SOME PRELIMINARY CONCEPTS OF GRAPHICAL ANALYSIS / COMPOSITION FOR MUSICIANS AND NONMUSICIANS

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Abstract

This article presents some preliminary ideas for educational purpose of composing and the analysis of music which apply basic graphical shapes on different levels of the organizing of visual and musical material. The method of this study involves comparison and transdisciplinary interrelation. The article includes three larger sections: (A) approach to analysis of structure and form, (B) aural/listening analysis with simple graphical forms, and (C) creative and analytical approach using basic graphic shapes. The aim is to make a methodological contemplation on transdisciplinary research in visual art and music. Background research shows that both visual and audible art is analogously organized on several hierarchical levels (micro, medio, and macro), and to understand both we must define and explore the material, proceed to discover the structure, and find out how this contributes to the overal form. My research presents some concepts of structural contemplation either analyzing visual art and music seperately, or using graphical tools for representing and understanding music which reveals interesting interconnections. The importance of regular, balanced, at-a-glance comprehensible archetypical, and simple basic shapes and motives for creating and analyzing is undeniable in both music and visual art.

Keywords: *perception, visual art, music, composition, analysis, hierarchy, form, music psychology, cognition; music theory, aural and listening analysis, sonology, graphical analysis and representation; structural analysis*

INTRODUCTION AND BACKGROUND

The following article presents some preliminary ideas for educational purpose of graphical approach to analysis and composition which emerged during my teaching at the Institute of Fine Arts of Tallinn University, and which is directly related to the research project „Analytical methods of graphic representation and their applications to the music of 20th century“ (together with Kerri Kotta, supported by Estonian Science Foundation, 2006–2008, ETF6866). These ideas are located in the intersection of musical and pictoral analysis, and composition as a general concept which is common to all fields of art. Visual representation functiones mostly as a prescriptive and/or descriptive interface and medium for creational, recreational, and analytical processes (Lock 2006a: 243–248).[1]

Background in perception of visual art and music

As we know artworks are perceived both through eyes and ears. Perception relies on common basic laws (*gestalt* laws, analogies etc.) and can be explored in synaesthesia, phenomenology, pictural and musical semiotics, philosophy and aesthetics, and psychology in visual and musical perception and cognition. The following section will give some particular insight into some interesting notions on perception of visual art and music.[2]

Perceiving visual and audible art we often speak of movement, dynamical develoment, tension, and culmination. In his book „Art and visual perception. A psychology of the creative eye“ Rudolf Arnheim (1974) shows how growth, movement, dynamics, direction, space,

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balance and tension effect the vision and understanding of visual art. Describing music we also use terms like motion, force, logic, dynamics of form, spaciality, tension etc., which can be generally subsumed under the terms energetics (see Rotfarb 2002: 927–955, de la Motte-Haber 2005: 283–310) and organics (see Thaler 1984).

Culmination and formal-tension development, especially in contemporary music (see Kirschbaum 2001, Lock & Valk-Falk 2008), as well as form in relation to both architectonic (Ligeti 1966: 23–35, Lock 2008: 83–93) and organic features are important aspects which are in fact intelligible for nearly every one of us, indepenend from expertise, heritage or age. But, there is the problem of articulating one's cognition and experience with such well-formed, and at least intuitively understandable, features both in music and in visual art. Verbal descriptions are the most common but seldom systematically developed. Graphical approaches are also used, but again quiet unsystematically, yet, the representational methods are mostly not reflected – but, see my own attempt on systematization into intuitive, systematical, system-based and automatic approach (Lock 2006a: 243–269).

Composition, analysis, hierarchy and form

Universal concepts of creating and understanding artworks – music, visual art, dance etc. – are composition, analysis, hierarchy, and form. Both creating (composing), recreating (recomposing), and analyzing (decomposing) requires the necessity to construct, reconstruct, or deconstruct an artwork from parts which together constitute a kind of a wholeness or entireness. But, György Ligeti points out that

> musical form is more than the relationship of its parts. Syntactic aspects have a primary roll in understanding form: within the musical process each phrase and single event have its own characteristics which take effect on the process itself. Importance and function within the whole, linkings or lack of linking, affinity and contrast of the single events build a system of relations, which indicates a putative moving or static remaining, and provkes an „elongation in time." The term „musical form" referes not only to aspects of the relations of the parts than also to the kind of effect they have within the entirety; function as category is therefor more important than mere arrangement (Ligeti 1966: 23).

According to Ligeti musical form emerges in our mind through the network of associations, abstractions, memories, and guesses, and is connected with abstract spacial configurations. In music these are abstractions of abstraction (Ligeti 1966: 23–24). The art historian Ernst H. Gombrich states that

> […] the very process of perception is based on the same rhythm that we found governing the process of representation: the rhythm of schema and correction. It is a rhythm with presupposes constant activity on our part in making guesses and modifying them in the light of our experience. Wherever this test meets with an obstacle, we abandon the guess and try again […] (Gombrich 2002: 231).

Understanding both compositional and analysis processes which can be called contingently reversible, or metaphorically expressed different sites of a coin (the coin represents here the artwork itself), we we commonly use the concept of hierarchy. We can understand an artwork as being present on different levels including one, that will be regarded as the most generalizing or embracing, representing an entirety which mostly is regarded as form.

For visual perception analysis Arnheim emphasizes, that „the interaction between the whole and the parts can be represented by the model of a hierarchic pyramid. For instance, when gestalt psychologists say that the structure of the whole determines the place and functions of the parts and is, in turn determined by the parts, they present „the whole" as an additional entity different from the parts but related to them (Arnheim 1966: 230). Pictoral semiotician Göran Soneson says, that „one way of approaching the intrinsic meanings of visual elements could be to establish a feature hierarchy" (Soneson 1993: 61). Musical perception researchers Mario Baroni, Rossana Dalmonte and Carlo Jacoboni point out that

> the concept of hierarchy, as defined by psychological studies on musical perception, referes to the mental devices involved in music processing. […] The different hypothesis of hierarchical organization can be distinguished into two main models: grouping and reduction processes" (Baroni, Dalmonte & Jacoboni 1995: 326). One of the most common hierarchy concept is that of foreground–middleground(s)–background (wellknown from Heinrich Schenkers theory) and tree structures (inspired by linguistics, for cognitive music analysis

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used by Fred Lerdahl & Ray Jackendoff) (see Baroni, Dalmonte & Jacoboni 1995: 325–327).

Composer and musicologist Walter Gieseler subsumes and states, that „the basic formal problem is how the whole and the single can be intermediated, to which extent one and the other are interdependent, and if this could be representated. Does one compose from the „top" or from the „bottom", from the whole to the parts, or from the parts to the whole? Should'nt all processes work together?" (Gieseler 1975: 130).

Hierachies can be oriented bottom-up or top-down and can proceed from a detailed level (inductive) to a generalized level (deductive). They also use the concept of the basic idea, main motive, or germ motive, which can be found concretly on the detailed forground, abstractly on the middleground levels and generalized on the background level. According to Gieseler (1975: 129–130) a musical entity exists and is realized on three levels: (1) Material, (2) Structure, (3) Form, which we also can call the micro, medio and macrolevel. We could speak of five main levels on which we can create and understand music: (1) nanolevel (physics of sound as basic for all music, tone envelope, Fourier "components"; graphical representation as spectra, sonogram), (2) microlevel (musical material, elements of which a musical piece consists: motives, themes, phrases, melodies etc.), (3) mediolevel (structure: the relatedness of the elements to each other, composing technique, the type of network established), (4) macrolevel (form as the larger complexes, units and sections in relation to the whole piece, and as the whole piece itself), (5) metalevel (the way we contemplate on or analyze a piece in relation to it's broader context (analytical, historical, philosophical, psychological, semiotical etc.) (see Lock 2008: 86).

Archetypes, simple shapes, and motives

The importance of regular, balanced, at-a-glance comprehensible archetypical, simple basic shapes and motives for both creation and analysis is undeniable in music and visual art. One of the most important theoretist of art analysis, Rudolf Arnheim, points out several important aspects on this issue:

> More plausibly, we might observe that when by some circumstance the mind is free from its usual allegiance to the complexities of nature, it will organize shapes in accordance with the tendencies that govern its own functioning. We have much evidence that the principal tendency at work here is that toward simplest structure, i.e., toward the most regular, symmetrical, geometrical shape attainable under the cirumstances. It should be noted that although in the instances under discussion the representional features derived from the physical world are few, the artist may nevertheless develop those few features into an elaborate play of shapes, which may be described variously as geometric, ornamentel, formalistic, stylized, schematic, or symbolic (Arnheim 1974: 145).
>
> Antropological and psychatric observations indicate that basic visual patterns, or kind of patterns, appear with surprising uniformity in different cultures, different periods, different individuals. Attempts to explain these similarities by migration or other social contacts often fail to fit the facts. The evidence suggests that similar visual conceptions emerge independently from one another (Arnheim 1966: 222).

Arnheim referes here also to Carl Gustav Jung, who called „motives and formal elements of identical or analogous shape" be derived from „primordial images, dominants, or archetypes" (Arnheim 1966: 222). According Arnheim we can subsume that „geometrically simple shapes emerge everywhere at the early stage of mental development because they are accessible to the limited organizing powers of a simple mind" (Arnheim 1966: 243).

MAIN IDEA

In this article I present (1) theoretical insight into the relationship between composing and the analysis of music which a) offer several catergories of form building, b) apply basic graphical shapes on different levels of the organization in visual and musical material. (2) As an implication for educational purpose I suggest some preliminary ideas on the usefulness of a graphical approach to the composing and analysis of music for musicians and nonmusicians in the context of learning styles and personality (visualizers/verbalizers).

Method, aim and main contribution

The method of this study involves comparison and transdisciplinary interrelation. The theoretical part of this article includes three larger sections: (A) Carl

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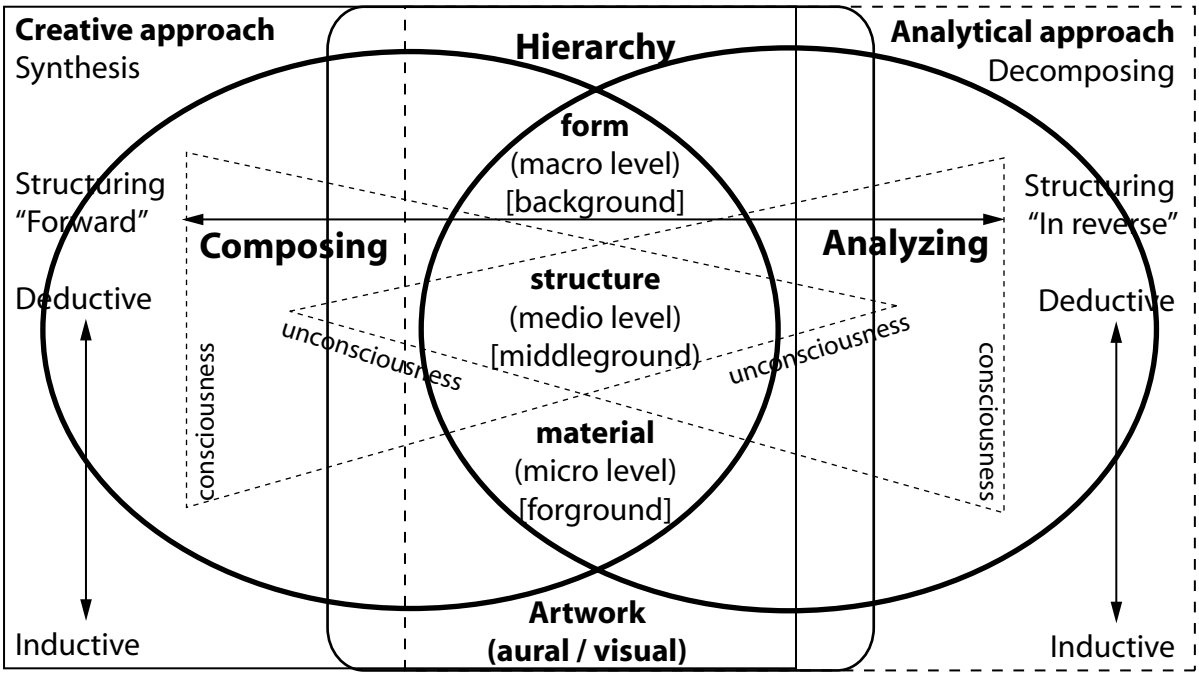
E. L. von Lorck's (1965), Hansgeorg Mühe's (1978), and Clemens Kühn's (1987) approach to analysis of structure and form, (B) Hansgeorg Mühe's (1978) and Lasse Thoresen's (2007) aural analysis with simple graphical forms, and (C) the „Character technique" by Usko Meriläinen (Suilamo 1988), and the system of seven elements for composition and analysis developed by myself (2005/2009) in comparison with Erhard Karkoschka's (1966) conditions of new notation, the melodic contour analysis by Charles Adams (1976), and the pedagogical approaches of visual artist Paul Klee and Wassily Kandinsky in the 1920s. The aim is to make a methodological contemplation on transdisciplinary research in visual art and music. Visual and audible art are analogously organized on several hierarchical levels; to understand both we must define and explore of the material, proceed to discover the structure, and find out how this contributes to the overal form. The research presents some concepts of structural contemplation through either analyzing visual art and music seperately, or using graphical tools for representing and understanding music. This often reveals interesting interconnections. The underlying aim is to establish a pool of principle features mainly derived from German speaking context (Lorck, Mühe, Kühn) in comparison with English speaking research (which relies on French traditions) on aural sonology (Thoresen).

Creating and analyzing in relation to hierarchical levels

Emanating from both the direction of approach of the above grouped authors (analytical *vs* creative approach) we can see the following systematical improvement from a pure reflective and analytical position to a combined reflective and creative position – from a pure theoretical to a applicable practical approach in which theory and practice become an amalgam.

Both composing and analyzing include characteristics of each other; hierarchy is common to both. Usually we are used to regard the level of consciousness of analytical thinking in composing to be low, while in analyzing the conciousness of creative activity is expected to be low, too. But creational and analytical processes are intertwined and will individually differ, depending on the level of intuitivness or the kind of systematization of the approach. Composing and analysis are not (completely) reversible, otherwise the artwork would not be an individual entity of itself carrying independent aesthetical and meaningful values. It would not be possible to completely recompose a real artwork through reversing – it would allways lack the spirit felt while creating, and according to the decrease/increase of consciousness there are processes impossible to repeat in the same manner. Also, analysis done either intuitivly or systematically, even with system-based approach



Example 1. Composing and analyzing in relation to hierarchy on different levels.

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(Lock 2006a: 248–254), would not be exactly replicable. Although both inductive and deductive principle work together in the mind of the analyst/composer, we often decide unconsciously/intuitively according to the first glance and/or our first aural impression which gives us hidden information regarding how to approach a specific work.

The neccessity to treat the process itself as an important aspect of musical creativity and analysis on a philosophical-analytical level ("subject – process of action – object") were recently discussed by Airi Liimets and Kerri Kotta: „A process of action as the movement (for example thinking of the musical work and the analysis of it, etc.) integrates subject with object in such a way that the structure of subject will, at the same time, become the structure of object and *vice versa*. Besides the linear, horizontal dimension (the components of which are the aim, means and the outcome/result) also a so-called vertical dimension or the deep structure or potentiality of subject and object as a certain reality, can be described" (Liimets & Kotta 2008: 106, full paper p. 1).

> Although the concept of the processcentered music analysis seems to place the stress on the motion, it uncovers the music as first and foremost a "spatial" phenomenon. The concept of the "process" should not be taken as a mere aspect or dimension of a composition, i.e. the course of the musical events, but as a metaphor, which describes the mutual and ever-changing relations between the work and the listener (or the text and the interpreter). Consequently, one can talk of music as of space-time, as of border (*limes*) (Liimets & Kotta 2008: full paper p. 4).

The following sections of this article are organized according to the method and aim mentioned above. It is a collection of principles which reveals significant analogies and similar approaches in thinking and structuring in visual art and music. My attempt is to systematize these approaches, and embed them into a universal approach to composition, analysis, hierarchy and form (see Example 1 above). My own commentaries to the concepts of the authors introduced below will be allways placed in square brackets. The main points – categories, application, examples – of each concept introduced here will be subsumed in list-like form to give an overview as to enable comparison (this also includes how examples are realized graphically, from pure score to outlining and sophisticated graphs).

(A) Analytical approach: similar organizing principles of music and visual art on the micro- (material – forground), medio- (structure – middleground) and macrolevel (form – background), this mean consciously analytical approach not denying the importance of creative thinking

(B) Graphical approach: representation for analysis of music using simple graphical shapes, this mean conciously analytical approach with creative component through graphical methods

(C) Creative and analytical approach to composing and analyzing music which apply the principles of (A) and (B), this mean consciously creative approach which also includes consciously analytical thinking.

(A) ANALYTICAL APPROACH

I. Visual analysis of art structures

Carl E. L. von Lorck – *Grundstrukturen. Strukturanalyse des Kunstwerks* (1965)

In art analysis Carl E. L. von Lorck established the so called *Strukturforschung* which aimed to systematize the „material form" of artworks dwelling from the meaning of the term structure (structura – arrangement of components) and equalizing it with the term synthesis (see Lorck 1965: 7). The object of analysis are paintings, sculptures and buildings from different epoches and cultures. The aim was to come closer to the real existence of the artwork through structural contemplation. The questions were (1) to find in the analysis of the smallest elementary parts up to the entireness increasingly more exact characteristical features than historical styl analysis could offer since, and (2) through structural analysis support better (re)cognition of the world of thinking of the artist. This led to the problem of interpretation, congruenz of form and substance. „Could it be possible to find through comparison of the world view of artist (which is manifested in the artwork) with the world view of a philosopher, poet or musician similarities within the human art creations of one epoch?" (Lorck 1965: 8). It was not the aim to mechanically put the artwork into a ready compartment, the method was intended to include also creative thinking during the analytical process. Structural and object oriented analysis should be synthesized with personal cognition. „Personalities are reqiered to understand personalities, the gap between the intellectual level of both creater and receiver or interpreter should not be to big"

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(Lorck 1965: 9–10). The application of this study was educational and directed to art students in high schools, arts schools and academies as a guide and handbook.

The system of Lorck includes three main categories: *Feinstruktur* (microstructure), *Gesamtstruktur* (entire structure), *Grundstruktur* (basic structure). The second and third category are mostly relevant in graphical/visual context only and will be interessting if analyzing graphical scores of the 1950s and 1960s (which is beyond the scope here). The entire structure can be regarded as a mixture of medio- and macrolevel, the basic structure is interpretative and generalizing in character establishing explicitely the macrolevel and providing a certain kind of background level. Analysis of microstructure takes place mostly on forground level, basic structures are something like middleground(s).

The microstructure is regarded as the characteristics (*Verhalten* – „behavior") of the immediate neighbours of the elementary parts (*Elementarteile*, *Kleinteile*), the entire structure is regarded as the arrangement of the whole artwork, and the basic structure means repeating organizing principles in the artwork. Lorck offers also the term reference (*Bezug*), also reference relation (*Bezugszusammenhang*), and reference connexion (*Bezugsconnex*), his first question is about interdependence in close and distant relation of the elementary parts to each other, the second question is concerned with typical characteristics of such relations and „behaviors" (Lorck 1965: 18–19).

Microstructure (*Feinstruktur*):

[Point of departure is the graphical material as single phenomena in relation to each other – microlevel, foreground]

1) Parallel reference (*Parallelbezug*)
2) Similarity reference (*Ähnlichkeitsbezug*)
3) Contrast reference (*Gegensatzbezug*)
4) Without reference (*Bezugslosigkeit*)
   [Small groups are already structural in character, agglomorating not only basic shapes but also combination of basic shapes on mediolevel – middleground]
5) Identity reference of small groups (*Identitätsbezug der Kleingruppen*)
6) Alternating reference of small groups (*Wechselbezug der Kleingruppen*)

Entire structure (*Gesamtstruktur*):

1) Grid structure (*Roststruktur*)
2) Network structure (*Netzstruktur*, variation of grid structure)
3) Polar axial symmetry (Polare Symmetrie als Achsenstruktur)
4) Contrast structure (*Kontraststruktur*, variation of 3)
5) Absolute polar structure (*Absolute Polarstruktur*, variation of 3)
6) Star structure (*Sternstruktur*)
7) Oval structure (*Ovalstruktur*)
8) Ring structure (*Kreisstruktur*)

Basic structur (*Grundstruktur*):

If the elementary parts, their small groups, the groups and entire structure are combined we observe a change of relevance.

1) Harmonisation of elementary parts (*Angleichung der Kleinteile*)
2) Surrounding of a centre group (*Ringsumgebensein der Mittelgruppe*)
3) Oval overal form of entire structure (*Ovalausrundung der Gesamtstruktur*)
4) Connection of details in contrast (*Verbindung von Details im Gegensatz*)
5) Balance of axial structure (*Waageschalen der Achsenstruktur*)

Categories:

Main idea: reference connexion of elementary parts [microlevel – foreground]

3 main categories: microstructure [material on microlevel - foreground], entire structure [structure and form – middleground], basic structure [typical forms and models – background]

6 different classes of reference connexion

Application:

Structural analyzing and understanding basic composing principles, form and hierachies

Levels: micro-, medio-, and macrolevel

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Direction of hierarchy: inductive (from detail to the whole: exact measuring), and deductive (from the whole to the detail: overview analysis)

Examples:

i) Black-white graphic-schematical representation of main features of works under observation (partly fragments);

ii) Several pictures in grey scale print as appendix

II. Score-based and aural/listening analysis

Hansgeorg Mühe – *Musikanalyse* (1978)

The analysis method is not restricted to a distinct style or composer, it includes works of several stylistic character (Mühe 1978: 8). Mühe speaks of establishing of form (*Formbildung*) as music-dramatic process, he discriminates form into four main typical categories: a) closed, tight and clearly structured form, b) closed-loose form, c) open-loose form, at the beginning tight structure becomes more and more loose, d) open form, which becomes more and more condensed (Mühe 1978: 157).

Relation of formal parts to each other (Mühe 1978: 181)

1) **Repetition:** exact repetition is rare, varied repetition is already free variation
2) **Variation:** includes inversion, sequence, transforming, e.g. character transforming
3) **Correspondence:** rhythmical – especially in tempo and textur –, sonorities or – rare – melodies
4) **Evolution:** growth of length of the units, ornamented widening, melodical or rhythmical elaboration
5) **Intensifiying:** increasing, dramatical concentration, sequenced development , culmination; interlocking or linking of heterogen motivees or figures; contrapunctal, rhythmical or harmonic densification; melodic development
6) **Reduction:** motivic splitting, elimination and liquidation
7) **Contrast:** as confrontation, collision or conflict of several parameters like rhythm, sonorities [vertical] or in melodic structures [horizontal]

The book introduces a) formal analysis, b) analysis of harmony, rhythm and melody, c) introduction to composition, d) content and meaning. It includes exercises for students, which are not ment to be regide schemes but as possibility to discriminate and describe the most common groupings of form types. It is a metodological guide to achieve an complete musical analysis (but the chapters can still be treated seperately as well) (Mühe 1978: 8–9).

Categories:

1 main idea (form as dramatic process) [typical forms and models - background]

4 typical categories (2 statically remaining in condition, 2 dynamically transforming) [typical structures - middleground]

7 principles of formal relations [material – forground and structure – middleground]

Application:

Structural analyzing and understanding basic composing principles, form and hierachies; creative producing of graphical output

Levels: micro-, medio-, and macrolevel

Direction of hierarchy: inductive (from detail to the whole: exact measuring) and deductive (from the whole to the detail: listening [aural] analysis)

Examples:

i) traditional notation (harmonic and rhythmic reductions, melodic extractions, only fragments)

ii) graphical outlining and underlining within traditional notation (brackets, rings, arrows etc.)

iii) *Abbildungsgeometrische Darstellung*; network structure; iconic, idexial and symbolic representation; intuitive, systematical and system-based approach; use of basic graphical shapes

Clemens Kühn – Formenlehre der Musik (1987)

The analytical approach to Formen*lehre* and *Formen*lehre means on one hand teaching types and models of music, and, on the other hand, pointing out the essential of a practice during a particulary epoch. The Formen*lehre* includes also creative thinking during the analytical process, *Formen*lehre makes vivid and creates awareness of the personal characteristics of distinctive phenomena in individual historical practice. The main outline of the book focuses on (1) form ideas (*Formideen*) and (2) creative formal principles (*formale Gestaltungsprinzipien*) demonstrating them with concrete examples within the historical process of change (Kühn 1987: 8–9). Kühn provides as structure

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of the book as well as a mental system nine form-ideas: (A) Form and interrelation, (B) Movement, (C) Balance, (D) Logic, (E) Following the vocal, (F) Affect and drama, (G) Reprise as event, (H) Idea of cycle, (I) Connections and freedom. But he is aware of inherent problems of his systematization but it nevertheless offers insight into the essence and kind of formal creations (*Wesen und Art formalen Gestaltens*) expressing also the way musical thinking (*musikalische Denkweise*). Kühn points out that mostly the nearly taken-for-granted can cause amazement. Why a art work will not break into parts, into a mere collection of ideas but is received as consequent entireness? Musical form as realized *gestalt* of a though, an part or a cycle of parts requieres the creative act of establishing form (*Formen*), only conscious form building will make elements be related or in contrast. In different times form building was aimed differently to relate and achieve coherence in detail as well as in entirety. „This depends on the imagination of form in its historical specificity and way of thinking. The form-idea, which is establised in the inner ramification and outer construction of a work, and the historical change of that ideas are equaly important" (Kühn 1987: 13).

The book is didactical in the sense of giving inspiration to think further in the same direction. The chapters are independent from each other, but references to other chapters should be followed. It do not want to be regidly systematic, but provides basic ideas and their emergence through different ages.

Form and interrelation (Kühn 1987: 13)

1) **Repetition:** ideas and parts will be repeated unchanged, they are alike to each other
2) **Variant:** ideas and parts are changed, they are similar to each other
3) **Difference:** ideas and parts are separated to each other, they are just different
4) **Contrast:** ideas and parts disperse away and are driven against each other
5) **Unrelatedness:** ideas and parts have nothing in common, they are alien to each other

Categories:

2 main categories: [form-ideas and creative formal principles - background]

9 form ideas [partly structure – middleground, partly form models – background]

5 formal creative principles [material – forground, partly structure – middleground, partly form – background]

Application:

Levels: micro-, medio-, and macrolevel

Direction of hierarchy: inductive (from detail to the whole)

Examples:

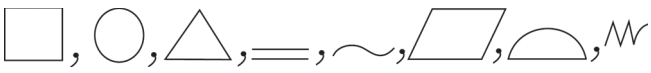
i) traditional notation (harmonic reductions, melodic extractions, only fragments)
ii) graphical outlining and underlining within traditional notation (brackets, cycles, arrows etc.)

(B) GRAPHICAL APPROACH

I. Score-based and aural/listening analysis with simple graphical shapes

Hansgeorg Mühe – *Musikanalyse* (1978)

Mühe's hierarchy relies on the inductive principle of finding motives which in combination form larger groups and again longer units. But he is also aware of deductive fragmentation until reaching the smallest units (Mühe 1978: 14). Stating the reason of using graphical representation of sections of a composition Mühe points out that arabic and roman numbers, small types and caps of our alphabet as well as borrowings from alphabets of other language groups (cyrillic and greek) reveals several limitations (not enough letters, similarities between the signs of several alphabets, arabic numbers would be mixed up with bar numbers [and roman numbers with harmonic scale degrees]). Therefore he suggests to represent smallest units or motives with graphical shapes (see example 2).



Example 2. Mühe's [basic] graphical shapes.

Each alike musical unit must be represented by the same shape. The use of graphical shapes enables clear representation of motiv, their relations and development (Mühe 1978: 15). Diminuations and augmentations can be expressed by shorter and longer signs [horizontal aspect], change of melodical ambitus can be shown by variation of the heighth of the sign [vertical aspect]. If only the beginning of a motive is used, the sign will be open to the right; if only the end of a motive is be given,

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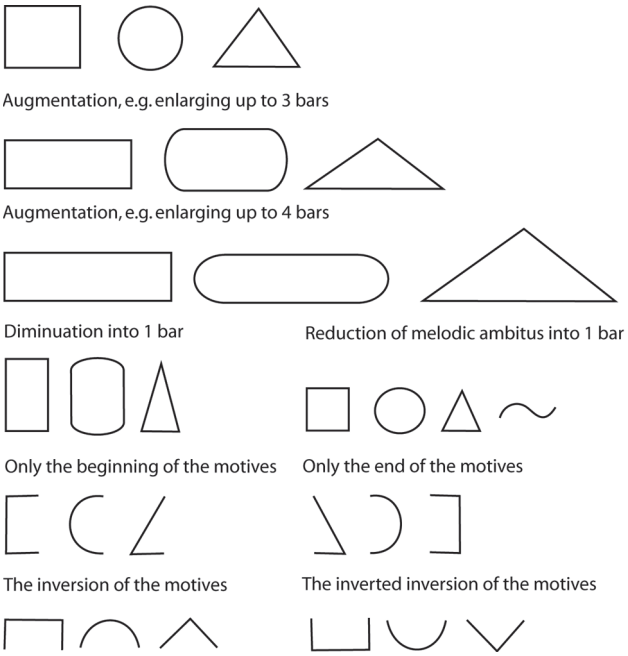
the sign will be open to the left. Other variations like inversion can be expressed by turning the sign in both direction.



Example 3. Mühe's variations of [basic] graphical shapes.

Mühe suggests for opening-motives the use of rectangular shapes but for ending-motives triangle shapes. Line and compound line-shapes he uses on the same level as surface-shapes, although for a more systematical approach there should be made a distinctions in meaning (line-shapes only for subordinated small figures within units). In this case surface shapes would be better used only for motives which are further developed. But Mühe alerts to over-systematize, according to him it would be not useful to develop a complete system which would turn to be unpractical and sophisticated but would not be flexible enough to analyse yet unknown musical structures. Sequencial appearing [say transposition] of a same motive can be expressed by shifting the shape up- or downwards. Small melismatic variation can be signalized by adding a point into the shape itself (see Mühe 1978: 16–17, and Example 6 below).

Mühe developes on basis of sonata form and *Liedform* a terminology which he illustrates with graphical representation. But, the term „motive" is used on several hierachical levels and it is not always the smallest unit (as we would expect). One motive will be represented by one shape, motivical junctions will given small letters, motive groups and complexes should be indexed by caps [using outline brackets to embrace the shapes included] (Mühe 1978: 20 ff).

Each graphical shape should represent (a) characteristic ornamental figure (*charakteristische Spielfigur*), (b) a small melodic section (*kleiner melodischer Abschnitt*). In some cases motive and [small melodic] section are not identical, motive is here the smaller unit. Mühe suggests for syntactical subdivision of units also the use of comma and semicolon between the signs. He defines section as a figure which obtains its function in relation to the whole piece [structure and form – medio- and macrolevel – deductive approach], but a motive will effect as an impulse the whole piece [material – macro level – inductive approach]. A motive not necessarily coincide with the bar-structure, one sign/shape could represent also two bars or one single note in one bar etc. (Mühe 1978: 24–25).

Bar	(Ornamental) figure (Figur)	(Melodic) section (Abschnitt)	[Unit] (Abschnitt)
	Motive	[Theme]	
	Motive	Motive	Model
	Smaller figures (*Kleinfiguren*)		

Example 4. Mühe's different notion of motive within the concret bar and the abstract unit.

Terms in square brackets are added by myself in addition to Mühe's mostly intuitive use of similar terms on different levels.

Mühe's graphical shapes and schemes represent either the whole textur of a section or whole composition, or different voices seperately using also above not shown other principles of graphical representation (arrows in different shapes, directions and positions) of different features (like pitch structure, rhythm, melodic contour). From the visual point of view there are some features represented clearly: identically units appear with the same sign (inclusivly variational principles like augmentation, diminuation, transpositional shift). Others features, e.g. more complicated variations, fragmentations and modification in melodic contour, are not represented unambigously. Also comparison

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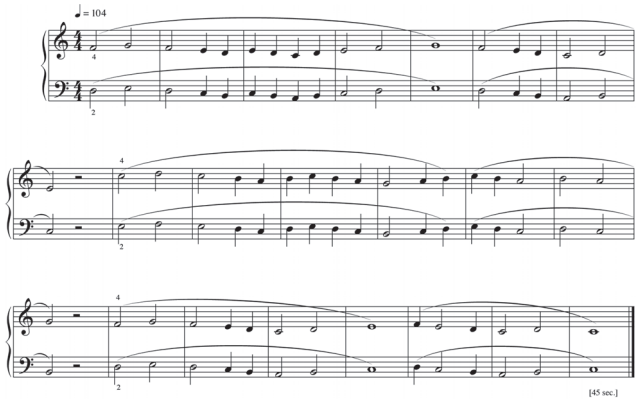
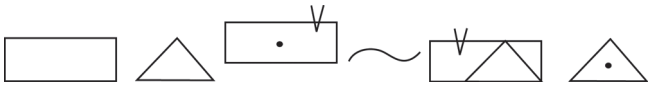
of analysis graphs of different pieces on the basis of graphically identical shapes for musicaly identical units is not possible. But, this was not intended by Mühe. Problematic are highly variational structures which are not represented analogously on the graphical level. There is also the problem of defining the vertical and horizontal axis clearly. Sometimes the proportions are quiet correct (horizontal axis), in some cases it will rise questions, especially on the vertical axis, which can be defined as relative (registers) as well as partition according the voice structure in a score (compare Mühe 1978: 46–49). Obviously the aim of the graphical shapes is to help the eye and mind discriminate the units on the basic notion of contrast, also in the case, if the musical material is highly related to each other. Although in Mühe's shapes several musical features and parameters are merge into one shape, sometimes one feature (melodic contour and direction, fragmentation of another motive etc.) can be more significant and effects the visual appearance of the shape.

There are several problems of graphical representation, among them those of contiquity and factorality,[3] and appearance[4] which can not be treated in this article further. But, in chapter 5 (exercises for analysis of form), Mühe underlines that his graphical pictures are only visual aids to represent the formal development. If sombody would search for or have found another method to visualize a single work, works of a composer, or a certain style, one would be free to use the own approach. But, „the shapes should not end in themselves!" His aim is to analyse musical works, but not to practice a graphical representation of musical forms (Mühe 1978: 134).

In several contexts of his book Mühe demonstrates the practicability of his pragmatic approach with examples as well from classical to 20th century music. As didactically interessting for studying phenomena of both musical form, and representational principles (and their problems) he uses examples from the „Mikrokosmos" (for piano) of Béla Bartók (1881–1945) (Mühe 1978: 134 ff).



Example 5. Béla Bartók „Parallel motion with change of position" (Mikrokosmos, vol. I, 16), score.



Example 6. Béla Bartók „ Parallel motion with change of position" (Mikrokosmos, vol. I, 16), graphical analysis by Mühe (1978: 135).

Mühe describes: A five-bar [first, main] motive [bars 1–5] is followed by a three-bar [second] motive [bars 6–8] which appears rhythmically slightly modificated and with another final tone at the end of the piece [bars 20–22]. Than the main motive appears again transposed up including a small melodic modification and shortened at the end – compressed into four bars [bars 9–12]. After another three-bar [third?] motive [bars 13–15] the main motive appears again in four bars [16–19], this time shortened (original third-bar-figur is omitted) and with a melodic modification. As a result of this modification the motive becomes simultaneously the second [three-bar] motive [see bar 6–8] with an additional bar in pre-position. In this case we not index the melodic variation – as usual – with a dot, but with adding the sign of the second motive. [Unfortunately the meaning of the little fitch in the main motiv is not described, but probably it could be an index for shortening modification the motive].

II. Aural analysis with simple graphical forms

Lasse Thoresen – Form-building transformations: an approach to the aural analysis of emergent musical forms (2007)

The following section shows how simple graphical shapes can be used systematically for listening analysis of music of several epochs. According to Lasse Thoresen,

> the present approach to analysis, termed Aural Sonology, results from an attempt to analyze music as represented on a phonogram, rather than on

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a score. This approach is particularly useful for dealing with music for which no score is available (e.g. electroacoustic music) or music in which there is no simple one-to-one correspondence between score and the aural phenomenon (which is often the case with late romantic and impressionist music as well as contemporary music), although music in which such a correspondence is evident (e.g. classical Western music) is by no means excluded, as long as the piece is represented on a phonogram. Aural Sonology shifts the focus of musical analysis from applying analytical concepts to what the analyst sees in a score, towards what she hears. The musical object is not entirely an objective fact but is partly constituted by the listener's intentions. Accordingly, in order to achieve a systematic analytical approach with a degree of intersubjective consensus, the analysis must be backed up by a theory of listening intentions, and these must not only be identified but practiced by the analyst: she must learn to observe, discern and select a specific listening intention of her own mind, as well as be able to set and maintain a consistent focus on selected strands of the multidimensional reality of music as heard (Thoresen 2007).

Aural Sonology takes as its starting point the experience of ordered, sonorous gestalts in music as heard. The point of departure of the analyst is, accordingly, an emergent phenomenon; from here, she proceeds in the direction of defining her experience by assigning to her experience a description in terms of structure. The initial perspective is holistic: the analyst starts with a concrete phenomenon as a given whole, meeting it with an attentive and receptive consciousness. The holistic orientation in combination with elements of applied phenomenology and structuralism, make the present project different from a number of more traditional approaches to analysis; e.g. it differs from the methodological position of operational structuralism that tries to explain phenomena through the disclosure of generative relationships within the object researched (Thoresen 2007).

Three levels of aural analysis (Thoresen 2007)

1) **Sound objects:** single sound objects, analyzed in spectromorphologic terms [material – micro- and nanolevel]
2) **Elementary gestalts:** combinations of sound objects into small patterns [structure – mediolevel]
3) **Form gestalts:** patterns of elementary gestalts [form – macrolevel]

The general isotopes relevant to form building (Thoresen 2007)

1) **Time-fields:** the temporal segmentation of the musical discourse
2) **Layers:** the synchronous segmentation of the musical discourse
3) **Dynamic form:** time directions and energetic shape
4) **Thematic form:** recurrence, variation, and contrast
5) **Formal transformations:** looser and firmer gestalts, transformations between them

Taxonomic listening is manifest through the listener's tendency (Delalande 1998: 26–27, cited after Thoresen 2007)

1) To distinguish sufficiently large morphological units such as sections or chains and to make a mental list of them;
2) To qualify these, but just enough to distinguish them from each other,
3) To notice how these units are arranged in relation to one another,
4) To try and memorize all this data

Categories:

4 main levels of approaching the aural phenomenon [nano-, micro-, medio-, and macrolevel]

5 general isotopies

4 principles of taxonomic listening

Application:

Analyzing and understanding sound objects, their elementary and form gestalts; creative producting of graphical output.

Levels: macrolevel

Direction of hierarchy: deductive (from the whole to the detail: listening aural analysis)

Examples:

i) iconic, indexed and symbolic representation; intuitive, systematic and system-based approach, use of basic graphical shapes
ii) graphical shapes similar to Lorcks *Gesamtstruktur* (entire structure) (see Lorck above)

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MELODIC ELEMENTS, LINES				TEXTURES		
COMPLEXITY	INTEGRAL	PARTITIONED		INTEGRAL	PARTITIONED	
Very complex						
Relatively complex						
Medium complex						
Relatively simple						
Very simple						

Example 7. Table of simple graphical shapes introduced by Thoresen (2007).

Example 7 shows different shapes of melodic elements, lines [horizontal] and textures [vertical] devided in two categories: integral and partitioned. It reveals similarity to Mühe's differentiation into beginning-motives and ending-motives represented by only one part of the graphical shape (see Example 3). Ring structures are regarded to be simple, as much corners the shape has the complexity of the element increases. This system is used for both horizontal and vertical phenomena. It is interesting to mention that all shapes include the dividing vertical dash in the middle, obviously to center the focus and avoid false interpretation. But for my opinion the vertical dash would not be necessary at all, because turning the shapes around would not led to confusion. The whole theoretical background, practical realization and systematic application together with pictural and sounding examples of Lasse Thoresen's aural analysis with simple graphical forms can by explored best in his article of the internet journal JMM (Journal of Music and Meaning) (Thoresen 2007).

(C) ANALYTICAL AND CREATIVE APPROACH

I. Composing and analysing with characters and simple basic shape associations

Usko Meriläinen – *Field–Line–Point* (1960s/Suilamo 1988)

The „character technique" of Finnish composer Usko Meriläinen (1930) which metaphorically referres mostly to simple graphical shapes[5], is according to Harri Suilamo (1988: 48)

> founded on the use of musical characters, molecular micromotives of strong identity, not as thematic building blocks but as the foundation for an edifice rising out of the inherent features and mutual relationships of his units. In Meriläinen's own analysis there are three ways of putting across the characters: as clusters forming a FIELD, as LINE shaped by a melodic stream, and as POINT-like event comprising an individual note or interval, often as repetition. The use of characteristics provides the composer with not only an intuitive means of shaping musical thoughts but also a chance to develop these thoughts further and ultimately to define the overall form. It is in its very universality and simplicity a valid counter-argument to the parameter calculation of serialism and the randomness of aleatory, and it can also be approached as a parallel view to the other trends avoiding extremes and seeking compromise that entered the public awareness in the 1960s and thereafter in Europe.

II. Composing and analysing with simple basic shapes

Gerhard Lock – *Seven elements* (2005/2009)

The method presented here relies on the assumption that (1) both analyzing and composing deal with the musical material (microlevel), its structure (mediolevel), and form (macrolevel) according to the open hierarchy introduced above; (2) music unfolds time and space characteristically in each epoch (see Cogan & Escot 1976). To generalize musical material and its organization within the framework of the horizontal and vertical dimension and look how these elements are interrelated helps us understand music of all epochs (Lock 2005: 29). The importance of horizontal-vertical relation was already pointed out earlier in the first half of the 20th century. According to Helga de la Motte-Haber we can generalize best the thinking of Ernst Kurth with the polarization of horizontal line and vertical chord (de la Motte-Haber 2005: 300). Generally two-dimensional, vertical–horizontal relations can be graphically represented as schemes, diagrams, and coordinate-systems (Lock 2006a: 244 pp.).

Example 8 shows simultaneously (and particularly) the most common possibilities of representing musical events within a global two-dimensional horizontal-vertical graphical score or diagram. All axes can be defined differently within the range from exact to undefined. This effects the shapes, figures and forms, and their meaning used within the coordinate-system.

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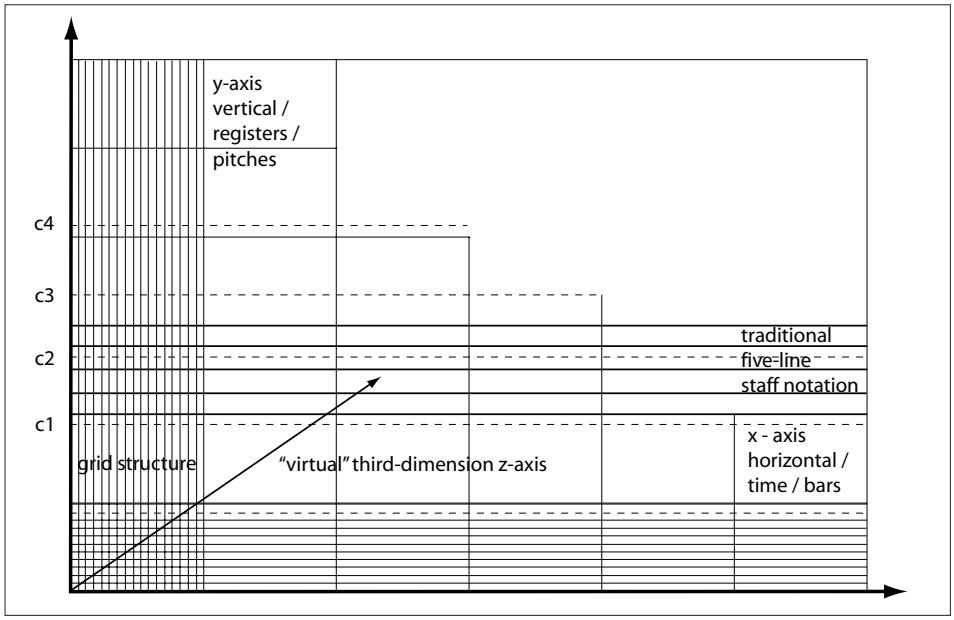

Definition of x-, y-, and z-axis:

1. continous
2. discrete
2.1 precise
2.1.1 non-linear
2.1.2 linear
2.2 relative
2.2.1 proportional
2.2.2 non-proportional
3. referential
4. symbolic
5. undefined

Example 8. Vertical–horizontal coordinate-system including several possibilities from detailed microlevel (grid structure), mediolevel (bars), macrolevel (whole piece represented within one coordinate-system). Traditional five-line staff notation is shown in the middle with straight vertical lines and dashed vertical lines to indicate register lines (e.g. pitch class c). The upper-right part of the coordinate-system is empty because both the vertical and horizontal axis must not necessarily be discretely defined.

According to Erhard Karkoschka (1966: 19) we discriminate four categories of notation: (1) precise notation, (2) frame notation, (3) referential notation, (4) graphical notation – from (1) to (4) the degree of exactness decreases. In the 1960s there was the tendency to invent new notational system which would be as well practical as most exact. Karkoschka (1966: 10) shows eight conditions to be needed to establish a new notation:

Eight conditions for new notation (Karkoschka 1966: 10) should:

1) include all notation technical possibilities of the traditional notation
2) mostly not contradict the traditional notation
3) use new, up-to-date, technical possibilities
4) have the ability to espress complicated structures more simply than traditional notation
5) have a broad, more neutral basis to represent many styles notationally
6) have better possibilities to enable transformation into individual notations, e.g. to non-exact values and musical graphics
7) have the possibility to represent more than 12 values within one octave
8) establish a meaningful connection between audible and visual aspects:

   a) visual events must be direct translations of the audible events and the amount of mental work to understand them should be reduced to a minimum

   b) the single sign and the entireness of all signs should be shaped according to the viewpoint of visual sense (*Augensinn*), this means eye-psychological „wellformedness“

But, most of the new notation systems did not achieve wide acceptance because their level of in/exactness and concreteness/relativity made them often unpractical. The traditional five-line staff notation we can regard as the most practicable one being the best in balance between concrete and relative representation of different aspects of music.

The following Example 9 shows seven elements regarded to be important for creating and understanding music: (1) point, (2) horizontal dash, (3) horisontal curved line, (4) vertical dash, (5) opening triangle, (6) closing triangle, (7) rectangle.

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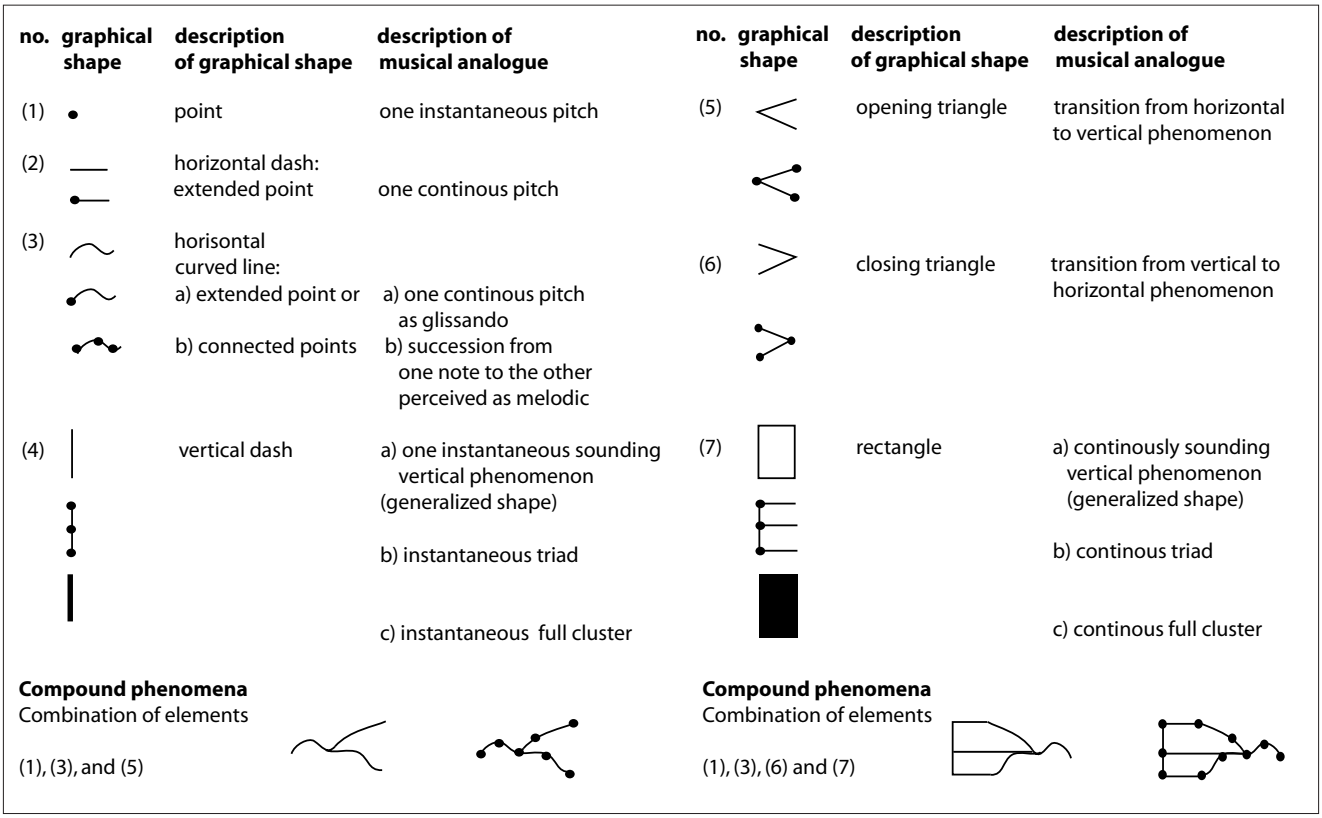

Example 9. Seven elements (basic graphical shapes) to create and analyze music on micro-, medio-, and macrolevel. Compare this scheme with the examples shown in Lock (2005: 31–32) demonstrating horizontal and vertical types of texture (melodie and sonic field), and the principles of their arrangement in time and space as well as transitions between the different types of texture.

These seven elements are expressed in basic graphical shapes abstractly representing the musical material, and how it can be shaped and transformed on the micro-, medio-, and macrolevel.[6] If the point (1) indicates most clearly the analogy to one single pitch (as instantaneous event) and the horizontal (2) dash the continous pitch, the further elements are indeed allready derivatives of the first two elements. In some sense the second element (2) can also be treated as the multiplication of the first element (1). However in my interpretation the sounding extention of one single note becomes the multiplier. The third element (3) is already a variation of the second (2), if adding points to indicate the change of direction of this line (or at least illustrate rhythmical aspects more in detail) it will become a compound shape. The fourth element (4) is more ambiguous because a simple dash will not express, what is sounding simultaneously. Adding points would make this much clearer – see version (4a). Using a broader line style – see version (4b) – would at least indicate a full cluster. The fifth (5) and sixth (6) elements are variants of each other indicating a more textural event transforming from a horizontal event (or streams of events up to a vertical phenomenon (like a chord or cluster) and *vice versa*. Here the element is left open, but further elaboration would allow to fill in the space with other elements. The seventh element (7) is the most ambiguous and unspecified, especially in the pure outline version, which only indicates a undetermined soundfield-like event that's inner structure and character is not clearly defined (only the ambitus and relative time of sounding is indicated). There are shown also two possible refinements, one showing a lasting triad (which turns this element into a variation of the second element), the other (completely filled rectangle) the most extreme emerge of cluster-like event. Of course, all elements following (5) can be modified and changed in their outline contoures (see (3) as modification of (2)) according to the better concordance between visual an audible events (see Karkoschkas condition no. 8). The seventh element (7) is the most questionable – but it should like (5) and (6) in the first place express symbolically and in outlines the sounding phenomena taking place within

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a longer time. Also in its very simplest shape it suggests that at the beginning and the end would be clusters, inbetween only the two outer stable voices. Elements (1)–(4) belong in general to the microlevel of musical (and graphical) material (single note, chord), but element (3) can already be treated as possibly belonging to the mediolevel (structure) if it would be part of a larger motivical or thematical unit. Elements (5)–(7) belong to the mediolevel (structure) and can be extended up to macrolevel (form) if they include several substructures. The example shows also compound shapes of elements (1), (2), (3), (6), and (7).

These are basic graphical shapes and their purpose is to didactically simplify the most important phenomena in music while using two-dimensional repretsentation as intermediate interface. We can find analogues especially for the elements (1)–(2), and (7) in the pedagogical attempts of the artists Paul Klee and Wassily Kandinsky. In the first half of the 20th century the relationship between music and visual art was very tight, especially in the 1920s at the Bauhaus in Weimar and Desssau (Rüden 1999, Põldemaa 1998, Roskill 1992, Grohmann 1958, Klee 1953/1968). Artists like Paul Klee („Pedagogical sketchbook", 1925/1968) and Wassily Kandinsky („Point and line to plane. Contribution to the analysis of the pictoral elements", 1926/1947) tried to establish theoretical concepts on definition and analysis of simple visual shapes for the purpose of educational application. According to Mark Roskill this is influenced by Russian Formalism:

> Russian Formalism comes to mean in this way a method of analysis, devised for literature but applicable also to the visual arts, which seeks to understand the workings of a given art form in terms of how specific effects are technically and structurally achieved. The conception operating here is both allied to and distinguished from study of the work in terms of its psychological effect on the reader or viewer. It relates to that form of study – as in [Boris] Eichenbaum's conception of the „dominant" as „that which underlies the organization of any poetic style" – insofar as it hinges on the way in wich individual elements are perceived in relation to one another, within the field of operation of the work as a whole. But it stands apart by virtue of the way in which an underlying „blueprint" is projected, as for an architecture in which material and functional considerations stand to the fore. There is no need correspondingly to bring in, as Kandinsky did in his 1919 articles on point and line, principles of perception that answer to inner cognition and associative needs; the elements are more like „counters" in the way they are taken to work as functional components, and the page or canvas, rather than serving as a context over and against which the elements assert themselves organically, becomes a surface on which their operations as distinct, potentionally repeatable units lay themselves out to view, in diagramlike or diagramatically graspable fashion (Roskill 1992: 91–92).

Egon von Rüden points out that Kandinskys artistical concept, which he applicated as teacher „can not be understand directly as application or embodiment of aesthetical rules, as he explored and analyzed them e.g. through development of lines and their effect in pictures. He was aware that this rules would not be enough to enable his students to be self-consciously creative. Rüden underlines that the experience of beauty in abstract visual structures or in from objects abstracted structures relies for Kandinsky on laws, that our perception is „naturally" given and which are to a certain extent learned, but which can be also further extended. Such tradition must not be further developed to lead consequently to art, but it must be studied because it effects the perception and view of a creative person. „Through teaching and study of such rules which we always more or less have learned in terms and views of our artistical culture Kandinsky will avoid, that they would establish themselves by the learners as unconscious guidelines and conductive rules for their creational work in general" (Rüden 1999: 87).

According to Will Grohmann „*Point and Line to Plane*, Kandinsky's major theoretical work of the Bauhaus period, makes emphatic use of the analytical method without losing sight of synthesis. The book deals with the elements of graphic art. It is a fragment, the sequel to it was planned but never written" (Grohmann 1958: 179). „Through pedantic investigation of each separate phenomenon – both in isolation and interaction with other phenomena – to draw comparisons and general conclusion." (Kandinsky, cited after Grohmann 1958: 180). Following Grohmann on his description of Kandinsky's theoretical thoughts, a work could consist of a single point: the single point in the center of the pictures surface is „the archetype of pictural expression." (Kandinsky, cited in Grohmann 1958: 181). Grohmann explains further that by moving it around and repeating it, we progress to awareness of the chord where point and surface meet. This chord is

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also to be found in nature, in architecture, in sculpture, and in music (Grohmann 1958: 181). The line is not only a element in painting and the graphic arts, but also in music (notation), in poetry (meter), in technology (Eiffel tower), in nature (crystals, tissues, skeletons). Like Klee, Kandinsky points to analogues with and divergences from the forms of nature (Grohmann 1958: 181).

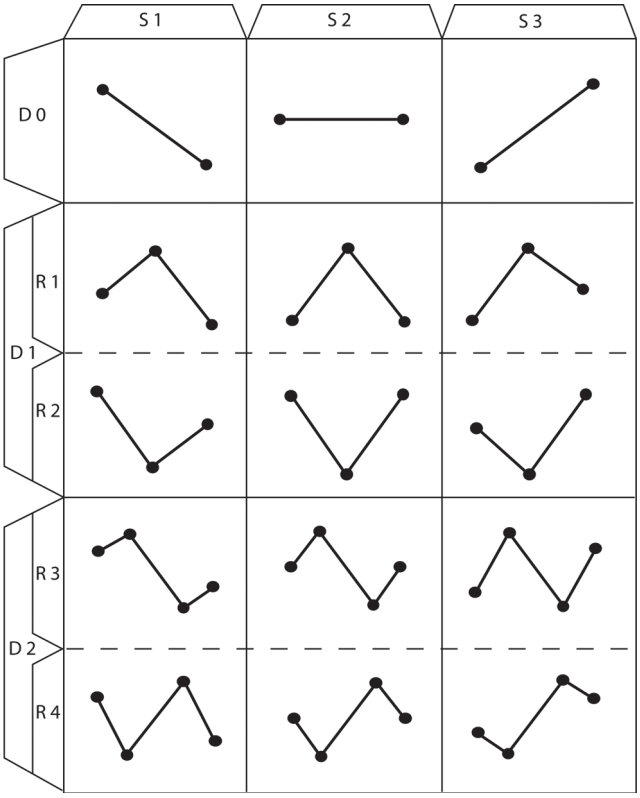
Example 10 below shows possibilities of more detailed analysis and creating motivical units. It consists indeed of above introduced element (1) and element (2) in different combinations establishing a typology of smallest melodical elements on the micro- and foreground level (material), belonging further also to the medio and middleground level (structure). On the abstraction level here we need not express sliding perception of successive tones by an analogous graphical curve. A similar principle I applied when developing the basic shapes of elements (4)–(7) (see Example 9) who's aim is only to indicate (and on the very macro- and background level) and symbolize the general activity. For this reason the shapes offered in Example 9 are most universal and applicable on different levels of analysis and composing, perharps as a simple visual aid or, if needed, enable us to exactly renotate the music.

The system of seven elements can be used both intuitively and manually for the digital and systematical using drawing program for creation. The elements can be arranged (1) in one-line-succession denying therefore polyphonic possibilities. Here it can serve as a most global form analysis tool for the macrolevel, yet not in the sense Mühe suggests. Mühe's system uses the shapes as pure symbols or icons, but in the system introduced here they already have an indexed meaning. (2) On the medio- and microlevel we can express multivoiced structures which can be most sophisticated and rely on a precise definition of the vertical axis (e.g. in traditional 12 tone octave division). Therefore, this becomes a very flexible tool useful for both composing and analysis within different hierarchical levels.

Analyzing the schemes created with the system on a pure structural level we can apply several questions:

Questions for structural analysis:

1) Is the scheme created consciously or intuitively?
   Or was it a semi-conscious process?
   What can be said about the process of creation?



Example 10. Typology of melodic contour analysis of Charles Adams (1976: 179–215), quoted after Cook (1987: 196–197)., in which he defines a four note complex as basic unit: first note, last note, highest note, deepest note. This causes 15 different types of contours, partly given only two or three note types which (after Cook) may accur, if two or three of the characteristics coincides (e.g. the last note can be the highest, the first note can be the deepest, or there can be one first, deepest or highest note etc.).

2) What elements are used?
   Are there elements which are not used in a particular scheme and why?
3) How many times (statistically) are each of the elements used and to what extent they are repeated?
4) How can the elements of the same class be grouped?
   Do they build any motive/theme-like structure?
5) How can the elements of different classes be grouped?
   Do they build any motive/theme-like structure?
6) How can groups of elements be grouped into larger units?

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7) Does the created scheme (artwork, „piece") have a clear beginning and ending?
Why or why not?

Further I suggest to apply as analytical strategy to approach the graphical „score" the categories of Kühn and Mühe, and for pure visual analysis those of Lorck (see above), attempting to (1) reflect upon the creational process, (2) search for regularities and structural features of not self-done schemes. At first we should look at the pure structural categories of Kühn's chapter A – Form and interrelation: 1) repetition, 2) variant, 3) difference, 4) contrast, 5) unrelatedness. For a more comprehensive view on (i) overall form in relation to formal standard models, and (ii) formal-dramaturgical aspects we can proceed with Kühn's ideas suggested in the following chapters – (B) Movement, (C) Balance, (D) Logic, (E) Following the vocal, (F) Affect and drama, (G) Reprise as event, (H) Idea of cycle, (I) Connections and freedom. Mühe's categories are useful to judge what a scheme, so to speak the imaginable music behind it and the graphical outline, in formal-dramaturgical way would tell us: 4) Evolution: growth of length of the units, ornamented widening, melodical or rhythmical elaboration; 5) Intensifying: increasing, dramatical concentration, sequenced development, culmination; interlocking or, linking of heterogeneous motives or figures; contrapunctal, rhythmical or harmonic densification; melodic, development; 6) Reduction: motivic splitting, elimination and liquidation; 7) Contrast: as confrontation, collision or conflict of several parameters. Concerning un/completeness of the schemes we can assume that a creation developed in bounded space (sheet of paper) will mostly not be as perfect as we perharps intend or should achieve. But it is important to at least attempt to create with very little material in bounded space (imaginably musical and visually concrete) art which could be complete as well as open in structure, length, and meaning. This leads us to the possibilities of static and developing/dynamical/transitional ways of formbuilding which Mühe suggests: a) closed, tight and clearly structured form, b) closed-loose form, c) open-loose, at the beginning tight structure becomes increasingly loose, d) open form. On the energetical and emotional level there are also several possibilities to describe what is happening in a scheme, but this is beyond the scope of this article.

It is important to try to imagin the possible sound derivable from the elements in interaction in connection with pure visual psychology categories of movement and spatial behavior of the elements. However it is possible to a certain extent the system could provide with the first four elements for the micro- and mediolevel. On the macrolevel, and using elements (5)–(7) (which themselves are built from the previous elements), we tend to express ideas and relations in a more generalized manner, the information inherent at that point increases while the level of abstraction have been raised to a maximum.

The system demonstrates general principles of formal structuring of both visual and sounding art, enabling a high degree of detail on the medio- and microlevel. It can also express several hierarchical levels, on which music unfolds in time and space. Through the compatibility and general congruence of visual and sounding events it meets to a certain extent also Karkoschkas (1966: 10) conditions of new notation but it is open also to be modified up to highly arbitrary musical graphic.

Categories:

3 main levels approaching the sounding phenomenon: micro-, medio-, and macrolevel

6 microstructural categories (Lorck)
formal relation categories (Mühe)

5 categories of form and interrelation (Kühn)

Application:

Analyzing and understanding music, their elementary and form gestalts; creative producing of graphical output

Levels: micro-, medio-, and macrolevel

Direction of hierarchy in creation and analyzing: inductive (from detail to the whole: motive-analysis); deductive (from the whole to the detail: listening analysis)

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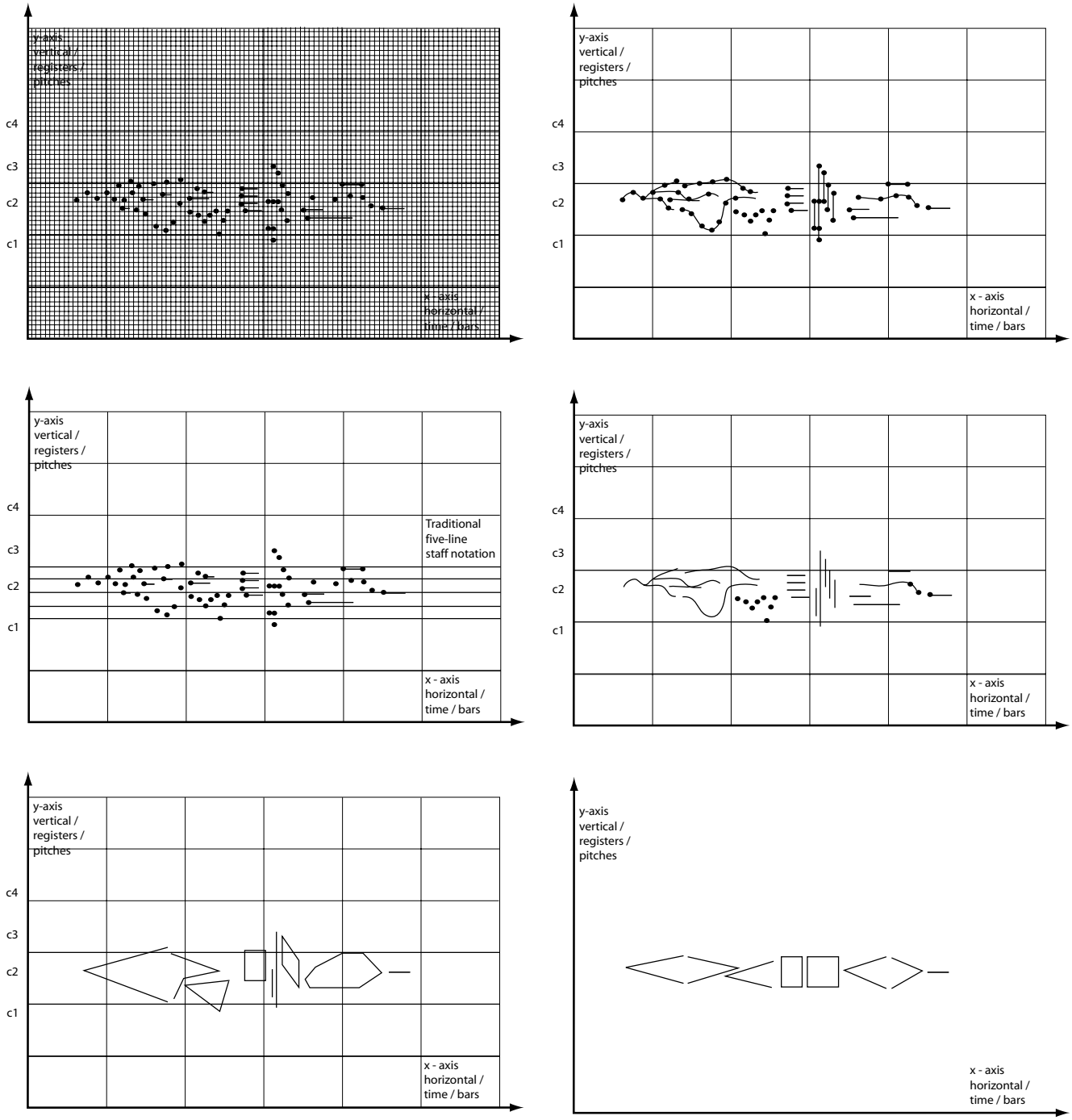
Examples:

i) iconic, indexed and symbolic representation; intuitive, systematical and system-based approach, use of basic graphical shapes



Example 11a-b. Graphical scheme of a composition on different levels.

Example 11a shows a small graphical composition on microlevel (foreground) using only elements (1)–(4). The background of the graphical score is fine grid which can be define for example as time seconds (horizontal axis), it also could be sixteen notes as duration. The bold vertical lines can be defined as larger time units or bar lines. The bold horizontal lines are already defined as register borders. Example 11b shows the

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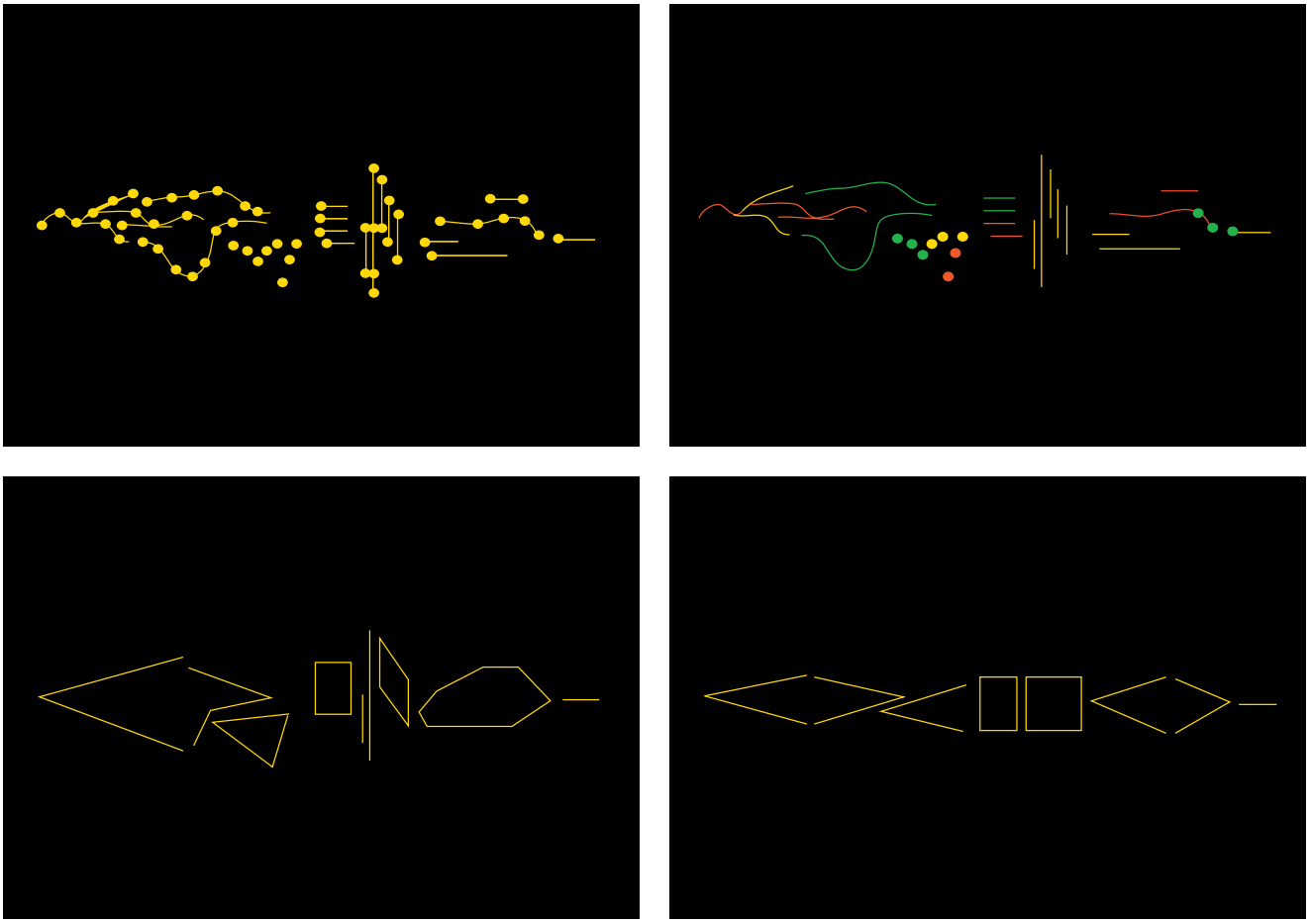
same composition without the fine grid. Example 11c adds line-connection between the some of the first elements of the composition indicating possible glissando between the otherwise non-connected short sound events. Example 11d shows in the first part glissando-lines only, but some sound events are still be treated as discrete. In the vertical dimension the points of the fourth elements ar vanished, too, indicating now a cluster-like sound event. Example 11e and 11f are in comparison of those as 11a-d (which demonstrate visual and musical material on micro- and mediolevel) generalizations of the same composition on the macrolevel outlining the entire shapes of several sound events building groups. 11e still considers roughly with a concrete defined vertical. 11f do not consider anymore the vertical, it shows only the overall structure of the small piece generalizing the events into symbolic transitional or static sounds – it reveals the most significant formal development of this composition. These graphs also can be analyzed according to Mühe's and Kühn's categories, it reveals on the macrolevel considerable logic and balance.

To provide a direct access to the sound of the pure creation the free software Coagula Light (Ekman 2003) can be used to either draw the graphical shapes into the interface of the program or use drawing software to produce shapes of one's desire (inserting them as BMP). There is only the restriction that the background of the picture must be black to indicate the software that there is no sound to synthesize (white colour indicates white noise), the most neutral colour is yellow, for stereo panoramic use the colours red and green indicates left and right channel. Before playing the graphical pictures must be processed.

Examples 12a–d show the same small composition formatted for Coagula Light software on as well micro- as also medio-, and macrolevel. Pictures as shown in 12a and b can be refined as long as we would achieve a considerable sound composition. Pictures as shown in 12 c and d can be treated as a kind of acoustic analytical proof on an more generalized level.



Example 12a–d. Graphical scheme done for Coagula

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IMPLICATION AND CONCLUSION

Analytical and creative thinking manifest in the thoughts of both the composers/artist, and music/art theorists to an conscious and unsconscious integrative process. Musical form emerges if elements and ideas join together to establish smaller and larger units. This happens on several levels in an open hierarchy, but its origins can be traced back to the material of as well musical as visual art.

I should underline that the approach to analysis and composing presented here is quiet preliminary, it is the attempt to amalgamate (1) theoretical knowledge in both music theory and visual theory of structure and perception, and (2) creative cognitions and practical purposes with (3) reflectivity, and different levels of un/consciousness while creating and analyzing. This applies to one's own creation as those of others.

The applicability of my system for educational purpose is related to learning styles and personality and the way of approaching and realizing tasks both visually and verbally. According to Susan A. Santo we can discriminate lerners into visualizers and verbalizers, which refers to how people process information (see Santo [2007]).

Visualizers prefer to process information by seeing.

They tend to:

1) Think concretely
2) Have high imagery ability and vivid daydreams
3) Like illustrations, diagrams, and charts
4) Prefer to be shown how to do something
5) Be more subjective about what they are learning

Verbalizers prefer to process information through words.

They tend to:

1) Think abstractly
2) Have low imagery ability
3) Like reading text or listening
4) Prefer to read about how to do something
5) Be more objective about what they are learning

Santo suggests that „some learners are equally comfortable with both styles, while others will have a strong preference. To be certain that you reach all learners, use different methods of instruction" (Santo [2007]).

Indeed we should be aware of the difference in approach of visualizers/verbalizers and integrate this knowledge into the teaching of both music theory and composition. Using visual principles we have the great possibility to immediately represent both conscious and unconscious thoughts (and those which are in the middle) at a glance. Creative and analytical principles can be practicized sucessfully intuitively and wholly without a given system. But it is the level of reflection which allows us to both explore and invent new structures also systematically.

The usefulness of my system of seven elements for both musicians and nonmusicians lies in the possibility to combine analytical and creative thinking in a most practicable way not relying on knowledge of traditional staff notation. Further this gives musicians the possiblity to approach music from a different angle, through analogues with visual art, which will broaden their abilities in the own field of expertise. For nonmusicians the system provides a tool for approaching music in terms of wider known principles of visual perception. It can support the introduction of the principles of both traditional staff and avantgard graphical notation. It can deepen the understanding of the unfolding of music in time and space in general, and of basic principles of music theory and composition in particular.

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Endnotes

[1] The term visual representation includes also gestural representation, which brings us to the field of choreomusical relations (see Hodgins 1992) not touched here. But we should mention Cheironomy as the oldest method to represent sound (known since Aegypt times), were musicians indicated the parameters of music unifying them through hand gestures in the air, but with loose of clearness (Stockhausen 1963: 178). In a broader sense this leads also to conducting and the gestural part of solfege in educational practice.

[2] Interaction of electronic music and painting was investigated by Valk-Falk, Lock & Rosin (2005). For interrelations of music and visual art see Brougher et. al. (2005).

[3] „[…] contiquity and factorality are present everywhere in the perceptual world without as yet forming signs; we will say, in case, that they are mere indexicalities. Perception is perfused with indexicality. Each time two objects are perceived together in space, there is contiguity; and each time something is seen to be part of something else, or to be a whole made up of many parts, there is factorality. Two items present together only become a sign, however, to the extent that one of them, identified as the expression, is directly perceived but not in focus, and the other one, the content, is indirectly perceived while at the same time being the focus of the relation" (Soneson 2007: 6–7).

[4] „What we call „appearance" is always composed of such successions of aspects, a melody, as it were, which allows us to estimate distance and size; it is obvious that this melody can be imitated by the movie camera but not by the painter with his easel. It is understandable if painters feel that the curve will suggest the movement of lines more convincingly than straigt projection, but this curve is a compromise that does not represent one aspect but many. Neither this nor any other system can claim that it represents the world „as it appears" , but within the orthodox perspective arrangement, we deal with tangible, measurable relationships" (Gombrich 2002: 217).

[5] Probably Meriläinen was aware of principles used in Finnish art education, because since the 1960s thanks to Unto Pusa (1913–1973) they were mostly familiar with Kandinsky's composition theory. Pusa applies in his book „Plastillinen sommittelu" (1961) Bauhaus principles which unify art work (point, line, surface, volume, colour, light) and their compositional techniques (rhythm, oposition, static, dynamic etc.) (Põldemaa 1998: 6–7).

[6] These elements I discovered and applied since autumn 2005. First of all I used only six elements, but recently I decided to refine this adding shape (3) – considering to be more consequent in systematization.

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