Gradation and its Relation with Structures of Discourse, Visual Forms and Musical Processes

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This article[1] is a result of the author's research on the music of composer György Ligeti[2]. The study of the concept of gradation, in different areas of human thinking, is a consequence of a research methodology that tries to exceed the limits of the proper discipline -- in this case music. More precisely, theoretical ideas about musical processes, visual forms, structures of discourse and semantic processes constitute a work that tries to find points in common and differences in different contexts. In this way, concepts used in one area are, when necessary, adapted to a new field of study.

In this text we bring together ideas from the writer Edgar Allan Poe (in particular, those appearing in his essay *The Philosophy of Composition*, in which he reveals the compositional ideas of the poem *The Raven*), show examples of gradation applied to diverse visual forms and establish relations between visual and sound processes in the music of the composer György Ligeti.

Gradation and climax

According to Jean Dubois (2011, p. 312): "Gradation is a rhetorical figure that consists of presenting a series of ideas or feelings in such a way that what follows always says a little more (*ascending gradation*) or a little less (*descending gradation*) of what precedes. The author presents the following examples.

• Ascending gradation: *March, run, fly, where honor calls you* (Boileau's *Lutrin*).

• Descending gradation: *A breath, a shadow, a nothing, everything gives him a fever* (La Fontaine's *The Hare and the Frogs*).

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[1] Some parts of this article appeared previously in the paper "Visual gradation in the micropoliphonic music of György Ligeti", *Ouvirouver*, Uberlândia, v.12, n.2, p. 390-405, 2016.
[2] It treats, mainly, the research developed in Vitale (2008; 2013).

According to Pierre Fontanier (1977, p. 333), the following example is formed by two opposed gradations; the first one is descending and the second one is ascending. Observe that, in the first gradation, the passage goes from the most concrete (to make) to the most abstract (to conspire - to imagine). In the second gradation, the aspects are stronger and stronger; notice that Cicero not only manages to understand the malicious intentions of Catilina, but can also see them, penetrate them and feel them. The first gradation (descending) causes the second one (ascending) to be perceived with increased intensity.

• You cannot, Cicero says to Catilina, *make* nothing, *conspire* nothing, *imagine* nothing that I do not only not *understand*, but also do not *see*, do not *penetrate* deeply, do not *feel*[3].

In the field of rhetoric, the ascending gradation is also known as climax (a Latin term that comes from the Greek term *klimax* and means "stairs" or "gradation").

> In classical rhetoric, the climax was synonymous with gradation or "figure of addition: in effect, it reiterates what was already said; before continuing the ascending march it delays with the previous elements" (Quintiliano, IX, 3, 54). In other terms, the first word or words of the second and successive units of the period reiterates the last member of the preceding unit, in the proper or modified form, in view of accenting, by repetition, the effect that is prepared in the outcome:

> "Thus, at a certain moment, the virtue of the small fish passes from the mouth to the hook, from the hook to the line, from the line to the fishing rod and from the fishing rod to the arm of the fisherman" (Pe. Antônio Vieira, *Sermão de Santo Antônio*, III).

> Nowadays, the word is used to designate the moment of bigger intensity in the sequence of ideas or events, and in general is located near the end and sometimes identified with it. In this sense it occurs in poetry, the short story, *novelas*, novels, theater, and all written work where the ascending or descending gradation is necessary (oratory pieces, essays, and journalistic articles). However, the word appears more frequently in dramatic language, notably in tragedies, to designate the critical instant when tension reaches an apex that forsees the outcome (Moises, 2004, p. 78)[4].

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[3] Original text: "Tu ne peux, dit Cicéron à Catilina, rien faire, rien tramer, rien imaginer, que non-seulement je ne l'entende, mais même que je ne le voie, que je ne le pénètre à fond, que je ne le sente" (FONTANIER, 1977, p. 333).

[4] Original text: Na retórica clássica, o clímax era sinônimo de gradação ou "figura de adição: com efeito, retoma-se o que já foi dito e, antes de prosseguir a marcha ascendente, demora-se nos elementos anteriores" (Quintiliano, IX, 3, 54). Noutros termos, a primeira ou primeiras palavras da segunda e sucessivas unidades do período retoma(m) o derradeiro membro da unidade precedente, na forma própria ou modificada, tendo em vista acentuar, pela repetição, o efeito que se prepara no desenlace:

If the ascending gradation is frequently identified with the climax, the descending gradation is understood as an anticlimax[5].

Summarizing the previous ideas we can say that the concept of gradation pre-supposes an increasing or decreasing of the ordering of ideas or feelings. We also notice that gradation is linked to repetition, either literal or modified. As Moisés affirms (2004, p. 78, citing Quintiliano), "before continuing the ascending march, it is delayed in the previous elements"[6]. By repeating or reiterating previous ideas we make the discourse more gradual, because we avoid the appearance of a leap. In the example cited by Moisés, the gradation is constructed, specifically, from the concatenation of members of the following form -----A/A-----B/B-----C/C-----D/D-----etc. See below:

"[...] from the mouth to the hook (A), from the hook (A) to the line (B), from the line (B) to the fishing rod (C) and from the fishing rod (C) to the arm (D) of fisherman"[7].

Taking the notion of climax as "the moment of greater intensity in the sequence of ideas or events" (Moisés, 2004, p. 78),[8] we can notice that gradation has a fundamental role in this process. It is exactly from an increasing ordering of facts or ideas that the climax is reached. In other words, it must always be an ordered accumulation of elements according to a gradational series. This means that the order of the ideas will rigorously be taken in consideration.

"De maneira que, num momento, passa a virtude do peixezinho, da boca ao anzol, do anzol à linha, da linha à cana e da cana ao braço do pescador" (Pe. Antônio Vieira, *Sermão de Santo Antônio*, III). Modernamente, emprega-se o vocábulo para assinalar o momento de maior intensidade na seqüência das idéias ou dos acontecimentos, de modo geral situado próximo do fim e por vezes com ele identificado. Revestindo tal sentido, ocorre em poesia, conto, novela, romance, teatro, e toda obra escrita em que a gradação ascendente ou descendente se torna necessária (peça oratória, ensaio, artigo jornalístico). Entretanto, a palavra surge com mais freqüência na linguagem dramática, notadamente de cunho trágico, para assinalar o instante crítico em que a tensão alcança o ápice que prenuncia o desfecho" (MOISÉS, 2004, p. 78).

[5] Some authors suggest that the anticlimax is not formed alone by a gradation but by two successive opposing gradations. It is exactly this relation of thematic opposition that defines, in this case, the anticlimax. See Georges Molinié (1992, p. 54-55).

[6] Original text: "antes de prosseguir a marcha ascendente, demora-se nos elementos anteriores" (MOISÉS, 2004, p. 78, citing Quintiliano).

[7] This structure is known as continued anadiplosis (reduplication), see Fontanier (1977). When what is repeated is not a word but a syllable, the procedure is called - metonymically - dorica castra. Notice that the Latin name used to designate this phenomenon is also an example of this procedure.

[8] Original text: "o momento de maior intensidade na sequência das idéias ou dos acontecimentos" (MOISÉS, 2004, p. 78).

Gradation of effects

In *The Philosophy of Composition*, Poe shows the method followed in his poem *The Raven*. Precisely, his aim is to demonstrate that no part of the composition is a product of randomness or intuition; the poem is developed step by step with the precision and rigor of a mathematical problem (POE, 1846, p. 163).

According to Poe, the compositional process must start with the establishment of an arrival point. In other words, the climax of the work must be clear for the author before the beginning of the writing process itself. Once the moment of greater intensity of the work is determined (and the effect that the author seeks to create), all the preceding elements must be guided toward this point. Let us see, briefly, how this process happens in the poem.

Poe suggests thinking carefully about the length of the poem. In this sense, he considers that the literary work should be neither very long nor very brief. In each one of these cases the work loses the important effect caused by the totality. Specifically, he affirms that if the reading is interrupted with other mundane activities, it loses "the immensely important effect derivable from unity of impression" (Poe, 1846, p. 163). As a function of these ideas, Poe concludes that approximately 100 verses are satisfactory for his poem.

Then, the poetical tone is defined. With respect to this, the author considers that the most appropriate tone is sadness, more specifically, the tone of melancholy.

Next, he defines an element upon which the entire discourse can turn, a refrain. This structure is represented, in the poem, by the word *nevermore* spoken by the raven.

Based on the premise that death constitutes the most universally melancholic subject, it is determined that a theme of great poetical intensity could be a lover speaking of the loss of his beautiful, beloved woman.

The first stanza written by the author is the 16th (the poem has 18 stanzas), and represents the apex of the poem. It is exactly at this moment where the monotonous answer of the raven reaches the greatest degree of cruelty; the lover asks with great anguish and despair if his soul will arrive to embrace the beautiful Lenore and the raven answers with the expected refrain, "nevermore".

Let us look at some aspects with respect to the previously exposed ideas.

In this essay by Poe, the gradation of the discourse appears as an essential element. The apex of the poem (16th stanza) constitutes the reference point for the generation of all the elements of the work. Concretely, it is from this stanza that the others will be graded. The preceding stanzas are ordered in an ascending gradation and the posterior ones in a descending gradation.

In this text, gradation is a product of the intellect and not the fruit of inspiration. This figure is developed from a rigorous and meticulous technical work, in opposition to romantic postulates linked to inspiration and unrestrained impulses. Poe proposes a composition based on a meticulous work, where each sentence or rhythm is "weighed", "measured," and "quantified." (In historical terms, this means the demystification of the poet's work, at a time when inspiration was highly esteemed).

The criterion of economy is also very important. Those superfluous or secondary elements that are far from the main goal and that could interfere with the gradation process must be eliminated. This fact implies the considerable importance of the ordering. Gradation assumes a clear order that must be strictly followed; its effectiveness, in summary, depends on this.

The extension of the poem appears as a consequence of the gradation. If the form is very brief, the reader will not be able to perceive a certain intensity. If the form is very extensive and the reader interrupts the reading with other activities then the effect caused by the gradation is lost. In summary, the impression of unity (and the perception of gradation) is caused only if the reading is done at one time.

The refrain does not always appear identical. Throughout the poem it suffers minimum modifications; the ideas are changed but the monotony of the sound is conserved. For example: *Only this and nothing more*, *Darkness there and nothing more, Quoth the Raven "Nevermore"*. The refrain also experiences a gradation.

In Poe's short stories we find similar characteristics to the ones commented on before. In fact, "technically, his theory of the short story closely follows the poetical doctrine: a short story must also start with the intention of obtaining a certain effect, then the author will 'invent incidents, combining them in the best possible way so that the preconceived effect is reached...' " (Cortazar, 1973, p. 33)[9].

The atmospheres generated by Poe produce a mystery that is fed step by step and maintained until the end. The mystery is the product of a linguistic context based on intense events where the secondary elements are suppressed. We can say that in Poe's hands, "a short story is [really] a literary machine of creating interest" (Cortazar, 1973, p. 35)[10].

The reader's attention is captured by means of a careful dosage of information. Todorov (1978, p. 168) notes that in Poe,

> gradation is the law of several short stories: Poe catches the attention of the reader by a general announcement of extraordinary events that he wants to narrate; after that he presents, with many details, the background of the action; then the rhythm accelerates until reaching, often, a final sentence charged with the greatest significance, which at once illuminates the skillfully maintained mystery and announces a fact, in general a horrible one.[11]

The French poet Charles Baudelaire (1873, p. 20) did not fail to notice the form as Poe attracts the reader.

> With him every entry into a subject is attractive, without violence, like a whirlwind. His solemnity surprises the mind, and keeps it alert. We feel at once that something grave is at stake; and slowly, little by little, a history is unfurled, the interest of which rests upon some imperceptible deviation of the intellect, upon an audacious hypothesis, upon an imprudent dose of nature in the amalgam of the faculties. The reader, as if taken with vertigo, is constrained to follow the author in his entangling deductions.

Gradation of forms

The phenomenon of gradation is part of our daily visual experience. As Wong affirms (1972), "things that are close to us appear large and those that are far from us appear small". The author comments that "if we look at a tall building with a facade of regular window patterns from a very low angle, the change in size of the windows suggests a law of gradation" (p. 39). This happens because the element (the form) is the same; what varies gradually is only the distance with respect to us.

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[9] Original text: "técnicamente, su teoría del cuento sigue de cerca la doctrina poética: también un cuento debe partir de la intención de lograr cierto efecto, para lo cual el autor 'inventará los incidentes, combinándolos de la manera que mejor lo ayude a lograr el efecto preconcebido...' " (CORTÁZAR, 1973, p. 33).

[10] Original text: "un cuento es una máquina literaria de crear interés" (CORTÁZAR, 1973, p. 35).

[11] Original text: "la gradation est la loi de nombreux contes: Poe capte d'abord l'attention du lecteur par une annonce générale des événements extraordinaires qu'il veut raconter; ensuite il présente, avec beaucoup de détails, tout l' arrière-plan de l'action; puis le rythme s'accélère, jusqu'à aboutir, souvent, à une phrase ultime, chargée de la plus grande signification, qui à la fois éclaire le mystère savamment entretenu et annonce un fait, en général horrible'' (TODOROV, 1978, p. 168).

When observing a row of trees we also have the impression of gradation. The trees next to us are perceived as bigger than those that are more distant.

If a person moves away gradually we also experience a gradation. As in the previous examples, when the person moves away, their size diminishes progressively. In the start of this process we perceive the person's movement clearly. We clearly notice one step to the next. However, when the person is at a considerable distance from us, their movement cannot be seen with the same clarity. Furthermore, at a certain point, it is impossible to know if the person continues walking or has halted. In this threshold of our perception differences become imperceptible and the person disappears completely from our visual field.

In this last example there is a modification in time that the two previous examples do not have. This gradual evolution in time of a person or object moving away can be compared with the evolution of the rhythmic structures found in Ligeti's music.

Consider the following case. Four voices play the same four eighth note rhythm (4-4-4-4). Gradually, all the voices increase the number of attacks per unit of time following the model shown in Figure 1 (4 = four eighth notes; 5 = quintuplet; 6 = sextuplet, etc.).

I	4	4	4	4	5	6	7	8	9	10	11	12	13
II	4	4	4	5	6	7	8	9	10	11	12	13	14
III	4	4	5	6	7	8	9	10	11	12	13	14	15
IV	4	5	6	7	8	9	10	11	12	13	14	15	16

Figure 1. Four voices gradually increasing the number of attacks

In the beginning, we will perceive the passage from one superposition to the subsequent, because we will notice both the increase in the density of attacks as well as the modification of the resultant rhythmic pattern. However, as the rhythmic process advances we are no longer able to distinguish one superposition from the following. (For example, we will not notice the difference between overlaps such as 12-13-14-15 and 13-14-15-16.) At a certain point we will have a similar impression to that experienced when a person gradually distances themselves from us. It will be no longer be possible to discriminate the different moments of the

rhythmic process and, furthermore, we will have the impression of a *continuum*. More specifically, once the threshold of fusion of the attacks is exceeded, we will lose the impression of movement and we will perceive a continuous sound with iridescences of the timbre.

It is worthwhile to remember that the greater the number of voices, the greater the impression of *continuum*, because the possibility of fusion increases. While the four voices example is reminiscent of works as the *String Quartet N. 2* (third movement, for example), *Atmosphères* constitutes an example of fusion caused by the high number of voices. Wucius Wong (1972) comments about interesting aspects in relation to the gradation functions in the area of graphical design. Let us examine some aspects studied by the author.

According to Wong, the work with gradation presupposes that the changes are not only gradual but also ordered. This procedure "generates an optical illusion and creates a sense of progression, which normally leads to a climax or series of climaxes" (p. 39).

The author understands that any form can be transformed gradually into another, and that there are several ways of accomplishing this. "The formal units can have gradations of shape, size, color, texture, direction, position, space, and gravity" (p. 39). The author proposes, for example, to gradually rotate a figure (35, a), to gradually change its position (35, b), its form (35, c), and its size (35, d), to gradually transform a circle into a triangle (36), to link gradation with repetition (44), and to alternate opposed gradations (while one form increases in size the other decreases, 45), etc. (p. 39-48). See these examples in Figures 2 and 3.
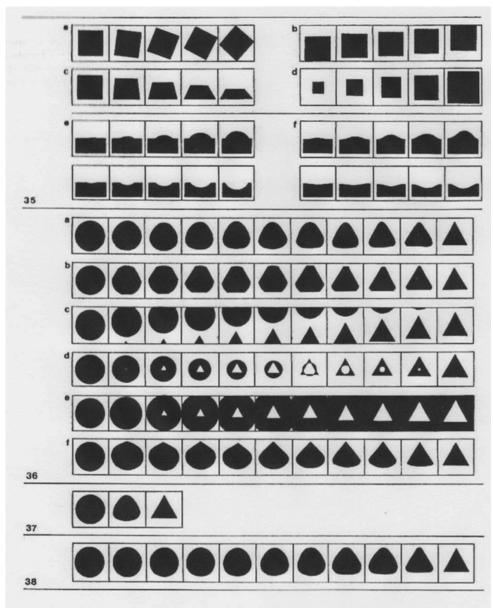
Figure 2. Examples of gradation in graphic design
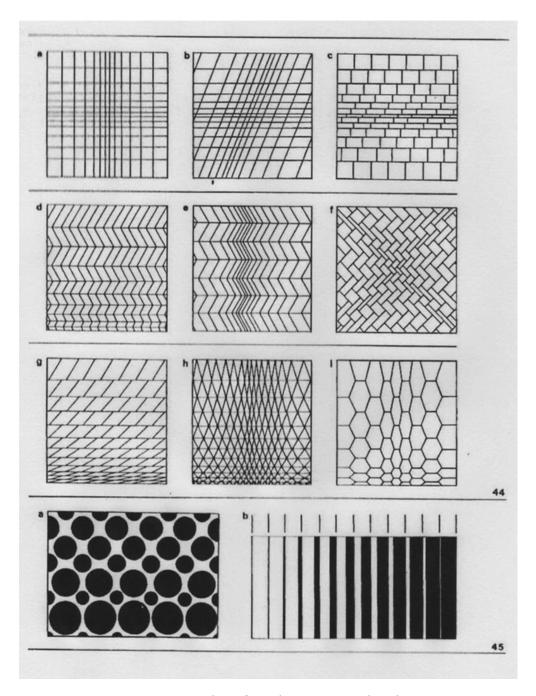(Wong, 1972, p. 40).

Figure 3. Examples of gradation in graphic design
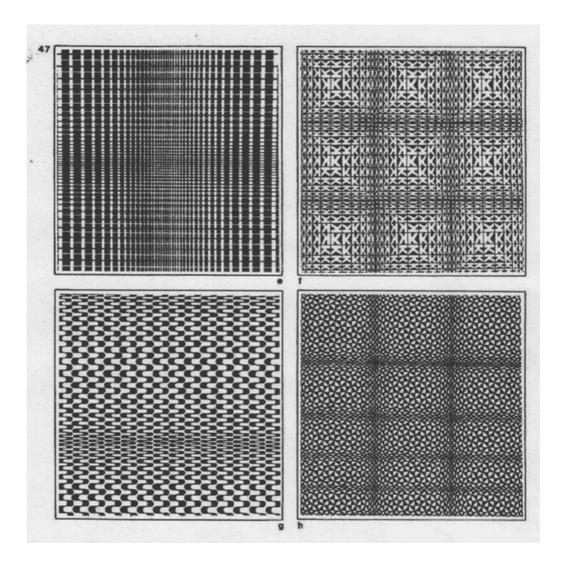(Wong, 1972, p. 44).

Figure 4. Examples of gradation in graphic design
(Wong, 1972, p. 48).

In each gradation process there are a number of steps needed to transform one figure into another. This quantity of steps determines the *speed of gradation*. In general terms we can say that when more steps are used in a transformation the gradation is slower; when less steps are used the gradation is faster. Whereas the latter can provoke visual jumps, the former (if it evolves slowly and imperceptibly) can produce an optical illusion. Very fast gradations can give the impression of absence of gradation, whereas extremely slow gradations are close to the repetition effect (p. 41). In figure 2, see (firstly) a rapid transformation in 37 and (secondly) a change in the speed of gradation in 38. Other examples of gradation structures are seen in Figure 4.

***Accellerandi and Ritardandi:* Two Ligetian Models of Visual and Sound Gradation**

When observing the gradual evolution of a superposition of contiguous structures[12], where the transformation is guided exclusively by the gradual passage from one pulsation to another, we notice that the degree of modification of the resulting rhythmic pattern is also minimal. There is a remarkable similarity between the different superpositions that can be examined by looking at a visual representation of the process. Let us see two examples.
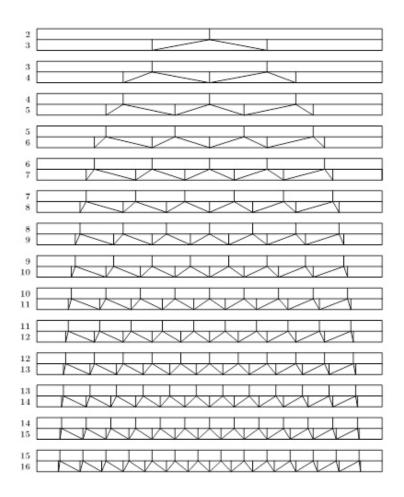

Figure 5. Gradual modification of the structure of an *accelerando* (2-3…15-16).

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[12] We call "contiguous structures" the rhythmic structures that are adjacent inside the same scale. For example, taking as a reference value the half note, we will have the following scale: 1 half note, 2 quarter notes, a triplet of quarter notes, 4 eighth notes, a quintuplet of eighth notes, a sextuplet of eighth notes, etc. This type of scale supports all the micropolyphonic music of Ligeti from the later fifties to the middle seventies. The composer proceeds similarly in both pitches and rhythm, using clusters (that is, contiguous or near elements) of pitches or clusters of rhythmic structures.
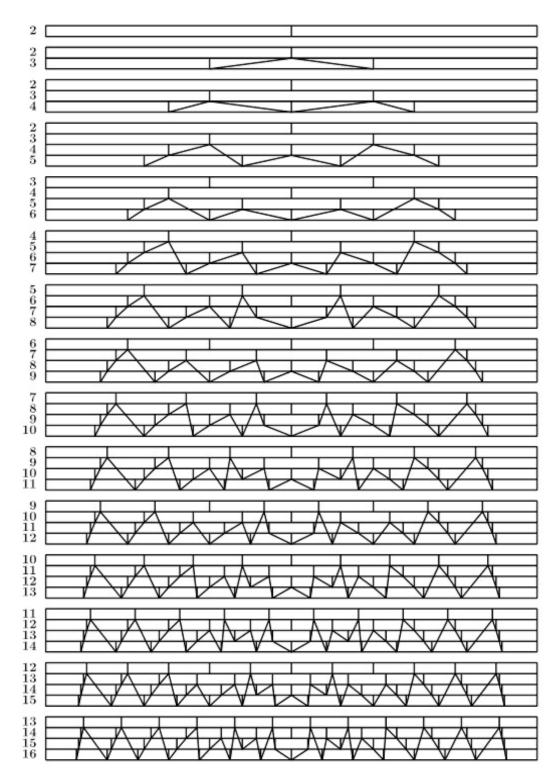
Figure 6. Gradual modification of the structure of an *accelerando*
(2, 2-3, 2-3-4, 2-3-4-5....13-14-15-16).

In Figure 5 we show the gradual evolution of two superposed structures, starting with 2-3 and going up to 15-16. In Figure 6 we show a process similar to the pre-

vious one, but first increasing the number of structures until reaching the superposition of four (2, 2-3, 2-3-4, 2-3-4-5) and then growing to 13-14-15-16. We unite the successive attacks in order to highlight the minimal transformations occurred from the gradual growth of the rhythmic structures. The first attack, represented by the left bar, is not linked to the second one for reasons of clarity. If it were joined, the last attack would also have to be linked to the beginning of the other cycle to conserve the symmetry in the figure (let us remember that the structures are always symmetric).

By the figure we notice that it is a basic, elementary representation that suffers a continuous transformation. In each step the scheme is different from the previous one, however it maintains a great similarity. In the case of the evolution of only two structures, the degree of similarity is still greater.

On the other hand, looking at these representations it is difficult not to remember the interests that Ligeti manifested in other areas of art as well as science. The work of artists like Maurits Cornelis Escher (1898-1972), Paul Klee (1879-1940), and also Piet Mondrian (1872-1944) appears to have the same characteristics observed in the figures. Between the most important features we highlight: 1) the work with illusion generated from the gradual transformation of an image into another, 2) the continuous images produced by small movements that produce, beyond the high number of elements, the impression of something static, and 3) the minimal deviations performed in geometric figures that try to generate very small fluctuations. In the same way, the behavior of fractals, studied by fractal geometry, brings the importance of repetition of the same pattern in a different number and scale. In other words, the idea of self-similarity (not necessarily exact but statistically approximate) can be associated with both fractals as well as rhythmic evolutions of adjacent structures in the music of Ligeti.

The rhythmic evolutions shown in Figures 5 and 6, as they are formed by a progressive growth, can also be compared with the traditional technique of *accelerando*. Let us examine this aspect in more detail. As it is known, *accelerando* and *ritardando* are Italian terms with opposed meanings used in music to denote gradual changes in tempo. While the first indicates the passage from a slower process to a faster one, the second indicates the contrary, from a faster process to a slower one. In the music of Ligeti, the evolution of the proper rhythmic structures con-

stitutes the reflex of the actions of *accelerare* and of *ritardare* in the tempo. This fact denotes the search for precise composing that comes considerably close to a literally continuous variation of the time.

Rigorously we must consider that in the music of Ligeti, *accellerandi* and *ritardandi* are products of a complex superposition of accelerations or decelerations of the pulse and not of the temporal variation of a unique element. In Figure 6, for example, if we think about the evolution of four voices, we can conclude that it is about an imitation, or more specifically, of a *tempi* canon. We can interpret this process as imitation of tempi because, in fact, what is imitated is a pulsation that is a certain quantity of attacks with identical duration. It is about periodic phenomena where the rhythm idea is merged with the pulse idea. All the voices take the same route beginning with the division by 2 and arriving, gradually, to the division by 16. However they are all out of phase. While a voice makes the division by 2, another makes the division by 3, another by 4 and another by 5. Afterwards, the sequence advances a step up to 3-4-5-6, and so on. All voices accomplish the same scale of *tempi.* However, as they are out of phase, the resulting time is a product of the superposition of *tempi* that are operating at each moment. This fact constitutes a radical difference with the use of *accelerando* in the tonal music of the XIXth century. At that time the intention of superposing different *tempi* did not exist and consequently it does not have different and parallel evolutions of tempo. The explorations of tempo do not have, still, the forcefulness that we find later in the research undertaken by composers as Charles Ives (1874-1954), Conlon Nancarrow (1912-1997), Karlheinz Stockhausen (1928-2007), and Ligeti himself.

Rhythmic Gradation in Ligeti's Micropolyphonic Music

In Ligeti's music, especially that of the '60s and part of the '70s, the rhythmic construction is founded on the gradation idea. The *accellerandi* and *ritardandi* previously analyzed are no more than two gradations with opposing directions, one ascending and the other descending. The way Ligeti works with the superposition of *tempi* is based on gradation. In the observed out-of-phase structures, the composer transposes the same series of pulsations from the horizontal line to the vertical line. In other words, the same gradation is structural both in the evolution of time well as in simultaneity. Observing Figure 7 we note that the rhythms that form the horizontal axis are being progressively transferred to the vertical axis.

The sequence 2, 3, 4, 5, n is transposed to the superpositions 2-3-4-5-6, 3-4-5-6-7, 4-5-6-7-8, etc.
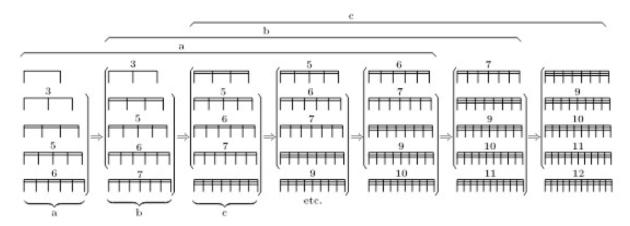

Figure 7. Horizontal and vertical gradations. Process of concatenation of rhythmic structures.

The example of Figure 7 brings another important aspect with respect to the notion of gradation: the relation of the already known with the new. In any gradual process there is a rigorous administration of the newness. It must always be a clear economic sense that regulates the process. The transference of elements between the horizontal and vertical axes, and the consequent union of planes, is no more than the consequence of repetition, of the reuse of structures. Taking the previous case we can affirm that in each step of the sequence we have only one new element. That is, of the five superposed structures (2-3-4-5-6), in the following step four are repeated (3-4-5-6) and one constitutes the newness (7). The discourse is structured on the basis of the concatenation of its members. See: A-B-C-D-**E**, B-C-D-E-**F**, C-D-E-F-**G**, D-E-F-G-**H**, etc.

Rhythmic processes in Ligeti's music always appear graded. The stubborn presence of contiguous degrees of the rhythmic scale constitutes a proof of this. In this type of compositional procedure used by Ligeti the scale is not only an element of reference for the construction; it confuses itself with the proper form of the process. In this sense we can affirm that the element itself does not have importance, because it is in the process where the element acquires its value. In consequence, the structure of the process is of extreme relevance and the relation by proximity constitutes a fundamental support. In the strictest sense, each new subdivision appears in relation of proximity with any other contiguous one. For example, a quintuplet of quarter notes will be next to structures such as four quarter notes,

or a sextuplet of quarter notes, considering not only the horizontal but also the vertical axis.

The rhythm field, as well as the pitch field, can be strictly graded. The duration parameter allows the establishment of a precise scale of rhythms (Figure 7 constitutes a proof of this). By its one-dimensional characteristic – different from timbre, for example, that has more dimensions - duration can be measured with accuracy. We can establish a route where the number or the duration of the attacks is increased or diminished, gradually having in this way some control of the process. The composing adopted by Ligeti establishes clearly delimited and defined steps. The exactness tries to avoid interpretations that can break the gradation process imagined by the composer. The sonorous result is always an approximation. However, the more precise the composition, the greater the possibility of proximity between what is imagined by the composer and the result of the interpretation. In this sense, the "super-precision" followed by Ligeti tries to avoid the random aspect, distancing itself from any open form. It is a type of statistical control of the sonorous result. In an interview with Michel, mentioning the notation used in his *Second String Quartet* (1968), the composer explains clearly his position: "I want things done as I imagined. For this I use a 'super-precision' in the notation" (Ligeti; Michel, 1995, p. 199)[13].

The idea of gradation brings the importance of the difference in degree and not in nature between the elements. Let us contemplate this question. A gradation is a continuous process where there exists a minimum distance between the successive terms of the series. There are neither ruptures nor cuts. The form is homogeneous and not dialectic. Therefore, what is at stake is the proper difference, the degree of variation between the components. In the case of the rhythmic structures discussed above, we can note that it is from the gradual addition or subtraction of attacks that the rhythmic process is built. In these cases, the form generated by

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[13] Original text: "Je veux que l'on fasse ce que j'ai imaginé. J'utilise même pour cela une 'surprécision' dans la notation" (LIGETI; MICHEL, 1995, p. 199).
Here it is important to remember that Ligeti's concern for precision or for a closed musical form does not impede us from finding in his music rhythmic processes written in a less precise form. In this direction we have the non- measured fast rhythmic figures that appear in the 6th piece of *Ten pieces for wind quintet* (1968), in the second movement of *Cello Concerto* (1966) and in *Chamber Concerto* (1969-70). The graphical notation used in the work *Volumina* (1961-62), constitutes another example of the absence of precision in the events' duration.

opposition or juxtaposition of elements is avoided and priority is given to gradual process. The canon, especially in the way it is used by Ligeti, constitutes an effective technique of gradual construction. The composer always imitates the same structures and he places them out-of-phase. In this way, the canon allows a strict control of the process and a strong unity between the planes. Returning to Figure 6, we notice that this technique is able to precisely grade the process. The regularity of the division by 2 made by the four voices is disturbed, gradually, when the process of superposition of other contiguous divisions (3, 4 and 5) is initiated. The irregularity (*the brouillage*) is established, and from this moment the steps of the sequence show a lesser variation than in the beginning, in the passage from the periodic to the non-periodic.

Final considerations

The use of the same compositional tool in different spheres brings, evidently, different aesthetic results. But the differences also exist inside each artistic branch, each artist, and each work and even in the same work, if we consider the way each person processes each aesthetic experience. Thinking about the subjects treated in this article we can, for example, observe the great difference between the universe of Allan Poe and that of György Ligeti.

Gradation allows Poe to guide a story that, little by little, discloses its secrets. In the case of his police stories we have, frequently, the impression of being at a card game, in which the cards are gradually eliminated until only one remains. It is exactly at this moment that we have the impression of having understood the narration (we discover, for example, the true author of a crime reported from the beginning of the story). In this case the writer not only tries to grade the effects that the story produces in the reader, but also to arrive to a point of climax in which the tension is resolved.

In the case of Ligeti, the relation between climax and gradation is different. Gradation, frequently, submerges musical processes into a statism that eliminates, or at least alleviates, the sensation of climax. If in some of his works it is possible to hear processes of intensification of the discourse that can be understood as climatic moments, in others it is practically impossible to make this connection. Although, looking at the score we are led to a conclusion of this type (we can compare, for example, the third movement of the *Second String Quartet*, or the *8th piece of the*

Ten Pieces for Wind Quintet, with *Atmosphères*). The search for a static music, in which the evolution processes are very slow, leads the composer to emphasize the process itself more than the points of arrival or resolution of the tension.

Finally, with respect to gradation, beyond the differences between the arts and the poetics of each artist, it is possible to point out some elements in common.

In a gradation process there is always a certain dose of information. The process must be gradual, and this means that it must be a criterion of economy, where each element is "weighed" and quantified. The order (increasing or decreasing) is of fundamental importance. (The degrees of complexity of these processes can be diverse. For example, many children's stories are constructed from gradation. Some works by Escher, Klee, Ligeti or François-Bernard Mâche are models of very elaborate and subtle gradation). The continuity, the unity, the homogeneity and the linking of the parts are some other strong characteristics of the gradation pro-cesses shown in this article. Let us remember, for example: (1) the tone of sadness and the refrain that give unity and homogeneity to Poe's poem; (2) the gradual (and continuous) processes shown in Figures 2, 3 and 4; and, (3) the rhythmic linking in the music of Ligeti (Figure 7).

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