orchestral pieces.

The characteristics of orchestral texture is determined by the dissemination of some elements in the direction of orchestral vertical, while others in the orchestral horizontal.² This is highlighted by many authors who analyse the orchestral phenomenon. As a result, when formulating a comprehensive view of orchestral structural elements, they are divided into two main groups:

- a) elements of orchestral vertical;
- b) elements of orchestral horizontal.

In order to systematically connect all the elements together, we require a single starting point – a primary-basic structural element – which holds the main musical characteristics and the beginnings of the orchestra’s formative logic, and which serves as a building cell allowing other remaining elements to form and dis-

² In this case, the notion of *orchestral vertical* refers to the elements that appear when sounding simultaneously and that can be discerned despite the parameter of time; they also easily reveal themselves in the vertical cross-section of the orchestral score. Meanwhile, the elements of *orchestral horizontal* are disseminated in time, across the structure of the work, and the time parameter is crucial for their identification and understanding; they reveal themselves in the horizontal cross-section of the score.

seminate across the orchestral texture. Therefore, the introduction and characterisation of the basic structural element, as a structural unit, acquires a significant role in this structure of elements, making a comprehensive understanding and definition of the orchestra's structure without this element impossible. The notion of structural unit becomes the basis for the formation of all remaining elements, and, as a result, it cannot be assigned to either of the aforementioned two groups and instead works as a starting point allowing the dissemination of these two groups across the orchestral texture.

2.1. The Basic Structural Element

In order to recognise the structure of an orchestra as a balanced system of different elements, we have to start by highlighting the main constitutional part of this system – the orchestra's *structural unit* – which is the most important basic structural element that forms the rest of the orchestra. By using different structural units, we achieve a completely different orchestral structure as well as the resulting sound. The structural unit works as a building cell, forming the basis of the entire orchestral construction. The definition of structural unit reveals the essential starting points of sound and its organisation, in the case of both, a concrete musical piece and an orchestral type, as well as the composer's approach towards the sound, music processes and, undoubtedly, the orchestra itself. Depending on the orchestral type, the structural unit can be assigned to an individual instrument, orchestral group, single timbre, instrumental block, sound mass, sound spectrum, *etc.*, out of which, with the help of specific rules and principles, we then form the overall orchestra.

The following criteria are key to the identification and isolation of the orchestral structural unit:

- a) indivisibility (this uniform formation or element functions as an indivisible whole; it is either impossible to split it into smaller elements or it goes against the logic of the work);
- b) stability (during the course of the work, the formation or element maintains all of its core characteristics across both, the orchestral vertical and orchestral horizontal);
- c) domination (the formation or element clearly dominates the orchestral score);
- d) tendency to disseminate across the orchestral vertical and horizontal (the formation or element becomes the basis when shaping the orchestral vertical and horizontal).

Therefore, if an orchestral formation functions like a uniform, indivisible element of orchestral structure, if it steadily maintains its core characteristics during the course of the work, dominates other possible formations and is disseminated across the orchestral vertical and horizontal, shaping both of them in the process, such formation meets all the necessary criteria of structural unit.

Depending on the orchestral type, the structural unit can carry different **characteristics** in accordance with its inner structure and its functioning within the orchestral texture. These characteristics can be divided into three main groups.

The first group defines a tendency towards **verticality** or **horizontality**. The structural unit can have a tendency to disseminate more across the orchestral vertical, rather than the horizontal (and vice versa), thus forming orchestral processes that themselves become more vertical or more horizontal. This definition contains an entire scale of positions, from extremely vertical to totally horizontal dissemination, including various in-between variations.

The second group characterises the scope of a structural unit. As the building cell of an orchestra, the structural unit can be defined according to its scope (size), i.e. as an element of a certain size (in the vertical) and duration (in the horizontal). Consequently, we can discern two main characteristics:

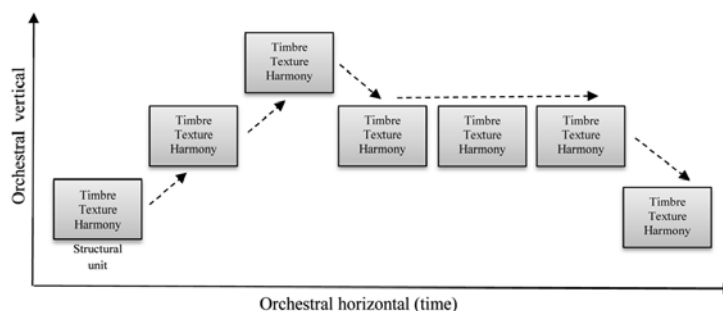
- a) *micro structural unit* – a relatively small formation, the multiplication of which allows the shaping of orchestral structure as well as a concrete work; i.e. this structural unit is much smaller than the entire work and is disseminated using the principle of multiplication or repetition;
- b) *macro structural unit* – a uniform formation that encompasses the entire scope of the work or its major part which is disseminated by the method of division; i.e. this structural unit holds the entire scope (or a major part) of the work and is divided into smaller sections.

While the logic of *micro* structural unit allows small details to form the entire work, in the case of *macro* unit, one large detail is divided into smaller parts. The in-between variations are also possible.

The third group defines the musical parameters, their quantity and the **mono-parametric** or **poly-parametric** structural units corresponding to it. If the structural unit's inner structure is dominated by one musical parameter (e.g. timbre), it is seen as mono-parametric. If a few musical parameters (e.g. timbre, texture and

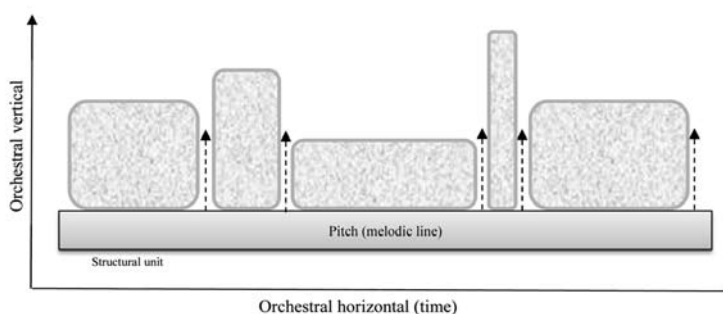
harmony) appear equally, creating a uniform whole, the unit is seen as poly-parametric. Moreover, in this case, as well as describing the quantity of elements, it is important to define specific dominating musical parameters. Therefore, even the mono-parametric structural units, if they are based on different musical parameters (e.g. when one unit exploits the timbral parameter, while the other – the parameter of pitch), can significantly differ from one another.

The two hypothetical schemes below demonstrate how structural units with different characteristics are able to disseminate across the orchestral texture. Scheme 1 shows a micro poly-parametric structural unit with a tendency towards horizontal dissemination.



Scheme 1. Micro poly-parametric structural unit with a tendency towards horizontal dissemination

This structural unit is characterised by three, equally dominating musical parameters – timbre, texture and harmony – and is therefore defined as poly-parametric. As it is mainly disseminated in the horizontal, using the method of multiplication and repetition, the element itself is relatively small in comparison to the whole and is defined as a micro structural unit.



Scheme 2. Macro mono-parametric structural unit with a tendency towards vertical dissemination

Scheme 2 shows a macro mono-parametric structural unit with a tendency towards vertical dissemination. This unit is mono-parametric because it exploits only one musical parameter – the pitch. Furthermore, it covers the entire length of the work and is disseminated across the orchestral vertical by dividing itself into smaller segments. The chart presents different possible versions of dissemination in different segments of the structural unit: a changing degree of vertical filling (marked as the figures' height in the scheme) and a changing degree of temporal filling (marked as the figure's width).

2.2. The Structural Elements of Orchestral Vertical

Certain structural elements of the orchestra disseminate across the orchestral vertical, shaping it in the process. It is also important to note that the basic structural element, discussed in the previous section, determines some of its important characteristics while disseminating in the vertical.

Orchestral vertical has three most important structural elements:

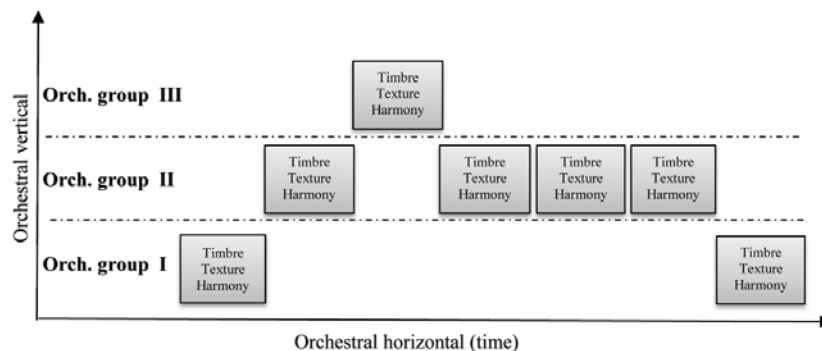
- a) orchestral groups with their individual qualities and formation principle;
- b) interrelationships between the orchestral groups;
- c) layers of orchestral texture.

In order to understand all these elements, the temporal parameter is not significant because they clearly function in the vertical and belong to the element group of orchestral vertical. The discussion below will examine each of these elements.

Many researchers observe one key feature of the orchestra – its tendency to form groups. **The formation principle of orchestral groups and the characteristics that emerge as a result** is the first, foundational element of the orchestral vertical formation. This element is directly linked to the functioning of a structural unit in the vertical. In other words, a specific structural unit, while disseminating across the orchestral vertical, determines the logic and characteristics of the group formation.

The principles used to form instrumental groups (and, in some cases, if they form at all) are especially important to the structure of the orchestral vertical. The instruments of an orchestra not only link to form groups, but, depending on the guiding principles, can also create qualitatively different groups of diverse sound that perform various functions and thus provide different flavour to the orchestra as a whole. The merging of instruments according to certain principles as though assorting the entire instrumental makeup of an orchestra into a distinctive structure and layers that can, more or less, function independently.³

Scheme 3 shows a possible example of the dissemination of structural unit in orchestral groups – the previously discussed micro poly-parametric structural unit with a tendency towards horizontal dissemination. As well as the dominant horizontal dissemination, it also inevitably disseminates across the orchestral vertical, thus determining the formation of orchestral groups. Because this structural unit is characterised by the combination of timbre, texture and harmony, these same parameters will determine the formation of orchestral groups. Therefore, in this case, it will result in a formation of three different orchestral groups: each characterised by the parameters of timbre, texture and harmony, and each carrying different characteristics of their combination. This way, they can be distinguished as orchestral groups that sound different, yet have formed according to the same principle.



Scheme 3. The dissemination of micro poly-parametric structural unit (the formation of orchestral groups)

The interrelationship between orchestral groups (or individual instruments). The instrumental groups that have formed in the orchestral structure (or, if the groups have not formed, the same goes for individual instruments) inevitably interact with one another. This interrelationship can be described differently, depending on what aspect (or aspects) is revealed in a specific orchestra type. These groups can be equally significant or exist in a hierarchy. They can also interact through contrast, overlap, merging and other ways, as well as not interacting at all. We can define not only the nature of interaction, but also its scale (from very a close interrelationship to a complete non-interaction) and speed (from a slow to a very fast interaction). In all these cases, the interrelationship between orchestral groups is one of the most necessary elements of orchestra and its characterisation can reveal important and specific features of orchestral structure.

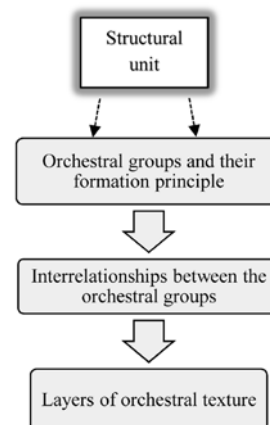
³ As an example, we could take one of the most common cases of grouping in the classical symphony orchestra – the merging based on the similarities between structure and timbre (string instruments, woodwind instruments, percussion, etc.). There can also be many other principles of grouping, based on the functions of instruments, registers, requirements of timbre etc., that determine a different inner instrumental structure of an orchestra.

The layers of orchestral texture. In many cases, orchestral texture tends to group itself into certain textural layers. This layering is an important element of orchestral structure and can be characterised according to various aspects:

- a) structural aspect – the principles of layer formation;
- b) quantitative aspect – the quantity of layers;
- c) hierarchal aspect – the importance of layers in relation to one another;
- d) interrelationship aspect – processes that happen between different layers.

Depending on a concrete type of orchestra, some aspects can reveal themselves more than others. In some cases, the non-existence of clear textural layers also becomes an important definition of a specific orchestral structure. Moreover, the layering of the orchestral texture phenomenon should not be confused with the instrumental grouping into orchestral groups. The former is related to various musical parameters, a specific musical expression in the music work or score, and a specific function performed by instruments in a concrete work; meanwhile, the latter reflects a much more abstract and fundamental level of orchestra’s instrumental structure. Both of these elements are undoubtedly related, with the latter often determining the characteristics of the former in one way or another. However, it is important to note that textural layers not necessarily and not always coincide with orchestral groups. Therefore, a more detailed view of the principles of orchestral layer formation, functioning and interrelation can reveal a lot of important information about the processes happening in the orchestra.

Scheme 4 shows a systemic view of all orchestral vertical elements discussed so far. An orchestral structural unit, while disseminating across the vertical, determines the formation of the vertical’s main basic element (the orchestral group). On their own accord, orchestral groups continue to disseminate, while interacting with one another (element of group interrelationship) and forming different textural layers in the third and final stage. This way, we achieve a consistent view of an orchestral vertical formation which happens in three main stages.



Scheme 4. The structural elements of orchestral vertical

2.3. The Structural Elements of Orchestral Horizontal

Some structural elements function in the orchestral horizontal. They can be recognised only in the process of dissemination in time and when placed within the limits of musical form. These elements, their inner structure and a certain developmental logic are substantiated by the dissemination of structural unit in the orchestral horizontal.

There are three most important structural elements of the orchestral horizontal:

- a) orchestral dramaturgy;
- b) factors of timbral stability;
- c) dominant musical parameters.

The rest of this section discusses each of these elements individually.

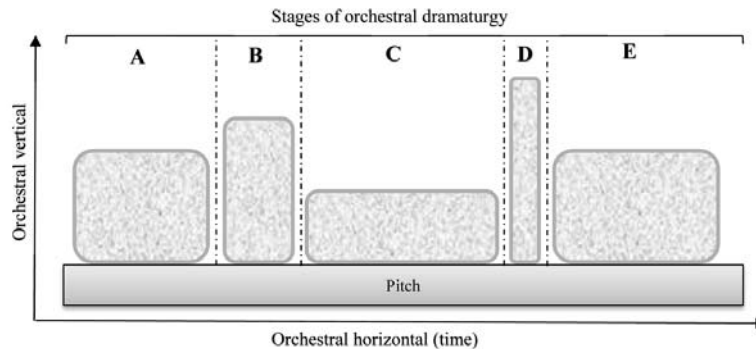
The first and one of the most essential characteristics of the orchestral horizontal is its temporal development, defined as **orchestral dramaturgy**. It describes the development of orchestral structural parameters in the musical form. This is a parameter of orchestra’s dissemination in time, which is closely related to music composition and its logic. Nevertheless, it is a very important element of orchestral structure that encompasses many other elements, controlling their development and functioning within the musical form. The nature of orchestral dramaturgy, its principles and rules can differ in orchestras of various types.

Orchestral dramaturgy is defined using the following aspects:

- a) intensity of change (from static to very intense);
- b) regularity of change (from a regular change of musical sections to various models of irregular changes);
- c) elements that take part in the change (individual textural layers, orchestral groups, timbres, etc.);
- d) ongoing processes (contrast, gradual transition, layering, etc.).

It is useful to mention the structural unit’s importance to the formation process of orchestral dramaturgy. The structural unit, while disseminating across the orchestral horizontal, determines the formation logic and characteristics of individual dramaturgical gradations. Depending on the nature of a disseminating structural

unit, we can achieve rather different results in the development of orchestral dramaturgy. Scheme 5 shows one of the possible versions. It depicts the aforementioned macro mono-parametric structural unit with a tendency towards vertical dissemination. We can clearly see that, next to the dominant vertical dissemination, the macro structural unit verticalizes differently in different time slots, thus being divided into a few time segments of various durations (in this case, five: A, B, C, D, E) that constitute separate stages of orchestral dramaturgy. We can notice that the structural unit based on the parameter of pitch disseminates in the vertical slightly differently in all five slots, thus filling a smaller or larger amount of the orchestral vertical (the segment's height) as well as extending itself in different time slots (the segment's width). As a result, these five vertical structures with different characteristics form the parameter of orchestral dramaturgy in the horizontal.



Scheme 5. The dissemination of macro mono-parametric structural unit (the formation of orchestral dramaturgy)

The orchestral dramaturgy is mainly linked to the orchestra's temporal development. However, all structures must have not only the developing elements, but also the ones that are fixed; otherwise, the structure as a whole could not function in a stable way and would split into individual formations. Therefore, it is really important for the orchestral structure to have some stable elements that are then surrounded by the developing ones. Consequently, the second structural element of the orchestral horizontal is a **timbral stability and factors that ensure it**. The aspect of timbral stability is highlighted only when disseminated in time and is almost impossible to grasp by isolating the orchestral vertical. As a result, it is more useful to assign it to the horizontal group.

The stable elements can be defined using the following aspects:

- level of stability (from little to extensive stability; the level of stability mainly relies on the frequency and changeability of a stable element in the score; the less changeable and varied the element, the more frequently it sounds, the more stable it becomes);
- nature of stable elements (the element's timbre, instrument, register, textural nature and similar);
- number of stable elements (from one to a few; the more stable the element, the less elements are required to stabilise the overall structure);
- dissemination of stable elements in time (directly connected to the logic of orchestral dramaturgy).

The factors ensuring timbral stability are varied and depend on the type of orchestra. The most common factors are: highlighting the dominant timbre, periodically recurring *tutti* texture (as a merged, coherent orchestral timbre) and others. The stability can also be ensured through a periodic repetition of certain timbral element, textural layer or specific textural gestures.

The dominant timbre plays a significant role in the stabilisation of the orchestral timbral structure. One of the common characteristics of orchestra is timbral domination when one or more timbres are used more than others. Such domination can be enacted by a solo timbre (an instrument or a specific playing technique), an instrumental group, textural layer of a specific timbre and similar.

Timbral domination can be defined using the following aspects:

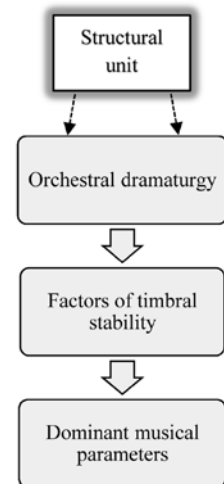
- existence or nonexistence of domination;
- degree of domination (from slight domination to obvious and absolute domination);
- number of dominating timbres (from one to a few);
- nature of dominating timbres (pure, mixed timbre and similar).

Moreover, in the case of all these timbral domination aspects, we should also mention their temporal development and its characteristics, which again brings us closer to the notion of orchestral dramaturgy. By ascertaining the dominant timbres of a specific orchestral type, how this domination is acquired and how it functions, as well as by defining other factors of timbral stability and their functioning, we can reveal the important principles of timbral organisation that constitute one of the most important aspects of the orchestral structure.

The **dominant musical parameter**, or a combination of a few dominant parameters, is the third structural element of the horizontal. Different dominant parameters of music language reveal themselves in different types of orchestra dependent on various structural principles. The common musical parameters, such as harmony, pitch, melodic line, rhythm, timbre, etc., acquire a varying degree of importance, depending on the use of orchestra. The interrelationship between the two is obvious, i.e. the dominant parameters of music language directly influence the orchestral structure as well as many aforementioned structural elements. In this context, it is important to highlight a direct link to the musical parameters that characterise the structural unit. These parameters, as components of structural unit, during its dissemination become the characteristic musical parameters of an entire orchestra. As a result, if the structural unit exploits, for example, parameters of rhythm or timbre, it is very likely that they will also be characteristic of the orchestral structure as a whole.

It is easy to imagine that an orchestra which mainly exploits the parameter of pitch will have a different sound quality to that dominated by the parameters of timbre or rhythm. Therefore, the dominant parameter (or the combination of a few) of music language becomes an important formational element of orchestral structure, while its definition reveals the formational conditions of this structure – a certain medium determined by the nature of common music language.

Scheme 6 shows a systemic view of all the aforementioned elements of the orchestral horizontal. An orchestral structural unit, while disseminating across the horizontal, determines the formation of the first horizontal element (orchestral dramaturgy). Orchestral dramaturgy continues to disseminate and is stabilised by the factors of timbral stability. The third stage highlights common dominating parameters of music language. This results in a multifaceted, three-level view of orchestral horizontal elements.



Scheme 6.
The structural elements
of the orchestral
horizontal

2.4. The Intergroup Interaction between the Elements

Whilst forming the two main groups (verticals and horizontals), the structural elements of orchestra interact not only within the group. Due to these elements being closely interrelated within the orchestral structure, the elements of one group inevitably influence the elements of another. The intergroup interaction between these elements, together with the mutual influence of separate elements from different groups, can differ depending on the orchestral type and the overall structural principle on the basis of which the orchestra is formed. This section will discuss the most common and evident **intergroup interactions** that, more or less, appear in the orchestral structure of any type. Two of these are the most prominent.

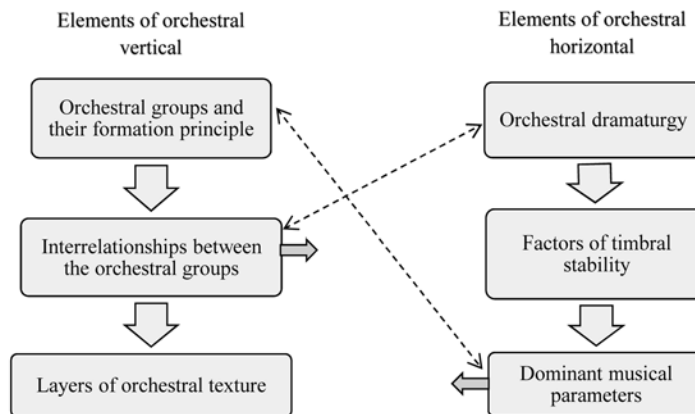
Firstly, the element of *dominant musical parameter* in the horizontal group is related to *the principle of group formation* in the orchestral vertical; and vice versa, the grouping principle of orchestral instruments can determine the exposure of musical parameter. In this case, the mutual interaction is evident. The nature of the dominant music language parameter(s) partially determines the logic of group formation, especially as the main dominant musical parameters are already encoded within the inner structure of a *structural unit*. This unit, while disseminating in the vertical and determining the group formation, also carries information about the musical parameters being used. For example, when rhythm is the dominant parameter, orchestral groups form according to the rhythmic requirements and different possibilities to express it with suitable musical instruments. Meanwhile, if the dominant parameter is pitch, instrumental groups will form depending on their different sounding characteristics to produce sounds with a particular pitch. Looking from a different perspective, orchestral groups inevitably use and highlight musical parameters, the domination of which reveals itself in the duration of the work, i.e. the horizontal.

Secondly, *the tools of orchestral dramaturgy* are directly linked to *the mutual interaction between orchestral groups*, because the nature of this interaction can become one of the aspects of dramaturgy. Moreover, general dramaturgical logic can impact the manner of interaction between separate orchestral groups. While orchestral dramaturgy, as the basic element of the horizontal, contains many elements of both, the vertical and the horizontal, its functioning reveals itself in the durational processes as a certain development of elements and the logic of their interaction. As a result, there is a clear connection between orchestral dramaturgy and the element of mutual interaction between orchestral groups.

It is worth noting that some elements existing in one group also have properties of another group, which can be understood as an **intergroup shift**. The element of *dominant musical parameters* in the orchestral horizontal group can also have some properties of the vertical. This element can be most clearly observed in the durational processes. In order to notice the domination, a time slot is needed, suggesting the dissemination in the horizontal. However, in some cases, the domination of certain musical parameters can be predicted by simply looking at the cross-section of the orchestral vertical. This is especially characteristic of the structural types of orchestra that have a macro structural unit. Because this type of structural unit encompasses the entire orchestral work and is repeated only once, it is most likely that it will disseminate using the same parameters in all time scales and will also be noticeable in the vertical cross-section of orchestra. On the other hand, some musical parameters have a tendency to verticalize and can already partially reveal themselves in the composition of orchestral vertical. This is especially evident in the cases of pitch, harmony and, partly, and timbre parameter domination. As a result, the element of *dominant musical parameters* in the horizontal group can be seen as shifting slightly towards the elements of an orchestral vertical group, i.e. as having the intergroup shift.

Similarly, the element of *group interrelationship* that disseminates in the orchestral vertical has some horizontal characteristics. As it was already mentioned in the discussion on the connection between the group interrelationship and orchestral dramaturgy, some processes of orchestral group interaction reveal themselves better when this element is expanded in time, making its shift towards the element group of orchestral horizontal more noticeable.

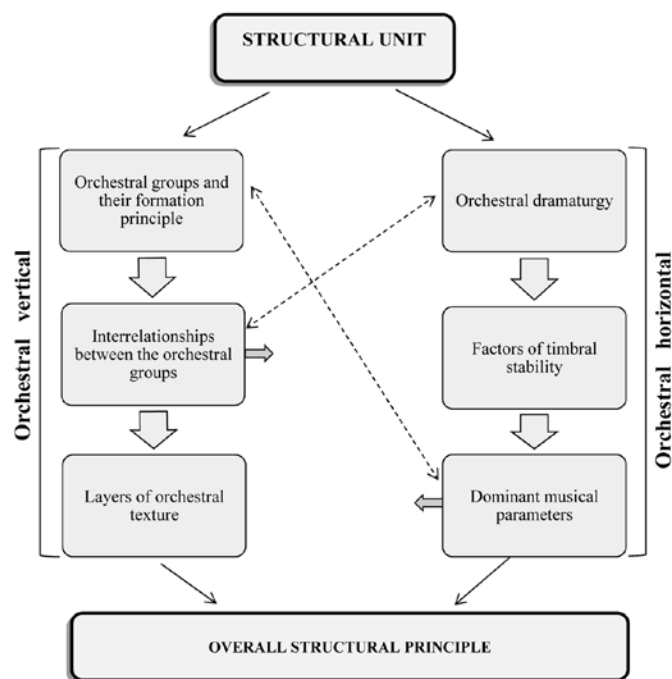
Scheme 7 shows the intergroup connections and shifts discussed in this section (the directions of intergroup interaction are marked with a diagonal dotted line; the directions of shifts is marked with a short horizontal arrow).



Scheme 7. The intergroup interaction between structural elements and intergroup shifts

2.5. A Comprehensive Model of Orchestral Structure

The structural elements discussed in this article reveal different levels of orchestra that are likely to be found and can be analysed in various orchestras from different cultures. These elements are also closely inter-related – influencing one another and sometimes even criss-crossing unnoticed. Because the overall structure of orchestra is like a uniform organism that is difficult to divide, it is necessary to link the elements discussed into a uniform system, while emphasising the most important moments of mutual interaction and interrelationship.



Scheme 8. A comprehensive view of orchestral structural elements

Scheme 8 shows a systematic view of elements and their interrelationships discussed in this article. The main basic element is *the structural unit* of orchestra, on the basis of which the rest of the elements are formed. We then notice that these elements are grouped into two conditional groups: the elements of the orchestral vertical (the formation principle of orchestral groups; the interaction between orchestral groups; and the layers of orchestral texture) and the elements of the orchestral horizontal (the tools of orchestral dramaturgy; timbral stability factors; dominant musical parameters). It is also important to note the connections between elements from different groups and their intergroup shifts (marked with diagonal dotted lines and short horizontal arrows). The comprehensive view of these elements reflects the inner makeup of orchestra, its structure, and has to be summed up by the overall structural principle (shown at the bottom of the table).

We can imply that in the case of different types of orchestra certain connections shown in the scheme will be more prominent than others, with some going completely unnoticed. Furthermore, the importance of structural elements might also vary, with some becoming more significant than others. As a result, this summarising table might have to be partially modified for each specific case, adjusting the marking of mutual interactions and highlighting a different factor of elements' significance.

It is also important to note that this system of elements has a potential to function as a compositional tool or method that allows one to create new models of orchestra systematically, from the very basics and to formulate new strategies of musical composition, thus obtaining a new kind of sound.

Conclusions

The argumentation and various aspects discussed in this article suggest systematic connections between separate elements of orchestra. As a result, we are able to state that, despite the variety of orchestral music and attitudes towards it, a universal system of orchestral structural elements is possible. The core of this system is the element of a structural unit, which gives rise to the dissemination of other elements in the orchestral vertical or horizontal direction.

The following elements are required to define orchestra:

- a) structural unit;
- b) the elements of the orchestral vertical: formation principle of orchestral groups; interrelation between orchestral groups; layers of orchestral texture;
- c) the elements of the orchestral horizontal: orchestral dramaturgy; factors of timbre stability; and dominating musical parameters.

The following additional factors are provided in order to achieve a more comprehensive definition and to balance out the elements of the system: intergroup interrelation between elements, intergroup shift and a level of significance of the element. The structural elements discussed in this article reveal different orchestral levels; these elements are likely to exist in any type of orchestra and can be used for their analysis.

The foundation of an orchestral structural element system is the element of a *structural unit*. The structural unit manifests in the form of *micro* or *macro*, both of which often have a different number of musical parameters. This allows for an identification of *mono-parametric* or *poly-parametric* structural units as well as their specific sound quality and types. Different structural units give rise to different orchestral types. The dissemination of a structural unit in the orchestral horizontal and vertical determine all other structural elements.

The aspect of orchestral structural elements formulated in this article complements the notion of orchestra. It is likely that the orchestra of any type contains the aforementioned structure and its constituent elements. The existence of these inner elements determines the orchestra as a comprehensive formation and allows better definition of the limits of its notion.

This research can be applied to further the understanding of the orchestra phenomenon: its systematisation and typology, the comprehensive and systemic analysis of orchestral scores and the interplay between orchestras of different cultures, discovering their shared meeting points. Moreover, it could give new creative impulses to composers who seek to renew their orchestral sound and discover new orchestral types and interplay opportunities between them, new structural models of orchestral music as well as new compositional strategies.

Translated by Judita Vivas

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Orkestro struktūriniai elementai: teorinis žvilgsnis

Santrauka

Tam, kad būtų įmanoma sistemiškai suvokti orkestrą kaip struktūrą, išskirti skirtingus tipus ir galbūt kurti naujus, reikia išsiaiškinti, kokios yra sudedamosios jo dalys, t. y. kokie svarbiausi struktūriniai elementai sudaro orkestrą. Viena vertus, tai būtina norint suformuoti efektyvų analizės ir tipologizavimo įrankį, kita vertus, tai leistų patikslinti orkestro sąvoką bei atvertų galimybę konstruoti naujas savitas orkestro struktūras. Orkestro sudedamųjų dalių – struktūrinių elementų – išryškėjimas bei jų sisteminių ryšių atradimas ypač aktualus komponavimo praktikos aspektu, kaip galima priemonė naujoms orkestrinės muzikos komponavimo strategijoms kurti.

Orkestrinio audinio specifika lemia tai, kad vieni elementai aiškiau atsiskleidžia orkestrinės vertikalės kryptimi, o kiti skleidžiasi horizontalėje. Todėl, formuojant visuminį struktūrinių elementų vaizdą, elementai yra skirstomi į dvi pagrindines grupes: orkestrinės vertikalės ir orkestrinės horizontalės. Ypatingą reikšmę šioje elementų sistemoje įgauna bazinio struktūrinio elemento įvedimas ir charakterizavimas. Šis elementas tampa pagrindu visiems likusiems elementams susiformuoti, todėl jis negali būti priskirtas nė vienai iš dviejų minėtų grupių, tačiau figūruoja kaip tam tikras išeities taškas abiem šioms grupėms skleistis orkestriniame audinyje.

Pasitelkus bazinį struktūrinį elementą – *struktūrinį vienetą* – formuojamas visas orkestras. Naudodami skirtingus struktūrinius vienetus gauname visiškai skirtingą tiek orkestro struktūros, tiek skambesio rezultatą. Apibūdinami struktūrinį vienetą atskleidžiamie esminius tiek konkretaus kūrinio, tiek konkretaus orkestro tipo skambesio bei organizavimo išeities taškus, esminį kompozitoriaus požiūrį į skambesį, muzikos procesus ir į patį orkestrą. Jeigu orkestrinis darinys funkcionuoja kaip vientisas, nedalomas elementas, stabiliai išlaiko savo esmines charakteristikas kūrinio eigoje, dominuoja lyginant su galimais kito pobūdžio

dariniais ir skleidžiasi bei formuoja tiek orkestrinę vertikalę, tiek horizontalę, galime manyti, kad toks darinys atitinka visus būtinus struktūrinio vieneto kriterijus. Struktūriniai vienetai, priklausomai nuo orkestro tipo, gali turėti skirtingas charakteristikas pagal savo vidinę sandarą bei funkcionavimą orkestriniame audinyje. Jos suskirstytos į tris pagrindines charakteristikų grupes. Pirmoji grupė apibūdina polinkį į vertikalumą arba horizontalumą, antroji charakterizuoja struktūrinio vieneto apimtį – *mikro* arba *makro*, trečioji grupė apibūdina charakteringus muzikinius parametrus ir jų kiekį. Pagal tai išskiriami monoparametriniai arba poliparametriniai struktūriniai vienetai.

Tam tikri orkestro struktūriniai elementai atsiskleidžia orkestrinėje vertikalėje, taip pat ją formuoja. Struktūrinis vienetas, besiskleisdamas vertikalėje, nulemia reikšmingas jos charakteristikas. Svarbiausi orkestrinės vertikalės struktūriniai elementai yra trys:

- a) orkestrinių grupių susidarymo principas ir tų grupių pobūdis;
- b) orkestrinių grupių tarpusavio sąveika;
- c) orkestrinės faktūros sluoksniai.

Orkestro struktūrinis vienetas, besiskleisdamas vertikalėje, nulemia pirmojo vertikalės elemento (orkestrinės grupės) sudarymą. Orkestrinės grupės toliau skleidžiasi sąveikaudamos tarpusavyje (grupių tarpusavio sąveikos elementas), paskutiniame, trečiajame, etape suformuodamos skirtingus faktūrinius sluoksnius. Tokiu būdu gauname nuoseklų orkestro vertikalės susiformavimo vaizdą, vykstantį trimis pagrindiniais etapais.

Dalis struktūrinių elementų funkcionuoja orkestrinėje horizontalėje, jie yra suvokiami laike, muzikinės formos ribose. Struktūrinio vieneto sklaida orkestrinėje horizontalėje pagrindžia šių parametų specifiką, vidinę sandarą ir tam tikrą plėtojimo logiką. Svarbiausi orkestrinės horizontalės struktūriniai elementai yra šie:

- a) orkestrinė dramaturgija;
- b) tembrinio stabilumo veiksniai;
- c) dominuojantys muzikiniai parametrai.

Horizontalėje besiskleidžiantis orkestro struktūrinis vienetas nulemia pirmojo horizontalės elemento (orkestrinės dramaturgijos) sudarymą. Orkestrinė dramaturgija toliau skleidžiasi ir yra stabilizuojama tembrinio stabilumo veiksmių. Trečiajame etape išryškunami dominuojantys bendrieji muzikinės kalbos parametrai. Šitaip gauname įvairiapusį, trijų lygmenų, orkestrinės horizontalės elementų vaizdą.

Orkestro struktūriniai elementai, sudarydami dvi pagrindines vertikalės ir horizontalės grupes, sąveikauja ne vien savo grupės viduje. Kadangi orkestrinio audinio visumoje jie yra glaudžiai tarpusavyje susiję, vienos grupės elementai neišvengiamai veikia kitos grupės elementų specifiką. Tai apibūdinama kaip tarpgrupinė elementų sąveika. Verta atkreipti dėmesį ir į tai, jog kai kurie elementai, būdami vienoje elementų grupėje, turi dalį kitos grupės savybių. Tai įvardijama tarpgrupiniu poslinkiu.

Visi aptarti orkestro struktūriniai elementai atskleidžia orkestrą skirtingais lygmenimis ir, tikėtina, gali būti randami bei analizuojami įvairių tipų ir kultūrų orkestruose. Be to, susieti glaudžiais tarpusavio ryšiais jie daro poveikį vienas kitam ir kartais nepastebimai vienas į kitą pereina. Kadangi orkestras, kaip struktūrinė visuma, yra vientisas ir sunkiai dalomas organizmas, šiuos elementus būtina susieti į vieną sistemą, atskleidžiant svarbiausius jų tarpusavio sąveikos ir sąryšio momentus. Ši elementų sistema gali funkcionuoti kaip orkestrinės muzikos analizės įrankis, taip pat kaip komponavimo metodas, leidžiantis sistemingai, iš pačių pagrindų kurti naujus orkestro modelius, formuoti naujas muzikos komponavimo strategijas ir kartu išgauti naują skambesio rezultatą.