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Learning complex piano music: environmentalist applications

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Dedicated to Ian Pace

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Preface:

The current paper started as an enthusiastic response of a –mostly contemporary music – pianist to environmentalist ideas proposed by M. Rowlands in the first part of his book *The body in mind*. The ideas in question seem to provide a powerful tool for reflection on traditional approaches to piano playing, capable of enlightening their pre-theoretical assumptions about the nature of the learning process. Quite naturally –given our special interest in postwar II complex repertoire – some of these conclusions can be extended to the issue of developing learning strategies appropriate for such repertoire. While all these points are still valid and elaborately dealt with in the paper, a more general theme which gradually came into focus during the writing process is the problematic ontological status of the performing body in the practices of notated music in the West. As a result, this paper will not only attempt to propose environmentalist applications to learning and performing complex piano repertoire; it will also look at how environmentalism and the repertoire in question can suggest ways in which the corporeality of performance becomes a " [..]problem in the positive sense-not just as an 'obstacle', but as a vehicle for thought and action." (Osborne,1996:192)

1.
Introduction:

The development of western music notation along the line of an increased specificity of both the sound- image (descriptive function) and the performing instructions (prescriptive function) contained in a sacralized score has radically affected the piano performer's primordial reflexes to the act of learning and performing. The very fact that the score -a visuographic mode of representation- is the inevitable starting point of fixity for the whole learning trajectory has privileged the eye and the mind as the performer's points of entry, in the expense of the ear and the performing body. The ear? Well, at least the ear is indirectly implied through the signification of sounds. As Ferneyhough –an already emblematic figure in the theorization of current notational practices- suggests:

> "Naturally enough, the emphasis will always be the adequacy of such [notational] systems as methods for specifying sounds." (Ferneyhough,1995:3)

But between sign and sound there is the physical mediator of the sound-production, the performer's body; and this has exactly been both a crucial absence in the notation and the only performer-specific field in the chain linking the composer and the listener.

The problem almost remained muted through an (at least) four centuries-long development of performative traditions and the language/narrative-based music material itself into a sort of *lingua franca*. Despite local deviations and distinct lineages in these traditions - national characteristics in the baroque era, schools of piano playing later etc- , the notational medium was rendered quasi-transparent through more or less commonly accepted stylistic rules applied to performance. After all, 19th century saw the emergence of the star-performer who "becomes music" and the romantic ideals concerning talent, intuition, genius further mystified performance and disembodied notation. Of course, the development of virtuosity, very often inseparable from improvisation still active in those days, was a privileged field for experimentation with the performing body, its results brought back to composition on paper. Nevertheless, the fixation of the results and the institutionalization of instrumentalist's education would ensure that "the unstable interface: performer/notation", a "deeply fragile and artificial" one, would remain "naively unquestioned" (Ferneyhough,1995:5) as to its purely corporeal aspects.

Postwar developments in the piano repertoire made these aporias visible again: The unfamiliarity of the material and the non-linguistic, non-linear, and highly fragmented articulation of it, plus lack of performative traditions, restricted the possibility of tapping into a reservoir of common knowledge and ready-made answers. New notational features, such as the notational information overload and notational novelties, obscured the accessibility of the mental image. While those developments triggered a new wave of virtuosity and some fresh, unmediated reflection on the performer- specific resources, the pathway to the body has been obscured again. Modern theorizing around performance tends to reproduce internalist ideas in the form of "heroic" challenges and tasks the performer is assigned, and his role remains subservient to the composer's mind.

2.
This a paper about corporeality in learning and how this corporeality can itself be seen as environmentally constituted, not simply as the incarnation of an autonomous conscious mind. While it is undisputable that learning notated music involves a major part of internalization of images and motions, we would like to explore what other points of entry and resources than the mind one might be using. It might be shown that the importance of the manipulation of external or - to put it in Rowlands' terms -environmental structures not only is equally important for learning (still: usually muted in current theory), but also that it can be extremely successful in dealing with the new problems posed by complex music. And it can possibly serve to signpost somewhat clearer the " [..] path [..] to the rich delta where the mental and manual meet."(Schick,2006:93)
Basic for the following arguments will be the acknowledgement of the hybrid nature of learning to perform through both internal and external resources, in a way which privileges learning as performance, as an action itself.

Before we proceed with the examination of two treatises on piano playing indicative of both the privileging of internal cognitive processes and some potential ways away from that theorizing, we would like to make a brief summary of environmentalism as presented by Mark Rowlands in the second chapter of his book *The body in mind*.

Environmentalism suggests a very radical view of the nature of cognitive processes, in stark opposition to the Cartesian idea of a mind inside the head which structures the world functioning as the exclusive locus of cognitive processes. In the authors' words:

> 'Environmentalism is understood as the conjunction of an ontological and an epistemological claim: […] cognitive processes are not located exclusively inside the skin of living organisms and […] one cannot understand those processes by focusing exclusively on what is occurring inside the skin of living organisms'[..] (Rowlands, 1999:22)

A word of caution should already be uttered: the adverb "exclusively" is particularly important in the above claims. As Rowlands himself keeps repeating through the book, environmentalism doesn't certainly oppose the fact that cognitive processes do take place inside the organisms' skin. What it does suggest, is that those processes are essentially hybrid in nature, partly consisting of physical manipulation of structures in the environment of organisms. In the context of this claim – termed "the manipulative thesis" (Rowlands, 1999:23-24) -, and given the special interest of the current paper in a manual activity *par excellence*, such as piano playing, it is important to make the following clarification:"manipulation" doesn't necessarily imply a manual or intrusive relationship to the environment (although in our case it will some times assume this manual meaning); it rather involves any sort of physical interaction with the environment in order to accomplish a given task. In particular, the environment is conceived as consisting of information-bearing structures, which organisms can potentially identify and appropriate. The manipulation itself is identified as indispensable to the cognition: a form of information processing. The crucial point here is the proposition that "in performing any given task, the more information the organism can process externally, the less information it has to process internally"(1999:30).And this is a proposition towards the direction of maximization of efficiency by minimizing internal costs, epitomized in the principle which triggered the discussion in chapter 2: "don't multiply effort beyond necessity" (1999:22).

The entire first part of *The body in mind*, labeled "psychotectonics", is devoted to the support of this manipulation thesis along two distinct lines .The first includes argumentation stemming from evolutionary biology. According to that, evolution on the part of the organisms is conceived as the ability to accomplish tasks posed by the environment at the least possible expenditure of the organism's energy, what Rowlands terms "evolutionary cost" (1999:24). The key to this minimization is the adoption of strategies which employ appropriate manipulation of environmental structures.The second line of argumentation puts distinct cognitive processes, namely visual perception, memory, thought and language, under the microscope.Traditional, that is internalism-inclined, views are co-examined with environmentalist alternatives, in support of the manipulative thesis. Some of the relative argumentation will be presented later in this paper, in the course of our examination of potential environmentalist applications to learning and performing complex piano repertoire.

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One of the most exciting aspects of environmentalism, next to its different insight into practical efficient strategies, is the metaphysical claim: The mind and body are not disconnected subjectivities but rather worldly in themselves , involved in a subtle net of interactions.
Similarly, we will claim that the performer's drama as a consciousness trying to harness its body , the piano and the notated tasks with the power of the mind, is just a privileged way to look at things , intrinsic to the way notation and practices developed. An alternative way is thinkable, which has efficiency results and metaphysical results and can find fertile fields of application to the relatively virgin genre of complex music. This way considers the learning process as a hybrid process, part of it happening internally (as in traditional accounts) and another part relying on manipulation of environmental structures, namely: the gravity, the body, the instrument , and the score.

3.

We would like to start our account of possible environmentalist applications on the learning strategies adopted for complex piano repertoire with a short comparative study of two very influential treatises on piano playing : *Piano Technique* by Leimer and Gieseking (1972) and *On Piano playing* by G. Sandor (1981).
Both books are essentially presenting basic principles of what is usually termed " modern piano technique" , a rationalized use of the human performing mechanism in the direction of effortless mastery of the mainstream piano repertoire.Despite some similarities to be outlined later, both books carry very distinct overtones of underlying preconceptions about the nature of the cognitive processes involved in learning pieces and performing them on the piano: Leimer and Gieseking develop a method which relies heavily on internalization through mental work away from the instrument as a first step to the learning process; on the contrary, Sandor interweaves the performer's body and gesture, the instrument and the score in an interactive schema which prioritizes a performer- specific feature as the entry point to learning : physical motions.If –in Rowlands' terms- we consider the score, the instrument and the performing body itself as information-bearing structures in the pianist's environment, then we will claim that Leimer and Gieseking's reflections are presenting us with a hard version of internalism in piano playing; while Sandor's account stresses an understanding of the process as hybrid:combining the pianists' internal efforts with an actual physical manipulation of those structures.

Before we go on with a more detailed account of these treatises, a word of clarification is needed in relation to the inclusion of the performing body in the categories of environmental structures: While we are aware of the fact that a latent Cartesianism might be at work in the perception of the body as a performing mechanism at the mind's will, we believe that it would be equally misleading to assume that the body as an incarnated subjectivity is separate from the world itself (a sort of corporeal Cartesianism).The physical body, through its specific structure, invites a dual mode of perception of itself as an inside (subjectivity) and an outside (objectivity) at the same time: depending on my point of focus, I (as a subjective consciousness) can feel and be my finger, but I also have the ability to bring it in front of my eyes and perceive it as another object, or use it in specific ways. This does not necessarily mean that I acknowledge a superiority of the mind over it; it might well mean that I recognize its oneness to the surrounding environment and manipulate it as if it was part of it-as I can do with my own consciousness. In an article-reference to Merleau-Ponty's ideas on perception, E.T. Gendlin writes:

> "If we think of the living body not as a piece of merely perceived material, neither as perceiving, but as interaction with its environment, then of course the body is environmental information." (Gendlin,1992:9)

It is this interactive concept of the body which will inform its inclusion in our account of environmental structures.

We will begin our account with a discussion of the most important points of Leimer's and Gieseking's (abbreviated from now on as LG) *Piano Technique* (1972), originally published in 2 volumes, *The shortest way to artistic perfection* (1932) and *Rhythmics, dynamics, pedal and other problems of piano playing* (1938).We will identify their internalist assumptions in the use of the score and the use of the body; and we will connect them to Rowland's discussion of cognitive tasks in relation to memory.

The foundations of the LG method, as manifested in the very first chapter of their first book *The shortest way to pianistic perfection* are three: training of the ear towards the direction of absolute control of tone quality, duration and strength for the smallest bits of the work; training of memory through reflection; and what they call "natural" piano technique employing the least possible physical strain. The first principle (ear-training), is complemented by two axioms manifested very early in the Gieseking's Foreword (1972:5,6), the urge for absolute following of the composer's markings and the subsequent substitution of "interpretation" with absolute correctness. The last points will prove very useful later in this paper (in the discussion of Frank Cox's "High-Modernist Model of Performance Practice") in showing the persistence of traditional schools of thought in some of the most radical developments. But for now, let us concentrate on memory.

Throughout their book, Leimer and Gieseking passionately advocate memorization of the score through internal representation away from the instrument as the cornerstone of any subsequent learning process. In the chapter "Foundations of our method' we come across a very clear statement of that point:

> "it is essential, before beginning with the practice of the piece, to visualize the same, whereupon, if this has been done thoroughly, we shall be able to play it correctly from memory. To be capable of doing that in short time, the memory must be trained by means of reflection (systematic logical thinking)." (1972:11)

In other words, the experience of performing on an instrument begins with a completely disembodied mental activity which includes visualization, reflection and training of the memory. Looking back to Rowlands and our own definition of the body, the instrument and the score as the three basic environmental structures at the performer's disposal when starting learning, we realize that the LG strategy essentially does away with all of them: it ignores the two first and it wishes to re-locate the third from the actual score to the performer's mind. Under the light of the manipulative thesis, this seems to constitute an expenditure of energy which maximizes effort – the word "training" is not accidental at all in suggesting an investment of internal resources.

A closer look at this process, which is thoroughly described in several examples in the book, will enlighten what is the author's perception of visualization, reflection and memory training, and will allow specific connections to environmentalist ideas on memory as exposed in chapter 6 of *The body in mind*.

The authors offer analyses of the mental working-out of pieces of increasing difficulty, starting with a simple technical study and proceeding to a Bach 2-part Invention, a 3-part Sinfonia, a Beethoven sonata .In the second book a French Suite is serving as a model for mental practicing.
The process remains relatively standard through the examples, with a small addition in the second book (written 6 years later): after the performer orientates in the time signature and key, there starts an exhaustive note-by-note and hand-by-hand verbal description of each individual measure. Points of focus are: pitches and intervals, their movement in space and their relation to simple chords; rhythm; simple similarities of musical material which articulate form. In contrapuntal music relevant terminology accompanies the observations (motif, counterpoint, sequence, inversion etc). In the

Beethoven sonata, priorities of focus remain the same; other musical parameters such as dynamics and articulation are reserved for the discussion on "interpretation"-always following up technical mastery. The addition coming with the French Suite description in the second book is a short verbal description, a sort of title, for specific spots in the work (for example"the Chord-spot"). From this account it is quite evident that the analysis is highly detailed, but in a prioritized way: pitch and duration as the barebones of the composition are exhaustively examined while the more "corporeal" ones, that is articulation and dynamics (a more elaborate explanation on their corporeality following up with Sandor's book) are not initially entering the mental frame. Structural observations are active in a relatively loose way, not with a rigid intention to grasp an overarching formal schema or reflect on the process. In other words, there is a moment-to –moment memorization which brings to mind the notion of episodic memory as exposed by Rowlands.

In his discussion of memory, Rowlands suggests that the development of modern human memory has followed a clear path from the employment of episodic and procedural memory systems to the development of semantic memory. The first two systems are primordial, still incompatible: episodic memory is employed for concrete, specific, detailed events in time and space, while procedural involves action patterns. Semantic memory on the other hand is a memory of facts, stressing some sort of semanticity in the bare events which constitute episodic memory.After all, the border between semantic and episodic memory seems to be so vague as to suggest that their difference is one of degree, not of kind.Rowland argues that the key to their actual differentiation and to this development of semantic memory has been the employment of external means of representation, such as visuographic (the music score is one of them),which are being seen as external information stores into which modern humans tap. This increased reliance of "civilized" people on these environmental structures is accompanied by an involution of episodic memory; on the contrary relatively "primitive" peoples and children seem to make heavy use of episodic memory storage strategies, the fact itself puzzling the modern observer as outstanding "natural" or photographic memory. (Rowlands, 1999:123-129).

Going back to the LG memorization process and under the light of Rowland's remarks, it looks that the balance between its episodic and semantic properties is considerably leaning towards the first. The highly localized -measure by measure, hand by hand- nature of the description of the musical text and the simplicity of the syntactic relationships observed point toward an episodic experience of "being in one place at a time", only that this happens mentally, not in real time and space.

This memorization strategy after all seems to be in perfect harmony with their description of the process on the instrument. The relevant discussion of the Beethoven example is exemplary of the prioritization of refinement and perfection of the smallest bits of the composition (1972:33-42). A metaphor employed by the authors is telling about how the process is to continue:

> "When a part of a composition has been played for the first time, a picture of the same becomes imprinted on the brain. This picture varies in clearance according to the mental constitution of the pupil. In general, a very faint impression is left on the memory, similar to a photograph which is not clear or has been under-exposed. Through constant repetition the picture becomes more and more distinct and finally resembles a clear, sharp photograph." (1972:47)

The clarity of the mental image of the music acquired in the very beginning of the learning process is a factor persistent through the actual formulations of the performance-the actual playing. Again, the crucial point here is that an experience which is fully corporeal, or at least hybrid, is reduced in Cartesian fashion to an impression of the brain.

Internalism could not leave LG discussion of piano technique intact. The internalization of the notes is followed up with the internalization of technique:

> "By further development of the idea, one acquires the ability even to prepare the technical execution through visualization, so that, without studying at the instrument itself, the piece can be perfectly performed and this in a most astonishingly short time." (1972:11)

The absolute banishment of the instrument from the learning process is later praised as an aim and even as a sign of superiority:

> "Only a very few of the elect are born with the talent of immediately and intuitively grasping the meaning of a composition; and they alone have the capability of reaching to so high a degree of mental and manual ability that they can mentally comprehend and correctly render a composition, by means of the fingers, practically without further practice." (1972:33.

But let's take a closer look at LG conceptions of piano technique. The very first principle seems to be lined-up with the efficiency axiom towards minimum energy expenditure:"natural" playing employing the least possible physical strain.
The account becomes more convoluted later, in detailing how one is to avoid strain: relaxation has a key importance, but this should be achieved consciously as a complement to the conscious exertion of the muscles.

> "I contrive to raise a feeling of relaxation from within, as it were. This is generally attempted by the aid of visible movements. All movements are injurious." (1972:12)

The muscles, in particular, seem to be the only source of energy a performer occupies. While acknowledging the fact that co-ordination of these muscles is indispensable, LG advocate also the strengthening of the muscles. Fixation of joints is constantly mentioned during the description of the individual modes of touch, and the contradiction of these remarks to the idea of relaxed playing is to be acknowledged later:

> "A strong fixation is unavoidable in forte and fortissimo playing. But one should always think of relaxing the muscles whenever the opportunity arises, so that the fixation will be interrupted and lessened. As we have already stated, the relaxation must ensue from within, minus any noticeable movement."(1972:111)

The points we would like to keep from this brief presentation are: the conscious control of muscular relaxation and exertion; the muscular strengthening; the fixation of joints and avoidance of movement. As it will be made clear very soon, in the context of Sandor's book discussion, these three features, plus the manifested intention of an exclusively mental practicing, consider the pianist as an entirely self-contained system who is dedicated to a perpetual quasi-biological development, both mental and corporeal.The reluctance to employ any structure other than itself in the course of learning and performing is total- in fact considered as a sign of weakness, almost inferiority, if it does happen.

Sandor's account in his book *On piano playing* presents us with an altogether different concept which stresses the inter-activity of the elements involved in piano playing, what we termed the "pianists' external information-bearing structures". For the sake of clarifying LG points on technique stated above, in Sandor's case we'll start with the technique and save his ideas on the use of the score for later.

A quote from the very first chapter of the book, where basic ideas are formulated, will serve as a very good example of environmentalist traces:

> "In order to mobilize the playing apparatus and generate the desired speed in the hammers, there are no other but two sources of energy available: the force of gravity, which pulls everything down towards the centre of the earth, and muscular energy, […] which pulls the finger and the arm towards the affixed portion of the contracted muscle [..] Most of the time, it is the participation of both energy sources that provides the optimal solution. Our aim is to achieve the optimal results with the least expenditure of energy. It will be up to us to determine when to utilize the force of gravity exclusively, when to use muscular energy exclusively, and when and how to combine both." (Sandor, 1981:7)

Here, we have a clear manifestation of the Rowland's manipulation thesis: Playing the piano is hybrid in nature, tapping into both internal and external resources; the aim of saving as much of our own energy as possible is achieved through the manipulation of a structure which is external to the

performer's body, that is gravity. The LG similar requirement of experiencing the least possible physical strain through the somehow mystified idea of constant relaxation consciously controlled by the mind, finds here a surprisingly environmentalist-friendly counterpart.

But are our bodies to be considered exclusively as an internal resource? Talking about relaxation, here's Sandor take on the issue:

> Total relaxation is non-existent in piano playing.. Even when we rely purely on the force of gravity, we must use the necessary muscular equipment to lift and place the arm and hand in their proper positions. Most motions are executed by antagonistic sets of muscles: while one group (for example flexors) works, the other group (extensors) relaxes. Partial relaxation alternates with muscular activity at all times; complete relaxation exists only if we lie down and rest." (1982:7)

The idea of partial instead of constant relaxation foregrounds the issue of muscular interdependence: where LG advocate muscle- building and finger independence, Sandor stresses the need for complementarity and co-ordination:

> " [..]piano playing is not a matter of muscular strength and endurance.[..] Some of the muscles are small and weak, made for precision work, others are strong and powerful. If we can activate these larger muscles properly, we do not need to strengthen the weaker ones. We must learn the kind of coordination that enables us to put to use the necessary equipment and to play without any trace of fatigue [.]." (1981:16-17)

While someone could argue that this take on bodily function, based on simple physiological facts, is just reproducing the Cartesian body-as-a-machine conception, with a ghost (the mind) controlling it, the tone is very different from the LG take in the following way: the body (or memory, in their account) is not a field of biological development; the body is already a locus of information, such as the fact that smaller muscles can be supported by larger when the task in question demands it, or that gravity is collaborating with the muscles itself. This is "information" not in a linguistic sense (as phrased in the previous proposition), but rather information about how can the body interact with the environment at less internal cost in the course of playing the piano. In this sense, the body can be seen as an environmental structure, where the performer can tap into, given that she is in possession of the right "code". Thus, the manipulative thesis recognizing the body as internal and the gravity as external has to be reformulated: instead, there is a conscious part in the process of playing the piano manipulating two environmental structures: the force of gravity and the body itself.

Before we go on with investigating what is the proposed by Sandor "code" for the performer to plug efficiently into these structures, let's see his take on the third environmental structure involved in a piano performance, namely the instrument itself. The first hint has already been given in the very first quote and in the formulation of the argument about energy sources: the performing mechanism "generates the desired speed in the hammers" (1981:p.7). In other places, it is argued that the volume of the sound is not depending on either finger strength (as in the LG case) or on some sort of weight (as a response to Breithaupt's notion of weight technique, the first to acknowledge gravity in the pianistic history), but exclusively on the speed with which the hammers will hit the strings. This is part of the reason then why the pianist's technique is not an isolated phenomenon, to be developed in a vacuum: because it addresses itself to a specific mechanism with special features. Other features, explicitly examined by Sandor, include: the sound's decay after hitting the key (excluding thus any sort of over-pressure to the keys, appearing in LG as a form of touch called the "pressure-touch"), the arrangement of the keyboard in white and black keys, the latter being higher and narrower (which brings about an adjustment of the physical motions when playing on them), the special case of moving from the extremes to the centre of the keyboard which brings about similar adjustments, the rebound from the keybed when one plays rapid and loud staccato, the elasticity of the piano mechanisms' materials which afford a limited amount of speed in the production of a sonorous forte, and so on.What is important here, is the very fact that Sandor bothers to go into this sort of detail, phrase them, and connect them to the notion of technique itself. Our claim is that this not only is a sign of a rationalistic/scientific understanding; it is also an insight into piano playing as environmentally constituted, in a way that one could claim that the instrument itself generates the correct motions, similarly to the physical anatomy.

We are reaching the point where the three already examined and interdependent structures –gravity, the performer's body and the instrument- have to be connected to the structure *par excellence* for notated music: the score. In his account of the development of modern humans' memory through an increased reliance on external representational systems, visuographic (such as the musical score) or not, Rowlands claims that

> 'invention of such a system is inherently a method of external memory storage. As long as a person possesses the 'code' (and such possession presumably is constituted by an internal store of some sort) for a given set of representational symbols, the information stored in the symbol is available to the person." (Rowlands,,1999:142)

The "code" that Sandor develops is, ingeniously enough, performer-specific and score-related : it is grounded on the exclusive performer's experience in that it is corporeal, employing five motion patterns and four modes of touch (and their combinations), but not in the abstract; those correspond to exact visual patterns on the score. Let us take a closer look at this simple gamut of interrelated patterns, whose implications we consider to be far-reaching.

Five letters are used respectively for the five motion patterns in Sandor's own notation: "A" stands for "Free fall", the motion employing gravity almost exclusively and used for big sonorities such as chords in a slow or moderate tempo; "B" stands for "Five-fingers/scales/arpeggios", used for every sort of movement towards the same direction as indicated in the score, but also for physical groupings indicated through slurs, beams etc. on the score (or not indicated and left to the performer's choice). The definitive factor here is wrist-adjusting motions which align the fingers with their respective forearm muscles and promote musical continuity through facilitating a uniformity of gradual key-releases (legato); "C" stands for forearm "Rotation", corresponding to constant alternation of direction in the score; "D" stands for "Staccato", a complex throwing motion for separated sounds, visually recognized in the score with dots , wedges, isolated sounds, octaves, repeated notes etc ; and "E" stands for the "Thrust", the only motion which employs muscular energy exclusively, proper for massive sonorities in tempi where someone has the time to be on the surface of the keys just before the attack. Next to the legato (associated with B) and staccato (associated with D) touch, there are also the portato and tenuto touches.

Someone who has learnt this code (and Sandor claims that this is something achievable in 6-8 months), and has good music-reading skills, can now plug into the score, and engage in a simple pattern-recognition and pattern-completion internal process, translating automatically the information into gesture and sound. Of course, nobody could claim that all problems are solved: the refinement of musical detail itself, questions of extreme tasks such as speed , accuracy and control , even the idiosyncratic manifestation of these motion patterns themselves are questions to be perpetually addressed .The point, though, remains that this code provides an environmentally-constituted interface between the performer and the notated music.

The mention of pattern-recognition and pattern-completion operations as part of the Sandor suggestions brings us to chapter 7 in *The body in mind* :Here it is argued that some thought processes (such as mathematical calculation) can have their own environmental take, seen as hybrid with an internal "pattern-mapping" component and an external "environmental structure manipulation" component. A multiplication of 3-digit numbers using pen and paper (environmental structures) and an algorithm of small, easy steps , is an informative example .What comes on the surface is a renewed and probably unexpected role for the "primordial" procedural memory, a type of knowing-how to do things instead of knowing things (1999:164).

Taking Sandor's idea even further, we would be tempted to suggest the following:
At the time the performer makes the conscious decision to engage with a score, this is triggering an environmental system of several elements (the score, the instrument, gravity and his body), which interact towards the actual performance. In a zen - like sense, after this initial decision , not only does the performer play the piece on the instrument, but also the instrument plays(= regulates, controls) the body, by dictating the necessary adjustments, the body controls the performer (when for example experiencing some sort of discomfort/strain alarms the conscious mind that something is imbalanced and must adjust), and quintessentially the score plays the performer in that its visual

patterns and requirements can automatically trigger motion patterns..;and so on, towards an infinite net of subtle interactions.

4.
The second part of this paper will deal with some potential applications of the environmentalist ideas mentioned above to the learning process and performance of postwar II complex piano repertoire. In this account, recent trends in performance practice analysis will be discussed in conjunction with our own propositions.

One of the most influential recent sources for complex music performance has been F. Cox's article "Notes Towards a Performance Practice for Complex Music". It summarizes some of the basic points of focus of current theorization in the field, and, even more interestingly for our own purposes, some of the aporias surrounding the learning and performance of complex music. F. Cox's account of the new challenges posed by complex music is measured in relation to what he terms the "High-Modernist Model of Performance Practice" (Cox, 2002:71)(from now on abbreviated to " hmmpp") . One quick look at his analysis will reveal very interesting resonances of hmmpp with our account of LG method of piano playing.

According to Cox, on the basis of this model, prevalent today in the mainstream classical music industry, lays the assumption

> " [..] of a "noise-free , transparent relationship between the above mentioned communicative chain [between conception, notation, performance and reception], with a direct functional relationship between 1)notation, as indicating tasks demanding responsible technical mastery, 2) […]an adequate "realization, in which all notes are correct, all the rhythms are accurately realized, all the dynamics, phrasing marks etc. are audibly projected, [..] and 3) ideal perception, which should be able to measure, based on the score, the correspondence of the former two aspects [..]' (2002:72).

In other words ,the good old (and internalist) LG idea of a mental image (the score) as being able to enclose every possible characteristic of the sonic phenomenon it represents, and, subsequently, dictate concretely specified tasks to the performer, as well as perceptual tropes to the listener, is here fully at work.Technique and interpretation are arranged in a strictly serial ordering, in the sense that "interpretation" always presupposes technique, very much like in the LG ideas on "interpretation" as cited above:

> "The properly interpretational level [..] should, according to this model ,primarily begin after one has mastered the technical challenges…[..]. In its 'soft' versions [..] demands of responsible realization may occasionally be overridden by interpretational demands, but in 'hard' versions, the latter should always be subordinated to the former." (Cox. Pg.72)

no guesswork needed for classifying LG version as "soft" or "hard".

Complex radical music, on the other hand, has according to Cox brought about a "fundamental paradigm shift" in the entire performance practice of Western art music, because of its quantitative characteristics, namely:

> "[..] extreme degrees of both density and fine detail, and [..] coalescence of highly rationalized materials, notated challenges and organization with an extreme physicality and almost irrationality of the results." (2002:70)

The paradigm shift consists in the transformation of the above mentioned communicative chain into

> "[..] an overlapping series of volatile conflicts between incompatibles. Thus notation is treated as an essentially opaque medium, [..] ,and such notation demands less reading than decipherment." (2002:72)

Under this light, traditional methods of training such as “resonance training” (our familiar from LG practicing of small bits at a slower tempo focusing on sound) and relevant absolute goals of a perfect rendition of the sound image are judged by Cox as inadequate and often irrelevant (2002:77). After an elaborate description of the current situation in performance practice, Cox sets off to present his programmatic positions for a model of such a practice, as a derivative of a revised “soft” version of the hmmpp.Four points are here of great importance: his acknowledgement of the legitimacy of a properly interpretational level independent of the technique in the performance of radical complex (in fact, every sort of notated) music; his suggestion of performance as part of a project of responsible translation between the incompatibles of the communicative chain; a privileging of spiritual and metaphorical dimensions for the musical works open to performative efforts (essentially an addition to his acknowledgment of a properly interpretational level); and the preservation of the highest technical standards advocated by hmmpp.

The last point sounds either contradictory or utopian grouped together with the previous three, and the practical solutions offered by the author back up our claim. What essentially Cox suggests following up, is a renewed privileged position for tasks and challenges of an even higher order, requiring equally heightened abilities and training according to the traditional standards: the theoretical framework he suggests for the contextualization of these tasks and the substitution of the conception of an absolute solution with one of varying degrees of tension and resolution (2002:107) is abstract enough to be easily overshadowed by his more earthly, but rather incompatible, description of the new tasks. In essence, these consist of a upgraded version of the traditional hmmpp model: the old training tools such as the piano and the metronome are upgraded to computers and chromatic tuners (for microtonal challenges); “resonance training” remains the basic process for training muscle memory, and patient serial learning is suggested as the remedy for the near-impossibility of advanced rhythmic tasks:

> “…this requires the patient and thorough learning of all the [..] metric/rhythmic patterns from which the piece is built: the first pair until a certain degree of feedback intensity is attained, then the second pair, and so on, then the first three, and so on, until all the relationships of the piece are thoroughly assimilated.” (2002: 115)

Taking a step back to reflect on the aforementioned positions by Frank Cox and contextualize them to our previous preoccupations , we would suggest the following: while his propositions pointing at the new opacity of the musical image and the irrationality of results do show a paradigm shift – one that can indeed trigger new performative attitudes, as we will try to show later on- and his interpretation-friendly ideas are very welcome,-still vague enough not to be performative-specific - his actual retuning into the hmmpp task-oriented perception accompanied with moralistic overtones still adheres to a highly-internalized and quasi-biological super-human development concept. The difficult tasks have to be patiently tackled with intelligence and moral power of will, as has ever been the case. As for the body, its role is clearly subservient: it has to tune-in to a model and burn it into muscular memory.The fundamentally Cartesian idea of a mind in absolute control of its storage system and tool is still fully at work.

The concluding part of Cox’s article, though, does bring fresh considerations as to the role of corporeality itself.In the beginning of this last section, Cox acknowledges that the set of tasks he has actually dealt with thus far are corresponding to their traditional equivalents (2002:118) and sets off to define those which distinctly break into new territory.
Their novelty is defined as such:

> “They can almost certainly provide no useful ‘sound-image’, because many of the [score] indications specify not specific types of sounds towards which coordinated physical movements are oriented, but rather different types of independently-organized physical movement whose sonic outcome is the result of their interaction.” (2002:122-123)

Let us make this conception clearer, as it will be part of our own focus later:a certain type of instrumental technique, for example the use of bow to produce sound on a cello, is a composite of distinct determinant elements : Cox defines -for the same cello example – several factors such as right-hand (bowing), gesture/texture types (such as ordinario ,semi-fautando , scrunch-tone etc), bow pressure (equaling dynamics), types of vertical bow placement / vertical motion on the strings,

similar patterns for the left-hand (soundboard), and so on (pg.121). The treatment of these elements as distinct parametrical strata in compositional and notational practice yields very challenging and finely differentiated, still sonically unstable and unpredictable results. The major point for Cox- and for us- is that this conception

> " open[s] the possibility of a new sort of 'corporeal' thinking transcending means/ends-oriented training (for example, of traditional virtuosity) [….] and value[s] that which is so consistently denigrated in Western philosophy-the physical body and physical motion- without fetishizing the physical domains in expense of the mental/ideal." (2002:129 129)

He goes even further as to suggest that

> "A fitting thought-experiment would be that of treating human bodies and physical motion as though they were potentially self-conscious." (2002:129)

With this last proposition, not only does the physical body enter the score-representation as legitimate compositional factor, but also its ambivalent ontological position in relation to consciousness – what we have already termed its inside (subjective)
and outside (objective) dual perception – turns into a theme of compositional reflection.

5.
Cox's last views on the ways corporeality is centralized in this recent repertoire characterized as "radical complexity" will serve as our starting point for a reflective synthesis of prior ideas on piano playing, environmentalism, and the specifics of postwar piano repertoire, in search of a "code", a proper interface enabling the performer to plug into the score and engage with the work. Both efficiency, in the sense of the least expenditure of energy possible in the learning process, as well as a challenging of the concept of the pianist as an autistic entity involved in a perpetual inner development of skills to tackle tasks and challenges posed by the instrument , the work and his own body, will be here at work.

We would wish to extend the field of application for these ideas to a broader corpus of postwar repertoire.Next to the explicitly complex works of radical complex repertoire (such as Ferneyhough, Finissy, Barrett, Mahnkopff etc), this would come to include serial and post-serial (Boulez, Stockhausen ,Babbit, Carter..), textural (Xenakis, Ligeti, Furrer,Sciarrino…), aleatoric (Cage) work, as well as some of Helmut Lachenmann's work (musique concréte instrumentale).The common denominator here is the "notational explosion" characterized by density and detail at the same time, rationalization of materials and extreme physicality, along Cox's earlier description. The mental image of the music as an (actually, the only available) entry point to learning is essentially resisting the clear visual perception it could enjoy in earlier repertoire; the eye is overloaded and the mind obscured , through a maximally fragmented surface. To remember an influential metaphor from before, the LG "photography", in its sharpest possible rendition (the score), already equals a blur !

The alienation of the image is heightened by the fact that , most often than not ,the musical ideas themselves cannot be plugged into any sort of discernible musical structure influenced by the linguistic/narrative models of the "common practice" past , discouraging even a purely intellectual/ traditionally analytic approach to it. To bring a notable example, in approaching much of early modern work, such as Schoenberg's Klavierstücke op.11 ,the pianist could at least rely on a design of phrases and form coming directly from Brahms and relieve the defamiliarizing effect of atonality ; but in dealing with Xenakis and constellations of signs on paper forming sonic "clouds" and "galaxies", neither tradition can help, nor an engagement in the highly abstract pre-compositional mathematic material. Notable exceptions are of course very true: Ferneyhough's gestural language in "Opus Contra Naturam" for speaking pianist, for example, is highly charged with late romantic and expressionistic material.Or,according to Ian Pace, Lachenmann is usually identified with

> " the bewildering range of inventive and wholly distinctive sonorities and techniques involved […]As such, the primary impact at first(for those relatively unfamiliar with the idiom) can be one of estrangement and mental/sonic disjunction. Yet, upon repeated listenings, the thorough integration of these sorts of sounds and gestures into the totality of the musical argument shows itself to be coherent in a quasi-symphonic

> manner that can even recall Beethoven or Brahms (as distinct, say, from aleatoric works or those written in moment form) ."(Pace,2005:1)

In these examples, though, the "quasi-familiar" materials or processes are still "buried" under a rather busy musical surface, hostile to the eye; and it is highly debatable, given our own takes on the absence of corporeality and the look of a properly performer-specific interface, if analytic processes on the abstract for discerning a mental structure can be an efficient entry point to the score for performance-oriented learning.

Since the mind and the eye are so notoriously short-circuited in the repertoire at question, it must be quite clear by now that the LG approach to mental representation is heavily inadequate for the purpose of triggering the learning process -unless we want to consider only individuals with phenomenal memory skills as able to be engaged in performing complex music. And the same applies to a hmmpp approach stressing the need for polishing the smallest bits of notational information in sound and aiming at a maximization of textual accuracy from the very beginning : an impossible project, essentially to be taken up by humans with a quasi- infinite life span (even if this could be the case , the notoriously cruel time limitations on the learning process imposed by the professional requirements in the New Music scene would bring such non-existent individuals to a disadvantageous position).

In this, potentially very annoying situation, an environmentalist-informed approach focusing on corporeality can come in very (literally) handy. We have already examined, in the first section of this paper , such a model: Sandor's code for translating directly visual patterns on the score into the performer's domain: motion patterns. Let us recapitulate and distill Sandor's points of focus :
a)patterns of movement in the score-space (and subsequently keyboard-space) = directionality established , either towards one direction, or rapidly alternating direction (where application of patterns B and C is respectively implied) ,
b)grouping or isolation of sounds (corresponding to B and D respectively ,isolated massive chords applying A and E) and
c)touch forms (legato B, staccato D , tenuto and portato)

This "typology" of simple visual/gestural patterns , which can be combined between them (with the exception of A and E being mutually exclusive since they employ exclusively either gravity or muscular energy respectively), allows a direct translation of the score into motion. The crucial point here, which will be very useful for our own applications, is that the model in question prioritizes very specific musical elements as starting points: movement in space, and subsequently pitch and pitch morphemes such as chords, as determinants of that space and that movement (and quintessentially not as " loci of existence" in the sense we approached the LG note-to-note treatment to pitch); grouping of movement or isolated events ; articulation and dynamics .If we compare this account with the traditional priority to pitch and rhythm accuracy, (where articulation and dynamics assume an almost decorative, interpretative role), we are certainly struck by the absence of a prioritization of strict rhythm and the utmost importance given to dynamics and articulation.

To be able to apply such a typology, developed out of consideration of mainstream classical piano repertoire, to the complex repertoire in question, we need to see how do these parameters change in the complex notational surfaces and in their actual translation in motion. One first point of departure is that the often non-linear, highly fragmented and multi -layered nature of the material (especially in complex polyphony, textural and aleatoric composition) short-circuits the immediacy of a basic, binary piano reflex Sandor's account takes almost always for granted : hand distribution. It is not accidental at all that the very first sentence in the latest Ferneyhough solo piano piece, *Opus Contra Naturam*, addresses exactly this issue:

> "Due to the constant changing of clefs and registers, the distribution of materials between the staves of the score is *not* intended as a guide to their assignment to left or right hands in performance. Each pianist will determine this aspect of the interpretation individually."(2000, p. [ii])

While such an approach could certainly be deemed commonsensical for any piano composition with rapid clef- and register-changes, it does indicate the fundamental challenge of realizing a complex, non-linear massive polyphony of overlapping gestures by tapping into a human, not octopus, structure : the 2 hands. One should also take into consideration another environmental datum here: individual hand span, which has to accommodate music material dispersed all over the keyboard. These two factors, hand distribution and hand span, become crucial then for our manipulation of the score in making the physical gesture trajectories visible and graspable.

Before codifying actual practical applications of this concept, let us revisit Rowlands model of information retrieval. In *The body in mind*, chapter 6, he presents us with four basic principles for the environmentalist view of memory (M1 to M4 will be the abbreviation, used also by the author himself): M3 and M4 are essentially applications of the epistemological and ontological claims respectively (mentioned earlier in the paper), on memory. That is, an organism can process information through manipulation of physical structures (epistemological claim) and manipulation of these structures is a sort of information processing (ontological claim) (1999:122-123). M1 has also already been dealt with in this paper in the definition of the manipulative thesis as a basic principle towards maximization of efficiency: the amount of information we process internally is inversely proportional to the amount of information processed through manipulation of external structures. The principle which we consider enlightening for our own account is M2:

> 'In performing a memory task T ,we cannot begin to understand the internal information processing task facing an organism unless we understand what relevant information is available to the organism in the physical structures around it." (1999:122)

Subsequently, if the pianist wishes to plug into the information contained in the Sandor environmental schema, she has first to understand the amount of corporeal information available to her in the score and its embodiment. We will suggest that this equals actually the visual translation and codification of the score in hand distributions and hand/finger graspings as an out-of-time layer which "cuts through the textual complexity"(Stefanou-Antoniadis,2009:5). The pianist can produce a performative score , (or map the existent score if this serves clarity and energy saving) ,where this layer has become clearly visible, and use this score as an external structure. Then one can actually plug into that using the Sandor code, and given the necessary adjustments implied by the repertoire in question. Movements need in general to adjust to the extremities of the writing : extreme registers in both hands will result in an unusual positioning of the elbows and in a foregrounded use of back and shoulder muscles; extreme continuous leaps might request rotation with a lateral component; extremes of accentuatuation might require non conventional attacks, maximizing key- noise, constant extremes of dynamics might result in a more exaggerated or subdued gestural vocabulary, according to each individual needs of using gravity as energy source, and so on. The actual translation of the score in motion, transforms then in two "simple" pattern-mapping operations (mapping a trajectory on the score and mapping the code on it), according to the relative Rowlands' ideas discussed before.

One could even suggest multiple scores: in my practice of *Opus Contra Naturam* I am using two of them, the "corporeal" score addressing the out-of-time layer discussed above and one second dedicated to complex rhythm decipherment. Here again, mapping is crucial in dealing with the information overload in an anti-overwhelming way : a top-down approach to rhythm 'sculpting' , involving steps of increasing complexity (from 2-bar tempo based units down to beats, simple relationships to the beat, more complex relationships, nested tuplets etc) becomes visible on the score, in a form which allows direct access and execution instead of internalization.

The idea of producing a different score might sound completely unattractive to advocates of internalization from the very first moment of the learning practice.
One possible critique might be the that the energy and time spent to prepare a score is actually more than accomplishing the task in the "patient" way cited in our discussion of Cox' arguments. An anecdotal mention is relevant here: The exceptional New Music pianist Steven Gossling confessed to me in an informal meeting that "I spend half of my life re-writing scores on Sibelius". While his justification considered mainly the clarification of inefficient, "bad" notational practices, it certainly struck me as an example of energy expenditure for providing oneself with a

proper environmental structure – proper in the sense that it will reduce the amount of internal information processes. Our second response to that critique is that pattern -mapping operations are in themselves very simple: circling right hand and left hand grasps/ positions, specifying trajectories and motion patterns, writing down fingerings, color-coding dynamics, clarifying rhythm with beams for the basic pulse etc., just in the same way a difficult multiplication is reduced in small, easy steps.They have to be easy , so that they can be articulated in complex constellations, subsequently they are minimally time- and energy-consuming .

A corporeally and environmentally focused discussion of the repertoire in question would be crudely incomplete if neglecting to address the questions of actual performative "difficulty" employed for compositional and expressive purposes. In our extension of the Sandor "code"/trope through a score manipulation based on clarity of gestural trajectories, we silently assumed that those trajectories are tailored on the whole idea of an efficient, energy-saving use of the body which acknowledges the role of gravity and its own physiology. We wish though to utter a word of caution as to the potential danger of "smoothening the edges", especially in the of case of the extreme repertoire in question, that such an approach in learning might entail .Composers are often deciding "conta naturam", and for good reasons!

In the first chapter of his book *Piano notes*, Charles Rosen cites a famous example of such a case from the mainstream repertoire : the opening left-hand leap of Beethoven's *Hammerklavier* Sonata:

> " Many play it with two hands, but this clearly ruins Beethoven's effect […] Played as the composer wrote it, it both sounds and looks like a grand and daring leap, and the sense of courage and excitement is communicated aurally and visually.Played with two hands it looks easy, and is easy-and consequently it sounds easy as well." (Rosen, 2002:22)

This is a very good example of how the performer's gestural vocabulary should always be calibrated by a contextual understanding of the "spirit" and the global and local expressive content of the work. In the complex repertoire under question, one of the most persistent features has been the development of the musical language towards the direction of radical defamiliarization with idioms of the past. Ian Pace has repeatedly shown how deviations from mainstream schools of piano -authoritatively reproduced in institutionalized musical education- (such as employment of keynoise as opposed to a "close to the key" approach and other unconventional modes of attack or release, stratification of layers of information and rubato issues), can project different degrees of continuity-discontinuity through corporeal means (Pace,2008:13). The issue becomes central in recent compositional activity which considers performative physicality and choreography as morphological determinants. One of the main figures working towards this direction, Aaron Cassidy, states;

> "[..] the primary morphological unit [..] is not merely the aural gesture, but far more importantly, the physical gesture.I would assert that the shapes and local forms that we hear and process as listeners are at their core the byproducts of physical, visceral activities and energies, and, further, that the physical motion required to create a particular sound or sets of sounds is the most important component of a gesture's morphological identity." (Cassidy,2004:34).

Decoupling of physical motions and stratification as discussed in the contexts of Cox's insights, as well as purposeful employment of unconventional uses of the body for the production of often unstable sound results are only some of the relevant developments. We would dare say that these ideas, next to their defamiliarizing effect, bear also an unexpectedly fresh result: the direct re-inscription of the performative body in the centre of compositional interests and the composer's re-familiarization with the primordial musical sources. Isn't that itself an environmentalist project in composition?

6.
Conclusion:

If Foucault is right in saying that

> "Our erstwhile animal bodies were utterly destroyed by history. History and language seem utterly to determine what we will perceive , what we will distinguish as touched seen, or heard." (1977:148)

then the recent developments suggested above might actually show that history can also restore them. Complex music provides an exciting platform for the re-introduction of corporeality in the center of the performer's activities, without at the same time fetishizing it. We hope that during the course of this paper it has become clear that the unification of the musician's creative forces, body and mind, might actually be passing through the acknowledgement of their distinct characteristics, their separation; what can unite them, by removing privilege over one or the other, is the appreciation of their common interactive nature as parts of an environment which is both physical and cultural.

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