Developing a Hybrid Contrabass Recorder

Resistances, Expression, Gestures and Rhetoric

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ABSTRACT

In this paper I describe aspects that have been involved in my experience of developing a hybrid instrument. The process of transformation and extension of the instrument is informed by ideas concerning the intrinsic communication aspects of musical activities. Decisions taken for designing the instrument and performing with it take into account the hypothesis that there are ontological levels of human reception in music that are related to the intercorporeal. Arguing that it is necessary to encounter resistances for achieving expression, it is suggested that new instrumental development ought to reflect on the concern for keeping the natural connections of live performances.

Keywords

New instruments, live processing, recorder.

1. INTRODUCTION

Experiencing live music performances stimulates not only our auditory and visual sensory systems, but allows us to sense a number of connections that occur between both systems. This fact influences the manner in which we perceive the music and become moved by it. The observation of a mechanical action such as a player's moving finger, the voluntary or involuntary movements of eyes, head, arms, etc, may induce changes in our perception of music. In this aspect, the musical experience in a live situation is maybe richer in communicating intentionalities than that of an event where the visual aspect is cut-off from the experience such as, for instance, listening to an audio recording. On the other hand, we could also think that an excess of gestures in a live presentation may disrupt the musical experience rather than increase the intensity of its reception. Unnecessary voluntary body movements may become artificial and disrupt the perception of the sounds. This paper focuses on the analysis of the theoretical and practical issues based on the author's ten-year experience in building and performing with an acoustic contrabass recorder with an integrated 32 input controller.

I explain how rhetoric became an important guide for developing the project by first presenting a theory that proposes the necessity of resistances for obtaining expression [1]. I also expose issues regarding human ontological aspects related to the intrinsic corporeal engagement in musical communication, in which gestures and their interpretation offer some interactive constraints involving responses based in our emotive, affective, and expressive capabilities [2]. On the practical side, I explain how some key decisions made for adapting the electronic interface to the instrument helped in the achievement of more musical expressive consistency and organological coherence.

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2. RESISTANCES

John Dewey's aesthetic theory reveals the importance of what he calls resistances to transform an impulse into an expression. An outward impulse without resistance would simply be a discharge. Dewey tells us that, "To discharge is to get rid off, to dismiss; to express is to stay by, to carry forward in development." [3] Dewey's concept of resistance is based on the need of "obstacles" for transforming what he calls "impulsion" into expression. Impulsions, he tells us, "Are the beginnings of complete experience because they proceed from need…" [4] He also explains that for impulsion to be transformed, or rather "distilled", into an expression "impulsion…meets many things on its outbound course that deflect and oppose it. In the process of converting these obstacles and neutral conditions into favouring agencies, the live creature becomes aware of the intent implicit in its impulsion." [5] While impulsion is the movement of the whole organism, impulse, he affirms, "is specialized and particular; … a part of the mechanism involved in a complete adaptation with the environment." [6] Dewey also tells us that prior experiences induce reflection upon the experience resulting from the impulsion, "one that does not know where it is going." This reflection represents a resistance which helps in converting a "direct forward action into re-flection; what is turned back upon is the relation of hindering conditions to what the self possesses as working capital in virtue of prior experiences." [7]

In theory, a resistance may manifest itself by meeting and overcoming the technical difficulties of, for instance, an instrument. In the case of computer music, for example, the learning process required for managing the electronic music hardware and software could be thought as offering resistances

as well. However, the manner for controlling them is usually restricted to a *mouse* or a couple of sensors, which do not offer a developed platform for allowing resistances to come forward from the interaction between the corporeal and the sound manipulation. Furthermore, we could also think of another level of resistances, one that is linked to knowledge and experience. Since playing music is a practice that requires training, both physical and mental, we could think of the second as a set of constraints which offer resistance that control expressive devices such as timbre, loudness, timing, etc. Those set of constraints are possibly built through individual experience within the realm of expressive generation and treatment [8].

It is maybe useful to consider that, since we are making the decision to use sounds to express ourselves and that there is an intrinsic concern on the expressiveness that we can achieve through making music, we ought to search for the development of new manners for dealing with sound. We cannot forget that, although we can choose to use innovative structures, sounds, media, and decorum, the manner in which the human receptive apparatus works still depends on certain kinds of dynamics in order to be moved by music.

3. BODY AND GESTURE

If we reflect on the idea that considers the body as playing a central role in musical activities, we should also think that there is an intrinsic corporeal engagement in musical communication, which allows moving sonic forms to affect our bodies. Roland Barthes in his *Musica Practica* acknowledges the existence of a "muscular music in which the part taken by the sense of hearing is one only of ratification, as though the body were hearing." [9] Furthermore, Richard Leppert tells us: "When people hear a musical performance, they see it as an embodied activity. While they hear, they also witness: how the performers look and gesture, how they are costumed, how they interact with their instruments and with one another." [10] Conclusively, the observation of a performance has a dialectical perception that involves aspects related to the mind and body.

Although it is maybe difficult to contextualize musical corporeal significations, they exist and affect us in the process of listening to music. Marc Leman proposes that if there is an intrinsic engagement of the body in music, there ought to be a signification through body action rather than through thinking [11]. Since mental representations are not detached from physical reality there must be characteristics that humans share in the reception of music. Antonio Damasio tells us that "the processes of the mind, including those of consciousness, are based on brain activity; that the brain is part of a whole organism with which it interacts continuously; and that we as human beings, in spite of remarkable individual traits that make each of us unique, share similar biological characteristics in terms of the structure, organization, and function of our organisms." [12] These qualities, for instance, may account, according to Leman, for the fact that music from a largely unknown culture in Africa can have meaning for Western listeners [13].

The problem is that how music affects our bodies is not easily contextualized, leading mostly to be dismissed by researchers for being too subjective. In the case of individual musical creativity, we ought to think at a root level for a moment. A person performing with his/her instrument is essentially a human being dealing with an interface which allows air to be moved so that others can listen to it. This is the easy part to understand. Now, what is more difficult to understand is how humans are capable of communicating intentionalities through this moving air. Because it must be clear that sound in itself cannot have an intrinsic affect, there are other aspects than the mere production of sound that are at play in the process of making music. Those aspects are not easily explained but we all know they are the essential part in a musical experience.

Recalling the concept of resistances in music performance, an instrument, for example, can be seen as an obstacle that has to be overcome and controlled so that we can produce expression. While performing, humans meet the instrument so that their impulses can be transformed into expressions. In this process of putting forward intentionalities, symbiotic interactive sequences are triggered in which mind and body shape each other continuously. It is during this symbiotic process that a balance between the conscious and the subconscious would allow dealing, on the objective side, with the mechanical aspects of playing while, on the subjective side, performing music with what we call "inspiration". The result of this would eventually arrive objectively in the form of music to the receptive apparatus of the listeners who in turn may also achieve equilibrium between the objectivity of receiving the sound, and the subjectivity of becoming "moved" by it. Naturally, as in a good kitchen, the ingredients used for cooking ought to be well chosen. The quality and diversity of sounds, rhythms, shapes, gestures, structures and intensities would contribute to making the delivery of music eloquent and clear.

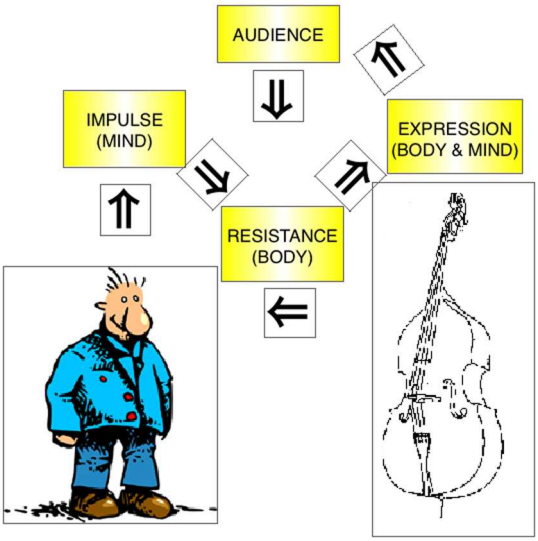

Figure 1. The symbiotic relationship between mind and body

Practically speaking, humans are able to communicate a diversity of intentionalities through music. Those processes may be difficult to understand and explain fully by using theories of human creativity, imagination, behavior and cognition. However, we might profit from taking an approach to understanding straightforwardly its products: the intentionalities. An ancient area of thought that deals directly with these issues is rhetoric.

4. RHETORIC

One line of inquiry that seems to be useful for approaching the ambit of music expressiveness that deals with the intentionalities transmitted through music in an objective manner is rhetoric. Assuming that the musical experience in question is one which requires direct involvement, with no distractions or interferences, the action sequences of musical communication may provoke a body-mind receptive synergy. In other words, body and mind work together in the process of listening to music. Rhetoric is based on preparing and adapting

the discourse to the conditions, *decorum*, for making this receptive synergy one that is more responsive to the message. In this aspect it seems that rhetorical studies acknowledge as a fact that there are human physical constraints that are universal and that, to a certain extent, it ought to be possible to find shared receptive qualities in communicating to each other. In this aspect we could suggest that rhetoric is part of who we are as human beings and that expressing ourselves in this way is a natural human activity [14].

Rhetoric, which is essentially interpretative, has been used since the fourth century B.C. in oratory with the objective of rendering the public more receptive to the message. Later, it was also used in Rome to increase the power of public speaking. With the transformations brought by Humanism, music went through a radical transformation during the second half of the sixteenth century in which polyphonic compositions started to be substituted with a musical genre that favored the clarity of the texts [15]. Rhetoric then established itself as a tool for understanding, performing and arguably also for composing music. During that period many treatises were written by Burmeister (*Musica Poetica*, 1606), Kircher (*Musurgia Universalis sive ars magna consoni et dissoni*, 1650), Vogt (*Conclave thesauri magnae artis musicae*, 1719), Quantz (*Versuch einer Anweisung die Flöte traversiere zu spielen*, 1752), Mattheson (*Der vollkommene Capellmeister*, 1739), among others [16].

However, rhetoric cannot be regarded as a fixed system of rules and principles but rather as a tactical tool for achieving a determined effect or as a useful tool for describing intentionalities. Rhetorical concepts rely most of the time on interpretation and are circumstantial. This characteristic is part of the inherent heterogeneity of the musical rhetorical theory of the baroque. Instead of jumping to the conclusion of considering that heterogeneity is an indication of inconsistency, we should think that the *modus operandi* of rhetoric is one that deals with the diversity of the characteristics of reception. Each individual is moved in a different way by music. What rhetoric aims is not to persuade a specific person but to find a manner of building ways to take people "by-the-hand" through a series of emotional experiences. Metaphorically, it is as if the *rhetor* constructs a building with many corridors, many rooms with a variety of decorations, gardens and halls, and leads the public into a journey with the hope that they become intensely moved. Rhetoric allows us to isolate intentionalities through making correspondences with structure, rhythm, texture, and intensity, allowing us to point out to the field where the intentionalities or affections may belong. Example: in a baroque sonata movement called *largo*, in F minor, where there is a consistent use and repetition of dissonances, it is easy to say that no realm of happy feelings could be present [17]. After that, we know we are left with possibilities such as sorrow, anger, pain, and sadness. The next step is identifying each moment with those possibilities and, although it seems very subjective, there are no big difficulties in distinguishing, for instance, sorrow from anger.

The music rhetoric of the baroque left us an arsenal of the so-called figures of rhetoric, *Figurenlehren*, which are a collection of correspondences between musical moments and affections. An example coming from baroque music is the figure of *anabasis*, which means a movement upwards with the analogous meaning of ascending to heaven or to express exalted, rising, or elevated and eminent thoughts [18]. The opposite figure is the *catabasis*, which points to a descending musical passage, which expresses descending, lowly, or negative images or affections [19]. Among many other figures, it is important to mention those ones related to the categorization of silences. Rhetorical silences are a very good example on how rhetoric works in analyzing music. To define the characteristics of a silence, it is necessary to explore its surroundings. In this way it is possible to obtain a clearer idea whether the silence is an active silence, such as an abrupt interruption (*abruptio*) or a questioning silence (*interrogatio*), an interruption with an emotional content (*suspiratio*), or simply a pause after a harmonic resolution (*pausa*).

During the Age of Enlightenment, music performance turned from audience-centered to artist-centered [20], rendering rhetoric in music obsolete. During the 1960s, "new" rhetorical theories proved to be necessary to adapt our understanding of rhetoric to the changing conditions of the new era. Lucaites and Condit mention two phenomena as particularly important in generating the need for such theories. The first is the rise of

Figure 2. The e-recorder

television as a mass medium for public discourse, and the second is the rise in social movements such as the civil rights movement, the antiwar movement and the woman's liberation movement [21]. The interest was to understand rhetoric and its connection with social theory. Today, rhetoric is viewed as the energy inherent in emotion and thought, transmitted to others

through a system of signs, with the objective of influencing their decisions and actions [22].

In 1997, when I set course to develop an instrument with the aid of computer technology, what gradually became the guiding premises for developing the structure and the manner to perform music with the meta-instrument were (a) the intrinsic intercorporeal level of music performances, (b) the congruence between gesture and sound, (c) the use of a reexamined concept of music rhetoric and (d) the transformation of impulse into expression through the interpolation of resistances. My PhD research thesis investigates the connection between rhetoric and the musical scope of contemporary improvisation. Today, rhetoric serves as a set of tools that constantly expands with experience. These tools are very useful when elaborating the musical discourse. Furthermore, rhetorical concepts have also helped in the development of pedagogical lines for teaching contemporary improvisation.

5. THE E-RECORDER

Extending the acoustic instrument, a contrabass recorder built by Herbert Paetzold [23], with an electronic set of controllers proved initially to be a development of heuristic discovery. During the process of testing the placement and role of each sensor I had to take decisions on how to make of the electronic interface something organologically coherent. The arguments behind those decisions were, and are, based on ideas with regard to the maneuverability and physical location of sensors and their connection with gestures. On the other side, the processes used to transform sound via the electronic interface

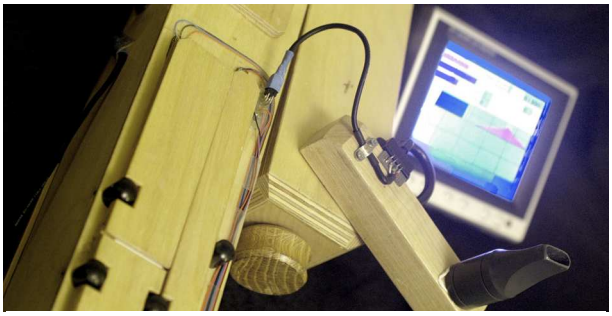

Figure 3. LCD monitor installed on the e-recorder

are chosen and informed by a number of satisfactory results accumulated in the past. What was initially an acoustic instrument with the capability of twisting some sounds through a set of ten sensors has become a complex hybrid instrument with its own instrumental technique. The principle used for this development consists of applying a set of changes, practicing and performing with them for a long period of time in order to gain control and expose those aspects that need to be improved. In this matter, musical expressivity has always been the driving force.

For example, a major change in the instrument came after trying to solve the obstacle of having to perform behind a set of electronic devices placed on top of a table. A solution had to be found not only for aesthetic purposes but also for removing what represented a physical obstacle between the performer and the audience. The way out came after installing a LCD monitor on the "head" of the instrument. The small screen shows a copy of the computer's desktop so that the electronic gear could be moved to the back or even off-stage. If to create resistances it is necessary to deal with the "obstacles" arising during the performance, the performer needs time in order to identify and react to those elements. In this aspect, staring at a graphical interface consumes time, which might be otherwise used for musical interactive processes. The e-recorder's graphical interface shows the status of each of the sensors (rec/stand-by; transpositions to several MIDI notes; filterA/B; envelope open/closed; etc.) and the size and place where the sound is playing back from a buffer of five seconds. Placing the monitor above the head of the performer avoids unnecessary visual distraction from the graphical interface, allowing for more concentration in the process of making music. From a rhetorical point of view, this helped in restoring the contact with the audience and granted more connection and communication with co-participants in the elaboration of music.

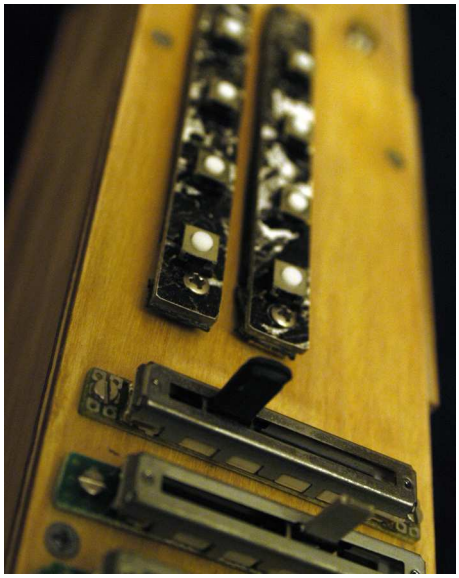

Figure 4. Triggers and sliders of the e-recorder

Playing the e-recorder, as any other instrument, produces a variety of physical gestures. Those gestures originate from two sources: (1) playing the acoustic platform of the recorder and (2) triggering the electronic interface. Some of the electronic triggering does not deliver a visible physical gesture parallel to the musical gesture, like opening the gate for filling the buffer, or switching between modes of filtering and transposing – all of this is done by the player's right thumb at the back of the recorder (Figure 4). However, the mouth pressure sensor of the instrument can be set to open the envelope when reaching at certain pressure, creating a parallel gesture between both the acoustic and electronic platforms. This parallel effect also becomes evident when turning on the transposition mode that makes the electronics follow the pitches of the recorder's fingerings.

A device that requires special attention is a mechanism that needed to be fit to the instrument so that it could be played in a standing position – the original recorder was supposed to be played in a sitting position. We called this device the bird-cage. The bird-cage has a potentiometer that allows the rotating movement of the recorder to "scratch" the buffer of the MAX/MSP patch [24]. This, in combination with a slider that allows the performer to select the amount of milliseconds of playback, plus the graphic of the sound in the LCD screen, give a sense of comfortable control on choosing the material for live-processing. It is possible to remember by looking at the graphics where each of the recorded sounds is located. The bird-cage also controls, through an accelerometer, the settings of band-filters through tilting the recorder back and forth. This movement can also control four channels sound spatialization. Constantly planning future developments for the e-recorder may be a characteristic intrinsic to the field of developing musical instruments today. It seems to me that a concern about

designing something permanent with the objective of producing a musical instrument for the future – such as the idea of a piano or a violin – does not have a place in an era with vast advances in technology. Any preoccupation with this kind of concept of permanence may turn out to be counterproductive for the development of new instruments. However, I believe in a

Figure 5. The bird-cage

development that takes into account the physicality of live music performances that use electronics. Regularly there is a divergence between what we listen and what we see. This lack of connection deprives audiences from understanding what is going on between the interpreter and the computer and creates an illusion that, once it takes place, threatens to disengage the perception of the music with reality. I believe that we should not compromise in trying to adjust to this situation by understanding it as a problem that the audience itself needs to solve by adopting a different concept of listening, but rather to find manners to restore the vital connection natural to live performances.

6. CONCLUSION

The hypothesis drawn by this paper is that as much as communication cannot be disassociated from any musical experience, human perceptive mechanisms rely in part on a set of ontological characteristics of reception related to the intrinsic corporeal engagement of musical experiences. When we perform, we engage in an activity that, in several aspects, is essential in the way we live. We make art because it is in our nature to do so. The reason why I am mentioning this is because it seems to me that sometimes an excess of concentration in the methods and materials used for making music blurs the objective of finding new manners for musical expression.

Today, the expansion of the musical material brought by the extended acoustic instrumental techniques, the use of electronic technology and the influence of having the possibility to become acquainted with music from any place in the world, seems to divert the attention to the issue of making the expression through music consistent. It must be clear that the great variety of materials available for musical creation today leads to a broad palette of possibilities but, at the same time, to a more complicated path to producing music which is consistent and eloquent. I believe that we would profit from acknowledging that to fully explore the possibilities for making music today, we should experiment with finding a balance between the use of a very broad palette of sounds in combination with different levels of intensity and control. At the same time, it might be useful to engage in the development of ways to create resistances in order to mature the musical discourse. Resistances, not only in the ambit of instrumental control, but in the development of a mindset that makes us perform with full awareness of our intentions.

Since I started to investigate and apply the central goals of this study – rhetoric and instrument development – my progress as a performer and the way I appreciate music as a whole has truly expanded. Although experience and the predisposition for change might by itself increase the chances of attaining tangible results, I believe that rhetoric can help in this matter since it is an area of thought and practice that allows us to understand the organization of structures in music simultaneously with the concatenation of intentionalities.

Since there is no pre-formulated strategy or rule that prescribes how to proceed in pursuing the objectives of discovering new platforms for musical expression, it might be beneficial to surrender to change and let the multiplicity inherent in this field help build up human expressions through the paths we meet in the course of development. The full significance of new instrumental developments is still unrevealed and it will probably mean a transformation in the manner we create and perceive music in the future.

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8. REFERENCES

[1] Dewey, John. *Art as Experience*. Penguin Group, New York, 1934, pages 58-81.
[2] Leman, Marc. *Embodied Music Cognition and Mediation Technology*. The MIT Press, 2008, pages 17-22.
[3] Dewey, page 62.
[4] Dewey, page 58.
[5] Dewey, page 59.
[6] Dewey, page 58.
[7] Dewey, page 60.
[8] Sloboda, John. *Exploring the Musical Mind.* Oxford University Press, 2005, chapters 16.3-16.6.
[9] Barthes, Roland, *Musica Practica* in: *Image – Music – Text*, Hill and Wang, Noonday Press, New York, 1977, pages 149-154.
[10] Leppert, Richard, *The Sight of Sound: Music, Representation, and the History of the Body*. University of California Press, Berkeley, 1995, page xxii.
[11] Leman, Marc. *Embodied Music Cognition and Mediation Technology*. The MIT Press, 2008, page 17.
[12] Damasio, Antonio. *The Feeling of What Happens; Body and Emotion in the Making of Consciousness*, Harcourt Brace & Company, 1999, page 85.
[13] Leman, Marc. *Embodied Music Cognition and Mediation Technology*. The MIT Press, 2008, page 21.
[14] Herrick, James A. *The History and Theory of Rhetoric*. Scottsdale, 1997, page 5.
[15] Palisca, Claude V. *Studies in the History of Italian Music and Music Theory*. Oxford University Press, 1994, pages 19-29 and
[16] Bartel, Dietrich. *Musica Poetica*, University of Nebraska Press, 1997, page 93.
[17] The unequal temperament used for tuning keyboards during the baroque era gives different characteristics to

tonalities. The equal temperament of today actually reduced the characteristics of tonalities to two: one major and one minor.
[18] Kircher, Athanasius. *Musurgia Universalis sive ars magna consoni et dissoni* (Rome, 1650) L.8 p.145 in Bartel, Dietrich. *Musica Poetica*, University of Nebraska Press, 1997, 180.
[19] Bartel, Dietrich. *Musica Poetica*, University of Nebraska Press, 1997, page 214.
[20] Tarling, Judy. *The Weapons of Rhetoric*. Corda Music Publications, Hertfordshire, 2004, page 40.
[21] Lucaites John L. & Condit Celeste M. & Caudill Sally Editors *Contemporary Rhetorical Theory,* The Guilford Press, New York, 1999, page 8.
[22] Kennedy, George translator's introduction to *Aristotle on Rhetoric: A Theory of Civic Discourse.* Cambridge University Press, 1989.
[23] The acoustic instrument is made by Herbert Paetzold in Munique, Germany.
[24] The Max/MSP patch is designed by Johan van Kreij.