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## Paradigm transformations



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### *Paradigm transformation*

**Abstract:** The study strives to follow some changes in the perception and experience of music initiated by the innovative compositional procedures of the 20<sup>th</sup> century. The transformations are explained as the shifting of boundaries defining selected categories within the listener's paradigm. The categories are nested into two groups, one following the aspect of continuity, and the other dealing with scaling. The transformations described are supported with analogies from avant-garde non-illusive cinematography as explained by Martin Čihák in his book *Lost River of Cinematography*.

### **Keywords:**

paradigm, perception, contemporary music, avant-garde film, developmental constructivism

This study is the result of concurrently reading a relatively new book—*Lost River of Cinematography* (2013), by Martin Čihák—and proof-reading the English version of a considerably older music-theoretical book—*Foundations of Modern Harmony* (1965), by Karel Janeček. Both the authors deal with the new: they need to classify and clarify the situation, to express an obvious shift. They seek analogies, comparisons, or even metaphors to give the reader an insight into their thought, but their aim is to make terms more precise and to clearly define categories. Čihák explores the compositional procedures of avant-garde film makers, Janeček addresses what seemed to be the infinite harmonic possibilities of the tempered chromatic system. However, their approaches differ significantly. Čihák declares an articulate opinion, mercilessly, even aggressively judging from the standpoint of “the new.” Janeček foresaw hints of future tendencies, and now we can admire how sensitively he anticipated the compositional and music-theoretical procedures of today. However, he took the standpoint of “the old,” i.e., judging and denying within his contemporary aesthetic limits. Therefore both the authors evaluate but as if standing on two opposite shores. Seemingly, these shores are completely separate. In my reading, however, I have realized that I know both of them very well, it means once I had to be on the “older” shore meaning I had to cross from one to the other.

One can imagine the “shores” to be paradigms. Čihák warns his readers right at the flyleaf: “Recognition of the actual face of film is irreversible. Therefore, those of you who want to go on indulging in the beastly illusionistic cinematography, do not even turn to the next page.” While there is no need to discuss the irreversibility of this recognition, it is not certain whether an unambiguous shift in evaluation must follow with the consequent loss of the ability to “indulge”. We can draw an analogy between Čihák’s opposites of illusionistic cinematography vs. pure film procedures, and the dichotomy of the compositional methods based on tonality and those of modern and contemporary music. In this text, I will argue that this irreversibility is a product of broadening the perceiver’s horizons. Yes, their thinking will change due to its becoming part of a broader structure (the curse of being aware of the context), however, they will not lose the possibility to choose how to evaluate a piece in question.

I present the process of thought structure transformation when constructing a new paradigm as an argument against the fear of avant-garde and contemporary compositional methods, and as a tool for broadening art students’ perspectives, mainly at the university level. To allow them to contextualize their work as broadly as possible, to ask questions, and even to face, with valid arguments, the intimidating force of the majority opinion.

In my study, I will take paradigm as a generally accepted scheme or thinking pattern.<sup>1</sup> I will describe the possible path from the “old” paradigm for perceiving art pieces to the “new” one without, however, describing them explicitly. A new paradigm requires a new terminological system. I will describe the paradigm transformation using examples of a transformation of particular parts of this system, i.e. concrete moments when existing concepts are extended, thinking is twisted, possibilities considered. When reading the *Lost River of Cinematography*, direct analogies to music would jump to my mind so often, that I started considering that I might be actually walking through nodes of a scheme independent of any media – nodes referring rather to perception and its principles. I realized that the mentioned film makers would ask the same questions I face during my analyses of musical compositions, and that we both solve these questions in an essentially similar manner. The presented transformational process would probably be relevant for other art branches, too, after substituting appropriate concepts for my nodes. In the following text I will illustrate the abstract concepts (nodes) of this system with particular examples limited to music and film compositional procedures.

Parallel editorial work on Janeček’s book kept strengthening the nodes of the emerging scheme. The reason was that striving to grasp the explored material, he had asked very similar questions, even suggesting various possible manners of how to cross the contemporary boundaries, with the only difference being that he would mention them only within a systematic enumeration of alternatives, finding them unsuitable for use in art pieces. He used history, i.e. verification through time and practice, to make his assessments, substituting the taste of the broad public over time (within a limited cultural circle) for nature.<sup>2</sup>

I understand a terminological system to be a mental construct consisting of certain elements (categories) that are in certain relations (forming a structure). I find it important to acknowledge that the considered categories can resist verbal description. Transformations can relate to both the categories, and their relations. With categories, the essential step is to define them, i.e. to specify their contents and boundaries. It is precisely the crossing over the categorical boundaries, their extending, that I find to be the most available way to transform an entire structure – the paradigm. Extending the meanings

<sup>1</sup> I am aware of a shift in understanding the concept as compared to the original Kuhn’s use: paradigm – generally acknowledged scientific results representing in the given moment, and for the expert community a model of problems and their solutions. (Kuhn, *The structure of scientific revolutions*, pp 10, 37.)

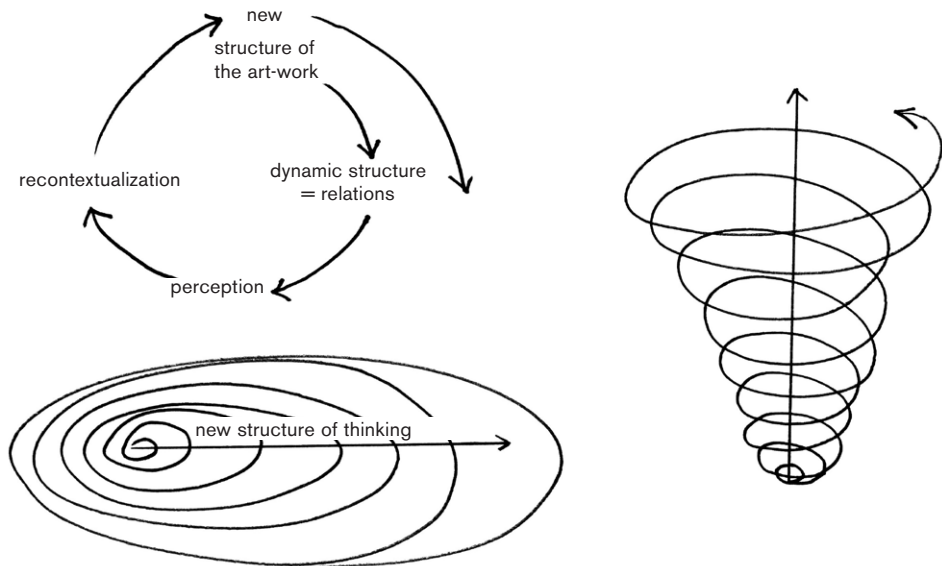
<sup>2</sup> Even in this respect he anticipated one of the future theories – so-called darwinism in music explored at the Imperial College London and Queen Mary University of London (lead by Bob Mac Callum). According to Darwin, all species or organisms arise and develop through natural selection where only the best adjusted ones survive. The DarwinTunes team has launched 100 randomly electronically generated 8-second-long sound loops into the virtual on-line space. Based on the collected rating of the audience, 50 loops “survived”, generating further generations. After approximately 1000 generation, the original “nonsense” loops developed into pleasant European-style tunes. The experiment offers a possibility to explain cultural dynamics in terms of competing evolutionary forces. (MacCallum, *Evolution on music by public choice*, pp. 12081–86.)

of already shared categories is also more agreeable than proposing altogether new categories. They are easier to transfer both in time and space.

In my approach, re-construction of the terminological structure is executed mainly through nested hierarchies. I describe the emergence of an extended category (which can be applied to the entire structure), with a three-phase model: identification, differentiation, and integration of the new form.<sup>3</sup> In the identification phase we recognize features, elements, etc., that do not fit within the current conception of the category or system.

In the second phase we clarify what is it that makes the noticed features or elements divergent. In the third phase we integrate these features or elements and form a new category. As such, the result can be only a minor shift of some boundaries. However, because these are nested hierarchies, the result can be a complete collapse of a category if the new knowledge casts doubt upon an already existing deeper level. Then we have to seek a new category. It can be the beginning of a rather radical re-construction of a category, or even of the entire system.

The following diagrams illustrate the formation of nested hierarchies. We can imagine the process as a broadening spiral within a plane or in space, which, crucially, integrates the old hierarchies within a broader context:



<sup>3</sup> Here I refer to the procedure described by Ken Wilber (*A Brief History of Everything*, p.144), but similar steps are typical for cognitive behavioral therapies (such as behavioral techniques of exposure and response prevention in treatment of obsessive-compulsive disorders – Jeffrey M. Schwartz at UCLA School of Medicine).

It is a laborious and lengthy process. The objection could be raised that one can simply take a new paradigm from the outside as a whole, rejecting the old one. This does happen. However, my opinion is that such a replacement is superficial: a sudden experience of a difference, an intense collision with the boundary of the current system can occur – but what counts is one's behavior after such an experience—how one integrates it into his overall world concept. The paradigm of art perception is only one part of it. Its fast transformations are often driven by social motivations or will – and such systems are shaky and reversible. In my study I explore solid, irreversible, gradual, and completely individual transformations of art-work perception.

In the remainder of my study, I will discuss some salient nodes of the described scheme. Most of the nodes are formed by several categories. The content or boundaries of these categories have undergone an essential transformation in the course of the last hundred fifty years. These categories can often be conceived of as opposite poles of one axis (dualities) or as parts of entire conceptual nests of categories that smoothly segue one into another. Further, I will present two conceptual nests: **continuity – cycle – object – vagueness** (in the section titled *From continuity to object*) and **context – accent – scaling – grain – micro/macro – figure-ground** (in the section titled *Figure-ground*).

I provide here a short list of perceptual principles that are germane to my discussion. Gestalt psychology (Gestalt = shape, grouping) is an originally German theory of experimental psychology that explores also the theory of mind. Its basic assumption is that the whole is other than the sum of the parts, meaning there is a qualitative difference – the whole and the sum of the parts are not comparable (Koffka). Gestalt is perceptually primary (Wertheimer), and not a secondary quality that would emerge only after the parts are assembled (as claimed by the older theory of von Ehrenfels). Gestalt psychologists explore the principles of singling out meaningful percepts from the surrounding world and the manner in which these percepts are stored, i.e. they strive to understand cognitive processes. Sometimes, Gestalt theories are criticized for being descriptive rather than explanatory. There are more sets of perceptual laws, however, several shared, general principles can be formulated:

**Emergence** – Gestalt stands out to the perceiver abruptly, not gradually, and it cannot be controlled by the perceiver's will.

**Reification** – the perceived Gestalt is immediately fully defined in the perceiver's mind. Due to the constructive or generative aspect of perception, the experienced percept contains more explicit information than the stimulus presented to the senses.

**Multistability** – ambiguous shapes can be perceived in more ways, however, we are able to perceive always only one of them at a time and switching between them cannot be fully controlled by will.

**Preference for invariance** – the whole is recognized even if varied. Human perception shows a tendency to process the experience with a preference towards regular, organized, symmetrical and simple Gestalts.<sup>4</sup>

Grouping visual percepts has gotten and still gets much more attention than auditive processing. That is also reflected in the Gestalt laws of grouping:

- Law of Proximity – the tendency to perceive objects that are close to each other as groups or series,
- Law of Similarity – elements within an assortment of objects are grouped together if they are similar to each other,
- Law of Common Fate,
- Law of Good Continuation – we search for uninterrupted lines in objects,
- Law of Prägnanz – the tendency to see the simplest shape,
- Law of Symmetry,
- Law of Closure – the tendency to fill in gaps in objects,
- Law of Figure-Ground – the mind's ability to focus on a meaningful shape and to ignore all the rest,
- Law of Constant Distance – the ability to perceive perspective.

More systematic explorations of the processing of audio signals started as late as the end of the 1960s by the psychologists at McGill University, Montréal, headed by A. S. Bregman. In the area of sound, cognitive psychologists would prefer terms like auditory stream segregation rather than Gestalts. Most support is sought with the general laws of proximity, similarity, closure, common continuation and figure-ground. Usually, however, they formulate their own principles, according to the focus of their research.<sup>5</sup>

<sup>4</sup> It is connected with the structure and types of memory.

<sup>5</sup> Significant personalities in the research of sound processing and perception include Albert S. Bregman, David Huron and James Tenney. The cognitive psychologist Bregman builds on the scientific results deeply rooted in natural sciences (such as physiology, or acoustics). Huron's focus is the experience of music, searching for the mechanisms that trigger emotions. The composer Tenney is interested in the perception of sound mainly as a way of predicting the listeners' response. More specialized but perception-based books include those by Justin London (perception and processing of the temporal component of sound) and by Bob Snyder (the role of memory). As concerns younger researchers, the works by Emilio Cambouropoulos (musicologically focused research of cognition and computational methods) are noteworthy. Since 1983, the University of California has been publishing an inter-disciplinary periodical *Music Perception*, available also in the National Library in Prague.

## From continuity to object

### *Continuity*

I propose the category of continuity as the first node and as a representative of many other terms. I mostly use the term to express an uninterrupted coherence, fluency, sequentiality, connectedness, etc. It can be described directly by the Law of Good Continuation, one of the most frequently formulated perceptual laws.

But how are we supposed to understand the word “good”?<sup>6</sup> These kinds of difficulties appear usually with flexible categories that allow re-evaluation. Often, they relate to learnt explanations of some phenomena. I will leave for philosophers to ponder over the question whether continuity is apparent or real. As a music theorist I can choose the starting point of my reflections: what is perceived is the perceiver's reality and what is measured, reproducible, and shared is the exterior reality. I will describe the phenomena from the viewpoint of the perceiver and at the same time I will also explore the stimuli that initiated their response. My focus will be those situations when the two realities differ.

Analyzing any whole usually involves discussing contrasts and similarities as well. Similarities unite, contrasts separate.<sup>7</sup> However, there is also the role of attention to consider. It is true that in classical music based on tonality, as in narrative films, the attention of the audience can be controlled in many ways, but in most cases, it is directed towards an anticipated and shared goal. To experience tensions within tonal relations, to follow a story, are such well-learned activities that they are the first strategy chosen (probably subconsciously) by the audience. They provide rich emotional experience, while expending only minimal energy. The authors now classified as avant-garde, modern, experimental, post-modern and similar, felt, within different historical contexts, the urge to challenge this situation. More or less consciously, they shifted the perceivers' attention to other connecting components, or even to certain parts by themselves, outside of any relations. To overcome the usual “perceptual indolence” of a common perceiver, the first thing they had to do was to make the comfortable strategy unavailable. Therefore, they would search for ways of establishing continuity other than tonality or storytelling.

That is the reason why many modern and avant-garde works typically feature discontinuity or fragmentation. We tend to consider an event to be continuous if there is at least one parameter, always present, that we can follow without much effort. Effort relates to

<sup>6</sup> Here it is worthwhile to mention the danger that goes with defining categories. Description can change into prescription, which is, to certain degree, the case of theorists trying to apply Chomsky's theory (dealing with languages) to music (such as the generative theory of Lerdahl and Jackendoff). The efforts aimed at formulation of a generally valid theory often lead to deformation of the material explored. What does not fit is simply neglected. By contrast, I would like to present the term “good meter” as discussed by J. London in his book *Hearing in Time* as an example of a well mastered use of the dangerous adjective “good.” Thanks to clearly commented contexts for each claimed statement, his theory stays open to further development.

<sup>7</sup> The terms identity and contrast, resp. meaning unity and contrast, are fundamental in Karel Janeček's *Tectonics* (p. 188).

the above-mentioned contrasts and similarities. If the parameter in question is salient (the contrasts prevailing over similarities), it can be followed effortlessly. It is precisely experiments that test contrasts, similarities or contexts, that can lead the perceivers to search for new strategies. They start looking for similarities (to feel safe, we prefer to search for invariants) where they have never looked before. And that is the moment when a switch can occur – one perceives an unpleasant discontinuity for a period of time, but as soon as the correct new linking parameter is found, one starts perceiving a new type of continuity. Oscillating or following a spiral, both the qualities – discreteness and continuity – are perceived simultaneously.

The fragmentation of one component is usually linked with a repetition or even nivelization in another component. Essentially, a change stops fluctuating at some level of the structure. What is repeated becomes a lead and draws attention. There it can end or the process can continue. The repeated entity becomes the background to newly emerging relations (for more see the section *Figure-ground*). Tenney and Polansky claim that there is a link between continuity in music and causality. Gesture is conceived to be causal, texture not.<sup>8</sup>

Consider these illustrative musical examples: in their late works, Skryabin, Debussy, and Liszt, gradually moved away from elaborating themes in a classical manner. The listeners' attention grasps the themes and segregates them; however, it is difficult to follow their course. The themes are too long, not articulated (Debussy), or too short, their role within the entire piece not clear (Skryabin). Tonality is not clearly expressed, the experience lacks direction, and it is likely that attention will be drawn instead to the qualities and timbres of simultaneities, or to the fluctuations of energy.

In Schoenberg's early twelve-tone pieces, one can follow beautifully how the weights between melody and rows get shifted to and fro. He uses such rows that their shapes can be overlapped or linked with melodic fragments. Further, even though his compositional method is strictly dodecaphonic, he still maintains the "old" continuity in melody (*String Quartet No. 4*, 1<sup>st</sup> movement, opening melody). In this sense, Webern's orchestration of Bach's *Ricercar* is the opposite. Here melodic continuity is disrupted by abrupt changes in timbre; however, the timbres simultaneously bring out new and hitherto unsuspected connections.

Drawing from *Lost River of Cinematography*, consider *Rhythmus 21* (1919) by Hans Richter. He draws the attention to a repeated shape, to moving the focus from objects to relations. Matthias Müller, in his *Home Stories* (1990), works with old Hollywood films (found footage). He creates a new continuity by editing and linking similar sections

<sup>8</sup> Tenney, *Meta+Hodos*, p. 88.



of different films.<sup>9</sup> I understand this procedure as analogous to the overlapping of dodecaphonic rows.

Martin Arnold films can be described as challenging continuity and the learned interpretation of situations. He also uses found footage but makes loops of it, often only several frames long, and through them he reveals the “monstrosity of beastly commercial cinematography.”<sup>10</sup> Arnold’s procedures inspired the Austrian composer Bernhard Lang, who uses the loop principle even in his operas. He demands from the singers a perfect execution of mechanical repetition, not only as concerns singing, but also acting, often of an entire group of synchronized singers.

### **Cycle**

Repetition (one statement immediately after another) can be viewed on one side as invariance (a liminal case of similarity) or on the other side as change (repeated occurrence changes the whole, prolonging it and forming connections at a new level). Repetition of elements and recurrence can be found in the absolute majority of art. It satisfies the human need to maintain orientation in time and space. However, immediate repetitions are less common. Classical compositions respect the rule of three – denying this rule attains a value of meaning.

It was as late as the end of the 19<sup>th</sup> century that innovative artists started systematically exploring the potential of repetition, undoubtedly also as a consequence of extra-European cultures and philosophies penetrating to Europe. In contrast to the teleologically directed European culture or Christianity-based philosophy, Eastern philosophies emphasize invariance. Also, in music at that time, the basic compositional material started losing its hierarchic character. The most common material, the tempered chromatic system, was starting to be understood as a set of twelve equal tones.<sup>11</sup> It was precisely the need for orientation that was the driving force in the search for new ways to organize pitch material. Symmetry, a phenomenon actually very close to repetition, proved fruitful. In essence, an element or an entirety is repeated, only as a mirror along an axis. When exploring symmetries, in any system, gradually it becomes clear that they differ as to the number of possible axes, of possible alternatives. Experiments with symmetries lead to the exploration of rotations and cycles. Cycles allow for converting the infinite into a finite entity: direction is broken into an object or a field with certain features, and reversely, using a cycle, an object can be unwound into continuity and direction (cf. the perceptual principle of the preference of invariance).

<sup>9</sup> *Lost River of Cinematography*, p. 174.

<sup>10</sup> *Ibid.* p. 176.

<sup>11</sup> I neglect, for the use of this text, other compositional systems. However, that absolutely does not mean that I would consider them less important.

Again, I present some examples. The circle of fifths contains all the twelve tones of the chromatic system. The cycle of minor seconds (semitones) and the cycle of perfect fifths are the only two cycles generating all the twelve tones. The number of (different) tones generated by cycles based on any other interval is always lower than twelve. Leaps of a fifth in the bass are foundational to classical harmony. However, as soon as this leap is repeated without changing direction, the tonal relations lose strength. Testing the strength of harmony – and the listeners' perceptual flexibility with all the linked emotions and cognitive constructs – is the essence of the late Romantic music. This is how, over the span of his piano sonatas, Scriabin arrived at dodecaphonic procedures. Both the chromatic scales and the circle of fifths abound in a strong directional energy. In older music, chromaticism was most common in melodic lines, i.e. in the horizontal. Béla Bartók makes extensive use of the turning chromaticism into the circle of fifths and back, often working with almost visually conceived notated symmetries. Through cyclic and self-mapping shapes – modes of limited transpositions, non-retrograde rhythms and symmetrical permutations – Olivier Messiaen projects his two theologically inspired concepts of time (divine timelessness and the infinite time of the world)<sup>12</sup> into music. Serial composition deals with pitch-class set permutations that form a field of a certain character, making no difference between the horizontal and the vertical.

It seems that in film, symmetries and cycles play a similar role. One example is Epstein's description of fragmentarization in Leger's pictures, quoted by Čihák<sup>13</sup> (the shapes he uses lead the viewer's eye to their centres or axes of symmetry with the result that the whole gets broken down into fragments). In his film *Le Ballett Mechanique*, Leger elaborated on this procedure by rotating the objects – a direct analogy to the above-described musical examples. Furthermore, the continuity is disrupted even more by cutting out some frames of the shots, which can be viewed as an anticipation of the later apparent jump cuts in Len Lye. Čihák's description of the work with the cycles rhythm can be directly applied to musical composition. Another interesting method is mentioned in a discussion of the film *In Light and Motion* (2001) by Greg Bo<sup>14</sup> – facilitating a path out of a mechanical loop by focusing on the detail of a single frame (an object unwound into continuity). I will discuss these procedures in more detail in the section Scaling.

### **Object**

Until now I have mainly discussed the horizontal – a sequence or direction in time – and its disruption. It corresponds with such a perception that involves more likely the sensory, working or short- term memory – and their possible confusion. The basic line

<sup>12</sup> Stolp, *Messiaen: Transcending Time*, VDM Verlag, 2008.

<sup>13</sup> *Lost River of Cinematography*, p. 129.

<sup>14</sup> *Ibid.*, p. 61.

of a temporal art piece is, however, seldom completely bare. Usually it is enriched, or complicated, by other simultaneous events. An extreme case would be such a piece where the linear events step back and invariance, stasis or object prevails. Here I get to another important group of categories that can represent a node on the path to a new paradigm.

If we look at the history of classical European music from the viewpoint of polyphonic and homophonic texture, we notice a continuous fluctuation between the two. The same can be said about the approach to the independence of single voices. However, a voice was understood to be a melody, i.e. a matter of pitch – such parameters as duration, timbre, register, dynamics, and articulation were mere tools to support the differentiation and segregation of the individual voices. The views described above brought in the courage (or perhaps the ability, or even the possibility?) to apply the hitherto used procedures to other parameters than pitches. I consider this step to differ in quality from any similarly radical change of compositional procedures within tonality. It is an example of thinking “outside the box,” a step off a long valid and generally acknowledged framework of thinking.

Thinking in voices was extended to thinking in layers or sound masses with characteristic features (by such composers as Varèse, Xenakis, Ligeti, Polish school of the sixties). The former categories, used to describe an isolated tone (pitch, volume and duration), were substituted with more general ones like intensity, timbre, and density, which allowed for the description of continuous complex sound as well. Compositions explore the relationship between layers in time and space, types of layering: various kinds of mixtures, of maskings, juxtapositions – from fully merged sound to sharp segregation. More and more often composers are concerned with the way the listeners would assemble the perceived elements of their music. More and more composers utilize psychoacoustic phenomena and illusions, whereby the intended music arises only once it has entered the listener's body. Nowadays, scores grasp only a smaller part of the events, or they do not exist at all as it is with electro-acoustic pieces and the linked styles.

In film, I can mention as an analogy to the work with less common parameters for example the transfer from realism to a subjective use of color by separating it from an object (Len Lye's *Trade Tattoo*, 1936)<sup>15</sup> or multi-layered exposition created directly during the shooting (Mekas)<sup>16</sup>. Chomett's film *Jeux des reflets et de la vitess* (1925), described by the author himself as a pure cinema (*cinema pur*), can serve as a good example of “thinking outside the box”. The viewer is pulled out of the traditional representation, searching for meaning and intellectual reflecting, and transferred to purely visual

<sup>15</sup> Ibid., p 101.

<sup>16</sup> Ibid., pp. 201–202.

percepts and emotions. He achieved this by juxtaposing objects “activated by purely cinematographic operations like acceleration, double exposure, and negative image”.<sup>17</sup> The so-called retinal collage of Robert Breer is fully based on perception, too.<sup>18</sup> It is a fast, often frame-by-frame, alternation of images, sometimes even alternating between 2D with 3D, where the frame content is barely noticeable. The frames merge only in the viewer’s perceptual system, thus forming a completely new kind of image.

Above, in the section on cycles, I have described the emergence of an object, which is a result of the collaboration of several types of memory. The listener or viewer is on the receiving end of a stream of events. First they perceive the stream linearly. Gradually, as they register similarities (consciously or subconsciously, due to the attention following salient elements), they can notice a repetition of a larger whole and their attention shifts to maintaining its invariance. They continue to register the incoming flux of events, however, if the invariant entirety gets strengthened and the registered changes are relatively insignificant, the changes do not disturb the invariant any more. The category that I label as object is closely related to the terms vertical, time<sup>19</sup>, and stasis<sup>20</sup>.

The music of composers like Steve Reich, Terry Riley or Philip Glass are based almost exclusively on building and disintegrating static objects by layering cycles. Above I mentioned Messiaen’s theological interpretation of stasis. Unfortunately, these procedures are nowadays almost misused, which is why I present those composers that I consider to be original. As concerns film, analogy can be found for instance in the temporal layering by three-color re-separation, as used by Arthur and Corinne Cantrill. They decomposed the real color into three basic colors and then re-composed them. Three black and white shots of a single scene, taken one after another, are copied through relevant colored filters onto each other. In this process the invariant objects attain their real color while the coloring of those parts of the image that had undergone a change during the shooting, are shifted. In my opinion, understanding this film technique can contribute to developing a deeper understanding of the emergence of a musical object.

<sup>17</sup> Ibid., pp. 125–126.

<sup>18</sup> Ibid., pp. 165–166.

<sup>19</sup> I explored the issue of non-linear temporalities in my Master’s thesis, see also the study in *Živá hudba* 2010/1 (Non-linear time in post-cageian music).

<sup>20</sup> It is interesting that in his *Foundations of Modern Harmony*, in the chapter Harmonic motion, Janeček actually already considers cycle and stasis: “Any kind of motion, constituting activity taking place in time, is irreversible. This means that the progression of formations A B is different from the reverse progression of the same formations, B A. Such retrogression in time is analogous to the process of inversion in pitch space.” (p. 185).

### ***Vagueness***

With pieces based on the active participation of the listener or viewer, it is worthwhile to consider the artist's attitude towards the audience's perception. Up to now I have described procedures that tend to disorient and where losing support can stimulate a search for new approaches. However, the opposite can also function as well. Percepts that come as somehow isolated can stimulate the activity of the perceiver. In that case, the composer would consider how isolated the events are, as well as the character of their isolation. Naturally, vacancy, silence, and pause (and their equivalents) have always been integral to music, as well as many other forms of art. But at the moment of their systematic thematization I would already classify them as a potential node of the paradigm transformation.

Perception happens in time and the study of the temporal limits of human perception – and respect or disrespect for them – is still topical. The density of events<sup>21</sup> that come to the perceiver is either within the limits of differentiation and stagnation<sup>22</sup> (where the perceiver has enough time to register and process them), or outside those limits. In the proximity and beyond the limit of differentiation the perceiver hardly registers their percepts or they do so only subconsciously. In the proximity and beyond the limit of stagnation in the opposite direction, they might register it all but might not be able to link together those events into larger wholes. The result of a higher density or acceleration of events is often a feeling of tension. On the contrary, a tempo that allows the perceiver to register, identify, and further process events tends to calm the perceiver. However, approaching the limit of stagnation, tension starts growing again.

In music, similar reflections and procedures are present mainly in the works of the so-called New York School composers (Cage, Feldman, and Wolff) and the spectralists. However, many younger composers also show an unusually sensitive treatment of the “reverb” of the individual phrases, often in combination with tunings besides equal temperament. In this context I find appropriate to mention the concept of imaginary tone, as defined and explored by Janeček in his *Foundations of Modern Harmony*, as well as similar terms that can be found in some works of cognitivist sound laboratories now. It is a tone that stays in the listener's mind even though its real sound has already ended and which, under certain conditions, is essential to the formation of context and perception of really sounding tones.<sup>23</sup> Perceptual limits are explored also in numerous research projects

<sup>21</sup> I understand event as a content of a temporal section that is segregated by the perceiver with a clear beginning and ending.

<sup>22</sup> Tichý, Kuhn, Matoušek, *Musical Kinetics*, p. 27.

<sup>23</sup> *Foundations of Modern Harmony*, p. 195 and further. The percept of an imaginary tone is the best canceled by the sound of a tone one semitone higher or lower, or by the sound of a whole tone lower than the imaginary tone. On the contrary, sound of the so-called critical anti-canceling tone prevents cancelation

at IRCAM, Paris. Already in the sixties, the results of such research were being used by composers. This includes Ligeti, with his micropolyphonic timbral textures.

I find an analogy with film procedures such as Norman McLaren's film motions based on the persistence of visual percepts,<sup>24</sup> Jonas Mekas' *flash and freeze* method, and Oskar Fischinger's rapid montage, which gives the viewer time just for identification of the image, not more. Čihák classifies the two last mentioned methods in the chapter Spontaneous film. It is dedicated to the authors for whom „the montage is imminently connected with the very action of shooting, i.e. “the film maker edits right in the camera”.<sup>25</sup> The *flash and freeze* method is described as follows: “one very short shot, markedly distinctive in tone (often only one image picture) is sandwiched into two shots, which are very much alike and it stays, as if frozen, in our perception much longer, than the actual duration in the film was.” And in Fischinger's *München – Berlin Wanderung* (1927) “there are completely ordinary motifs. However, each of them stays on the screen for the duration of only several frames, or several seconds at the most. Surprisingly, the result is not a detrital jumble of a retinal collage. Each shot is identifiable for the viewer (for some more, for others less easily) so that we do perceive its contents. Nevertheless, the individual shots do not stay on the screen for so long that we would stick to them and they merely stimulate us to further conjectures and imagination.”<sup>26</sup> The quoted description clearly supports the analogy with Janeček's concept of imaginary tone.

Conjecture, that is, filling in, is one of the aspects of perception. The Gestaltists would explain it as a consequence of the Law of Good Form or of Good Continuation – but regarding the fact that the perceptual laws actually only describe statistically significant phenomena, I present this view with some reservations. But it is precisely through art that we can reach the limits of our will, consciousness and subconsciousness, and through art we can explore how hard and/or thick are our cultural crusts in which we are captured. Vagueness (use of an incomplete form) and ambiguity (more than one alternative of completing an incomplete shape) – those are categories that form another node which can allow for a paradigm transformation. They can initiate a focus directed inwards, self-reflection, a becoming aware of and contemplating one's own personal limits.

of an imaginary tone (this is for instance also the case of cross-relation that is avoided in classical harmony). Imaginary tones lingering in the listener's mind from the preceding event can significantly influence complexity of the really sounding simultaneity or to disrupt the serenity of a really sounding perfect harmonic closure.

<sup>24</sup> *Lost River of Cinematography*, p. 103.

<sup>25</sup> *Ibid.*, p. 197.

<sup>26</sup> *Ibid.*, p. 198.

If a listener/viewer finds himself in a new situation and loses support for the routine perceptual strategies, it is precisely the new context that can help them to see the possibility of a new “good form”. If the perceiver is aware of this process, they start comparing. Where there was a single choice, suddenly there are more available, viewed from different perspectives. Searching for the root of the hitherto unambiguous view of the particular shape can lead to discoveries of surprisingly general personal limitations. This node can initiate a very essential recognition that can influence even considerably fundamental nodes of the structure of the overall world-view.

Extreme compositional procedures use silence, transparency, cut out frame, and pure stream of light. As a result, the categories of the inside and the outside can swap, any boundaries can be questioned, and opposites can become only different aspects of the same.<sup>27</sup> That is my understanding of Cage’s compositions and texts where he seeks for and explores time, silence and sound by itself, cleansed of the silt of the composer’s ego and of meanings.<sup>28</sup> Similarly radical is the view of Len Lye (in the mid-1930s!) “to remove camera from the entire creative process and to give up a film frame altogether”<sup>29</sup> when spreading paint across the film tape. Or in the 1970s Sharits’ films, liberated of “their basic feature, i.e. projection of light impulses, getting to a continuous modulated flux of light.”<sup>30</sup> These ideas were already conceived within the new paradigm.

### Figure-ground

In the previous chain of nodes, I focused mainly on the aspect of continuity. In the second chain I will follow the aspects of zoom (scaling) and view angle.

### Context

The more possible completions an element allows the perceiver to imagine, the bigger the role of its surroundings. From this viewpoint, various historical styles can be seen as solutions to particular ambiguous situations. The fact that a new style appears means that the previously valid solutions are unsatisfactory and new ones are sought for. Each such solution develops in stages: it does not exist yet but its future features emerge in response to the limitations of the existing one → the contents and boundaries of these features become clearer → gradually a solid structure of the new solution comes into

<sup>27</sup> See Fraser’s eo- and atemporality in the study *Non-linear time in post-cageinan music*.

<sup>28</sup> For a short time, young John Cage worked with Oskar Fischinger as his assistant in 1937. “[Fischinger] began to talk with me about the spirit which is inside each of the objects of this world,” Cage later recalled. “So, he told me, all we need to do to liberate that spirit is to brush past the object, and to draw forth its sound. That’s the idea which led me to percussion.” [online]. MoMA calendar [access Oct 16, 2016] <http://www.moma.org/calendar/events/571>

<sup>29</sup> *Lost River of Cinematography*, p. 99.

<sup>30</sup> *Ibid.*, p. 42.

being. Obviously, this process is reminiscent of the above suggested transformation of categories and paradigm.<sup>31</sup> But it wasn't until the 19<sup>th</sup> century that, due to deeper studies of older styles and their juxtaposing, the ground was prepared for thematization of a plurality of styles. The artists can intentionally use contexts, relations and analogies are explored at a very abstract level – and even one step further, across the levels of abstract hierarchical structures. If the listener or viewer is aware of and able to follow such abstract connections in an art work, moving even within multiple paradigms will become easy – and that is the topic of this study.

Back to concrete compositional methods: I consider important such techniques as layering (suspension of linear development) or the separation of parameters where they used to be inseparable, and their re-separation against common sensory experience. The first hints can be found deep in history: for instance, the use of the strength of syncopes (heavy beat separated from the motion impulse goes against its natural position in dance) or soft dynamics and possibly silence as the discharge of a gradation (versus natural explosion as a discharge of accumulated energy). The means formerly used to achieve a local effect can become form-bearing in the works of contemporary artists. The listener's attention is guided from such local accents (surprises) to following how they function and subsequently even to contemplating the relations between those functions. Frequent re-evaluation of scaling (zooming in and out) and changes of context are part of this kind of listening. That is why I dedicate this section of my study to the thought nest with the following nodes: **context – accent – scaling – micro/macro – figure-ground**.

### ***Accent***

Shifts in the thinking of composers are directly reflected in the shifts and broadening of theoretical concepts' boundaries. Let us stay for a while with the concept of accent. In the narrowest musical sense, it is usually understood to be the dynamic accent – a tone significantly differing in dynamics from those surrounding it. Even nowadays, it is true that many performers will react to the instruction “accent on this note” with a change in dynamics. However, thanks to the parallel influence of inventive contemporary composers, and of researchers of historically authentic interpretation, with their always deeper understanding of historical compositional procedures, a fascinating complexity has been discovered under this iceberg tip. In today's theoretical studies we can find long passages

<sup>31</sup> Art history is a kind of interpretation. One of the few positives gained by the experience of a radical change in political regime and ideology in the country one lives in, is the personal experience of this fact. Explaining art history actually does not that much differ from analyzing a musical composition. A sequence of events is the material (however, the decision what to consider as an event depends on the observer), the events are grouped into larger wholes (here it is important what is the observer's method for evaluating their significance and for deciding what to neglect), and the classification of styles itself depends on the evaluation of the degree of the difference of their individual features and the choice of moments that initiated so essential a change in the whole structure that it should be considered a new paradigm.



dealing with various types of accents (such as metrical, structural, or phenomenal).<sup>32</sup> Their classification actually follows the context within which they function. Emphasizing a tone by different dynamics is only a consequence of an interaction of forces active at the given moment.<sup>33</sup>

I have presented some examples already in the section Continuity: these include discontinuities in Stravinsky's works,<sup>34</sup> or Webern's orchestration of a Baroque composition, which transfers the attention to groupings based on timbre. Context is the direct starting point for polystylistic compositions (already Mahler, Ives, later Schnittke, and from the youngest generation for example Richard Ayres – his multimedial and at the same time wonderfully unpretentious and witty opera *No. 42 (In the Alps)* premiered at the New Opera Days in Ostrava 2016).

In film, it was already Fernand Léger in his *Ballet Mécanique* (1924)<sup>35</sup> with his “rational reconstructions”. Peter Kubelka (*Unsere Afrikareise*, 1966)<sup>36</sup> separated synchronous events (image and sound) and re-connected them to achieve a new meaning. Jonas Mekas renounced “meanings that got objectivized” by transferring the viewers to “subjective perceiving”<sup>37</sup> (*Diaries, Notes and Sketches*, 1969)<sup>38</sup>. In these works, the thinking and approaches of innovative composers and film makers is really very close (Mekas claims Cage as a significant source of inspiration for him). They set situations for the listeners or viewers who actively enter and create their own individual alternative of the work according to their personal memories, experiences and imagination. Wilhelm and Birgit Hein conceive of their individual films as unfinished—they are only units within the continuous process of their oeuvre bringing a new meaning with each new presentation.<sup>39</sup> Musicians will not get surprised by this approach. They immediately recall such as Stockhausen's *Momentform* or Cage and Cunningham's performances to their minds, which questioned the framework of the presented pieces and, further, the very notion of a concert as such. To illustrate the above described motion across

<sup>32</sup> See Lerdahl and Jackendoff (p. 17) or Snyder (p. 170).

<sup>33</sup> Here I would like to point out how important it is that the performer bases his motions on his own following of these continuously active forces instead of merely reacting to isolated symbols and instructions in a routine manner, even though such reactions are faster.

<sup>34</sup> See the theoretical studies by Edwarda T. Cone, some earlier works by Marianne Kielian-Gilbert, or Dora Hanninen's work published in 2012.

<sup>35</sup> *Lost River of Cinematography*, p. 129.

<sup>36</sup> *Ibid.*, pp. 48-49.

<sup>37</sup> An imposing question: is the conceptual on a higher level than the sensory? The discussed works change the signs in this conventionally accepted relation, or they even prove the question as irrelevant.

<sup>38</sup> *Lost River of Cinematography*, pp. 203-204.

<sup>39</sup> *Ibid.*, p. 179.

abstract hierarchies and how it plays with scaling, I would bring out Tscherkassky. In his *found footage* film *Outer space* (1999) he switches from story situations cut out of Hollywood horror films to a bare work on a single film frame.<sup>40</sup>

### ***Scaling, grain***

At the individual levels of the hierarchy created by the listener or viewer while watching a temporal artwork, there occur wholes of various sizes. That is where the term scaling, already mentioned several times in the previous sections, becomes important. It is not a scaling based on a fixed unit, it is even doubtful whether it is shared by more people, considering that it relates to the perception of each individual.<sup>41</sup> The capacity of attention is limited,<sup>42</sup> and that is why we can use the image of a limited view-angle which relies on inverse proportion: a wider angle is connected with less registered details and vice versa. And it is precisely the intentional use of changes in scaling that is typical for contemporary compositional procedures in both music and film. Sometimes a particular new scaling is treated as a theme, sometimes the focus is directed on the course of scaling switches – i.e. on the motion across the levels of the perceiver's built-up perceptual hierarchy with the attention focused on the relations among them. Similar kinetic features can be perceived like the ones at the lowest, "real" level of the linear stream of stimulæ – pulse, tempo, and rhythm.

Furthermore, in film, changes in scaling can initiate the impression of depth, the actually flat picture becomes an illusionary space.

From the compositional viewpoint, hierarchically organized levels of a musical composition will probably fit in the general scheme: material – events – whole. From the viewpoint of perception, it is rather difficult to suggest a general scheme. Two types of schemes are probable: one starting with a simple and striking particular Gestalt, gradually building up to form a more complex hierarchy (analytical approach). the other on the contrary goes from an emotionally experienced whole to the segregation of smaller Gestalts. In film media, the different scalings would correspond most roughly with the hierarchic level of single frames, as opposed to the level of shots. However, a category such as a chain like element – plane – framework completed with the perpendicular dimension evoking depth could also be plausible.

<sup>40</sup> Ibid., p. 181.

<sup>41</sup> On the other hand, artists present their works to other people with certain intention, i.e. mostly they refer to an existing convention (including negative references). Therefore, some kind of sharing can be assumed.

<sup>42</sup> For more detailed discussion of attention-based perceptual models and the concept of view-angle see my dissertation *Musical time – its deviation from the astronomical time*.

Some late Romantic compositions meant for concert performance are extremely demanding of listeners' perception. This resulted in the tendency of the twelve-tone composers, especially Webern, to use as reduced material as possible. Only with the new technologies – especially tape-recorders and synthesizers – could a radical breakthrough come. Artists could work at the edge of differentiation (with the events that are smaller than the ear can differentiate as two separate entities, including details as small as the soundwave envelope ranging in milliseconds). For this study it is not important whether the composer used their knowledge in a piece for acoustic instruments or in an electro-acoustic composition. The important fact is that new levels of the perceptual hierarchy open up. Focusing the listener or viewer on a detail and magnifying it, pulls them in a game within new dimensions. It is worth mentioning that often this happens at the cost of restraints in other components, because of the limits of human perception (of the listener but of the performer as well!). Compositions for acoustic instruments are then typically soft, slow and of very long durations, however, extremely loud sections or moments can function equally well.<sup>43</sup> Attention to the development of changes very often goes together with a transfer to a non-linear temporality. The experience of stasis can occur, in the manner described above in the section Object, but by no means is that the only alternative. Focus on change at extremely small scaling can explain the popularity of such compositions that, according to the classical values, negate the basic principles of "good" form, like indispensability of contrast, recurrence, and climax.

### ***Figure-ground***

Morton Feldman is the composer whose compositions negate the majority of the classical principles – and in spite of that, they win favor with a variety of audiences. It is also true that up to now (fortunately?) nobody has succeeded in providing a satisfactory analysis of his pieces. However, one can state that a very fine work with time and figure-ground principle play an essential role.

In several chapters of the *Lost River of Cinematography* – describing the films by Sharits or Breer – Čihák analyzes methods of work at the level of single frames and contemplates features of materials or conditions for a figure stepping out of its background. They might relate to a different media than music, but what if that is exactly the reason why they make it so much easier to think outside the box? An impression of figure cannot arise if the ground keeps changing. That is how the author explains the difference between traditional animation ("sequence of only slightly different shots meant to evoke the illusion of motion") and the "non-representations", purely cinematographic motion in

<sup>43</sup> They are followed actually by a temporary perceptual "deafness". If the first percept of the restored hearing is a soft tone, its quality is irreplaceably fine. This trick is typical for instance for Giya Kancheli but it can be found in the music of the past centuries as well.

Sharits' *Piece Mandala (End War)* from 1966<sup>44</sup>. Is this not a brilliant explanation of the link between athematism and atonality in music?

### ***Micro/macro-structure***

In the section dedicated to scaling I described a situation in which the attention focuses on the relations among the hierarchical levels created by the listener or viewer while they follow an art piece in real time, and I described the possibility to perceive the same features at different hierarchical levels. This necessarily broadens the understanding of the feature in question – it is another way in which boundaries can be shifted. Newly set boundaries of a category lead to the contemplation of possible new links within the paradigm structure and retrospectively to the hitherto unimaginable coherences at even the concrete, lower levels of individual events. Thus, new aspects can open with even seemingly well-known phenomena.<sup>45</sup>

The easiest to find are similarities in the temporal component. In Czech music theory there are two areas of study concerning the temporal component of music: tectonics and kinetics. Tectonics explores segmentation at higher hierarchical levels and the interaction of the individual participating musical components in time. In the music- theoretical works written in English, research of the tectonic aspect of a composition would probably correlate best with the analysis of its dynamic form where perceptual processes are taken into consideration. *Rhythm* would relate to the issues of kinetics and *higher-order rhythm* to tectonics. Regardless of the terminology, at all the levels – kinetic or tectonic – it makes sense to discuss pulse, rhythm, duration, accents or culminations, density and its changes (i.e. acceleration and attenuation), and possibly even patterns.

In film, analysis of the temporal aspect is usually done at two basic levels: at the level of frames within a single shot, and at the level of the composition of shots. Patterns identified at one level and then at one or more other levels are usually the easiest to notice. One could then speak about self-similarity or even fractals. These procedures were used for example by Hans Richter. In music, it is the fundamental principle that is more likely to be disrupted or disguised – when studying a particular composition, it is only the deviations from self- similarity that bring any benefit.

I would like to mention the research of Marianne Kielian-Gilbert which I find very inspiring. She addresses very abstract relations between hierarchical levels in her analyses. She focuses on two types: *correspondence* and *analogy*. They relate more to quality than to quantity in relations. Correspondence is a particular meter-rhythmic relation concerning texture, timbre or choice of pitches. Analogy relates to similarities at

<sup>44</sup> *Lost River of Cinematography*, pp. 39-40.

<sup>45</sup> This principle was very radically used by John Cage both in his music and his texts.

the higher levels, starting with patterns of the whole, position, and role within the given context and the proportional distribution of events.<sup>46</sup>

In his introduction to the chapter on pure film, Čihák explains how it differs from absolute film: "... while in absolute film, rhythm is imposed from the outside, in pure film it originates in the features of the very photographic image, therefore it is not an order of changes imposed from the exterior, but it springs out from the photogenic features of the depicted. There is present here a self-similarity of the relation between motion – in the general sense as realization – in the photogenic features inside shot, and of that between the inter-shot links".<sup>47</sup> Static and dynamic interpenetrates. The static duration is filled with changes and, on the contrary, the wholes of the individual changes form a sequence. Closing a circle we got back to the polarity of continuity and object and the relativization of the duality of inside and outside.

In my study I present a description of the process of a paradigm transforming by challenging the boundaries of categories. The categories discussed are parts of a mental construction formed during the perception of an art piece. I describe the shift of boundaries of only a few categories arranged in just two thought nests. They are concrete examples supporting my opinion that a new paradigm for understanding art – essentially independent from the media – cannot be passively taken over, that it is a result of the listener's and viewer's activity which is (paradoxically) directed mainly inwards, to one's own perception.

In the *Lost River of Cinematography*, Čihák describes structural film as lacking in story and lacking in poetic contents. However, there is content there—it refers directly to the essence of the media. The very expressive tools themselves become the theme of the films. Viewers get the opportunity to realize the difference between the image they see and the one on the film tape. Attention is focused at the very act of perceiving.<sup>48</sup> Čihák opens his book with the chapter on structural film because he wants those readers that are not yet ready to throw it away (if they have not done it already reading the flyleaf). Starting with the new paradigm he was along a very similar path to the one in my study, only in the exact opposite direction.

<sup>46</sup> Marianne Kielian-Gilbert, *The Rhythms of Form: Correspondence and Analogy in Stravinsky's Designs. Music Theory Spectrum*, Vol. 9 (Spring, 1987), pp. 44-5.

<sup>47</sup> *Lost River of Cinematography*, p. 122.

<sup>48</sup> *Ibid.* p. 23.

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