

Simonetta Sargenti

Listening and analyzing electroacoustic music: sound analysis, gesture and communication of emotions

Conservatorio Guido Cantelli , Novara (Italy)

Gatm, Gruppo Analisi e teoria musicale

simonetta.sargenti@consno.it

Introduction

The topic of the last EMS Conference, if electroacoustic music is still today an experimental music, puts in light the concept of ‘experimental’ in the field of electroacoustic music under various points of view. Can electroacoustic and electronic music be considered ‘experimental’, when it is becoming a part of our daily life? In which sense can we say that this music is still today something ‘experimental’? There are some fields of music practice and music life in which the music created with technological tools is really even not well known.

My contribution to the discussion will present the partial results obtained since today of an investigation on the reception of electroacoustic music conducted with people without or with less familiarity with this repertoire.

In fact even professional musician and advanced music students if not specifically oriented towards electronic music, are not familiar with it. For these people electroacoustic is synonym of experimental. My goal is to bring these students and people closer to the repertoire of cultured electronic music starting from a practice to listen it and to shorten the distance between electronic and non-electronic repertoire.

Edgard Varèse at the beginning of the XX century replaced the word ‘music’ with ‘organised sound’, foreseeing the use of new tools to make music. Today a century later, to introduce musicians and music student to electroacoustic repertoire constitutes in some cases yet an experimentation.

Topic and Aims

This project tells about my experience of approaching electro-acoustic music through listening to people unfamiliar with it.

The experience takes place with different groups of people:

- 1-5 intermediate music students (aged between 20 and 25 years)
- 2- 5 high level music students (aged between 25 and 30 years)
- 3- 5 non professional listeners (aged 35 years)
- 4- 5 professional musicians (aged between 45 and 51 years)

A total of twenty people took part to the experience.

A first question posed to the different kind of listeners is:

Which elements can be identified and recognized within this music only by listening?

Are you able to distinguish inside these compositions the main sound events and the techniques of composition?

The compositions proposed to the experience were:

1. Luciano Berio *Thema Omaggio a Joyce* (1957), a piece, composed in the Studio di Fonologia della Rai di Milano. Composed using tape recording technique. There is an example of , investigation of a new relationship between text and music, made possible with technological tools.
2. Jonathan Harvey *Mortuos plango vivos voco* (1980) commissioned by the IRCAM, The piece is based on computer-manipulated and concrete sounds, also an experience of composition with digital techniques in the period of affirmation of these new technological tools.
3. Denis Smalley *Wind Chimes* (1987) composed with synthetic sounds and concrete sounds. A well known and studied piece made by a composer who contribute also to electronic music analysis methods .

The reasons of that choice are :

One of the main reasons for choosing these compositions is that in the context of this repertoire, these are compositions of recognized aesthetic value. In fact, while in many cases the compositions of experimental electro-acoustic music are mainly aimed at evaluating the means used, these pieces are on the contrary recognized as musically valid and listened to as works of artistic value. This has meant that a literature has also developed around these works. As a consequence, another important reason for the choice is the presence of a reference bibliography. Moreover in particular:

1. *Thema* is one of the first experiences of electroacoustic music, suitable to introduce people to electroacoustic music listening.
2. *Mortuos plango vivos voco*, has in common with *Thema* the presence of the voice, and a dialectical relationship between word and sound: different levels of comprehension and non comprehension of word's meaning.
3. *Wind Chimes* is an interesting example of evolution in digital composition. All these compositions have been studied and we have references on them.

Methods

Our experience has developed in different steps

1. listening of the compositions
2. recognition of characterizing elements
3. segmentation and description
4. connection with associated images or extramusical meanings
5. conclusions and future perspectives

1- Listening . The first point of the project is of course listening to the proposed compositions belong to different periods in the history of electroacoustic music. To the two groups of music students (intermediate and advanced) I proposed to listen the composition twice, the first time without a support of the references, the second time with the support of its and to describe the events which they are able to recognise. The listening experience is in these cases particularly interesting because completely concentrated on the hearing without the visual experience of the score. In fact the proposed compositions don't have a traditional score. For people accustomed to written music, it is a new experience. They approached this music with a certain **curiosity**, but in most cases with difficulty to **keeping attention**. The reason for the curiosity is probably due to the fact that it is for all types of listeners participating in this experience an unknown music and a music to which they are not accustomed. The difficulty in concentrating instead depends on the lack of a text to be followed in parallel with listening and probably also with the characteristics of the proposed music.

The experience of listening is proposed to the different groups of in the following order: 1- intermediated music students (first listening) 2- first listening advanced music students (first listening) 3- non professional listeners 4- professional musicians 5- intermediate students (second listening) . 6- advanced students (second listening).

2- Recognition and description. A description of the listened compositions should be obtained by the listening with the aim to define a formal analysis and to individuate and recognise the main characteristics of the sound events.

In the composition of Luciano Berio, after the first listening experience, conducted without any support, the students advanced and intermediate recognised mainly only the difference between voice and noise. The non professional listeners and the professional musicians, who are asked to listen the compositions only once, are more interested to the imagin association and not so much to the sound events typologies.

The students of both levels are asked to listen the compositions twice. The second listening experience was supported by references.

Starting from the experimental era of electroacoustic music until today, various analytical methods have been developed concerning electroacoustic music: for example spectromorphology (Smalley). Spectromorphology is an important tool to describe and analyse electroacoustic music starting from listening experience. Another important tool for analysis and comprehension of electroacoustic music is the method called SIAM (Segregation, Integration, Assimilation and meaning (Hirst) which applies frame work developed inside the studies of western music. In many cases are the same composers that provide useful elements for understanding the structures of the pieces themselves. For example Berio refers to the contrapuntal structure of the chapter of Joyce's novel from which it draws the text. (Berio 1957). He describes in his article the main principles of their composition *Thema*, that is a superposition of different texts in three different languages, the individuation of musical characters of the words and the procedure to isolate the sounds contained in the word to transforming word's meaning in sound events and to emphasise the sound elements of the words to create different levels of articulation of words and sounds following the relationship between continuity-discontinuity and periodicity. Listening the piece a second time the intermediate and the advanced students, supported by the analysis of Berio, come to recognize beyond the difference between the different types of text and not just the difference between voice and noise as after the first listening experience.

Mortuos plango, vivos voco is based as demonstrated by Bruno Bossis (Bossis 2004), on a three part structure in which are individuated the three main sound typologies: bell, voice, and the transformed sounds. An important reference is the article of Kendall (2016) who focused their attention on sonic disparities between the bell, the soprano voice. These characters has been recognised by the intermediate and the advanced students after the second listening supported by references.

Wind Chimes principally the analisis of David Hirst (Hirst 2006) and the artiche of Denis Smalley (1984 and 97) have been the references of the second listening experience of the two groups of people, the intermediate and the advanced students. Both the groups find that composition the most difficult to analyse regarding the difference of sound typologies. In particular the spectral types and the superposition of its.

3-Segmentation. Based on listening and supported by the mentioned references, after a second listening of the pieces we asked to the students to obtain a segmentation and a summary description of the main sound events.

I will show here only the first 60 seconds of each composition as example of the obtained segmentation and recognised characters

Segmentation and characters *Thema Omaggio a Joyce* (first 60 seconds).

section	duration	character
1	from 0 to 5	voice
2	6 to 10	voice
3	from 11 to 16	voice, noise
4	from 17 to 25	voice, noise
5	from 26 to 30	voice, noise and whisper
6	31-50	Overlapping of voices, noise
7	50-60	Isolated phonems ,whisper

Segmentation and characters *Mortuos plango, vivos voco* (first 60 seconds)

section	duration	character
1	from 1 to 17	Bells in diminution and changing the sound shape from continuous sound to instant sound
2	from 18 to 20	bells and introduction of the voice
3	from 21 to 25	bells and voice
4	from 25 to 30	bells
5	31-40	Voice in foreground
6	40-45	Bells
7	45-60	Transformed sounds

Segmentation and characters *Wind Chimes* (first 60 seconds)

section	duration	character
1	from 0 to 3	one sound like bell
2	from 4 to 10	silence
3	from 10 to 18	3 type of sounds: the first, another new and punctual sounds
4	from 18 to 25	developement of the same
5	from 25 to 30	acceleration
6	30-34	silence
7	35-60	New timbre

We can observe in the first piece, *Thema* a regularity in the distribution of segments: in the first 60 seconds we have segments with about the same duration. Each of them is featured by an inflection and progressively by the insertion of the phonemes and the rustles.

In *Mortuos plango* we have longer segments in the first minute of music, with a different length and continuity of sound.

In *Wind Chimes* there is a density of events and an acceleration at the end of these section and there is an importance of silences.

The sound typologies are more evident particularly in *Mortuos plango vivos voco*. The disparity between bells and soprano voice in this composition is mentioned also in the quoted reference of Kendall (Kendall, 2016). In *Wind Chimes* is more difficult to describe in words the character of musical events.

At this step of our experience we can conclude that 1- intermediate and advanced students at a first listening recognise only some of the sound typologies. At the second listen supported by references they recognise more differences between sound typologies and they are able to make also a segmentation based on the sound events changes. They are also able to describe the main sound events. Musicians not engaged in electroacoustic repertoire and non musicians, are asked to listen the compositions only once and they give attention in any case, only to the associated emotions or images aroused by the music.

A question can be asked at this point: ***it's possible to recognize also some of the technical procedures?***

In these compositions we have different kind of sounds: voice, concrete sounds and synthesis sounds. How are they manipulated?

At the second listening experience only some of the advanced students individuate the compositional techniques: for example the use of reverber effect in *Thema* and an hypothesis of the presence of granular synthesis in *Wind Chimes*. They even if are not able to explain which technique is used, attribute relevance to the technical means. Musicians and non professional listeners as said before are not interested to this aspect.

Here I will show the associations with images and emotions and the relevance attributed to technical means

Thema, Omaggio a Joyce: association of imagins and emotions

Kind of people	emotions	imagins	Relevance of tecnicl means
advanced music students	Distress	Spaceship and extraterrestrial people	yes
Intermediate music students	Distress Interest curiosity		yes
Professional musicians	Distress Restlessness gloomy		no
Non professional listeners		Water and body absorbed in water	no

a-the advanced music students perceive a distress sensation. Some of them focused their attention more listening the piece twice and confirming the first perception. In one case imagins are associated to the sound: the vision of a spaceship and of extraterrestrial people. Advanced students give importance to the tecnicl means used for composition.

b- The same perception of distress is experienced from intermediate music students. Some of them individuate it in the character of the voice manipulation. Also it's possible to confirm that the technological means influence the perception of the music. These students observe the importance of the voice manipulation : sound –significance or non significante of words.

c- professional musicians not engaged in the electroacoustic repertoire have a sense of distress and restlessness. Gloomy is a recurring word.

d- non professional listeners are involved in the listening experience. They have a difficulty to focus on the listening this kind of music, because it's missing a recognizable structure. In one case an imagin it has be associated with this piece a sensation of falling water.

Mortuos plango vivos voco: association of imagins and emotions

Kind of people	emotions	imagins	Relevance of tecnicl means
advanced music students	Distress Beginning merry, then distress sadness	Ghost in a square in front of a church	Yes (recognition of spectral characters)
Intermediate music students	Distress As dominant feeling		yes
Professional musicians	Distress Restlessness Gloomy sacredness		Relevance of the voice and importance of tecnica means
Non professional listeners		Night landscape	no

a-Predominant emotion is distress. At the beginning of the piece we have a sensation of serenity, but then sominate the distress. Imagin of ghosts that appair in the square near the Church. Relevance of tecnica means and distinction of different spectral types.

b-Even intermediate students recognize spectral tipologies and the presence of a text. Distress is the predominant emotion.

c-For musicians is iteresting a similarity in the use of the voice between Thema and Mortuos plango. Gloomy, sacredness and distress are the most relevant emotions.

d-Non musicians perceive a gloomy athmosphere and some of them imagine a night landscape.

Wind Chimes: association of imagins and emotions

Kind of people	emotions	imagins	Relevance of tecnical means
advanced music students	Distress Not leaching	Water drops falling Spaceship and space world	yes
Intermediate music students	Distress		Yes Interest in tecnical means
Professional musicians	Early primitive music	Walnut shells Wood Coliding objects	no
Non professional listeners	Eterea and suspended sounds	Summer breeze	no

a-Advanced students listened the piece twice . The association is with a distress sensation and the image is of water drops falling.

b-Distress fsensation is associated to the listening by intermediate students too. In these people is very relevant the attention to the tecnical means even if they cannot describe them..

c-Musicians remember primitive music produced wuth wood instruments or walnuts shells. For students tecnica means are relevant, for musicians not so much.

d-Non musicians only focus on emotions. In *Wind Chimes* is important the sensation of summer breeze ore suspended sounds.

Conclusions and future perspectives

To conclude the answer to the first question: which elements can be identified and recognized within this music by listening? It is possible to recognise spectral types and divide the compositions in sections (segmentation) for the intermediate and advanced music students at the second listening experience and supported by some indication (references). For the other listener who listen the compositions only once, this is in any case not interesting.

To the second ansie:

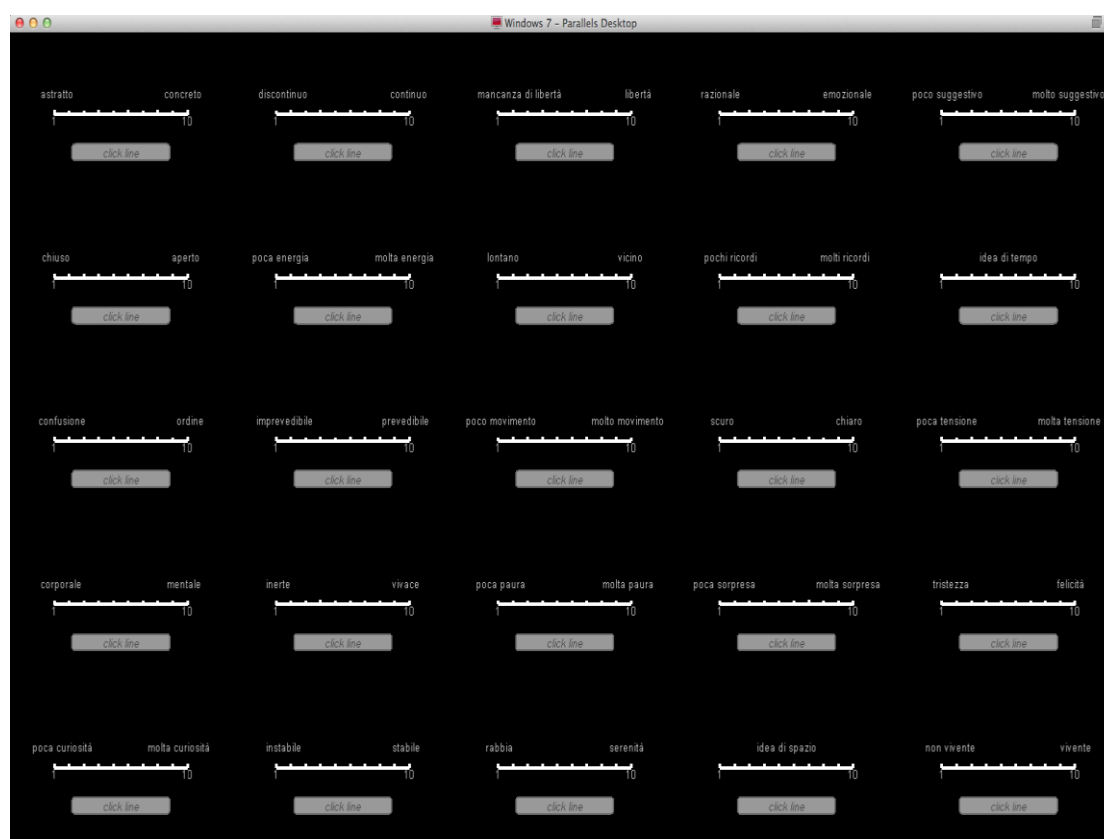
Are you able to distinguish the main sound events and the techniques of composition? the answer is that is very difficult to recognise all the techniques of composition, but it's possible to recognise the different sound events and spectral characteristics. Students are interested in it, non professional listener and professional musicians not engaged in this repertoire are not interested.

These conclusions confirm the results obtained in a previous study conducted by Erica Bisesi and me in 2016 (Bisesi-Sargenti, 2016) We asked to listener with different level of experience (in that case were not students, but or professional musicians or non professional listeners) to listen different version of the composition *Solo* by Karlheinz Stockhausen. The question was: ***What are the structural aspects which affect communication of content in this repertoire?***

Which kind of content do they communicate?

Participant to the experience were: 10 participants, (2 musicians experts in contemporary music, 3 classical musicians, 2 amateurs, 3 non-musicians)

We proposed also a series of words as showed in the table below:



The listeners have to choose in each word a level from 1 to 10.

The result of investigation shows that expert musicians in contemporary music don't have problems, classical musicians have more difficulties to listen and appreciate this kind of music, amateurs and non musicians even not comprehending techniques are interested and curious to listen and appreciate electroacoustic repertoire.

Future perspectives are to answer to the question: *what is the reason of difficulty in listening to and understanding the procedures of electroacoustic music for musicians are not experts in the field?*

It is a cultural conditioning or a lack of necessary tools ? To reach the result and to be able to answer this question we must continue to offer listening and study of this music also supported by the means available for analysis.

References

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