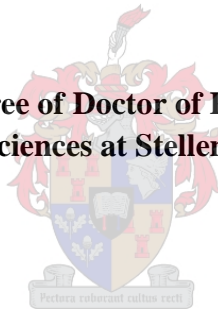


Sounds of Suffering.

**A creative response to Human Suffering and Emotional Pain in
the form of a contemporary musical composition**

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**Dissertation presented for the degree of Doctor of Philosophy (Music) in the Faculty of
Art and Social Sciences at Stellenbosch University**



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DECLARATION

By submitting this dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

ABSTRACT

This doctoral dissertation is intended as a contribution to the field of practice-based research in music, more specifically in the area of composition. It presents a study on the topic of human suffering in which theoretical and creative work are integrated so as to provide a view on the subject from the perspective of the researcher as composer. Throughout their history and in all cultures humans have been confronted by the phenomenon of pain and suffering as an integral part of life and have been dealing with it in various ways. This also applies to artists, who have responded to the phenomenon with the respective creative means at their disposal. For a twenty-first century composer the devices that were developed by composers in past centuries to represent or express pain and suffering are no longer viable. Therefore, to respond creatively to this phenomenon in a way that is contemporary, musically sensitive and stylistically appropriate, I explore the potential which the sounds of actual human voices expressing pain and suffering offer me for my compositions. The aim of the project, therefore, was to record and analyse the expressive quality of human voices in a state of suffering so as to understand their particular characteristics and then to exploit these characteristics for my creative work. For this purpose I undertook extensive fieldwork, during which I recorded vocal expressions of pain by people in a state of suffering, more specifically the expression of grief in the form of mourning at funerals conducted at public cemeteries. These sound samples were then analysed by means of SPEAR sound analysis software. The results provided me with raw sound material for my creative work, which, in turn, led to the portfolio of compositions offered as part of this dissertation. Ultimately, the challenge was to find a theoretical basis on which to base the entire project and to integrate its various parts, i.e. cultural awareness, fieldwork, questions of compositional style, the possibilities offered by software and the actual creative work, into a coherent whole.

OPSOMMING

Hierdie doktrale proefskrif is bedoel as 'n bydrae tot die veld van praktyk-gebaseerde navorsing in musiek, meer spesifiek tot die gebied van komposisie. Dit bied 'n studie aan oor die onderwerp van menslike pyn en lyding, waarin teoretiese en kreatiewe werk geïntegreer word om 'n blik op die onderwerp te verskaf vanuit die perspektief van die navorser as komponis. Deur die geskiedenis heen en in alle kulture is mense gekonfronteer met die verskynsel van pyn en lyding as 'n onlosmaaklike deel van die lewe en het hulle op verskillende wyses daarop gereageer. Dit geld ook vir kunstenaars, wat op telkens verskillende maniere en met die onderskeie kreatiewe middele tot hul beskikking daarop geantwoord het. Vanuit die perspektief van 'n een-en-twintigste-eeuse komponis het die middele wat deur komponiste in vroeëre eeue ontwikkel is om pyn en lyding uit te druk hul geldigheid verloor. Om dus kreatief op pyn en lyding te antwoord op 'n wyse wat eietyd, musikaal sensitief en stilisties toepaslik is, ondersoek ek die potensiaal wat die stemme van mense in 'n werklike toestand van pyn en lyding vir my skeppende werk inhou. Die doelwit van die projek was dus om die ekspressiewe kwaliteit van menslike stemme wat pyn en lyding uitdruk op te neem, te analiseer, die kenmerke daarvan te ondersoek en dan vir my kreatiewe werk te ontgin. Vir hierdie doel het ek uitgebreide veldwerk onderneem, waartydens ek die vokale uitdrukking van pyn en lyding deur mense by openbare begrafnisse opgeneem het. Hierdie klankmonsters is dan met behulp van SPEAR sagteware ontleed. Die resultate het klankmateriaal tot my beskikking gestel wat op sy beurt tot die kreatiewe werk gelei het wat ek as komposisieportefeulje by hierdie proefskrif insluit. In die laaste instansie was die uitdaging om 'n teoretiese grondslag vir die projek as geheel te vind en waarby die verskillende dele, naamlik kulturele bewustheid, veldwerk, kwessies van komposiestyl, die potensiaal van sagteware en die uiteindelijke kreatiewe werk, uiteindelik tot 'n koherente geheel geïntegreer kan word.

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Finally, the completion of this dissertation would not have been possible without the support and kindness of my close friends, whose names may not be mentioned but their help and advice is sincerely appreciated and gratefully acknowledged.

DEDICATION

To my Mother, who is my rock. And

To my Father who opened my eyes to the world of music.

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CHAPTER 1: INTRODUCTION

1.1: MOTIVATION FOR THE STUDY

The artist [...] takes in the world, but instead of being oppressed by it he reworks it in his own personality and recreates it in the work of art (Becker, 1973:184).

I believe that making art is a process of transforming an inward journey outwardly. By inward journey, I mean experiencing the world through a contemplative and creative state of mind. When taking this journey, we often come out of it inspired and connected to something greater than ourselves, something beyond our physical existence that liberates us from the burden of everyday life. I believe that such great experiences, through which we can find ourselves, can lead us into an untouched state of consciousness.

My interest in perceiving and representing such experiences on a profound level, and abundantly so, has to do with my yearning for agency and earning authorship over my creative choices. In my case, the raw experience of suffering is what triggered me to take such an inward journey, even if, at the time, it may not have been an altogether a conscious choice.

I found the notion that suffering can lead us to creativity, to a breakthrough and ultimately to rebirth, a crucial one in the context of my creative work. Those moments in which the artist experiences suffering can be an inspiration to truly meaningful art. Jean Paul Sartre believes that “Suffering is justified as soon as it becomes the raw material of beauty” (Sartre, 2002:32) and Jay McInerney claims “Suffering is supposed to be the raw stuff of art” (McInerney, 2011:39).

The artist can transform her¹ wounds into something bigger and more valuable, which can be of an irreplaceable importance in the world. Only then did she not suffer in vain. Undoubtedly, such an artist is not happy about her misery, nor has she wished for the occurrence of tragic events in her life. Yet, she is able to create exceptional works of art from these experiences. This is how an artist finds validation of her existence in the face of death and absurdity.

¹ The feminine form of the pronoun is always taken to include the masculine form as well. I choose to follow this procedure to make the point that I am a female composer.

I have come to realise that the following aspects of suffering have inspired me more than any others: 1) Suffering is a preordained part of life, 2) it is universal, 3) and there is no escape from it.

It is true that life is suffering. As Pascal articulates: “If our condition were truly happy, we would not need diversion from thinking of it in order to make ourselves happy” (Pascal, 2018:48). **Suffering is a preordained part of life.** The world is filled with horrifying conditions: war, poverty, murder, violence, torture, terror, and horrible sicknesses. Everywhere one finds loneliness, depression, fear, anxiety, rejection, loss, anguish, separation, lamentation, grief, distress, dissatisfaction or unsatisfied desires, failure, hopelessness, stress, boredom, ennui, angst, and existential malaise, conditions which we all experience. We know that death is inevitable, yet we wish for life to continue. We have to make choices, knowing that such choices all have consequences. We pursue happiness and meaning in life despite the universal reality of death, preceded by an unavoidable sense of isolation and feeling of loneliness as if your soul is divided against itself. In this regard, Kalupahna (1992:87) in *The Problem of Suffering* points out:

The noble truth of suffering is this: 1) birth is suffering; 2) ageing is suffering; 3) sickness is suffering; 4) death is suffering. (Sorrow, lamentation, pain, grief, and despair are suffering.) 5) Association with what one dislikes is suffering; 6) separation from what one likes is suffering; 7) not to get what one wants is suffering. 8) In brief, clinging to the five aggregates of the personality as possessions of “my self” is suffering (Kalupahna, 1992:87).

In a most convincing way, these sentences express that **Suffering is universal**; it is familiar to us all, everyone can relate to it – one way or another, everyone grieves, experiences diseases, ageing and loss, etc. This universality of suffering – on the one hand – enables the artist to achieve an authentic connection with her audience on a deeper level, yet, on the other hand, the complexity and individuality of such feeling makes suffering – to some extent – unshareable and unique to each person.

One might think that the only redemption from suffering is to pursue and discover those circumstances in which one can avoid or eliminate pain; unaware of the fact that **suffering is inevitable**, hence **there is no escape from it**. In this regard Dostoevsky, in his well-known novel *Notes from the Underground*, took issue with the philosophy of development and perfection as the liberation from suffering; those philosophies that claim that if our circumstances were different suffering could be overcome. Dostoevsky argues that this is only

a delusion, since changing the circumstances will not eliminate suffering. Life can only be a process of changing the cause of pain, never removing the pain itself. There will always be something to agonise about. Suffering will always continue to flow.

For me as a composer, salvation from suffering can be achieved through the act of composing, i.e. through transformation of pain into sounds, and sounds into music. However, this is not an easy task, one that can be described linearly; in my opinion, the expression of suffering in the form of music is more challenging than in other art forms.

The stronger the pain and the deeper its emotional impact, the more complicated and demanding its expression. For this reason, I have been struggling with the question of how to translate suffering into music? Because suffering is a universal experience, we are all able to recognise the pain in a shrieking and/or a sobbing voice. What element(s) in one's painful screams makes its expression so strong and real? Is there a way to find those elements and use them in my compositions?

In my quest towards finding an answer, I presumed the key to the solution might be found in the expressive quality of human voice and in an analysis of the sounds it emits in a state of suffering. Furthermore, what are the characteristics of the sound of suffering and how can it be measured? Are those results useful enough to be transformed into music? How can I apply them in my compositions? What element(s) in a sound makes it sad? Can this be ascertained from the waveforms of the sound? What are their waveforms carrying?"

It is difficult to lay down generally applicable rules by which to assign musical patterns and features for the expression of pain and suffering. Most of the conventions mentioned in musical and philosophical literature on the topic are linked to tonal music or the use of melody². But they do not apply to the requirements of twentieth century music and the music after that, with

² Composers of tonal music used to follow generally accepted conventions when expressing suffering or emotional pain. Bach, Beethoven and even later composers in the nineteenth century used minor keys, a slow tempo, well-chosen chromatic progressions and even dissonances in connection with high registers and sharp and shrill orchestration to achieve their aim. As Edmund Gurney (1880) mentioned, there are some features, which are traditionally connected with the expression in music, such as timbre or quality of musical sound, major and minor 'mode', particular harmonic features and undecided rhythm (Gurney, cited in Hosper, 1971:123-124). According to Gurney, for example, Prout refers to instrumentation when he says that the sound of an oboe is equally useful for the expression of melancholy, tenderness, happiness and satisfaction. The horn has a dreamy or melancholy character. The bassoon is suitable for expressing humorous and grotesque effects, which were described by Niccolò Piccinni as sad and melancholy. The major mode is suitable for expressing confidence and happiness, while the minor mode is mournful and sad (Gurney, cited in Hosper, 1971:125-126).

its quest for innovation in respect of harmony, intervals, rhythm, instrumentation and other musical techniques. With the demise of tonal music, even if this was not the abrupt process as it was made out to be at the time, the aforementioned conventions became obsolete. Nowadays, the expression of emotions in musical composition and its methods are likely to be different from one composer to another.

As a composer of the twenty-first century, I wish to discover and exploit novel ways and methods for expressing pain and suffering in my music. For this purpose, I deem the expressive character of the human voice in a state of suffering to be the most appropriate source for the sound material I require. As a consequence, it is my aim to consider the natural expression of 'real' people in the form of crying, mourning and whining, that is to say, the sound people make when they are in a state of suffering, and to examine and analyse their constituent elements and structure and their sound spectrum, and to use the resulting information to translate those features into music of my own.

For this purpose, I decided to record vocal expressions of pain, voices of people who are in a state of suffering and, subsequently, to analyse these sound samples by means of SPEAR³ sound analysis software. The most practical and suitable circumstances that would give me direct access to people who are in a state of suffering and to record their voices in situations where sorrowful emotions are expressed, is at funerals. In some countries, such as my country of origin (Iran), where people are encouraged to express their feelings, it is not difficult to hear the sound of suffering in unmediated fashion. My familiarity with Iranian culture has provided me with the opportunity to gain access to the required raw materials for this research in Iran. To come closer to the generic form of expression, I focused on the simple elementary verbal utterances in my recordings, and analysed the sound spectrum of these samples with SPEAR. Subsequently, I evaluated the similarities and differences between the various samples, their generic characteristics, their frequencies and amplitudes, etc., and used the results as the raw sound material for my compositions. After reflecting on the features emanating from my analyses, I came to realise that the results of the analysis are especially suitable for electroacoustic composition. However, I believe that the outcome also has the potential to be used as raw material for instrumental or orchestral compositions.

³ Sinusoidal Partial Editing Analysis and Resynthesis (abbreviated to SPEAR), is a spectral analysis software (see section 1.3).

1.2: RESEARCH PROBLEM

1.2.1: CONTEXTUALISATION OF THE RESEARCH PROBLEM

The dissertation presented here is a contribution to the growing body of doctoral work in the field of practice-based research (or research-based practice⁴, as I prefer to call it) at Stellenbosch University. In accordance with the stipulations for this kind of doctoral degree, as set out in the Calendar of the Faculty of Arts and Social Sciences, the dissertation “reports” on an “integrated study of [...] the creative processes and theoretical work”. Its “unique nature” is “derived from the coherence and interdependency of [...] the creative processes and theoretical dimensions”. In this case, the project is situated within the field of musical composition (see Stellenbosch University Calendar, 2019:197).

These stipulations form the background against which the research problem underlying the present project has to be conceived. There are four aspects to this problem. The first of these is that I approach the project as a composer for whom it is imperative to engage with and respond to the world in which I find myself. My response is not in the form of scholarly research output, but in the form of music. The second aspect is that of my cultural background and the exposure I have had for as long as I can remember to the ways in which grief is expressed. I have also had such experiences myself. Together, these experiences represent the initial creative inspiration for my work. This also means that my music will reflect my cultural background in some way. The third part of the research problem is to find a musically sensitive and stylistically appropriate way of incorporating these expressions of pain and suffering into the compositions I present as part of this project. The fourth feature of my research problem is to find a way in which to integrate all these aspects convincingly and present them in the form of a doctoral dissertation in the field of research-based practice.

Each of these aspects will now be discussed in some detail.

In the first place, it is important for me not to remove myself from society, or to live and create music in an ivory tower. On the contrary, I feel the imperative to engage with my social environment. I do so by being moved intensely, for example, by the pain and suffering experienced by humans in my immediate environment, at the same time recognising that pain and suffering are part of the human condition everywhere. This recognition urges me as a

⁴ It seems that the name “research-based practice” would better describe this present research, since the practice part of this project (i.e. my compositions) is based on the primary research.

composer to say something about the world in the form of art, in this case music. It is a world to which I feel intensely connected and for which I feel a sense of responsibility. This is where the initial inspiration to create music about pain and suffering originated. Being a composer, and not a scientist intent on “objective” research, makes it possible for me to place myself directly into the world about which I am creating music, to be part of the picture, so to speak, and not to stand outside of it. In this way, I hope to achieve the highest degree of immediacy imaginable to me in my music.

All through the history of humankind and in all cultures, people have responded in various ways to pain and suffering. Such responses are frequently channelled into culturally determined forms of musical expression, for example as dirges, threnodies, laments, solemn hymns or elegies. As has already been alluded to earlier, western composers of previous centuries created a complex vocabulary by which to express pain and suffering within the confines of a tonal musical language. These devices include the choice of mode deemed suitable for such a purpose (e.g. the minor scale), dissonant melodic movement (e.g. the augmented second) and dissonant harmonies (such as diminished chords, to name but one example). They also include the creation of formal procedures such as the passacaglia. Various kinds of chromaticism, both melodic (e.g. the lamento bass) and harmonic (e.g. unusual or “incorrect” resolution of chords) have even, over time, taken on the form of stylistic conventions intelligible to most listeners familiar with the style concerned. Many of these devices have survived, even beyond the end of the tonal stylistic era, in the medium of film music.

However, for a twenty-first century composer, these devices are no longer viable. The same goes for devices developed by composers of the twentieth century. These include various kinds of atonal structures, dissonant tone clusters and unusual instrumental timbres. Nowadays, the availability of music technology, especially in the form of various kinds of software, has expanded the array of sounds available to the composer and has opened up completely new avenues of musical expression. It is the availability of these technical possibilities which challenges me to find a way to exploit the sounds of actual human voices expressing pain and suffering for their compositional potential.

Secondly, I am aware of my cultural background and that it will be reflected in my music. It is imperative for me not only to acknowledge this cultural background, even when I compose music within an international twenty-first century context, but also to exhibit a deeper understanding of this culture. In Iranian culture, pain and suffering are expressed on a personal

level by people in a state of grief, as well as on the level of culturally mediated forms of expression. This can be done by individuals on their own, or collectively, for example by people who attend a funeral or through mourning rituals. In the context of research-based practice, my artistic response to such expression of pain and suffering cannot be purely spontaneous. Instead, I have to gain a deeper understanding of such expressions and I have to find a way of capturing them for the purpose of an artistic response for which I am able to give account.

Beyond the culturally specific context within which pain and suffering are expressed, I also take into consideration that, in the course of their anthropological evolution, humans have developed the vocal means to express emotions of an extreme nature. I am referring to such uses of the voice as shouting, shrieking, crying or wailing. It is to be expected that under such circumstances human voice, as the most personal and intimate expressive medium at humans' disposal, creates sound characteristics such as timbres, intervals, dynamics and durations which differ from those normally produced when speaking or singing. It is these qualities of voice, which are of immense interest to me as a composer and give my work a decidedly anthropological orientation.

The possibilities which music technology makes available to composers nowadays have already been mentioned. In my quest, thirdly, to find a musically sensitive and stylistically appropriate way of incorporating expressions of pain and suffering into my music, I am exploring the potential which recorded sounds of actual human voices expressing pain and suffering offer me for my compositions. This part of the research problem deals with the collecting of such sound samples by means of field work conducted at appropriate settings in Iran, the spectral analysis of these sounds and making them available, employing them either directly or in electronically manipulated form, as the raw material for my compositions. My aim is to exploit this sound material most sensitively and in that way express my solidarity with the individuals from whom my sound samples originate, as well as with the experience of pain and suffering as part of the human condition. Examining and presenting how the input of raw sound material relates to the ultimate outcome as compositions represents an important part of this aspect of the research problem.

The fourth aspect of the research problem is to find a way in which to integrate the various parts of the project, i.e. cultural awareness, fieldwork, questions of compositional style, the possibilities offered by software and the actual creative work, into a coherent and convincing whole. This means that a theoretical basis has to be found that will accommodate these various

considerations. (The following chapters will discuss the questions presenting themselves in this respect in more detail.) Presentation of the work in the dissertation then has to progress logically from a descriptive and analytical discourse to the discourse of actual music, where the sentiments can no longer be described in terms of scholarly language, but have to be made audible by means of/in the form of music.

1.2.2: RESEARCH QUESTIONS

In summary, the above discussion leads into the following general research question: how can the expression of pain and suffering still be the topic of twenty-first century music? Flowing from this is the more specific and central question as to how the sound of human voices from a specific social environment, expressing pain and suffering, can provide the sound material for music that responds to such suffering in an artistically valid way instead of merely documenting it in the form of a soundscape. And, finally: how can such artistically valid music be presented within the context of a doctoral dissertation?

These questions should be understood in a hierarchical way. Answering them appropriately to the topic at hand and in the context of a project in the category of Research-based Practice leads to a somewhat unconventional layout of the dissertation. I believe that the particular nature of this work justifies this decision.

1.3: METHODOLOGICAL CONSIDERATIONS

As mentioned in the previous section (1.2), this project draws together diverse areas of investigation. Consideration therefore has to be given to the areas' respective and appropriate research methods. However, despite their differences, they all belong to the category of qualitative research. Thus, it is necessary to describe these methods separately before considering how they can be brought to bear on the final aim of the project, namely to create a number of musical works that, ultimately, represent an integration and artistic synthesis of their constituent methods.

The first area of investigation is that of cultural or ethnological studies. In this regard, my research can be divided into two aspects. The first is to gain a deeper understanding of the human experience of pain and suffering, views on death and grief, and of the way in which its

expression is culturally mediated in Iranian society. This search for deeper understanding takes on the form of literature study on the topic, augmented by my own observations as a cultural insider.

The second aspect has to do with my fieldwork in various localities in Iran. The aim of this work was to observe people giving vocal expression to pain and suffering at public funeral sites at the cemeteries, in two of the largest cities and then to collect sound samples of these vocal expressions. The method of collecting the sound samples was quite simple: I walked around these sites with my recorder switched on and recorded what was there and what I found worthy of note. Overall, the decision of which samples to collect was determined by my ultimate aim to use them for creative work, rather than by an attempt to gain a fully representative collection that lends itself to sociological analysis. Therefore, my artistic intuition had a decisive influence on the mode of my fieldwork. Nevertheless, what is less straightforward in this respect are the ethical considerations that have to be taken into account. Since the sounds were to be collected in a public space, where many people are present at the same time, uttering their various expressions of grief, and where the specific source of each of the sounds was difficult or even impossible to identify, it would not have been possible to gain the consent of the individual people concerned. This raises the crucial question of whether it is ethical to record the voices of people in a state of grief, without them being aware of it. In my application for ethical clearance, this question was discussed at length during several meetings. Eventually, clearance was granted on the understanding that the recorded sounds would flow into my compositions in manipulated form, so it would be impossible to trace back a particular sound to an identifiable individual⁵. In this respect, therefore, my fieldwork is of a completely different nature than that of a sociologist investigating the vocal expression of pain and suffering of a certain group of people at a given time and place for the sake of ethnographical research.

The second area of investigation is that of analysing and manipulating the collected sound samples by means of software with the aim of making them available for creative work. After considering various options, it was decided that SPEAR, which is a spectral analysis software, would be the most suitable for my particular purpose. SPEAR (Sinusoidal Partial Editing Analysis and Resynthesis) provides two different spectral analysis models: the Phase Vocoder

⁵ The document granting ethical clearance by Stellenbosch University for this fieldwork is attached in Appendix A.

and Sinusoidal modelling that offers several different synthesis methods. Its graphical interface gives the user the possibility of quick assessment of analysis quality. Analyses performed in SPEAR provide data in terms of the time continuum, frequency, amplitude and phase. Its high performance Graphical User Interface (GUI) makes it possible to visualise the complex sounds and manipulate them. Its detailed analysis can be used in the derivation of harmonic and rhythmic models, as well as the derivation of harmonic models for instrumental composition (summarised from Klingbeil, 2009). The capabilities of compositional applications of SPEAR, the simplicity of its usage and accurate detailed outcomes of the sound analysis, makes it an appropriate software programme for the purpose of this project.

Finally, consideration has to be given to the method that leads to the main outcome of this project, i.e. the creative work. To some extent, account can be given of the processes that led to the compositions, such as the analysis of the sound samples, outcomes and manipulation techniques, the decisions made about genre and the process of composition of each work. Ultimately, however, the process of composition, i.e. giving form and shape to the sound material, relies on the inspiration and intuition of the composer, even if the more systematic research methods described thus far will have had a bearing on the music. To some degree, this aspect of the music is open to subsequent stylistic analysis, a musicological research method already employed during the evaluation of musical works for the purpose of the literature overview. While all this may seem obvious, the important point to make here is that, in contrast to empirical research conducted on the vocal expression of pain and suffering by a sociologist, for example, the outcome of my project cannot be replicated by another person following exactly the same procedures. The possibility of replicating a research outcome to a greater or lesser degree, a cornerstone of empirical research, does not therefore apply in my case. This is an important point to make when considering questions of research method in the context of a project of research-based practice.

All of the above considerations will be discussed at length in the following chapters.

CHAPTER 2: THEORETICAL FRAMEWORK

2.1: THEORETICAL CONSIDERATIONS

As was mentioned in the previous chapter, presenting creative work as research for a doctoral degree is a rather new manner for an artist to conduct her work. It implies, firstly, that I have to give account for the way in which the creative work, in this particular case a number of musical compositions, has been conceived and how the outcome has been arrived at, instead of regarding this process as a private matter, which one does not make explicit. Secondly, it implies that the work as a whole needs to be placed within a coherent theoretical framework. The first obligation, i.e. giving explicit account of the way in which the creative outcome has been achieved, will be dealt with in chapter 4, where the ways are discussed in which I have created my compositions from the sound samples that I collected. The second obligation, to find a theoretical framework within which to place the creative work in question, is the subject of the present chapter.

It stands to reason that there is not necessarily a single theoretical paradigm that will serve all cases equally well, where creative work is presented as research. This will apply even more in the case of music, because the different art forms may call for different, discipline-specific considerations. The reason for this is that music is a non-referential art form and therefore, when embarking on a project in the category of research-based practice, one should be sensitive to the particular possibilities and limitations by which creative work in music can be linked to an external stimulus.

Moreover, even within music the fields of performance and composition may each have their own particularities, which require specific recognition. Therefore, it is incumbent upon the composer to align her compositions with a framework that is compatible with the aim of the project as a whole, i.e. to say something about pain and suffering as part of the human condition in terms of music. The following words by Carl Dahlhaus come to mind in this context:

Does music mirror the reality surrounding a composer, or does it propose an alternative reality? Does it have common roots with political events and philosophical ideas; or is music written simply because music has always been written and not, or not incidentally, because a composer is seeking to respond with music to the world he lives in? (Dahlhaus, 1983:19).

The expression of pain and suffering as part of human emotions has been the topic of countless examples of music over the ages, many of them in the twentieth and twenty-first centuries. Composers seek to express these emotions in an appropriate way. The idea seems to suggest itself that I base my project on a theory of expression⁶.

In this respect, several scholars have conducted groundbreaking works. According to Andrew Kania (2017: Section 3.1),

Those usually cited as classic expression theorists include Tolstoy (1898), Dewey (1934), and Collingwood (1938). (A classic critique is Tormey 1971 [...]) [...] Jenefer Robinson has attempted to revive the expression theory, though she defends it as an interesting and valuable *use* of music's expressiveness, rather than an account of expressiveness itself (Kania, 2017: Section 3.1, para.3).

Kania continues,

Several theorists have defended accounts of musical expressiveness known variously as resemblance, contour, or appearance theories (e.g., Kivy 1989, though see Kivy 2002 [...]; Budd 1995 [...]; S. Davies 1994). The central idea is that music's expressiveness consists in the resemblance between its dynamic character and the dynamic character of various aspects of people experiencing emotions. The aspects appealed to include the phenomenology of the experience of the emotion, the emotion's typical facial expression, the contour of vocal expression typical of a person experiencing the emotion, and the contour of bodily behavior typical of such a person, including "gait, attitude, air, carriage, posture, and comportment" (Kania, 2017: Section 3.1, para.8).

However, according to Kania (2017: Section 3.1), "Stephen Davies argues that such theories hold music to be expressive in a literal albeit secondary sense of the term. We say that a piece of music is sad in the same sense in which we say that a weeping willow is sad" (Kania, 2017: Section 3.1, para.8). Similarly, "Jerrold Levinson agrees that there is an important resemblance between the contour of music expressive of an emotion and the contour of typical behavioral expressions of that emotion. He objects, however, that such an account cannot be the whole, or even the most fundamental part of the story" (Kania, 2017: Section 3.1, para.9).

Kania (2017: Section 3.1) summarises:

The cliché that music is "the language of the emotions" is often considered as a possible starting point for a theory of musical expressiveness. The idea combines the attractive simplicity of conventionality that associationism makes the basis of music's meaning with the formalist notion that music's order is to be understood in terms of syntax. [...]

⁶ One may also be tempted to include a detour via neuromusicology at this juncture. While this idea would have its own attractions, neuromusicology has not yet advanced to the point where it can be employed to explain and interpret the expression of pain and suffering in music in the comprehensive sense of the term.

However, although Deryck Cooke (1959) and Leonard Meyer (1956) are often cited as proponents, it is not clear that anyone holds a full-blown version of the theory. The central problem is the great disparities between language and music, in terms of the ways in which each is both syntactic and semantic (Kania, 2017: Section 3.1, para.7).

However, it seems, then, that to this date no consensus has been achieved in respect of a coherent theory of expression in music. In this regard Andrew Kania (2017: Section 3.1) states that

Pieces of music, or performances of them, are standardly said to be happy, sad, and so on. Music's emotional expressiveness is a philosophical problem since the paradigm expressers of emotions are psychological agents, who have emotions to express. Neither pieces of music, nor performances of them, are psychological agents, thus it is puzzling that such things could be said to express emotions (Kania, 2017: Section 3.1, para.1).

Moreover, a similar conclusion can be gained from Roger Scruton's article on expression in the *New Grove Dictionary of Music and Musicians*. He mentions that Adorno proposes a "Modernist theory of expression" (Scruton 2001:466), and he discusses "transitive and intransitive notions of expression" (2001:468,471). "But in the end he seems to evaluate the discussion on musical expression as ultimately inconclusive when he makes the point that a comprehensive theory of expression will have to wait until there is an adequate theory of musical understanding" (2001:471).

In this regard, according to Kania (2017: Section 3.1),

A major burden of such a theory is to explain away the widespread tendency to describe music in emotional terms. This has been attempted by arguing that such descriptions are shorthand or metaphor for purely sonic features (Urmson, 1973), basic dynamic features (Hanslick 1854), purely musical features (Sharpe 1982), or aesthetic properties (Zangwill 2007) (Kania, 2017: Section 3.1, para.14).

Kania (2017: Section 3.1) argues that

There are two major problems with this "expression theory". The first is that neither composers nor performers often experience the emotions their music is expressive of as it is produced. Nor does it seem unlikely that a composer could create, or a performer perform, a piece expressive of an emotion that she had never experienced. This is not to deny that a composer could write a piece expressive of her emotional state, but two things must be observed. The first is that for the expression theory to be an account of musical expressiveness, at least all central cases of expressiveness must follow this model, which is not the case. The second is that if a composer is to express her sadness, say, by writing a sad piece, she must write the right kind of piece. In other words, if she is a bad composer she might fail to express her emotion. This brings us to the second major problem for the expression theory. If a composer can fail to express her emotions in a piece, then the music she writes is expressive independently of the emotion she is

experiencing. Thus music's expressiveness cannot be explained in terms of direct expression (Kania, 2017: Section 3.1, para.2).

Without discounting the possibility that a theory can be found according to which music is, or can be, expressive of emotions or feelings, it seems more productive for me to pursue a different line of thought for my project, one that links up well with my views as a twenty-first century composer, and can serve my thoughts and the philosophies behind my creative works.

Recent discussion of practice-based research (abbreviated to PBR), has benefitted greatly from a number of seminal articles published under the guidance of Henk Borgdorff in the *Dutch Journal of Music Theory* in 2007. Various focus areas in the field are explored. It has also had a bearing on my work. Of particular relevance for my project are those articles which deal with the more philosophical aspects of practice-based research. Tom Eide Osa, for example, refers to the work of Wittgenstein in his pursuit of the question "whether it is possible to know something without being able to say it [in terms of language]" (Osa, 2007:52). He continues:

[T]he example of knowing the sound of a clarinet makes this clear. If someone had never heard the sound of a clarinet it would be impossible to explain in words exactly how it sounds. Though the explainer has precise knowledge of the sound of a clarinet, his verbal explanation will never be able to portray the sound accurately (Osa, 2007:52).

Osa here touches on the much discussed concept of qualia. It seems that this recent branch of philosophy that deals with the concept of "qualia" can be exploited productively for the present project as well. Scholars like Daniel Dennett come to mind, for example his work in *Quining Qualia* (1988:42), where he considers how non-subjective interpretation explains experience. Qualia is a term that is defined as "Something that could not be more familiar to each of us: *the ways things seem to us*":

Look at a glass of milk at sunset; *the ways it looks to you* – the particular, personal, subjective visual quality of the glass of milk is the *quale* of your visual experience at the moment. *The way the milk tastes to you* then is another, gustatory *quale*, and *how it sounds to you* as you swallow is an auditory *quale*. These various "properties of conscious experience" are prime examples of *qualia*. Nothing, it seems, could you know more intimately than your own qualia; let the entire universe be some vast illusion, some mere figment of Descartes's evil demon, and yet what the figment is made of (for you) will be the qualia of your hallucinatory experiences (Dennett, 1988:42).

One's particular and personal experience of pain and suffering could then be described in terms of qualia. Taking this notion one step further, Rei Terada, in *Feeling in Theory* (2001:107),

mentioned that ‘Qualia’ are actually very similar to expressivity, and specifically in respect of expressive qualities articulated by abstract nouns. Referring to Dufrenne he states that expressivity is the “primordial reality of affective quality” (Terada, 2001:107).

In similar fashion, now focusing not on the sound of an instrument but on the musical work of art, Marcel Cobussen asks “what kind of knowledge is it that can be passed on only through art works” (Cobussen, 2007:20). This is the crucial question on which hinges justification for presenting creative work within the context of a doctoral project. In finding an answer to this question he refers to the work of Søren Kierkegaard, who, according to Cobussen,

pairs the sensual and the immediate with indeterminacy. It goes without saying that language is not able to express the indeterminate; indeterminacy is that which by definition escapes insertion into linguistic categories. And it is precisely through music that we can encounter the indeterminate⁷. Music is able to give us an experience – and thereby, in some way or another, knowledge – which (discursive) language, whether scientific or otherwise, can never achieve (Cobussen, 2007:21-22).

Whatever else can be said about the kind of knowledge that can be passed on through music – and he refers here to philosophers like Suzanne Langer, Michel Foucault, Jerrold Levinson and Jacques Derrida⁸ – Cobussen ultimately, and quite rightly so, makes the matter contingent on the question of truth, by asking whether “musical knowledge” can be connected with that most important aim of “collecting knowledge at universities: truth” (Cobussen, 2007:24). The crucial question then is “[I]s there truth of or in music, of or in art? And if so, what is truth of or in music, of or in art?” (Cobussen, 2007: 24).

Perhaps it would be more productive to replace Cobussen’s term “musical knowledge” with the notion of “music as a way of knowing”. This would be more in line with the extensive discussion, which follows from here on. Nevertheless, Cobussen seeks the answer to his question in the work of Martin Heidegger. This happens to coincide with my own interest in the work of Heidegger and his student Hans-Georg Gadamer.

Heidegger explored the *Origin of the Work of Art (Der Ursprung des Kunstwerkes)* in a seminal chapter with this title in his book *Holzwege* (1935/36, translated as *Off the Beaten Track*). Here, he views the notion of truth not as something “present in itself beforehand, somewhere among

⁷ Here Cobussen points out that Kierkegaard regarded this as a “defect”, not as a sign of music’s “perfection”.

⁸ See section 2.2.1 (PBR) for more details.

the stars, so as then, later on, to find accommodation among beings”, but rather links it to the ancient Greek term *aletheia*. More specifically,

[T]he unconcealment of beings is what the Greeks called *aletheia*. We say “truth” and think little enough in using the word. In the work, when there is a disclosure of the being as what and how it is, there is a happening of truth at work. In the work of art, the truth of the being has set itself to work. [...] The being of the being comes into the constancy of its shining. The essential nature of art would then be this: the setting-itself-to-work of the truth of beings (Heidegger, 2002:16).

Heidegger’s definition of truth as “disclosure”, rather than being “somewhere among the stars”, is further qualified by the notion that truth is not an external quality that is then placed into the work of art, but that it “happens” when it is set into the work: “Thus art is: the creative preservation of the truth in the work. Art is, then, a becoming and happening of truth” (Heidegger, 2002:44).

From this it can be gathered that Heidegger distances himself from nineteenth-century or “modern” aesthetics, where the work of art is still understood as an object of aesthetic pleasure, which stands in an external relation to the subjective observer or listener⁹. These ideas are clarified by the Heidegger scholar Iain Thomson, when he shows that Heidegger’s views are inherently critical of modern aesthetics and pave the way for a postmodern understanding of art:

[...] modern aesthetics frames its understanding of art by presupposing the subject/object dichotomy: Aesthetics presupposes a fundamental divide between the art “object” and the experiencing “subject,” a divide that is subsequently crossed by the commerce of sensation or feeling. Of course, the subject/object dichotomy forms the very basis of the modern worldview, so we would be surprised if modern aesthetics did not presuppose it (Thomson, 2011:48).

Thomson describes this critique by pointing out that Heidegger

thinks aesthetics follows from modern “subjectivism” and leads to late-modern “enframing,” historical worldviews [he] seeks to transcend from within – in large part by way of his phenomenological interpretations of art. [...] Heidegger seeks to build a phenomenological bridge from a particular work of art [...] to the ontological truth of art in general. [...] We see how [...] Heidegger thinks art can help lead us into a genuinely meaningful postmodernity (Thomson, 2011:40-41).

⁹ To avoid any misunderstanding it needs to be pointed out here that Thomson’s (and Heidegger’s) use of the term aesthetics does not refer to the discipline of aesthetics in general, but to its particular nineteenth-century or modern, Cartesian manifestation.

To show how the significance of art expands beyond the realm of aesthetic pleasure, Heidegger indicates, in the words of Thomson, that

the only way to get beyond aesthetics is to first understand how it shapes us and then seek to pass through and beyond that influence [...]. Heidegger thinks that only such a post-aesthetic thinking about art can allow us to recognize art's true significance, helping us understand the inconspicuous way in which art works to shape our basic sense of what is and what matters (Thomson, 2011:41).

In the context of the present project, I as a composer have much affinity for this notion, because it can be aligned with the often quite difficult process of composition, where I struggle to find the most appropriate way of presenting my ideas in relation to the kind of fieldwork I have been conducting.

An astute commentator on the work of Hans-Georg Gadamer, Kristin Gjesdal, shows that Gadamer also dwelt on the question of truth in art. She elucidates this as follows:

In Gadamer's view, as in Heidegger's, our modern understanding of truth has been dominated by the idea of a correspondence or adequation between (linguistic) representation, on the one hand, and matters of fact or states of affairs in the world, on the other. In an essay from 1957, "What is Truth?", Gadamer states this very clearly by claiming that predominantly "[t]he truth of speech is determined by the adequation of speech to the thing, i.e., as adequation of the presentation through speech to the presented fact." If the truth of art were to be conceived along the lines of such an adequation-model, then art would be assessed in terms of its ability to present us with a faithful representation of a non-aesthetic reality. Within the framework of post-romantic aesthetics, such an understanding of art may, admittedly, appear both far-fetched and naïve (Gjesdal, 2009:88).

Echoing Heidegger's view of truth as disclosure (*aletheia*), Gadamer "takes the truth of art to be about the self-presentation (being) of beings (phenomena)" (Gjesdal, 2009:93). That the kind of truth disclosed or revealed in art is different from truth (or art) as adequation is also alluded to in the introduction to Gadamer's book *Wahrheit und Methode* of 1960 (*Truth and Method*):

The same thing is true of the experience of art. Here the scholarly research pursued by the "science of art" is aware from the start that it can neither replace nor surpass the experience of art. The fact that *through a work of art a truth is experienced that we cannot attain in any other way* constitutes the philosophic importance of art, which asserts itself against all attempts to rationalize it away. Hence, together with the experience of philosophy, the experience of art is the most insistent admonition to scientific consciousness to acknowledge its own limits (My own italics. Gadamer, 2004:xxi-xxii).

Elsewhere Gadamer (1986:37) describes this particular quality of the work of art as being inherent in its “symbolic” character, a quality which was not recognised by nineteenth-century (idealist) aesthetics:

The weakness of idealist aesthetics lay in its failure to appreciate that we typically encounter art as a unique manifestation of truth whose particularity cannot be surpassed. The significance of the symbol and the symbolic lay in this paradoxical kind of reference that embodies and even vouchsafes its meaning. Art is only encountered in a form that resists pure conceptualization. Great art shakes us because we are always unprepared and defenseless when exposed to the overpowering impact of a compelling work. Thus the essence of the symbolic lies precisely in the fact that it is not related to an ultimate meaning that could be recuperated in intellectual terms. The symbol preserves its meaning within itself (Gadamer, 1986:37).

Further support for the notion that art discloses truth, rather than presenting “the relation between work and world in terms of a model of adequation” (Gjesdal 2009:88), can be found in a revealing statement by Maurice Merleau-Ponty, albeit in a reference to visual art. Describing the relationship between the painter who endeavours to paint a mountain and the mountain itself, he says that “[i]t is the mountain itself which from out there makes itself seen by the painter; it is the mountain that he interrogates with his gaze” (Merleau-Ponty, 1993:128). This notion could be made to apply to my music as well, especially when Merleau-Ponty asks “[w]hat exactly does he [the painter] ask of it [the mountain]? To unveil the means, visible and not otherwise, by which it makes itself mountain before our eyes” (1993:128). He goes on to say:

Inevitably the roles between the painter and the visible switch. That is why so many painters have said that things look at them. As André Marchand says, after Klee: “In a forest, I have felt many times that it was not I who looked at the forest. Some days I felt that the trees were looking at me, were speaking to me. [...] I was there, listening. [...] I think that the painter must be penetrated by the universe and not want to penetrate it” (Merleau-Ponty, 1993:129).

In my case, of course, it is not a mountain or a forest that is speaking to me, but the vocal expression of human beings in a state of pain and suffering. The following words by Cobussen could serve as a fitting conclusion to the matter:

Art’s truth cannot be located in its ability to represent; art makes perceptible. Unlike a techno-scientific objectification that seeks to penetrate into human beings in order to inveigle the secret of their functioning out of them [...], art makes perceptible the undisclosable of beings. Art opens a space in which concealedness itself can display itself. Art divulges a secret without encroaching on it. It lets be (Cobussen, 2007:25).

The last sentence above alludes to another aspect of the work of art that is emphasised by Heidegger, and which is important to understand when creative work is presented as research-based practice. It concerns the sense of presence, which an artwork exudes or projects and which carries us

[...] out of the realm of the usual. To submit to this displacement means: to transform all familiar relations to world and to earth¹⁰, and henceforth to restrain all usual doing and prizing, knowing and looking, in order to dwell within the truth that is happening in the work. The restraint of this dwelling allows what is created to become, for the first time, the work that it is. This allowing the work to be a work is what we call its preservation. It is in such preservation that, in its createdness, the work first gives itself as the real which now means, is present in its work-character (Heidegger, 2002:40).

This rather dense wording becomes clearer when it is placed next to Gadamer's notion that the presence of a work is an essential quality of its meaning. He elaborates this with reference to a poem:

[...] *the meaning of the work of art lies in the fact that it is there.* [...] This means, for example, that the transitory process in which the flow of speech rushes past comes to stand within the poem in a mysterious fashion and becomes a creation. [...] Someone who has produced a work of art stands before the creation of his hands in just the same way that anyone else does. There is a leap between the planning and the executing on the one hand and the successful achievement on the other. The thing now "stands" and thereby is "there" once and for all, ready to be encountered by anyone who meets it and to be perceived in its own "quality". This leap distinguishes the work of art in its uniqueness and irreplaceability (My own emphasis. Gadamer, 1986:33-34).

In this context it is worth quoting Theodor W. Adorno's view on the question of truth in music, when he says in a lecture on analysis in music, given in 1969:

No analysis is of any value if it does not terminate in the truth content of the work, and this, for its part, is mediated through the work's technical structure. If analysis hits up against technical inconsistency, then such inconsistency is an index of the work's untruth (Adorno, 1982:177).

Again, this view locates the truth content of music within the musical work of art itself, and not in an external reality with which the music has to be in a relation of "adequation".

It goes without saying that this discussion and these few quotations do not exhaust the views on art of Heidegger, Gadamer, Merleau-Ponty and Adorno. Perhaps they do not agree with each other in every respect. However, they should contain sufficient material to provide the

¹⁰ In the work of Heidegger "World" and "Earth" are concepts laden with a great deal of meaning, the essence of which cannot be discussed in the present context.

kind of theoretical basis on which I should like to place my work as an example of practice-based research. They indicate the direction in which an answer to the question about the kind of truth to be found in music should be pursued. As a composer, I have an affinity for these ideas and choose to link my work to them. They describe the kind of truth that I wish to “make perceptible” in the compositions I present as part of this dissertation. And they justify the presentation of such musical works of art as an outcome of the search for truth in its own right, perhaps different, but nevertheless comparable in value to scientific research.

The difference between this notion of truth and what is generally deemed as truth in scientific research requires further elaboration in the context of my own project. Embarking on a research project about the pain and suffering of people in a state of grief, I do so, as I have made clear before, as a composer. The implication is that pain and suffering is part of the world about which I as a composer feel obliged to say something. I do that not in the manner in which a researcher in sociology or anthropology would do, namely to document expressions of pain and suffering, analyze them, develop theories about them and ultimately present them as a scholarly (i.e. objective and peer-reviewed) finding to the scientific community. At the danger of over-simplifying the scientific process to make my point: there is a more or less linear relationship between collecting the data (i.e. the fieldwork), collating it into a coherent finding and presenting the result to the scientific community, a result that could even be duplicated (and thus verified) by another researcher. The world of pain and suffering is presented as a world “out there”, about which objective conclusions can be made. The term “adequation”, as it was used above, comes to mind once again.

For the composer who presents her work as an outcome of similar fieldwork, the process is completely different. It is not linear, for two very significant reasons. The one can be explained by the truth concept as it has been explicated here and which I have chosen as the theoretical framework for my creative work: truth, not as an objective, verifiable proposition, but as something of which I am a part, and which is present in my music. I do not present pain and suffering as one who stands in front of a picture she has painted. The world of pain and suffering I am presenting is not a world “out there”, in the Cartesian sense, separate from myself and of which I am the unaffected and neutral observer. Rather, I am placing myself in the midst

of the picture¹¹. The expression of pain and suffering is also my own pain and suffering, it is a world of which I am a part and from which I cannot distance myself.

The second reason is that the compositional process is not a linear one. The input, i.e. my initial inspiration of having experienced pain and suffering (not only that of the people recorded in my fieldwork, but also my own) is not in a linear relation to the outcome, i.e. my compositions (as it would have been if I had produced an article for a scientific journal). Rather, the initial inspiration, as well as the collected sound samples, have undergone immeasurable degrees of filtering, interpretation, transformation, clarification, manipulation and other kinds of modification that can only be described in terms of them having gone through the prism of the artistic instinct or intention. For that reason, my work is not a documentary soundscape of expressions of pain and suffering by people in Iran, but autonomous art in its own right¹².

I allow myself to introduce another personal observation into the discussion. When I initially embarked on the project, I did not yet have clarity about these matters; they had not yet become fully conscious, although I had already composed a great deal of music and had contemplated the creative process in much depth. Even if I cannot say that the outcome surprised me, I have to say that it brought about a great deal of clarification. This non-linear relationship between the experience of suffering and the outcomes – in the form of composition, in the context of a project that claims to make a contribution to the field of practice-based research – I already regard in itself as a significant “finding”.

2.2: LITERATURE OVERVIEW

The novelty of the present project, culminating in a creative response to human pain and suffering in the form of original music, also determines the novel format of the Literature Overview. The lack of literature on this topic specifically allows me to place the focus very briefly on written work pertaining to practice-based research, but then also to incorporate a brief overview of musical works of the last several decades that deal with pain and suffering in a broad sense.

¹¹ See Nicholas Cook’s discussion of the picture theory in chapter 5 of his book *Music: A Very Short Introduction* (1998).

¹² I use the term autonomous art in a very cautious way, so as not to stir up the controversy surrounding this term.

2.2.1: PRACTICE-BASED RESEARCH

As mentioned in section 2.1, recent discussion of practice-based research (abbreviated to PBR), has benefitted greatly from a number of articles published in 2007 in the *Dutch Journal of Music Theory* under the guidance of Henk Borgdorff. According to him, ‘art practice as research’ or ‘research in and through the arts’ are types of research in which the artwork itself is a significant part of the research process, or where the work of art is the result of the research (Borgdorff, 2007:1).

There are various phrases that stand for artistic research, such as: “‘practice-based research’, ‘practice-led research’ and ‘practice-oriented research’” (Borgdorff, 2017:5). In the first article of the journal in question, which serves the purpose of a leading article, Borgdorff (2007:1) asks whether such research is valuable enough to be regarded as appropriate academic research at the doctoral level of higher education, or

[...] this type of research distinguishes itself from other research in terms of the nature of its research object (an ontological question), in terms of the knowledge it holds (an epistemological question) and in terms of the working methods that are appropriate to it (a methodological question) (Borgdorff, 2007:1).

Borgdorff (2007:1) concludes that, in recent decades, “it could come to pass that ‘research and development’ are no longer an issue just for universities, businesses and independent research centres and consultancy agencies, but that artists and art institutions are also now increasingly calling their activities ‘research’” (Borgdorff, 2007:1). However, there remain significant questions with regards to research in arts. Borgdorff (2007:2) asks:

When does art practice count as research? (and its possible corollary: Doesn’t all art practice count as research to some extent?) Can criteria perhaps be formulated that can help to differentiate art practice-in-itself from art practice-as-research? And a concomitant question is: How does artistic research differ from what is called academic or scientific research? (Borgdorff, 2007:2).

He then goes on to differentiate between: “(a) research on the arts, (b) research for the arts and (c) research in the arts” (Borgdorff, 2007:4). These three categories are then described in more detail:

(a) *Research on the arts* is research that has art practice in the broadest sense of the word as its object. It refers to investigations aimed at drawing valid conclusions about art practice from a theoretical distance (Borgdorff, 2007:5).

The second category is called *Research for the arts* and “can be described as applied research in a narrow sense. In this type, art is not so much the object of investigation, but its objective” (Borgdorff, 2007:5).

The last category, *Research in the arts*, is the type of research that comes closest to my project. According to Borgdorff (2007:5),

(c) *Research in the arts* is the most controversial of the three ideal types. [...] It concerns research that does not assume the separation of object and subject, and does not observe a distance between the researcher and the practice of art. Instead, the artistic practice itself is an essential component of both the research process and the research results. This approach is based on the understanding that no fundamental separation exists between theory and practice in the arts. [...] Concepts and theories, experiences and understandings are interwoven with art practices and, partly for this reason, art is always reflexive. Research in the arts hence seeks to articulate some of this embodied knowledge throughout the creative process and in the art object (Borgdorff, 2007:5).

Borgdorff's notion of "embodied knowledge" raises an extremely important point. It confirms the ideas I put forward in my theoretical considerations (section 2.1). It implies that the knowledge associated with a work of art, its truth content, is located (Borgdorff says "embodied") in the artwork itself and in the process involved in its creation, and cannot be thought of as something separable from its manifestation. Of course, Borgdorff's notion of embodied knowledge can also be taken to refer to the "body" of the artist (e.g. how it feels when a chord is played with this or that fingering). However, that is not the kind of "embodied knowledge" that is of interest for the present project, except in respect of the personal experiences I go through while composing, that is to say, e.g. how it feels to compose and how this process feels in each stage, and so on. This comes quite close to the quotation from Merleau-Ponty (1993:129) about the forest (mentioned in the previous section, 2.1), and could be classified under the category of phenomenological thinking.

In order to contextualise his methodological, epistemological and ontological considerations, which give his article such importance, Borgdorff refers to the institutional landscape within which the current debate takes place. In addition to mentioning the situation in several European countries, he singles out the UK and refers specifically to the UK Council of Graduate Education, the Research Assessment Exercise and the Arts and Humanities Research Council (Borgdorff 2007: 4-7). While these considerations may be of only peripheral interest for my project as such, they are of considerable significance for the quest for recognition of PBR in South Africa. It is my intention that my project, and the questions it raises, contribute to this quest as well, more specifically in the area of musical composition.

2.2.2: COMPOSITION REVIEW

The term ‘literature review’ applies to the discussion of research that is of relevance to the present project. However, in the case of a project in the field of research-based practice, it seems not only legitimate but also crucial to include a discussion of musical works of a similar intent. Considering that the outcome of my work is in the form of musical compositions, it is necessary for me to contextualise my work not only within recent scholarship, but, perhaps even more importantly, to review some recent works by other composers on the topic of pain and suffering in the wide sense of the term.

For this purpose, I have studied a number of contemporary musical works on the topic of pain and suffering. What is of particular interest to me, in addition to the focus on pain and suffering in these works in general, is the stylistic means which the composers in question use in their quest to respond to their topics. What are the harmonic, melodic, rhythmic, timbral, formal and other devices which these composers employ, how has the employment of these devices shaped the compositional discourse on the topic, and what is the influence which these composers have on a younger generation of composers like myself: these are the questions underlying my review of the following works.

The works to be discussed here have been chosen for two reasons. On the one hand, they provide an insight into how other composers have dealt with the topic of pain and suffering in their creative work. At the same time, the chosen works have been of particular significance for my own creative work. Even if they may not have had a direct influence on my work, they certainly set the context within which my work is to be understood.

It is necessary to make the observation at this point that the selection of works under discussion is largely based on my personal preference. Each composition has been inspirational to my own creative works and discussing them here should be regarded as providing the kind of contextualisation required in a literature review for my own contribution to the topic.

Luciano Berio, *Visage* (1961): For Electronic Sounds and Cathy Berberian's Voice on Tape

My interest in *Visage* is not because of the hidden message or the obscured meaning it might carry, since listening to this work is entering into a world of abstract imagination, memories, and variety of clear and unclear emotions. What interests me the most, as a composer, is how Berio freed himself from the instrumentational limitations and the restrictions of traditional

musical connotations. The experience of electronic and electroacoustic music is crucial; it enables the composer to incorporate a larger area of sound phenomena – especially concerning timbre – into the musical world. Such areas might not have been discovered without the help of electronics.

Visage does not seem to elaborate any specific compositional system: interval structure, rhythm order and patterns, or harmonic systems. The mental associations are carried through the vocal and non-vocal gestures and articulations. It does not present a meaningful text or a specific language; only the resemblance of them. This work is a perfect example of focusing on the power of *the expressive quality of human voice* – which is the centre of this project with regard to compositional materials. The relationship between the vocal and non-vocal sounds through an evolving process results in a music in which the poetic and sonic effect is clearly direct and evocative. The primitive – yet very expressive – vocal gestures in the introductory part when Cathy Berberian murmurs, shouts, stutters, laughs, cries, wails, gasps, gradually turn into vowels and syllables; meanwhile the electronic sounds go through polyphonic changes, and the selection of consonances expands. All these movements result in an expressive musical world in which the listener moves from one sonic experience to another throughout the music. *Visage* continues to be one of the richest, most provocative and vibrant examples in my list.

Allan Pettersson, Symphony No. 12: *The dead of the market square* (1973-74)

Pettersson based his work on a collection of nine poems by Pablo Neruda; *Canto general* (Stavans, 2015:952) in which Neruda focuses on the bloody history of Chile and the suffering of its people. It is an unsentimental text with emphasis on pain, death and anger. This work is a perfect example of an attempt to express human suffering by means of traditional instrumentation and tonal connotations. The result is music that is very powerful and moving.

How Pettersson achieves the articulation of suffering throughout this composition can be perceived through his choice of musical materials and arrangements. The music commences with a violin run accompanied by percussion with minor triads in brass, setting the mood in C minor for a lament (a melody) to enter. Parallel thirds in the chorus line follow, with a recapitulation of the opening lament. The next movement begins in $\frac{3}{4}$ time. Tenors open the movement, singing in parallel thirds. Then there are pizzicato lines moving from cellos to violas and second violins. The music intensifies, reaching the climax through heavy contrapuntal whirling in the strings. The third movement opens with parallel thirds – again – followed by chromatic moves in the vocal lines. Whistle-like sounds of high register in the

woodwinds, above the parallel thirds, calm down in the next movement. Similarly, in the following movements, tonal considerations continue to shape this composition until 53 minutes later it ends with a burst in C major – the hope – representing the final word: “day”.

The message of this long musical work resonates with me and with this project, at a profound level; it is an angry protest against the cruelty of human beings; against dictatorship, tyranny and brutality. This is a message to humankind; the protest is not only against specific events in Chile or any other country, but also against cruelty between human beings in general. To me, Chile’s name, people and places are a representation of what is happening every day, and all around the world. Since the beginning of time, history has been filled with so many cases of human cruelty and violence. This symphony sounds like a requiem in honour of all victims of such brutality and the struggles of humankind seeking for justice. I, too, have always been horrified, witnessing the degree to which massacres are being perpetuated by humanity.

I believe that Pettersson decided on the large orchestra to represent a mass murder instead of the death of an individual. This work could be viewed as a great example of the expressive power of traditional composition techniques; the outburst of angry feelings through the cluster of harsh sounds, and polyphonic singing. The violent nature of the music expresses a tragedy through meditative hymn-like sections. The sorrowfulness of sustained notes and slow recitatives express the misery of human condition. The work is a reflection of this earthly hell that we live in, but what seems to be a never-ending hostility at the end of this music invites us to hope, through a brilliant C major.

Ilhan Mimaroglu, *To Kill a Sunrise: a Requiem for those shot in the back* (1974) for Electromagnetic tape and Vocals

The message of this outstanding electronic work is very clear, strong and straightforward: a political objection in its highest order. This composition can be understood as a lament for those who have been murdered by suppressive forces. The solo speakers Chris Washington and Geoffrey Gursoy, and the singer Mary Ann Hoxworth, are reading from a text by Ilhan Mimaroglu, Che Guevara and Marco Antonio Flores¹³. The text and music complement one another, yet in one passage, where the speakers list the names of political activists and leaders

¹³ Released by Folkways Records in 1976.

who have been murdered by anti-revolutionary forces, disagreeing tones are placed over the music.

The texture of this composition is very dense with the most terrifying moment, in my opinion, towards the end when a boy is reading the autopsy report of Che Guevara. The sudden attack of the ominous sounds gather around; later these terrifying sounds accumulate and build up to the climax, where the words fade out with the disturbing sounds of the scream and cry – perhaps Mimaroglu tried to express the pain of the victims here. The 20 minutes of nightmare, accompanied by electronic sounds, result in very expressive and strong music.

My interest in this work is not due to its political message, but mostly the compositional techniques that resulted in an expressive representation of pain. Although the role of the text is very effective, one should nevertheless not eliminate Mimaroglu's excellent method of composition and sound manipulation techniques¹⁴: employing editing blocks, reverberation plates, razor blades, envelope generators, voltage controlled amplifiers, leaders, ring modulators, frequency shifters, greaser pencils, analogue filters, adhesives and modular synthesizers. It must have been very difficult to create sophisticated electronic music by going through an irreversible and time-consuming manual process. Nowadays any type of manipulation can be done easily on computer by clicking a button, and composers are able to undo any unwanted sonic results unlimitedly.

The dead of the market square and *To Kill a Sunrise* carry almost the same message: they both are angry protests against dictatorship and human brutality. However, from the compositional perspective, they invite the listener into completely different musical worlds. Symphony No. 12: *The dead of the market square* by Allan Pettersson is an instrumental piece, which employs traditional orchestration and compositional techniques. *To Kill a Sunrise* by Ilhan Mimaroglu, as mentioned above, is electronic music, which exploits manipulation techniques on recorded vocal sounds.

Henryk Gorecki, Symphony No. 3, Op. 36: *Symphony of Sorrowful Songs* (1976)

Symphony of Sorrowful Songs is a long piece of deep sorrow – almost an hour – in three movements, all indicated as *Lento*. The work has a large and complex canonic texture, starting with an eight-part canon in strings; a dark, gloomy line in the double bass is repeated by cellos,

¹⁴ *To Kill a Sunrise* was composed with analogue tape in the Columbia-Princeton Electronic Music Centre, New York City.

violas and violins, sequentially. The purely instrumental introduction takes almost 13 minutes. It is slow and its harmonic progression reminds the listener of Gregorian chants. The sustained voice of the soprano enters around 13 minutes into the music, in a high register creating a contrasting timbre. It adds to the mournful quality of the music. Alyssa Griffith declares that

Górecki used his music to confront, mourn, and express his pain and the pain of many other people. [...] Because of his personal experiences with the prison camps and the persecution of his family members, Górecki wanted to write a piece of music expressing his grief, commemorating his love for the sufferers, and dealing with the pain associated with the holocaust. In the *Symphony of Sorrowful Song*, Górecki artistically used the medium of orchestral and vocal sound to express his pain (Griffith, 2015:92).

According to Griffith

Górecki said, “This was my world. The only way to confront this horror, to forget, but you could never forget, was through music.” [...] “Somehow I need to take a stand-as a witness. As a warning” (Gorecki, cited in Griffith, 2015:86).

Gorecki’s *Sorrowful Songs* is the music of lament, despair and grief when words cannot express the depth of such feelings: “depicting pain through artistic expression” (Griffith, 2015:86).

Besides its skilful compositional structure, there are two aspects of this work which drew my attention. The first aspect is its popularity; this music is one of the few examples of success and fame in the world of contemporary classical music. Although one might think that this work is overrated, the evidence has demonstrated that this piece successfully touches the souls of a large audience and not only a few well trained musicians who are familiar with the language of contemporary music. In 1992, this piece became a huge hit, selling more than a million copies. Its second movement in particular was used on TV trails, adverts and film soundtracks and was a regular fixture on Classic FM.

The second aspect of this work – which inspires me the most – is its powerful expression of profound sorrow. The music is not rebellious towards suffering of humankind or an angry protest against human brutality; it is purely dark and mournful. Gorecki does not horrify you with nightmarish sound events: on the contrary, carrying a religious significance, this work can have a comforting effect on those dealing with the excruciating pain of the loss of a loved one.

Witold Lutosławski, *Grave: Metamorphoses for cello and piano* (1981), transcribed for Cello and 13 String Instruments (1982)

Grave is dedicated to the memory of Polish musicologist Stefan Jarociński (Lutosławski, 1981:1). According to Marat Reilly, in describing the connections between Jarociński, Debussy and *Grave*, Lutosławski stated:

I wrote *Grave for Cello and Piano* to honor the memory of Stefan Jarociński. As he devoted a great part of his activity to Debussy, I thought it only appropriate to put the first four notes of *Pelléas et Mélisande* at the beginning of my composition. These four notes provide the starting point for the melodic line of the cello. The work consists of a sort of metamorphoses in which – just as in my *Funeral Music* – the rhythmic values are gradually broken down, providing the illusion of a quickening *tempo*. Before the end of the composition the four notes from *Pelléas* recur (Lutosławski, cited in Reilly, 2014:1).

This work is very significant with regard to its compositional techniques; it has a completely different approach from the previous examples. It seems that here Lutosławski is mostly interested in the quality of intervallic resonances rather than the traditional methods of tonality or modality. Thus, the focus is not on the gravity of a specific tone – which is the characteristic of tonality and modality – but rather on using the limited number of set-classes, which is a brilliant way to create unique harmonic colours and distinctive melodic unity. Through this specific approach, the composer can also relate a certain interval to a certain timbre, articulation and/or instrumental technique. The number of intervals in this composition is mostly limited to the unordered pitch-class intervals 1 and 6 – set class (016) – which in my opinion, could be perceived as a connotation of death and mourning.

The other outstanding aspect of this composition is the development section, which happens through the shortening of the rhythmic values and ascendance of the register; e.g. in the sections that are faster and higher in register. Lutosławski also uses aleatory techniques and twelve-tone aggregates¹⁵ in a limited and controlled way, e.g. in the cadenza when sustained notes are accompanied by fast rhythmic values that can be interpreted without much restriction. All of this gives rise to the expressive quality of the music and its extra-terrestrial characteristics.

¹⁵ Lutosławski, in some sections throughout the piece, also employs 9, 10 and 11 tones.

Sir Harrison Birtwistle, *Panic: a Dithyramb for Alto Saxophone, Jazz Drummer, Wind, Brass and Percussion* (1995)

Panic is one of Birtwistle's noisiest compositions. Boosey & Hawkes (1995) published the composer's notes:

Panic was composed in response to John Drummond's request for a work to be performed at the 1995 Last Night of the Proms and my own desire to write a work as a showcase for the saxophonist John Harle. I have called the work a *dithyramb*, in Classical Greece a choric song in honour of Dionysus, whose wild exuberance here runs riot. The soloist, as chorus leader, is identified with the mythic god Pan, literally "spreading ruin and scattering ban" as in the quotation from Elizabeth Barrett Browning with which I preface this score. The title *Panic* refers to the feelings of ecstasy and terror experienced by animals in the night at the sound of Pan's music. The chaos wreaked by Pan is exemplified by the conflict between the orchestra and the alto saxophone soloist together with the drum kit. At times the two odd-men-out rebel and branch out, adopting tempos independent of the orchestra (Birtwistle, 1995:Program note).

Robert Adlington (2006:66) states that:

Birtwistle prefaced the score of his substantial work *Panic* with three half-remembered lines from a poem by Elizabeth Barrett Browning:

O what is he doing the great god Pan
Down by the reeds by the river.
Spreading ruin and scattering ban (Adlington, 2006:66).

Birtwistle intended to express the "feeling of ecstasy and terror" through the screaming and wailing of saxophone, trumpet and percussion accompanied by winds in a high register. Moreover, with regard to "spreading ruin and scattering ban" it seems that he tried to fracture and scatter the rhythmic system, formal patterns, pitch-sets and number systems. Random numbers, for instance, "constitute his prime method of messing things up" (Hall, 1998:x).

This work is an example of a controversial piece of contemporary music, which at first glance might repel the audience. It is flabbergasting; there are such violent and roaring sound events, which can be heard loud and clear all through this music. Yet, it is one of the most impressive and energetic pieces written in the past two decades. Its dramatic and explosive musical gestures are the appropriate outcome of Birtwistle's creative imagination and his interest in mythological subjects. His approach to expressing "the feeling of ecstasy and terror" is quite exceptional: from the unique way of instrumentation to the demanding notation, complex technical choices and the clever compositional structure, all of which are evidence of the

composer's pure boldness, and aptitude to experiment and challenge the performers and the audience through this exceptional composition.

Clearly, there are many remarkable works that can be added to this list, in chronological order: *Erwartung* Op. 17 (1909) by Arnold Schoenberg, *Die glückliche Hand* Op. 18 (1913) by Arnold Schoenberg, *Wozzeck* (1922) by Alban Berg, *The Autobiography of the Runaway Slave* (1969-70) by Hans Werner Henze, *The Rara Requiem* (1977) by Sylvano Bussotti, *The Blind Owl* Op. 16 (1973) by Alireza Mashayekhi, *Le Grand Macabre* (1977) by György Ligeti, *Tabula Rasa* (1977) by Arvo Pärt, *Coro* (1977) by Luciano Berio, *Concerto for Piano and Strings* (1979) by Alfred Schnittke, *Piano Sonata No.6* (1988) by Galina Ustvolskaya, *The Confession of Isobel Gowdie* (1990) by James MacMillan, *The End* (1992) by Jacques Bank, *Still Sorrowing* (1992) by Thomas Adès, *Trilogy of the last day* (1996-97) by Louis Andriessen, *Asyla* Op.17 by Thomas Adès, *The Silent Cry* (2001) by Hans Cox, *On the Transmigration of Souls* (2002) by John Adams, *Light of the End* (2003) by Sofia Gubaidulina, *Death speaks* (2011) by David Lang, *Scheherazade.2* (2014) by John Adams, etc. However, it is not possible to discuss every single work that has been composed regarding the topic of pain and suffering. Thus, due to restricted space, I let this list of examples suffice.

CHAPTER 3: KEY CONCEPTS

3.1: HUMAN SUFFERING

3.1.1: THE QUIDDITY OF SUFFERING

In the context of a project dealing with the expression of pain and suffering, it is applicable to delve into these aspects of the human condition in some detail. Apart from my personal experiences of pain and suffering, and the natural feelings of empathy which I have for fellow human beings who are in a state of suffering, and which inspire me to capture these states spontaneously in terms of music, it is appropriate to stand back and contemplate them in a systematic way to some extent. Such a general view will serve my purpose to capture pain and suffering as belonging to the human condition in a universal way, even if I locate my fieldwork in a specific place, time and culture. Moreover, since emotional pain and suffering are related, the one depends on the other, so for the purpose of the following discussion they will be conflated into the notion of suffering.

One aspect of suffering with which scholars on the subject agree is that it can be observed everywhere, irrespective of age, gender or culture. It is not only something that happens to humans, as it also does to animals, but it is something of which we are deeply conscious and which, frequently, reaches into the depths of human existence and leads us to question our entire being. From an anthropological perspective it could, therefore, be argued that suffering, as a conscious experience, is one of the aspects that make humans truly human. As will be shown presently, scholars also regard suffering as a phenomenon of great complexity.

Suffering can be described in physical terms (e.g. if it caused by an illness or injury), in emotional terms (e.g. if it results from psychological trauma, from sorrow or from the loss of a sense of meaning in life, as in the case of bereavement) or in socio-political terms (e.g. poverty, oppression, or being a refugee). Humans have learnt to channel their response to suffering into various outlets; apart from consolation practices on the individual level, these also include cultural and religious responses. The response I am most interested in for the purpose of this project is what perhaps could be called the aesthetic response, aesthetic referring here to the attempt to achieve some kind of sublimation or cathartic experience by means of a work of art. Literature, the visual arts, film, theatre and music present innumerable examples of such responses. In my case, it is the group of compositions presented as part of this dissertation.

To substantiate the above discussion, the views of a number of scholars are now presented, touching on a wide range of aspects. Even so, it is difficult to find agreement on a single, comprehensive definition of suffering (Illich, cited in Wilkinson 2005:16). Suffering is known to us all; it can only be understood as a unique personal experience. While we are all able to identify the external signs of others' distress, we will not be able to capture their personal experience of suffering. The individuality of this experience and its "unsharability" limits one's capability to deliver an explicit expression of the nature of personal experiences accordingly, and causes a vague representation of it (Scarry, cited in Wilkinson 2005:16).

In this regard, according to Wilkinson (2005:17), Arthur Frank (2001:354) writes:

Suffering involves experiencing yourself on the other side of life as it should be, and nothing, no material resource, can bridge that separation. Suffering is what lies beyond such help. Suffering is the unspeakable, as opposed to what can be spoken; it is what remains concealed, impossible to reveal; it remains in darkness, eluding illumination; and it is dread, beyond what is tangible even if hurtful. Suffering is a loss, present or anticipated, and loss is another instance of nothing, and absence of what was missed and now is no longer recoverable and the absence of what we fear will never be. At the core of suffering is the sense that something is irreparably wrong with our lives, and wrong is a negation of what could not have been right. Suffering resists definition because it is the reality of what is not. Anyone who suffers knows the reality of suffering, but this reality, is what you cannot "come to grips with" (Frank, cited in Wilkinson, 2005:17).

An aspect of suffering which has challenged scholars for an explanation includes the great variety of forms in which it occurs. These include "experiences of bereavement and loss, social isolation and personal estrangement" as well as "depression, anxiety, guilt, humiliation, boredom, and distress" (Cassell, cited in Wilkinson 2005:16-17).

Craig (2000:870) describes suffering in terms of mental pain, an unpleasant feeling, emotion or sensation:

Although sometimes identified with pain, suffering is better understood as a highly unpleasant emotional state associated with considerable pain and distress. Whether and how much one suffers can vary in accordance with any meaning attached to the associated pain or distress, or with expectations regarding the future [...] The fact of suffering provokes moral concern especially when suffering is caused unnecessarily, and raises ethical questions, mainly regarding the nature and extent of our obligations to those who suffer. Suffering is also an important source of personal or religious meaning in many people's lives (Craig, 2000:870).

Noelia Bueno-Gómez (2017:7) adds further perspectives to this:

Suffering is proposed to be defined as an unpleasant or even anguishing experience which severely affects a person at a psychophysical and an existential level. [...] [However,] suffering is not always extreme. Sometimes it is a bearable, short, inconsequential experience. Yet, it is important to include in our definition the possibility that suffering can affect us at an existential dimension, meaning that it can have an impact on crucial matters regarding one's personal life, matters that affect our existence in the world, like the desire to continue living, the decision of whether or not to have children, or even how to live life – choices that have to be seen in the context of our attachment to the world (Bueno-Gomez, 2017:7).

Stan van Hooft in his book *Caring About Health* (2017) defines suffering from a different aspect. He believes that suffering “does not refer just to maladies, pains, and difficulties with which we can and should cope”; it also refers to “the spiritual dimension of our existence or the ‘contemplative’ aspect of our selves, which is implicated in suffering”. Therefore the meaning of suffering can also be perceived “at the level of discourse at which cultural meanings and visions of human life are negotiated” (van Hooft, 2017:Chapter 12, para.1).

3.1.2: PHILOSOPHERS ON INEVITABILITY OF SUFFERING

As has been pointed out above, suffering is an inevitable experience of existence and part of the human condition. Some philosophers even present suffering as the essence of the world. Buddha, Schopenhauer and Nietzsche, for instance, insist on the importance of confronting suffering; and suggest that suffering can be regarded as part of one's connection with others, encouraging compassion and extending our sympathy towards tragedy and the melancholy of the human race.

Buddha, for example, declared that all of creation, from ants to dying human beings, is unified by suffering. He portrayed the four noble truths as a path of liberation from suffering; they can be summarised as: 1) the realisation: there is constant suffering and dissatisfaction in the world; 2) this suffering originates from our attachments and desires; 3) we can rise above suffering by detaching from and handling our desires and 4) by stepping in the noble eightfold path (Trungpa, 2009:7,33,63,91).

Inspired by Buddha, Arthur Schopenhauer was one of the few European philosophers who held a very dark and pessimistic view of the human condition. Some of the most significant and continuous aspects of his philosophy dealt with death and suffering. In fact, very few

philosophers before and after him have made these twin phenomena the focal point of their philosophical reflections (Cartwright, 2010:320-321). Schopenhauer specifically argues:

If the immediate and direct purpose of our life is not suffering then our existence is the most ill-adapted to its purpose in the world: for it is absurd to suppose that the endless affliction of which the world is everywhere full, and which arises out of the need and distress pertaining essentially to life, should be purposeless and purely accidental. Each individual misfortune, to be sure, seems an exceptional occurrence; but misfortune in general is the rule (Schopenhauer, 2004:1).

In his well-known book *The World as Will and Representation*, Schopenhauer (1966:634) explains that, in this world, suffering is inevitable. Pleasure always outweighs the pain, yet if any, it is not nearly as pleasant as expected. Pain – on the other hand – is the essence of life and it is continuously more agonising than anticipated:

There is only one inborn error, and that is the notion that we exist in order to be happy. [...] So long as we persist in this inborn error [...] the world seems to us full of contradictions. For at every step, in great things as in small, we are bound to experience that the world and life are certainly not arranged for the purpose of containing a happy existence (Schopenhauer, 1966:634).

Schopenhauer (1890:37) concludes that: “This is why man is so very miserable”. He even goes one step further by stating that this world cannot be the creation of “an all-wise, all-good, and, at the same time, all-powerful Being” not only because of the misery that is abundant everywhere, but also because man, “its highest product” is clearly imperfect, “who is a burlesque of what he should be (Schopenhauer, 2007:14)”. Schopenhauer deliberately compares humans with lambs:

We are like lambs in a field, disporting themselves under the eye of the butcher, who chooses out first one and then another for his prey. So it is that in our good days we are all unconscious of the evil fate may have presently in store for us –sickness, poverty, mutilation, loss of sight or reason (Schopenhauer, 1890:12).

It is worth including Søren Kierkegaard (2013:38) in this brief overview. In his notable book *Either/Or* he reminds us of the insufferable inconsistencies and impracticable choices one has to make in everyday life:

Marry, and you will regret it. Do not marry, and you will also regret it. Marry or do not marry, you will regret it either way. Laugh at the stupidities of the world, and you will regret it; Weep over them, and you will also regret it. Laugh at the stupidities of the world or weep over them, you will regret it either way. Whether you laugh at the stupidities of the world or you weep over them, you will regret it either way. [...] Hang yourself, and you will regret it. Do not hang yourself, and you will also regret it. Hang

yourself or do not hang yourself, you will regret it either way. Whether you hang yourself or do not hang yourself, you will regret it either way. This gentlemen, is the quintessence of all the wisdom of life (Kierkegaard, 2013:38).

Friedrich Nietzsche (1887) also devoted much attention to the question of suffering, viewing it as an essential part of any human life. According to Raymond Geuss (2009:111), Nietzsche believed that one should differentiate between various kinds of suffering, which in turn will result in differentiated responses. In this regard, he differentiates between suffering that has a meaning and “senseless” suffering. Nietzsche believes humans find “senseless” suffering most problematic and intolerable (Nietzsche, 1887, cited in Geuss, 2009:111).

In contrast to philosophers who have tried to eliminate suffering by suggesting different methods in which human misery could be avoided or prevented, Nietzsche’s stance was far more embracing. According to Georges Bataille (2015:23), he believed that suffering has a constructive and explicit role in contributing to the development of a human being:

[...] To those human beings who are of any concern to me I wish suffering, desolation, sickness, ill-treatment, indignities, and illness – I wish that they should not remain unfamiliar with profound self-contempt, the torture of self-mistrust, and the wretchedness of the vanquished: I have no pity for them (Nietzsche, cited in Bataille, 2015:23).

On the contrary, Nietzsche suggested that any person who is in search of happiness should embrace suffering. He believes that people who are comfortable and benevolent know very little about human *happiness*, “for happiness and unhappiness are sisters and even twins that either grow up together or as your case, *remain small* together (Nietzsche, 2010:269).” He states

If you refuse to let your own suffering lie upon you even for an hour and if you constantly try to prevent and forestall all possible distress way ahead of time; if you experience suffering and displeasure as evil, hateful, worthy of annihilation, and as a defect of existence, then it is clear that besides your religion of pity you also harbor another religion in your heart that is perhaps the mother of the religion of pity: the *religion of comfortableness* (Nietzsche, 2010:269).

Emile Durkheim (1973:153-154) shared similar views. Regarding inevitability of suffering, he states in his book *The Dualism of Human Nature and Its Social Conditions* that:

We are never completely in accord with ourselves for we cannot follow one of our natures without causing the other to suffer. Our joys can never be pure; there is always some pain mixed with them; for me cannot simultaneously satisfy the two beings that are within us. It is this disagreement, this perpetual division against ourselves, that

produces both our grandeur and misery: our misery because we are thus condemned to live in suffering; and our grandeur because it is this division that distinguishes us from all other beings. The animal proceeds to this pleasure in a single and exclusive movement; man alone is normally obliged to make a place for suffering in his life (Durkheim, 1973:153-154).

3.1.3: SUFFERING AND AESTHETIC CONTEMPLATION

Suffering may be inevitable. However, Arthur Schopenhauer sees a temporary liberation from it through *aesthetic contemplation* in forms of expression like art. He apportions a high value to the pure state of aesthetic contemplation: human life is so miserable, yet aesthetic experience frees us from pain, if only for a brief period, and it is an occasional liberation from our endless suffering. According to Ted Sadler (2000:126),

In *The World as Will and Representation*, Schopenhauer distinguishes two kinds of redemptive experience: aesthetic (Book Three) and ascetic (Book Four). [...] However, Schopenhauer maintains that aesthetic contemplation cannot be an enduring condition. It is episodic and transitory, providing only a foretaste of the more comprehensive redemption to be attained through asceticism (Sadler, 2000:126).

Moreover, Schopenhauer believes that, among all arts, music – especially absolute music – has a unique position; if other arts reveal an idea about the world or life, music reveals the basis of all realities, *the striving of the will*: “but more likely he [Schopenhauer] means that music represents the striving of the will to *the human mind*, music itself being a product of the human mind” (Laird Addis, cited in Kivy, 2001:32).

Similarly, Elaine Scarry puts forward the idea of a fundamental dichotomy between suffering and the work of imagination. She indicates:

[...] pain and the imagination are each other's missing intentional counterpart, and that they together provide a framing identity of man-as-creator within which all other intimate perceptual, psychological, emotional, and somatic events occur (Scarry, 1985:169).

Schopenhauer's views should be seen in the context of his position as a nineteenth-century philosopher. Whatever else can be said about his views, I am fascinated by the idea that music should, even today, still be regarded as a highly appropriate way to deal with suffering, if not in respect of the world as it is described in his work, then certainly as part of the human condition. It is the genius of the artist to be able to free her/himself from the captivity of the suffering through aesthetic practice. However, the *unsharability* of suffering (as explained

earlier in this section), and the fact that it can only be understood as an existential experience, makes its expression in an artwork – especially at the deeper level – exceptionally difficult. As a consequence, the felt reality of this experience cannot easily be shared and communicated with others.

This rather extensive list of quotations serves to exemplify initial viewpoints about suffering. They indicate how the present project is to be understood: not as a naïve or sentimental artistic response to suffering on a superficial level, but as an attempt to reveal something about the deeper meaning of suffering in terms of the musical vocabulary available to me at this time.

3.2: GRIEF

3.2.1 DEATH AND THE PROCESS OF MOURNING

In addition to examining the link between pain and suffering on the one hand and music on the other, it is necessary to understand grief from a socio-psychological perspective. The purpose of introducing these additional perspectives is to contextualise the fieldwork that has been conducted in Iran where samples of the vocal expression of grief and pain were compiled as raw materials for new compositions. However, these utterances have to be understood in some additional contexts mentioned above. The following discussion is presented by means of the subject matter, not adhering to the chronological order.

Encountering the loss of a loved one can be one of the most painful experiences that is inevitable at some point in life. Significant losses can possibly wound us by causing deep and intense suffering. Anne S. Straus (2004:5) believes that grief and mourning is an expected expression of such extreme pain: “the exquisite pain of loss through death is said to be the hardest thing a human being must face in the arduous journey on the surface of the earth: grief and expression of grief are to be expected at such times” (Straus, 2004:75).

Similarly, according to Rita V. Frankiel (1994), Freud claims that “Mourning is regularly the reaction to the loss of a loved person, or to the loss of some abstraction which has taken the place of one, such as one’s country, liberty, an ideal, and so on” (Freud, cited in Frankiel, 1994:38).

George H. Pollock states

In 1895 in Draft G, on Melancholia, Freud related depression and melancholia to mourning and grief. He spoke of a “longing for something that is lost,” and “a loss in the subject’s instinctual life.” [...] he also commented that “the uncoupling of associations is always painful” (Freud, cited in Pollock 1994:148).

Frankiel claims that, according to Melanie Klein and Hanna Segal, “The pain of mourning is related to the collapse and rebuilding of the inner world and the restoration of the internal good object, which is the source of optimism and good feeling about self and the world” (Frankiel, 1994:37). It is also described as

[...] a profoundly painful dejection, cessation of interest in the outside world, loss of the capacity to love, inhibition of all activity, and a lowering of the self-regarding feelings to a degree that finds utterance in self-reproaches and self-revilings, and culminates in a delusional expectation of punishment (Freud, cited in Frankiel, 1994:39).

Furthermore, Neil Thompson (2012:1) perceives “Grief [as] an existential challenge, by which I mean that it is a part of life (part of what it means to exist as a human being, hence the term, ‘existential’) that we all have to face up to, sooner or later” (Thompson, 2012:1).

According to Thompson, the emotional responses to a significant loss can be cognitive as well as behavioural, emotional (intensive) or physical (extensive); devastating emotions such as sadness, bitterness, cynicism, resentment, impatience disappointment, anxiety, confusion, a lack of confidence, anger, a sense of guilt, as well as a very strong sense of insecurity and vulnerability (Thompson, 2012:19).

In 1961, Pollock in *Mourning and Adaptation* references Freud:

The essay on *Totem and Taboo* (1912-13), further develops Freud’s ideas on the mourning process. He writes that “mourning has a quite specific psychical task to perform: its function is to detach the survivors’ memories and hopes from the dead. When this has been achieved, the pain, the pain grows less and with it the remorse and self-reproach” (Pollock, cited in Frankiel, 1994:148).

According to Pollock (1994), the first response to the incidence of death is shock; a sudden excessive distress in the ego-balance caused by the distinguished awareness that the loved one no longer exists in the world. He suggests that this devastating task may be result in panic responses, including shrieking, wailing, or mourning, demonstrated with a complete collapse, paralysis and motor retardation (Pollock, cited in Frankiel, 1994:151).

Shock is followed closely by the grief reaction. According to Pollock (1994), in his book *Expression of the Emotions in Man and Animals*, Darwin associates some physical responses to early grief, such as hand wringing, aimless wild walking, hair and clothes pulling. Darwin relates these desperate reactions as symptomatic incapability the mourner may experience in trying to deny the death of the loved one. However, upon realisation that nothing can be done, these hysterical behaviours change, resulting in a very profound depression and sorrow. Hence, the sufferer might become mute, sit motionless or sway gently back and forth, taking deep sighs and becoming muscularly limp and lifeless (Pollock, cited in Frankiel 1994:152). Additionally, “Lindemann has described the feelings of fatigue, exhaustion, and anorexia seen in this acute grief phase. The energy impoverishment seen in grief has been related to the mourning process by Freud in his *Inhibitions, Symptoms, and Anxiety*” (Pollock, cited in Frankiel 1994:152). Furthermore, Pollock (1994) acknowledges a period of intense psychic pain as the shock merges into the grief phase, accompanied by sudden screaming, yelling and non-verbal but vocal displays of grief reaction. Gradually, these responses develop into depression and the spasmodic crying turns into tearful lamentations or verbal communications together with frequent sobbing (Pollock, cited in Frankiel 1994:153).

The next stage in the mourning process is the setting in of a sense of separation, which is intensified when the reality of the loss is recognised not as temporary but as permanent and that the loved one is actually dead (Pollock, cited in Frankiel, 1994:157). This realisation leads to anxiety and anger that means separation has been acknowledged. According to Pollock, Freud states that the pain is “the actual reaction to the loss of the object, and anxiety is the reaction to the danger which that loss entails, and in its further displacement a reaction to the danger of the loss of the object itself” (Pollock, cited in Frankiel, 1994:160).

To review in a few words the acute stages of the mourning process which occurs following the loss, consists of shock, grief, pain, and separation-reaction. The reaction to separation produces high levels of anxiety caused by the perception of loss, as well as anger.

Apart from these responses, the realisation of the loss of a beloved person produces other various infrahuman reactions such as tearless moaning, animal-like shrieking and an inhuman howl that is accompanied by screaming and crying which is transitory and, certainly, is the most primitive way of expression of such unpleasant experience (Pollock, cited in Frankiel, 1994:176).

Elizabeth Kübler-Ross (1969) was in agreement with such views and propounded such knowledge by setting out the grieving stages that would follow: denial, anger, bargaining, depression and acceptance. *Denial* is a sense of disbelief with regards to the reality of death, that is the refusal and inability to accept the truth that death has occurred. Furthermore, the unpleasant feelings caused by the loss of the beloved person manifests outwardly in the form of resentment or outwardly in the form of irrational guilt, resulting in *Anger*. After feelings of anger, due to the experience of pain produced by loss, comes a *bargaining* attitude, a negotiation with God¹⁶ (Kübler-Ross & Kessler, 2005:17) and (Kübler-Ross, 2011:79). Moreover, the depressed state of mind and mood is followed by a sense of vulnerability and hopelessness, accompanied by exhaustion, cynicism, and low drive characterised as *Depression*. In Kübler-Ross's view, this stage takes place after bargaining. At the end of the process, *Acceptance* is the acknowledgement and consciousness of the reality of loss (Kübler-Ross, 2011:37, 49, 79, 83, 109).

Neil Thompon (2012:25) introduces another method to describe the mourning process, referencing William Worden (2009):

[...] has established a better understanding of what happens when someone is grieving than the simplistic reliance on the stages model (Worden, 2009). Worden's tasks can be described as follows:

1. *Accepting the reality of the loss.* Getting used to the idea that the person (or thing) is no longer physically with us.
2. *Working through the pain of grief.* Dealing, as far as possible, with the pain involved in the loss.
3. *Adjusting to a changed environment, externally, internally and spiritually.* Getting used to the wider changes brought about by the loss.

¹⁶ Kübler-Ross's understanding of the term "God" and the different ways of bargaining with him is expanded upon in the following quotations:

If we have been unable to face the sad facts in the first period and have been angry at people and God in the second phase, maybe we can succeed in entering into some sort of an agreement which may postpone the inevitable happening: "if God has decided to take us from this earth and he did not respond to my angry pleas, he may be more favorable if I ask nicely (Kübler-Ross, 2011:79)".

And elsewhere;

Before a loss, it seems you will do anything if only your loved one may be spared. "Please, God," you bargain, "I will never be angry at my wife again if you'll just let her live. After a loss bargaining may take the form of a temporary truce. "What if I devote the rest of my life to helping others? Then can I wake up and realize it has all been a bad dream?" we become lost in a maze of "if only..." and "what if..." statements. We want life return to what it was; we want our loved one restored. We want to go back in time: find the tumour sooner, recognize the illness more quickly, stop the accident from happening...if only, if only, if only (Kübler-Ross & Kessler, 2005:17).

4. *Emotionally relocating the deceased and moving on with life.* This means continuing to have a meaningful, loving relationship with the deceased, but in a new context (Thompson, 2012:25).

Therese Rando (1993), too, develops a different approach, which is beyond the stages model, but in a way she calls the “Six Rs”, referring to six tasks to accomplish while grieving. According to Thompson (2012:26-27), De Spelder and Strickland (2005) summarise this process as such:

1. Recognize the loss (acknowledge and understand the death).
2. React to the separation (experience the pain; feel, identify, accept, and express the reactions to loss; and identify and mourn the secondary losses).
3. Recollect and re-experience the deceased and the relationship (review and remember realistically; revive and re-experience the feelings).
4. Relinquish the old attachments to the deceased and the old assumptive world.
5. Readjust to move adaptively into the new world without forgetting the old (develop a new relationship with the deceased, adopt new ways of being in the world, form a new identity).
6. Reinvest (De Spelder & Strickland, cited in Thompson, 2012:26-27).

Later in 1999, Margaret Stroebe and Henk Schut (1999:3) provided a completely different yet very effective and insightful model of grief that is a combination of two existing approaches – so called *dual processes*. They write about the ‘loss orientation’, which refers to the ways one looks back on the *who* that has been gone forever which is characterised by anguish and anger. On the contrary, there is also what Stroebe and Schut call ‘restoration orientation’. This refers to the process of looking forward to the development of a new sense of identity, obtaining a new approach to life due to the altered circumstances.

Stroebe and Schut (1999:3) explain that over time, the mourner spends more time in ‘restoration orientation’ and less time in ‘loss orientation’, however continuing to swing between these two processes. This theory – the dual processes – is very helpful in distinguishing and understanding the individuality of the grief process, that different people grieve differently, since every individual oscillates at a different rate in time.

The reason for the above discussion on the responses to grief is due to their similarities between the previously mentioned descriptions and Iranian responses to pain and mourning processes. With regard to the fieldwork context from Iranian culture, Iranians, at most, do accept their own emotions and are encouraged to express them. As L.P. Elwell-Sutton (1978:35), the Professor of Persian at the University of Edinburgh, states “a tendency towards zealotry and

fanaticism, especially in religious matters, struggles with negativism and passivity, with acceptance of fate and concealment of one's real feelings" is part of the Iranian national character (Elwell-Sutton, 1978:35).

3.2.2: EXPRESSION OF GRIEF; UNIVERSAL OR CULTURALLY SPECIFIC?

As mentioned in the previous section, grief is an existential (personal) experience (see Thompson, 2012:1). However, as Robben states,

Grief may be a universal emotion of bereavement, as psychologists such as Bowlby (1981) have noted, but its social expression in mourning is culturally specific. [...] Mourning becomes then a social and cultural way to cope with any significant loss for which death is the ultimate metaphor (Bowlby, cited in Robben, 2004:7).

Every society defines appropriate behavioural patterns for particular circumstances. The culture can indicate how one is expected to respond to death: how to mourn, or arrange a burial, how to behave, speak or dress. It may have guidelines on the intensity and duration of mourning; about certain emotional responses expected in each stage; the degree to which the responses are supported by custom; whether the expressions of grief are accepted and supported or whether the inhibitions are demanded, and if so to what extent (Vernon, 1970:129-130). In this regard, according to Robben (2004), Robert Hertz (1907) indicates that

The body of the deceased is not regarded like the carcass of some animal: specific care must be given to it and a correct burial; not merely for reason of hygiene but out of moral obligation. Finally, with the occurrence of death a dismal period begins for the living during which special duties are imposed upon them. Whatever their personal feelings may be, they have to show sorrow for a certain period, change the colour of their clothes and modify the pattern of their usual life. Thus death has a specific meaning for the social consciousness; it is the object of the collective representation. This representation is neither simple nor unchangeable: it calls for an analysis of its elements as well as a search for its origin (Hertz, cited in Robben, 2004:197).

It is through such norm-role definitions that each individual learns the particular patterns of emotional expression as expected by the particular culture. Emile Durkheim (1995), who has had a great influence with regard to the anthropology of death, emphasises that

... [T]he individual grief experienced at the death of another human being is expressed collectively in culturally prescribed ways of mourning. Crying is related in the same way to grief as weeping and wailing to mourning. Mourning is not a spontaneous emotion but a collective obligation manifested in appeasement rites (Durkheim, cited in Robben, 2004:8).

Furthermore, Radcliffe-Brown (1964) in his ethnography *The Andaman Islanders*, declares that weeping is a collective presentation rather than spontaneous personal expression of sorrow. When obligated by society, one can cry on demand. Radcliffe-Brown even suggested that these cultural rituals can demonstrate emotions which are obliged to be expressed by individuals; this confirms the social attachments that hold society together (Radcliffe-Brown, cited in Robben, 2004:8). With regard to anger, for instance, according to Glenn M. Vernon, Gorer (1970) indicates that some cultures provided symbolic expressions of anger in the form of rituals, such as the destruction of the property or possessions of the dead person or by the various mutilations which are expected from mourners to inflict upon themselves as a sign of pain. Thus, anger is considered as a component of mourning and it is through the process of mourning that one would dissolve this anger in the form of rituals of participation and expression (Gorer, cited in Vernon, 1970:163).

Robert Hertz (1960) in *A Contribution to the Study of the Collective Representation of Death*, which is one of the most significant works in anthropology of death, claims that death is not only a biological reality or limited to the personal sorrow of the bereaved relatives, it also conveys social obligations that are determined culturally through funeral rituals (Hertz, cited in Robben, 2004:9). These mourning rituals¹⁷ are in fact culturally universal, displaying human struggles towards acceptance of the biological death, and the desire to delay its occurrence (Robben, 2004:9).

With regard to the specificity of the culture of mourning, and since the fieldwork took place in Iran, the following section will discuss the cultural view on death and funeral rituals in Iran.

3.3: IRANIAN CULTURAL VIEW ON DEATH AND FUNERAL RITUALS

As mentioned before, in chapter one, it is important for me not to remove myself from society, and create music in an ivory tower. On the contrary, I feel the imperative to engage with my social environment. Therefore, what is going to be discussed here is not from the observer point of view, but merely my personal experience as a member of society. Being an Iranian, not only am I familiar with the culture, funeral and mourning rituals in Iran, but I have also practised

¹⁷ In *Death without Weeping: The Violence of Everyday Life in Brazil*, Nancy Scheper-Hughes (1992) goes further by arguing that not only mourning, but also grief, is produced by culture (Scheper-Hughes, cited in Robben, 2004:9).

them every time a family member or a friend has been lost/passed on. Below is a brief report on such practices.

From a research perspective, especially from the distance of a research project at a South African university, my insider status in respect of Iranian culture places me in the position of a primary informant (primary source). For that reason, the following brief exposition does not rely extensively on secondary literature.

Iran's funeral and mourning rituals are very much influenced by the Islamic religion. They are long and complicated. Mourning is public, sociable, shared with relatives, friends and acquaintances, and highly expressive. When death occurs, relatives and friends gather around the deceased, placing her or him in a specific position (facing Mecca)¹⁸, praying and reciting from **their** holy book, the Quran. In the case that death occurs during the daytime, the body should be taken to a mosque or directly to the cemetery to be washed. However, if the death happens later at night, the body should be kept in the house with burning candles. This is to protect the deceased from the evil spirits or Shayatin¹⁹.

The body needs to be buried within 24 hours, washed following Islamic tradition²⁰, scented with 'Kafoor'²¹, and wrapped in 'Kafan'²² while prayers are recited to ask Allah (God) to forgive the deceased for her sins. Afterwards, the body is carried by four males, to place in the coffin and carry to the graveyard. The body is put on the ground. The family members and friends, who surround the deceased, mourn, pray, and express their pain openly. Then the body is lifted up three times and only the fourth time will it be placed in the grave²³.

Those who attend the funeral are obliged to wear black and relatives stay in black for forty days, and in some cases a whole year²⁴. Participants voluntarily spread a handful of soil²⁵ and sprinkle rosewater on the grave, while together praying and lamenting at the time, screaming, crying and weeping. Any other type of mourning and expression of grief is not only displayed

¹⁸ Muslims practise their daily prayers – Namaz – facing Mecca.

¹⁹ It is believed that light and burning candles scare the evil spirits away.

²⁰ 'Mordeh Shoor' who performs the washing, has to be Muslim and from the same gender as the deceased. Nine washes with three watery solutions – including Sedr, Kafoor and fresh water – is custom (three washes per solution).

²¹ Camphor.

²² A large white cotton cloth.

²³ The deceased should be placed on her right side facing Mecca.

²⁴ It is accepted for the members of the deceased family to wait until the oldest member changes into other colours after forty days before they stop wearing black.

²⁵ This act is believed to be a blessing in favour of God.

and accepted but also encouraged²⁶. It is believed that shared expression of sadness produces intimacy between the participants, and increases a sense of sympathy in the community.

In some cases, women beat their chests, laps and heads, pulling their own hair while wailing and shrieking. With regard to such intense displays of grief in these ritual practices, Kimberley Patton and John Hawley state that “[C]rying often turns the individual not *away* from the world but *towards* it, in communicating of something vital, something upon which life – or its very meaning – depends (Patton and Hawley 2005:11).

‘Halva’²⁷, tea and dates are usually expected to be served at all funerals, including special meals, sprinkled rose water, and flower vases everywhere. The ceremony can take place in the home of the deceased, mosque, hotel or any other location. There are always readers of the Quran, i.e. ‘Gharee’, experts present at such ceremonies, who can recite professionally.

The next visits to the grave will be ‘Hafteh’ (the 7th day), ‘Chele’ (40th day) and ‘Sal’ (the anniversary of the death), with the participation of close family members and relatives, accompanied by sorrowful expressions, religious narrations, prayers, and donations of food.

Relatives and close friends are always there to support the immediate family members. Mourning in Iranian culture is not a lonely pain; on the contrary, it is a time of understanding, remembrance, closeness and unity. Such strong support and togetherness soothes the extent of the pain of losing a loved one.

²⁶ Regarding the fieldwork, most of my recordings happened in such environments at the graveyards.

²⁷ Halva is a sweet dense paste. In Iran it is normally served at funerals or during Ramadan (fasting month).

CHAPTER 4: CREATIVE PART: COMPOSITIONS

In the first chapter, section 1.3: Methodological Considerations, I mentioned that the field recordings of people in the state of mourning that I have collected in Iran will be analysed with the software SPEAR, and that the outcome of this analysis will be used towards the creative part of my research project, i.e. my four movement composition *Sounds of Suffering*.

In the following sections, I shall first discuss how these recordings appeared in SPEAR (in terms of their waveforms), and what type of information could be extracted from this analysis (in terms of numeric data). Secondly, I shall turn my attention to how these outcomes shaped *Sounds of Suffering*.

4.1: RECORDINGS: ANALYSIS AND PRESENTATION OF THE RESULTS

As noted previously, I recorded my samples in public cemeteries in Iran. It goes without saying that in such social settings one needs to be highly respectful of mourners' emotional state and right to privacy, even if the cemeteries are public spaces and open to everyone. Therefore, to avoid being insensitive towards members of the grieving crowd and their mourning practices, I was ethically obliged to keep my physical distance from the mourners and to be careful about the size and position²⁸ of the sound recorder that I had to carry around throughout the recording sessions. Under these circumstances, it was very difficult to repeat such fieldwork more than a few times. I made three rounds of recordings: the first one was only as a sample to decide whether my idea was practical at all, while the second round of recordings showed up a number of technical problems in some of the sound samples (some parts were not readable or were distorted). Thus, I had to make a third set of recordings, of which the total duration of usable material was 276 minutes and 33 seconds²⁹.

As a consequence of the circumstances under which I recorded my sound samples, I discovered that my recordings contained a great deal of noise and environmental or ambient sounds such as background noises, movement of people and speeches³⁰. This meant that some parts of each

²⁸ I kept the recorder in the pocket of my purse or my clothing with its microphones' part out.

²⁹ The first time I recorded some sounds with my iPhone7/Plus as experiment, the second and third times with Zoom H1 Handy Recorder.

³⁰ These ambient sounds later shaped part of the noise clusters in my compositions (see chart 4.3.1).

sample were not usable for studying the actual sounds of suffering, i.e. crying, shrieking, moaning, and wailing, etc.³¹ Moreover, many of these sound samples were very similar in quality.

Initially, the main purpose of the fieldwork – in which I made careful selections of sound samples that are representative of the human voice in the state of suffering – was to determine the characteristics of such sounds, and to see what can they offer me as a composer in terms of raw material for my compositions. Therefore, it was necessary to isolate and analyse sounds of suffering by means of a process that will be explained in more detail below (see section 4.1.1). It is not easy to conclude exactly how many minutes of each recording contain actual sounds of suffering, but I did analyse every sound that can be categorised as such on the strength of it being audibly recognisable in the recording³².

4.1.1: ANALYSIS

To apply a sinusoidal partials analysis on a recording in SPEAR, the first step is to open the intended file. The analysis data should be in SDIF, SNDAN MQ, SNDAN AN, ATS, or text format. The audio data should be in AIFF, WAV, SND, or SF format; compressed formats such as MP3, M4A and WMA are not supported in SPEAR³³.

As can be seen in figure 4.1.1.1, in the Sinusoidal Partial Analysis³⁴ wizard, information such as sampling rate, channels, duration, MIDI Key-number, Analysis Channel, Window size, FFT size, start and end time (in seconds), minimum amplitude threshold can be seen at the first glance. Moreover, the frequency resolution can be defined (and changed) to base the analysis on³⁵. The results of such analysis in SPEAR is a very dense set of partials (see figure 4.1.1.2).

³¹ In this chapter, “sounds of suffering” refers to the voices of people who are in a state of grief and are expressing their pain in form of crying, shrieking, moaning, or wailing, etc.

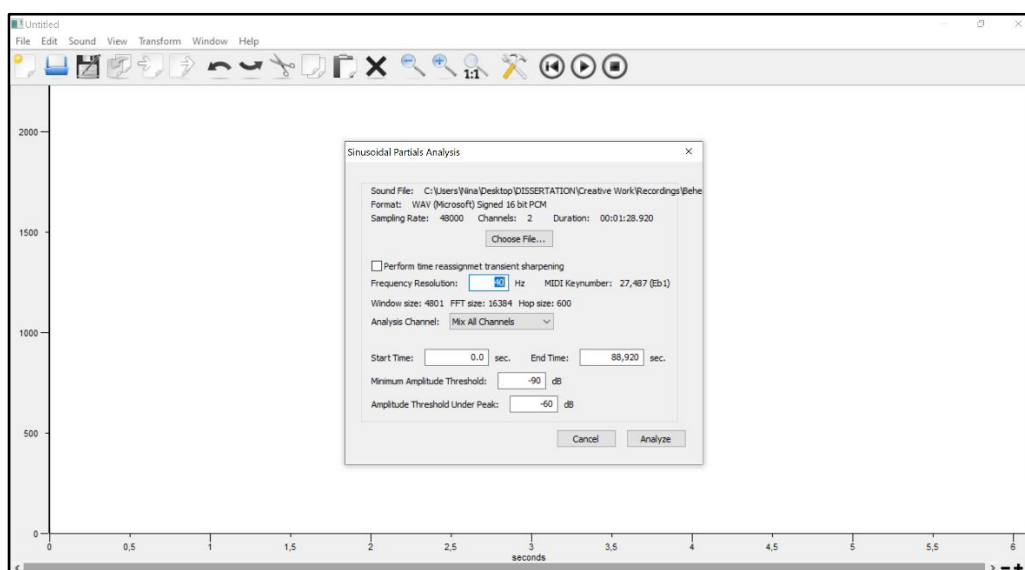
³² What is presented in this chapter, as the results of analysis of such recordings, is only representative and shown by way of example (see Appendix B).

³³ Since my original recordings were in MP3 format, I had to convert them to WAV format.

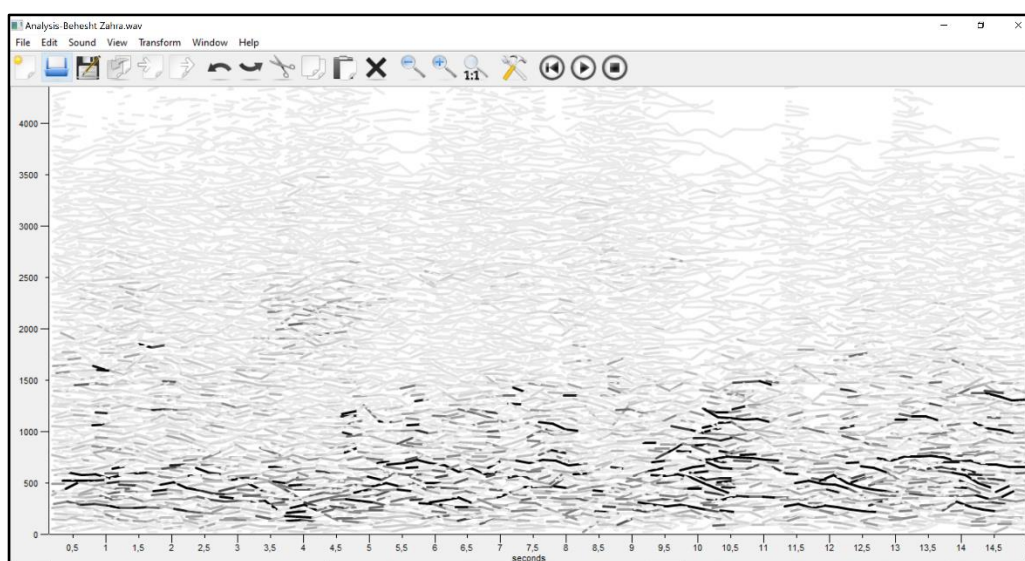
³⁴ In this chapter, all the words in capital letters refer to a feature in software.

³⁵ I used the 40HZ frequency resolution for all the analysis of my recordings.

4.1.1.1: Sinusoidal Partial Analysis



4.1.1.2: Results of the Sinusoidal Partial Analysis (waveforms)



As mentioned before, the recordings do not consist of sounds of suffering only, but also ambient sounds, and therefore these sound samples are very complex and dense. The very first view in SPEAR demonstrates this complexity. Yet these rich and vibrant sound spectrums and timbres offered a wide range of sound materials for my composition (see chart 4.3.1).

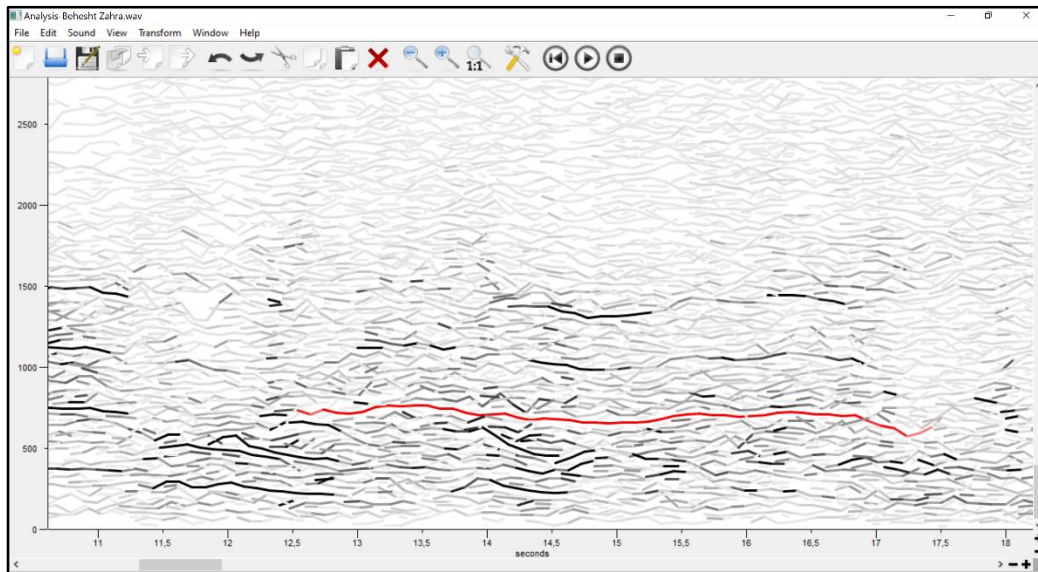
Before I analysed my recordings in SPEAR, I expected to see a significant visual difference between these types of sounds, i.e. sounds of suffering and other types of background sounds.

However, I discovered that after I opened my recordings in SPEAR, I could not see any difference (visually) between the waves representing the background sounds and sounds of suffering, such as crying, screaming, wailing, etc. If one looks at these sound waves in SPEAR, they look very similar (see figure 4.1.1.2). Moreover, when opening a sound sample in SPEAR, the grey waves represent mainly the lower dynamics and the black/bold waves represent the higher dynamics (louder), but this is not a very reliable criterion to help distinguish the sounds of suffering from other sounds (ambient). One cannot say with certainty that all the ambient sounds are low in dynamics and are therefore represented in grey, while sounds of suffering (intended sounds) are all loud and clear, and can therefore be distinguished simply in black and bold. Thus, it is very difficult (if not impossible) to separate the sounds of suffering – the voices of people in state of mourning – from the background sounds only on the basis of their visual representation on the SPEAR screen.

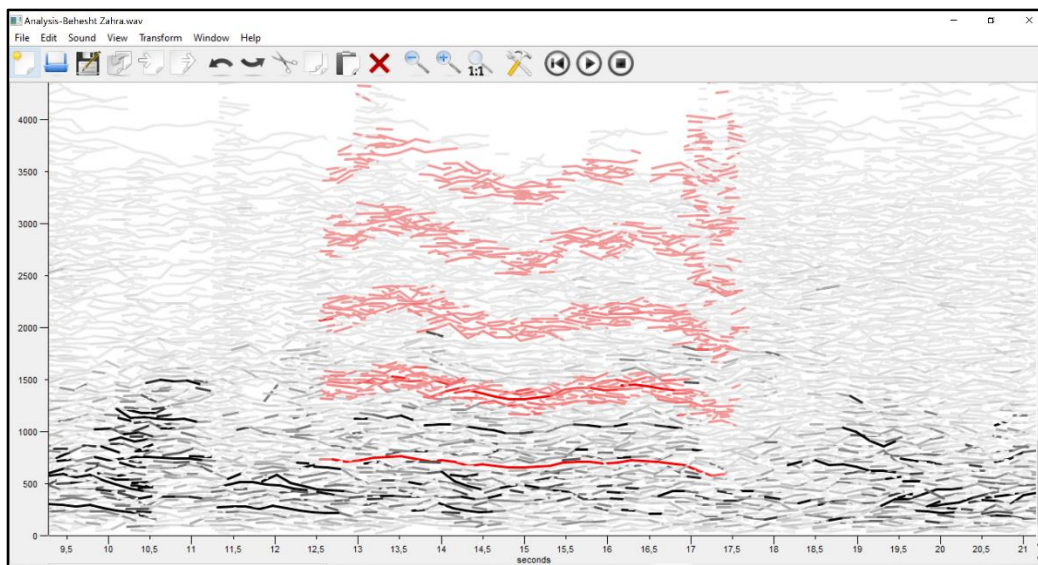
To solve this problem, the sounds of suffering have to be isolated by ear, because the timbre of a sound (whether it applies to sounds of suffering or to ambient sounds) is not represented visually in SPEAR in a distinguishable manner. Only by actually listening to these sound samples can one differentiate female and male voices from the background (ambient) sounds³⁶. This means that in order to study the sounds of suffering one has to select the fundamental wave of a crying, shrieking, wailing or moaning sound and isolate it from rest of the partials. As has been pointed out, this cannot be done through mere observation of the visualised waves, but only through actually listening to the sounds, and comparing what one can hear with the visual representation of the waveforms in real-time playback. Only in this way can one determine the position of a sound of e.g. crying or shrieking (see figure 4.1.1.3 and 4.1.1.4, fundamentals and harmonic waves).

³⁶ Although I am aware that MIR (Music Information Retrieval) and algorithm-oriented programmes such as MATLAB would offer variable-controlled audio features and extraction techniques, I discovered that working with SPEAR software as the primary software programme in this research, served the creative process as well as my aesthetic discretion best. Moreover, SPEAR is a multifunction user-friendly programme that provides a precise and differentiated frequency analysis of a sound sample, but also it is very effective as a composition tool (see tables 4.3.1.6, 4.3.2.5, 4.3.3.6, and 4.3.4.5). In addition, using this software does not require the knowledge of numeric computing or programming languages such as C or Fortran. The musical language of SPEAR can be easily understood by any musician and composer, and makes the process of analysis, selection and editing of the sound partials less complicated and more manageable.

4.1.1.3: An isolated wave of a sound of suffering, female wailing (only fundamental wave)



4.1.1.4: An isolated wave of a sound of suffering, female wailing (fundamental and its harmonics)

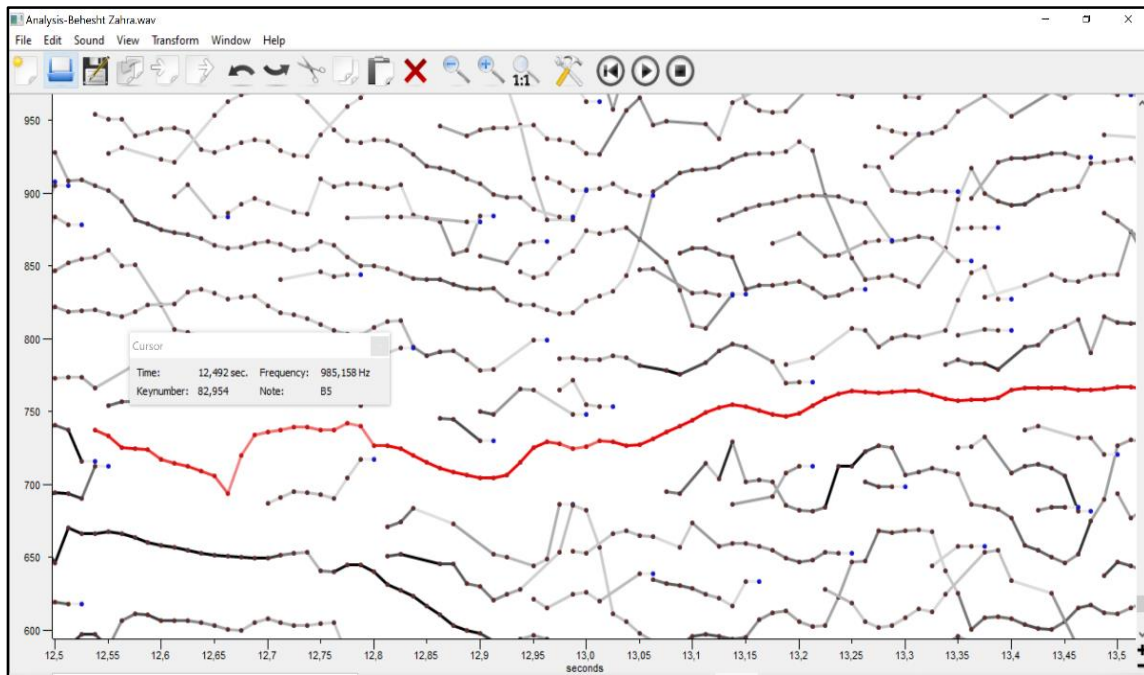


After identification and isolation of those waves that represent sounds of suffering the next step is to discover the type of information they offer and which can then be collected from such waves. This is numeric information.

The approximate frequency of a wave can be spotted by checking its position in the SPEAR screen, since the vertical axis represents the frequency and the horizontal axis represents time (in milliseconds). However, the easiest and most precise way to gain such numeric information is through zooming in on the isolated wave of a sound of suffering until the changing points on

the wave get clear on the SPEAR screen, then clicking on each point and reading the information such as Time, Frequency, MIDI Key-number, and Note, shown on the cursor window (see figure 4.1.1.5)³⁷.

4.1.1.5: Reading the information of an isolated wave of a sound of suffering



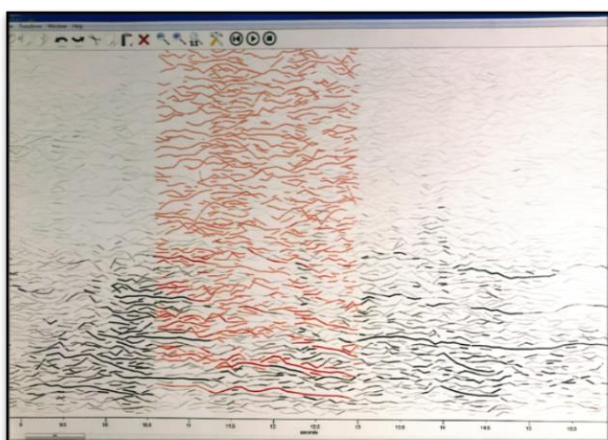
³⁷ All the other tables such as 4.1.2.1.3, 4.1.2.2.2, 4.1.2.3.2, 4.1.2.4.2 and 4.1.2.5.2 present frequency changes and numeric information about each wave.

4.1.2: PRESENTATION OF THE RESULTS

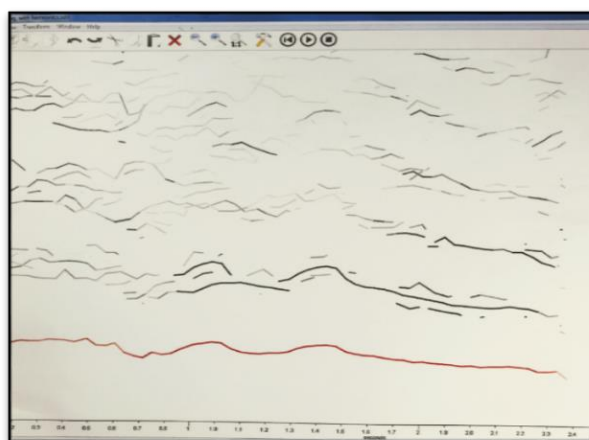
The presented figures and tables in the following sections are representative examples of sound characteristics of the sounds of suffering, i.e. waveforms, frequencies and intervallic changes³⁸.

4.1.2.1: MALE, LONGEST WAVE

4.1.2.1.1: Male, Longest Wave: Complete Partial, View from SPEAR



4.1.2.1.2: Male, Longest Wave: Isolated wave including its harmonics, View from SPEAR



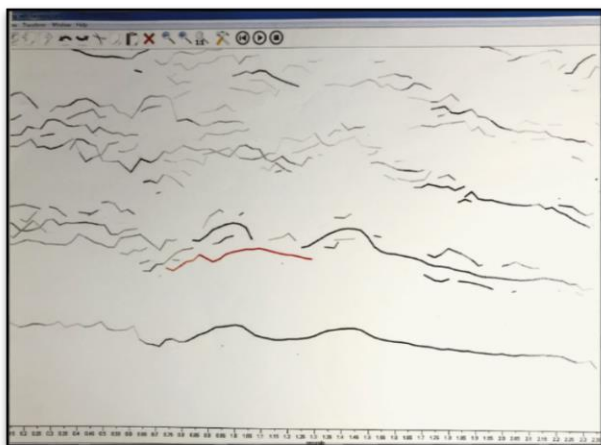
4.1.2.1.3: Male, Longest Wave: frequency (pitch) changes

POINTS	TIME (Sec.)	FREQUENCY (Hz)	KEY-NUMBER	NOTE
1.	0.025	312.674	63.086	Eb4
2.	0.037	328.823	63.958	E4
3.	0.050	327.792	63.903	E4
4.	0.088	316.797	63.313	Eb4
5.	0.100	316.110	63.275	Eb4
6.	0.138	305.114	62.662	Eb4
7.	0.162	289.309	61.741	D4
8.	0.175	291.371	61.864	D4
9.	0.187	293.776	62.007	D4
10.	0.200	294.119	62.027	D4

³⁸ Tables of complete results of the full duration of each wave can be found in Appendix B.

4.1.2.2: MALE, LONGEST WAVE, HARMONIC 1

4.1.2.2.1: Male, Longest wave, Harmonic 1: View from SPEAR

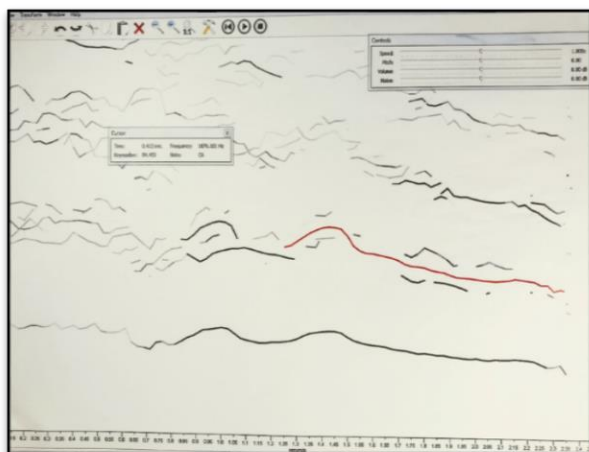


4.1.2.2.2: Male, Longest wave, Harmonic 1: Frequency (pitch) changes

POINTS	TIME (Sec.)	FREQUENCY (Hz.)	KEY-NUMBER	NOTE
1.	0.737	466.967	70.030	Bb4
2.	0.750	461.197	69.815	Bb4
3.	0.762	458.523	69.714	Bb4
4.	0.775	462.604	69.867	Bb4
5.	0.787	472.315	70.227	Bb4
6.	0.800	485.967	70.720	B4
7.	0.813	484.418	70.665	B4
8.	0.825	483.715	70.640	B4
9.	0.838	489.203	70.835	B4
10.	0.850	488.218	70.800	B4

4.1.2.3: MALE, LONGEST WAVE, HARMONIC 2

4.1.2.3.1: Male, Longest Wave, Harmonic 2: View from SPEAR

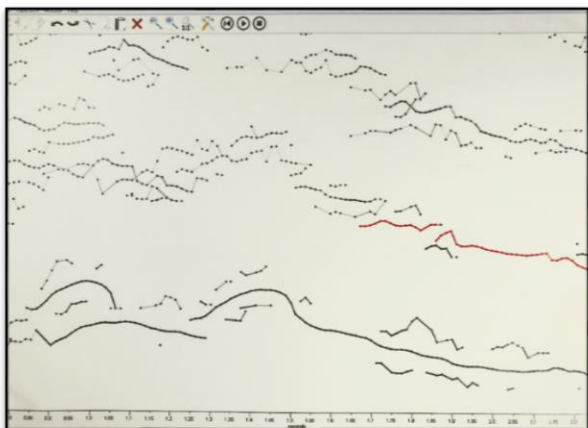


4.1.2.3.2: Male, Longest Wave, Harmonic 2: Frequency (pitch) changes

POINTS	TIME (Sec.)	FREQUENCY (Hz.)	KEY-NUMBER	NOTE
1.	1.250	527.062	72.126	C5
2.	1.262	529.032	72.190	C5
3.	1.275	530.299	72.232	C5
4.	1.288	534.662	72.373	C5
5.	1.300	542.261	72.618	C#5
6.	1.312	550.283	72.872	C#5
7.	1.325	555.069	73.022	C#5
8.	1.338	560.839	73.201	C#5
9.	1.350	566.468	73.374	C#5
10.	1.363	570.972	73.511	D5

4.1.2.4: MALE, LONGEST WAVE, HARMONIC 3

4.1.2.4.1: Male, Longest Wave, Harmonic 3: View from SPEAR

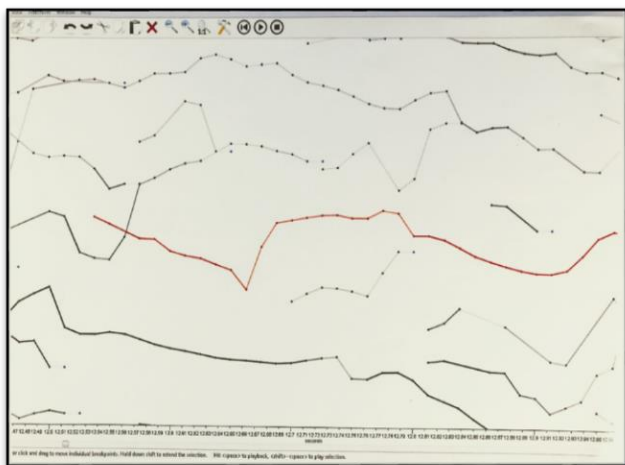


4.1.2.4.2: Male, longest Wave, Harmonic 3: Frequency (pitch) changes

POINTS	TIME (Sec.)	FREQUENCY (Hz.)	KEY-NUMBER	NOTE
1.	1.675	703.265	77.119	F5
2.	1.687	703.265	77.119	F5
3.	1.700	704.532	77.150	F5
4.	1.712	708.332	77.243	F5
5.	1.725	713.257	77.363	F5
6.	1.737	713.539	77.370	F5
7.	1.750	708.895	77.257	F5
8.	1.763	704.391	77.146	F5
9.	1.775	703.406	77.122	F5
10.	1.788	704.954	77.160	F5

4.1.2.5: FEMALE, LONGEST WAVE

4.1.2.5.1: Female, Longest Wave: View from SPEAR



4.1.2.5.2: Female, Longest Wave: Frequency (pitch) changes

POINTS	TIME (Sec.)	FREQUENCY (Hz.)	KEY-NUMBER	NOTE
1.	12.537	737.419	77.940	F#5
2.	12.550	733.366	77.844	F#5
3.	12.575	724.539	77.635	F#5
4.	12.587	724.179	77.626	F#5
5.	12.600	717.153	77.457	F5
6.	12.613	714.541	77.394	F5
7.	12.625	712.650	77.348	F5
8.	12.638	709.227	77.265	F5
9.	12.650	705.804	77.181	F5
10.	12.662	694.185	76.894	F5

What can be concluded from this lengthy discussion is:

- 1) I expected to see a recognisable feature in the shape of the waveforms or anything else that differentiates the waves of sounds of suffering from other types of waves, i.e. ambient sounds. However, I came to realise that nothing significant could be recognised in the visual features of these waves that differentiates them from other sounds. Be that as it may, to differentiate waveforms representing sounds of suffering from waveforms representing ambient sounds – in terms of their visual characteristics – is not a primary objective for me as a composer. However,
- 2) The characteristics of these waves are obtainable in the form of numeric data instead of visual representations. This information was then exploited for the purpose of my compositions³⁹.
- 3) When isolating a wave that represents the voice of a person – both female and male – in the state of mourning, the frequencies (fundamentals and their harmonics) do show some distinguishable characteristics. Firstly, when reading the numeric data that these waves represent, changes in the frequencies can be discerned⁴⁰. However, the range of these frequencies changes within a perfect 5th approximately, but not wider than an octave. Both male and female: long, steady wave in middle register (e.g. around C4 for fundamental wave of males and around C5 for fundamental wave of females as it is shown in SPEAR software)⁴¹. Secondly, the frequency changes in waves (fundamental and harmonics) happens in the region of microtones, but because in SPEAR notes are defined in tempered tuning, the changes in pitch are only shown in semitones in the cursor window of the SPEAR screen⁴².
- 4) In some cases, the ambient sounds and sounds of suffering might share the same frequencies and dynamics⁴³. In such cases, I cannot say if the characteristic differences between sounds of suffering and ambient sounds would be recognisable. The only way to do so would be to analyse all the partials in a sample. I have not done this for two reasons: firstly, this is an impossible task, simply because the number of the partials is extremely high, e.g. in figure

³⁹ See section 4.3, figures 4.3.1, 4.3.2, and 4.3.3.

⁴⁰ From the beginning of a wave to the end of a wave, i.e. throughout the whole duration of a wave.

⁴¹ See Appendix B.

⁴² The frequency changes are actually in microtones and the notes in the last column defined in semitones (see tables 4.1.2.1.3, 4.1.2.2.2, 4.1.2.3.2, 4.1.2.4.2, 4.1.2.5.2).

⁴³ Moreover, the numeric data resulting from their analysis might also be similar. In this case relying on hearing can be a great help towards the differentiation between two groups of sounds.

4.1.1.2, the sample consists of 39501 partials. It is impossible to compare all these partials with each other and determine the differences between them. Secondly, I did not cover this aspect as part of this study, because my concern was to obtain the type of information that can be gained directly from the sounds of suffering in order to incorporate them into my compositions. What I needed from these recordings, from my perspective as a composer, was to focus primarily on sounds of suffering, isolate and study them, and find out what characteristics and sound elements they offer for utilisation in my compositions. Analysis of the samples reveals a very complex spectrum, provided to me in the form of a graphic representation. On the other hand, the numeric information provided in the form of tables helped me to untangle that complexity into the kind of simplicity that I could exploit for my compositions.

5) These findings determined my compositional choices: firstly, I came to realise that after isolating the sounds of suffering from the other sounds and narrowing them down, I could not write a complete composition from such sounds only. It became clear to me that, in addition to the valuable potential these sounds offered, I would have to delve deeper into my recordings. Thus, by using SPEAR and by studying the recordings in more depth and detail, I realised that these samples had the potential to offer a much wider range of options in respect of diversity in timbre. Secondly, I also did not know that I would be able to use the ambient sounds and produce a completely different type of timbre mainly by “select” and “edit” options in SPEAR software. In order to achieve such a wide diversity in timbre, by means of selection and manipulation techniques in music software such as SPEAR and Audacity, is why I decided to compose electroacoustic rather than instrumental music; my choice of creating an electroacoustic work was guided by the fact that, in doing so, I could get the closest to the sounds of suffering. If the choice had been to compose an instrumental work, this would have led to the transformation of a complex spectrum into a simplistic aggregate of pitches (in comparison to the original sounds) with new timbres, even unwanted ones. Thirdly, considering the expression of suffering in these compositions⁴⁴, i.e. *Sounds of Suffering, No.1-4*, the electroacoustic genre would be a better choice considering the nature of this project. I believe that writing an instrumental piece would have resulted in a less expressive music, it might have not strongly (or not strongly enough) presented the emotional pain; it might have sounded as a piece written in micro-tonality⁴⁵. Accordingly, with regard to saying something about suffering through music, for me electroacoustic was a more effective choice. Since, not only I have the

⁴⁴ By expression, I am not referring to the theory of expression, but rather to expression as a term.

⁴⁵ Considering that, the frequency changes are in microtones (see 4.1.2).

direct quality of the sounds of suffering, but also when I separate e.g. long duration from short waves, or below threshold in SPEAR (see section 4.3) I can make changes and variations in the quality of the sounds, i.e. timbre, which I can never (or hardly ever) get from an instrument.

In summary, when I say that my compositions are about suffering, my intention is that they should be understood as a deeply felt creative response by an artist to the sufferings in the world as a whole, not as an investigation into suffering as one would expect from an anthropologist or social scientist, nor as a soundscape created by a journalist. I embarked on fieldwork and recorded my sound samples at funerals so that I could have direct access to the genuine and sincere expression of suffering, so that, in the end, my compositions would penetrate to the core of human suffering. This is also the reason why I did not use pre-recorded samples of sounds of suffering such as crying or shrieking or wailing, which are available in many studios, archives or libraries. In the latter case, I would not have been able to vouch for the authenticity of such expressions. Consequently, from the recording stage of my work right up to the analysis and the various creative choices I made during the composition process, every decision taken was to try and achieve the most sincere and authentic expression of suffering of which I am capable in my compositions.

4.2: SOUNDS OF SUFFERING, NO. 1-4: OVERVIEW

The creative part of this project, *Sounds of Suffering*, is a series of four compositions with a total duration of circa 56 minutes, based on recorded sounds during fieldwork in Iran, and on the results of their analysis. While the four works are related to each other, they also make sense as individual compositions in their own right:

1. Sounds of Suffering, No. 1: “12:30 Minutes of Agony” (12’:30” min)
2. Sounds of Suffering, No. 2: “In the Presence of Death” (13’:00” min)
3. Sounds of Suffering, No. 3: “In Memory of God(s)” (18’:10” min)
4. Sounds of Suffering, No. 4: “Lamented in an Elegy” (12’:10” min).

The first work, “12:30 Minutes of Agony”, has a stormy character; it portrays events that are distressing. It is an attempt to say “something tragic and horrible is about to happen,” i.e. death⁴⁶. It talks about the terror and pain one might go through, caused by the observation of

⁴⁶ I am referring to death which is dealt with in the next piece, “In the Presence of Death”.

the warning surroundings and events. The twelve and a half (12:30) in the title refers to the duration of this piece through which I have tried to express the shock, disbelief, anger and self-struggle one experiences at the beginning of every tragedy. This work has a thicker texture and is noisier, i.e. noise clusters, than the next work (No. 2).

Sounds of Suffering No. 2, “In the Presence of Death”, is about facing the tragedy of death, surrendering to death. The significant wailing sound, which appears in the second minute of this piece, and repeats in some variations, refers to the voice of death; death is talking. The background sounds are setting the mood for the presence of its voice, and even though terrifying, there is no struggle in the face of death – since it is invincible – but only acceptance.

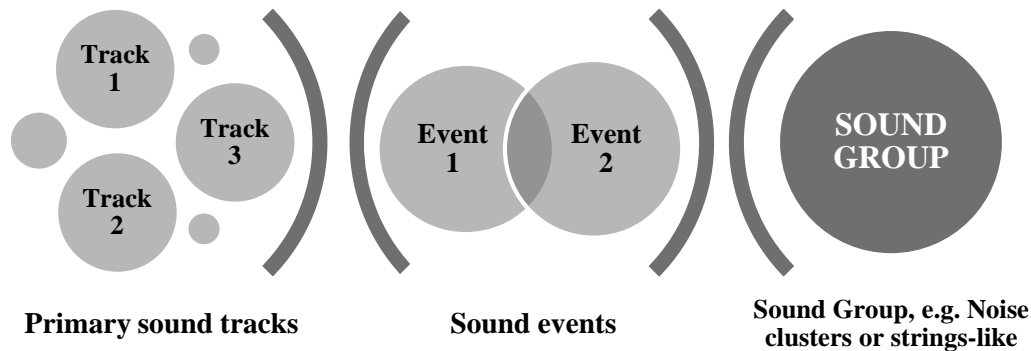
“In Memory of God(s)” is the longest piece in this composition. “God(s)” in the title has a dual meaning; it can either (a) refer to those beloved ones in our life who are like God (or Gods) to us and/or humanity, or (b) refers to the religious God or in some cases Gods. If we consider the first meaning (a) then this piece is a mourning in memory of those loved ones who have died and losing them left us in the state of grief. If we consider the second meaning (b), this piece is a mourning in memory of the God, and it raises the ironic question of “where is God when we suffer?” – maybe even God has given up on us, i.e. humanity, and this is mournful. The sounds of shrieking and wailing accompanied by the manipulated percussion are the most significant sound characteristic of this piece.

The last work, as is clear from its title “Lamented in an Elegy”, is a lament for the dead. Now this is the last stage of grief, i.e. acceptance and the acknowledgement of the reality, which is death. This is the pure state of lamentation. The vocals in this piece are not just the primitive type of expression of pain, i.e. crying or shrieking, but also prayers and lullabies that are sung by the family and relatives for the peace of the soul of the dead.

Each piece explores three significant sound (or timbral) groups, each containing several sound events. These sound events consist of several primary sound tracks that are individually composed and arranged: each track undergoes specific manipulation and an editing process considering the role that they play in a related piece⁴⁷.

⁴⁷ The structure of this composition will be discussed in section 4.3 in more detail.

4.2.1: Sound tracks/events/groups process



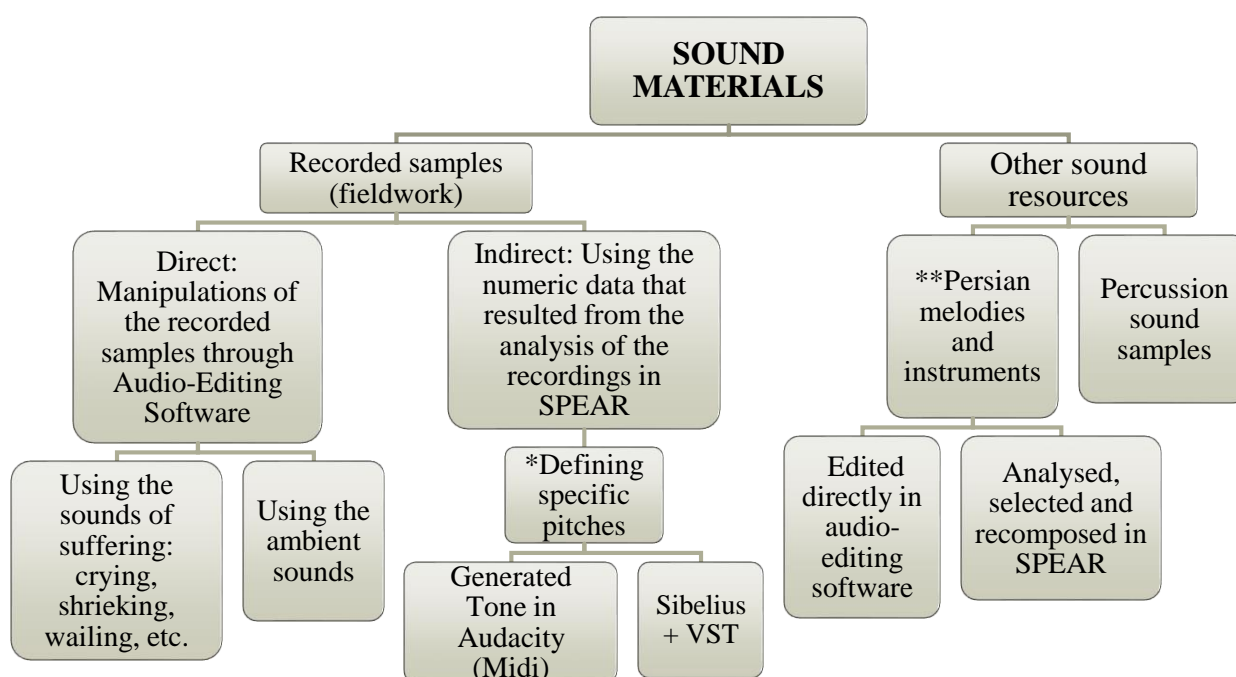
In all my compositions, I deliberately limit myself to a handful of ideas, musical tools and sound materials. These self-imposed limitations help me to avoid getting confused, even overwhelmed, by the various opportunities that any idea or advanced software can offer, and, instead, force me to get the most out of little material and few ideas by applying various compositional techniques and experimenting with how an idea can evolve and be developed. For example, in *Sounds of Suffering*, instead of applying a multitude of speakers to achieve multi-phonetic sound experience, in Stereo/Mono I defined Left, Right or Centre for each primary sound track before they were added up to create a sound event, belonging to a sound group. The same goes for other music technological aspects, from choosing the editing and analysing software, to my choice of a mere handful of sound samples.

The following section will discuss the structure of my composition, the choice of sound materials and the production process for each work in detail.

4.3: SOUNDS OF SUFFERING, NO. 1-4: STRUCTURAL ANALYSIS

Below is a chart presenting a general view on the sound materials, and ways in which I incorporated the outcomes of the sound analysis of the recordings into my compositions.

4.3.1: Sounds of Suffering, Sound Materials



* **Defining specific pitches** (referred to as notes in the tables): As mentioned in the previous sections, the outcome of the analysis of the recording in SPEAR is in the form of numbers. This numeric data can guide the composer to define specific pitches that can be incorporated into the composition.

For example, in the table below, which is a small section of the presented outcome of the analysis of recorded sounds in SPEAR⁴⁸, duration and frequency of a note can be developed from the numeric data in such a way.

⁴⁸ See Table 4.1.5.2: Female, Longest Wave.

4.3.2: Female, longest wave, from point 5 to 10 (Note: F5)

Points	Time (Sec.)	Frequency (Hz.)	Key-Number	Note
1.	12.537	737.419	77.940	F#5
2.	12.550	733.366	77.844	F#5
3.	12.575	724.539	77.635	F#5
4.	12.587	724.179	77.626	F#5
5.	12.600	717.153	77.457	F5
6.	12.613	714.541	77.394	F5
7.	12.625	712.650	77.348	F5
8.	12.638	709.227	77.265	F5
9.	12.650	705.804	77.181	F5
10.	12.662	694.185	76.894	F5

4.3.3: Define Note, Calculations of Duration and Frequency

<p>Duration:</p> <p>The subtraction of the smallest number from the biggest one (Timespan). Since this timespan is a number defined in milliseconds, and would therefore be too short to use effectively in my composition, to make it an easier and more practical element, I altered the number 0.062 by multiplying it by 100.</p>	$12.662 - 12.600 = 0.062$ $0.062 \times 100 = \mathbf{6.2(sec)}$
<p>Frequency (average):</p> <p>From point 5 to 10 in the table, we see the changes in frequencies but the note stays the same (F5). Therefore an average frequency needs to be calculated.</p>	$(717.153 + 714.541 + 712.650 + 709.227 + 705.804 + 694.185) =$ $(4253.56 \div 6) = \mathbf{708.926}$

After the durations and frequencies obtained through the simple mathematical calculations, we can either:

- (a) Generate a tone: in a musical program such as Audacity → Generate → Tone → Waveform → Sine. Later incorporate these generated tones directly in the form of midi in the composition.
- (b) Notate them in a program such as Sibelius → assign them to the instruments (such as strings, woodwinds and percussion) → export either (i) as Sibelius sound-files (wav) or (Midi) or (ii) using VST instrument samples⁴⁹.

**** Persian Sounds⁵⁰:**

- Origin: Improvisation in “Dastgâh” (Persian Music System).
- Instrument: National Persian instruments such as Kamâncheh, Târ, Santour, Ney, etc.
- Method: either (a) the sound recording is directly imported in audio-editing software such as Audacity and manipulated, or (b) the original recording of the sound of an instrument is analysed in SPEAR, then the partials that have a duration below one second is cut and pasted in a new SPEAR document (via Select Partial Below Duration). Then both files are exported from both documents separately and used as two different tracks in the audio-editing software. In this way, not only one musical line is divided into two (short and long duration), but also the characteristic of the instrument is changed.

In the next sections (4.3.1, 4.3.2, 4.3.3 and 4.3.4) a detailed analysis of each of the four movements of *Sounds of Suffering* is presented. Firstly, an image of the waveform of an entire movement is shown, followed by an image of its spectrogram. Both these views - generated by Audacity software – represent particular details that facilitates understanding of the music as a whole.

⁴⁹ Through defining specific pitches, composing an orchestral piece (or writing a score) is also possible.

⁵⁰ Other sound resources such as Persian sounds and sounds of a few percussion instruments are obtained from my personal archive.

The waveform view is a time-based graphical representation of the sound wave: As the amplitude of the signal increases, the wider the vertical representation becomes. Therefore a structural overview of the music is made possible according to how the dynamic intensity varies. That is to say that the dynamic profile represented as a graph gives one a sense of the structure of the music.

On the other hand, a spectrogram view of an entire movement gives a visual representation of the frequencies of the sound wave. Here one can observe which frequencies are present from moment to moment, but also which frequencies are the most prominent: the bright colours represent frequencies that are sounding more prominently as apposed to dark colours that represent the weaker sounding frequencies. In other words, the density/translucency of the music can be deduced from the graph, which, in its own way, articulates the overall structure of the music.

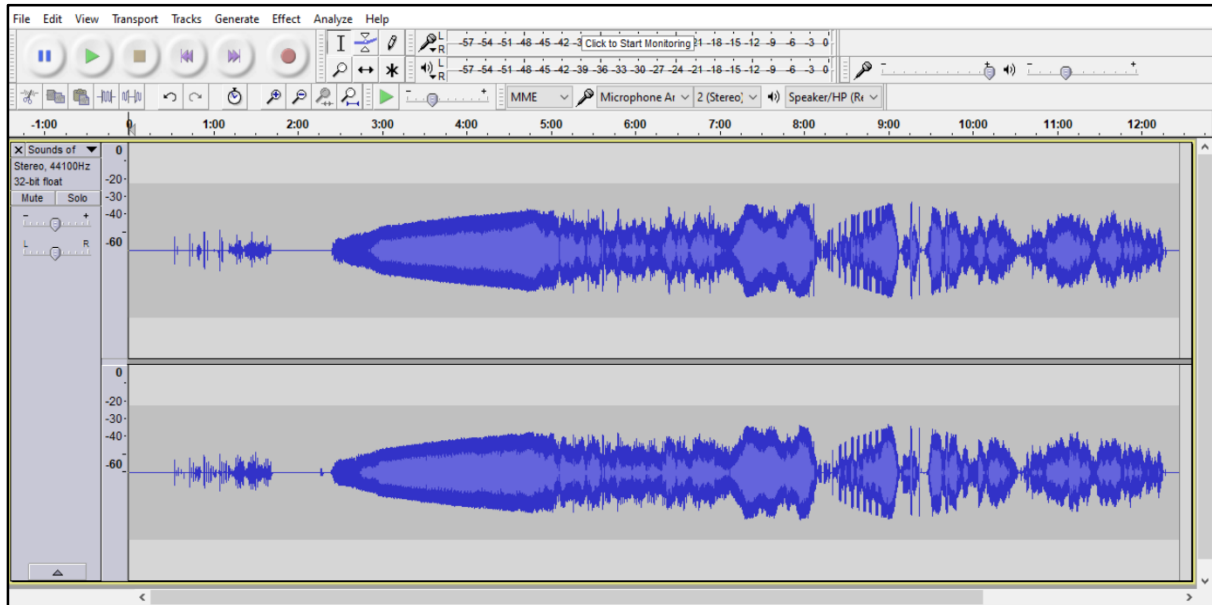
When the spectrogram and waveform views are compared with one another, a distinct correlation between their graphs becomes apparent.

Following onto the aforesaid, the discussion will focus on segments of each movement from *Sounds of Suffering* with reference to graphs that depict the dynamic contours of the three elements and sound groups, aspects of the sound material and its manipulation that will be elaborated upon as the discussion proceeds (in the form of tables). Therefore the dynamic contour views, in contrast to the waveform and spectrogram views, focus specifically on segments of the music (see figures 4.3.1.2, 4.3.1.3, and 4.3.1.4 for instance). Hence, the composition's structure, sound materials, as well as the production processes employed will be explained in more detail.

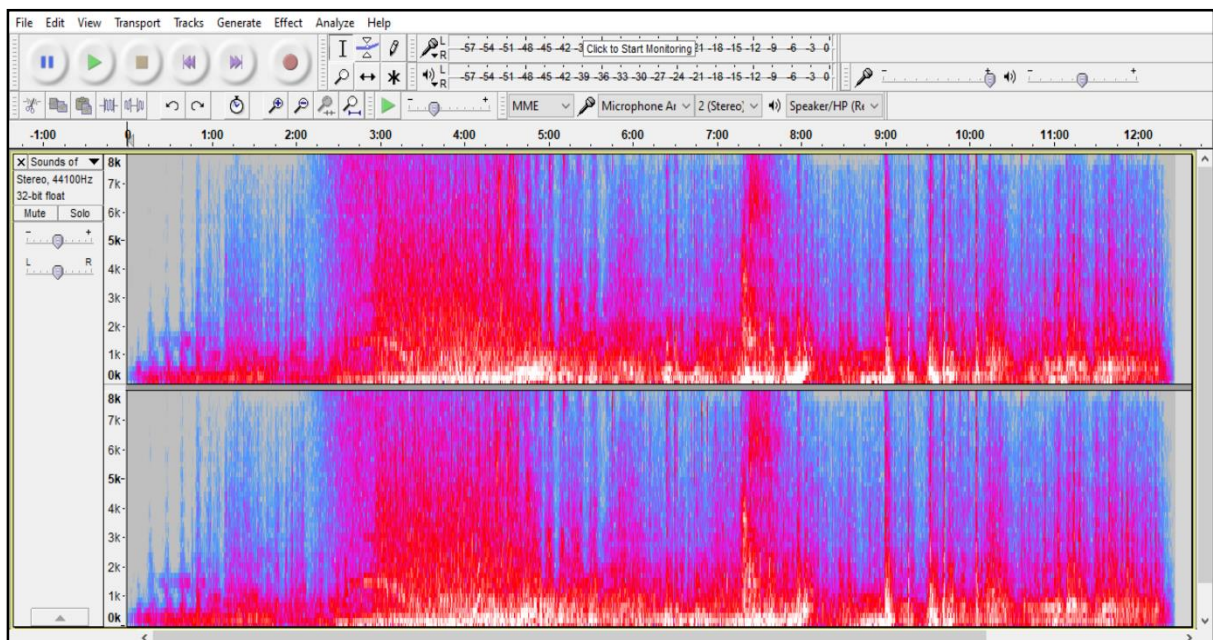
4.3.1: SOUNDS OF SUFFERING NO. 1: 12:30 MINUTES OF AGONY

4.3.1.1: Sounds of Suffering. No. 1, View from Audacity (Waveform and Spectrogram):

WAVEFORM

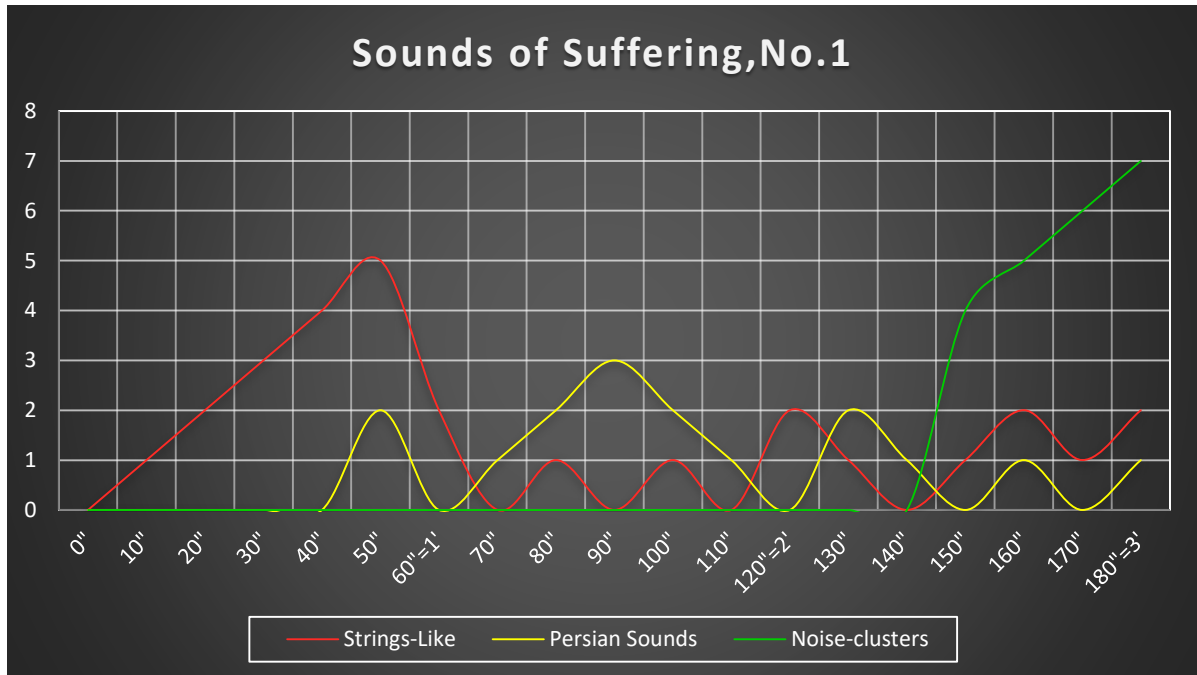


SPECTROGRAM



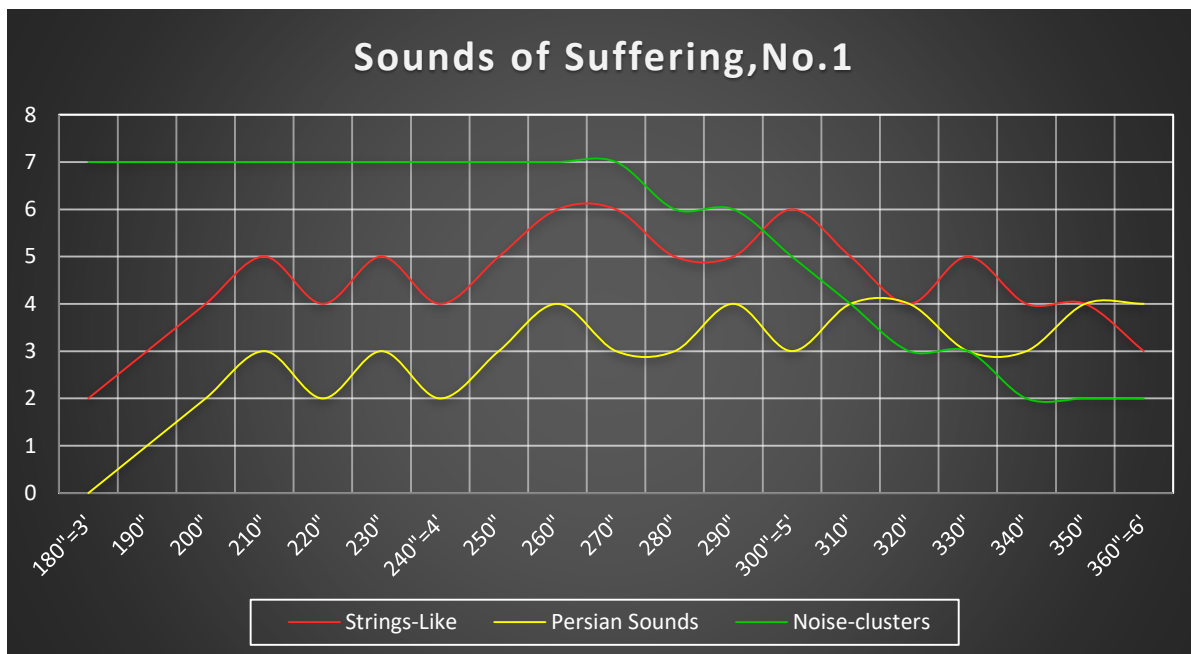
The sound event in this piece can be divided into three major categories: Strings-like, Persian sounds and Noise-clusters. The charts below provide an overview of the alterations throughout the music based on the unit of time and dynamic changes⁵¹.

4.3.1.2: Sounds of Suffering, No. 1, ‘Dynamic contours: their bases and apexes over time’, [0’:00” – 03’:00”]

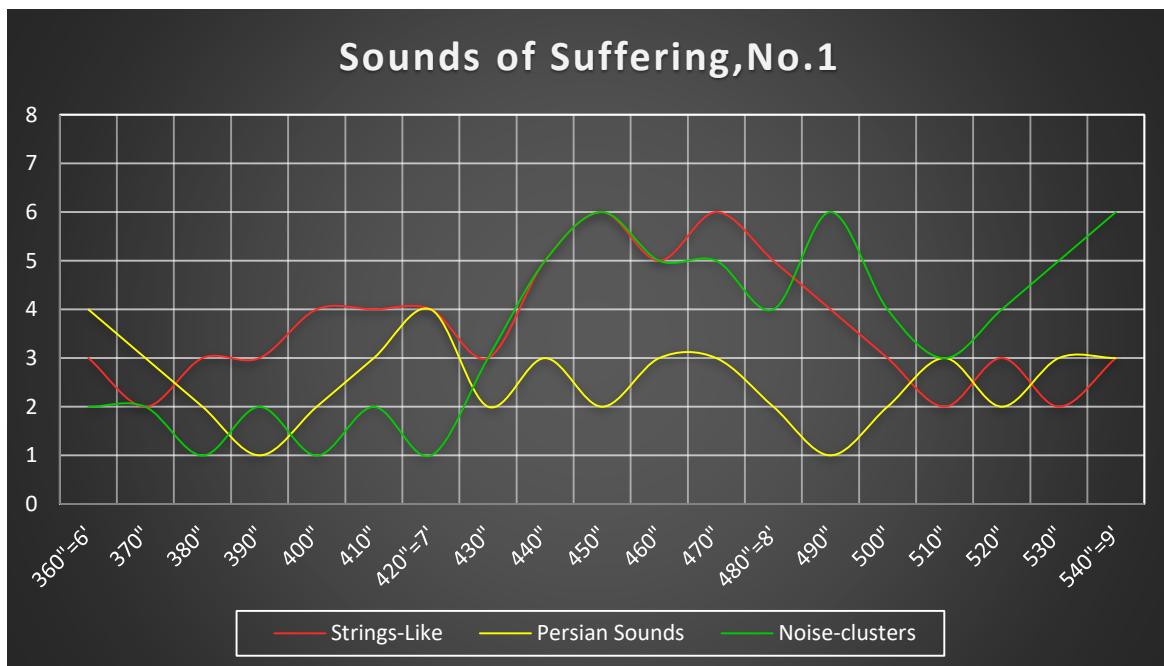


⁵¹ In all charts presented in this section the vertical axis refers to dynamics; [0=*ppp*, 1=*pp*, 2=*p*, 3=*mp*, 4=*mf*, 5=*f*, 6=*ff*, 7=*fff*] and the horizontal axis presents time in seconds.

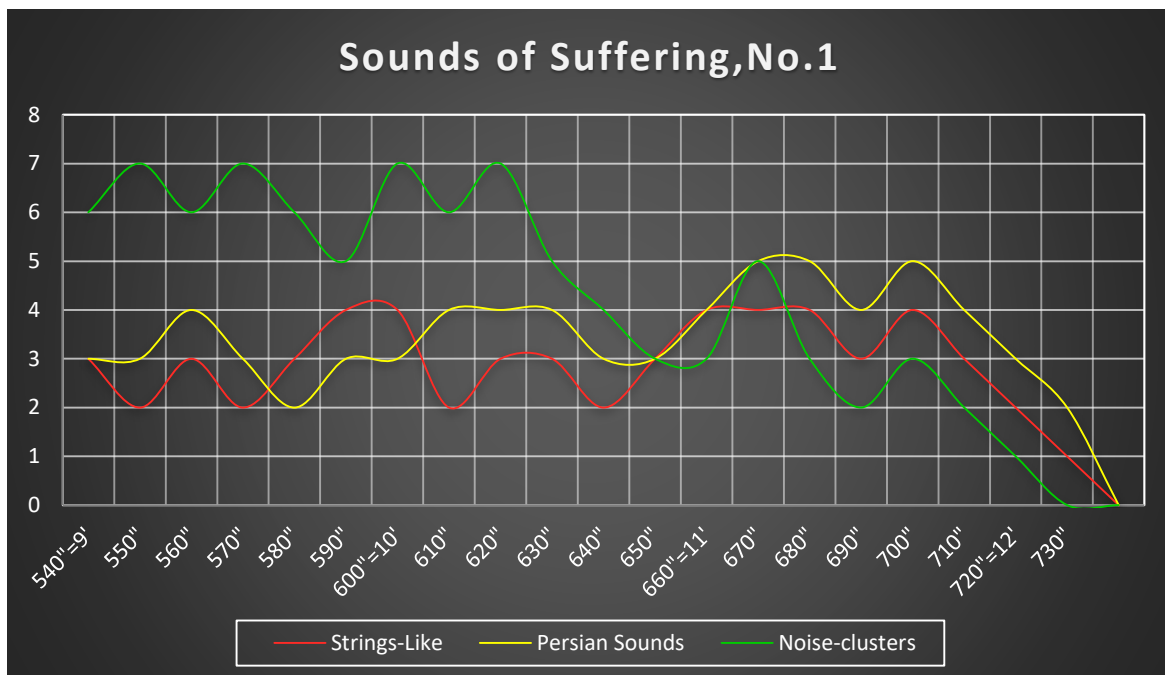
4.3.1.3: Sounds of Suffering. No. 1, ‘Dynamic contours: their bases and apexes over time’, [03’:00” – 06’:00”]:



4.3.1.4: Sounds of Suffering. No. 1, ‘Dynamic contours: their bases and apexes over time’, [06’:00” – 09’:00”]:



4.3.1.5: Sounds of Suffering, No. 1, ‘Dynamic contours: their bases and apexes over time’, [09’:00” – 12’:30”]:



4.3.1.6: Sounds of Suffering, No. 1: Sound Materials and Production

SOUND GROUPS	SOUND MATERIALS AND PRODUCTION
<p>Red line (Strings-like)</p>	<ul style="list-style-type: none"> - Define special pitches → Assign tones to Strings in Sibelius → export using VST samples → either: - (a) Import directly in Audacity as an individual track → Amplify/Change Tempo/Change Pitch/Reverse/ Reverb⁵², or - (b) Import in SPEAR → Select Partials Below Duration + Select Partials Below Threshold → separate short from long durations, or separate low from high partials → export individually → import in Audacity → manipulations/effects/filters, etc. - Recording of “Kamâncheh” (a string instrument) → Select Partials Below 3” in SPEAR → Invert Selection → export long duration → import in Audacity, applying Change Speed/

⁵² Not necessarily in this order.

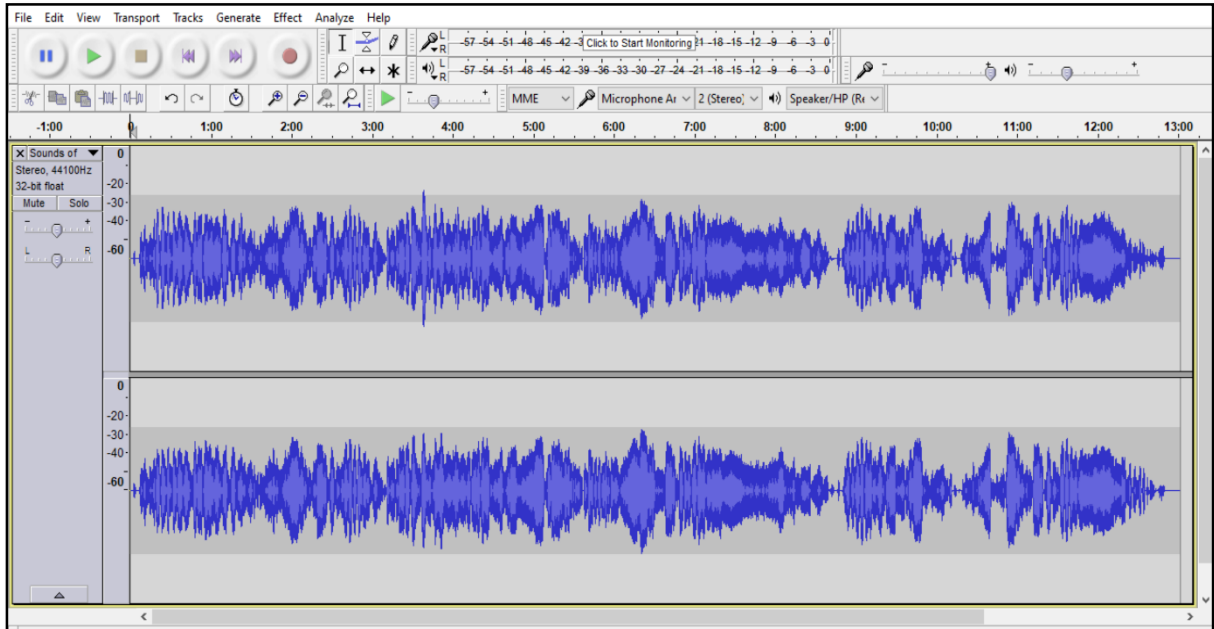
	Change Pitch/ Change Tempo/ Amplify/ Reverse/ Invert/ Reverb ⁵³ .
Yellow line (Persian Sounds)	<p>Origin of sound recording: Improvisation in “Dastgâh” (Persian Music System), performed by “Kamâncheh” and “Santour” (both string instruments).</p> <ul style="list-style-type: none"> - In SPEAR → Select Partial Below → separate short waves from long waves → two track exported → (1) long duration used as separate track in Audacity (Yellow line). - (2) Short durations made part of noise clusters in another track (Green line).
Green line (Noise Clusters)	<ul style="list-style-type: none"> - Recorded samples (fieldwork) analysed, selected and recomposed in SPEAR (partials below 1" separated from longer durations) → short duration exported separately and used as noise clusters in Audacity by applying Change Pitch/Change Tempo/Reverse/Tremolo/High-Pass Filter. - Then in SPEAR → applying Select Partial Below Threshold on long durations remaining from previous step → separate high registers of long wave durations → in Audacity apply Slide Time Scale/ Pitch Shift used as other part of the noise clusters. - In SPEAR → select waves of “Santour” → Select Complete Partial → cut and paste in a new SPEAR document → in the new document, Select Partial Below Duration (1") → Invert Selection → export short durations (1") → import in Audacity as part of the noise clusters.

⁵³ Not necessarily in this order.

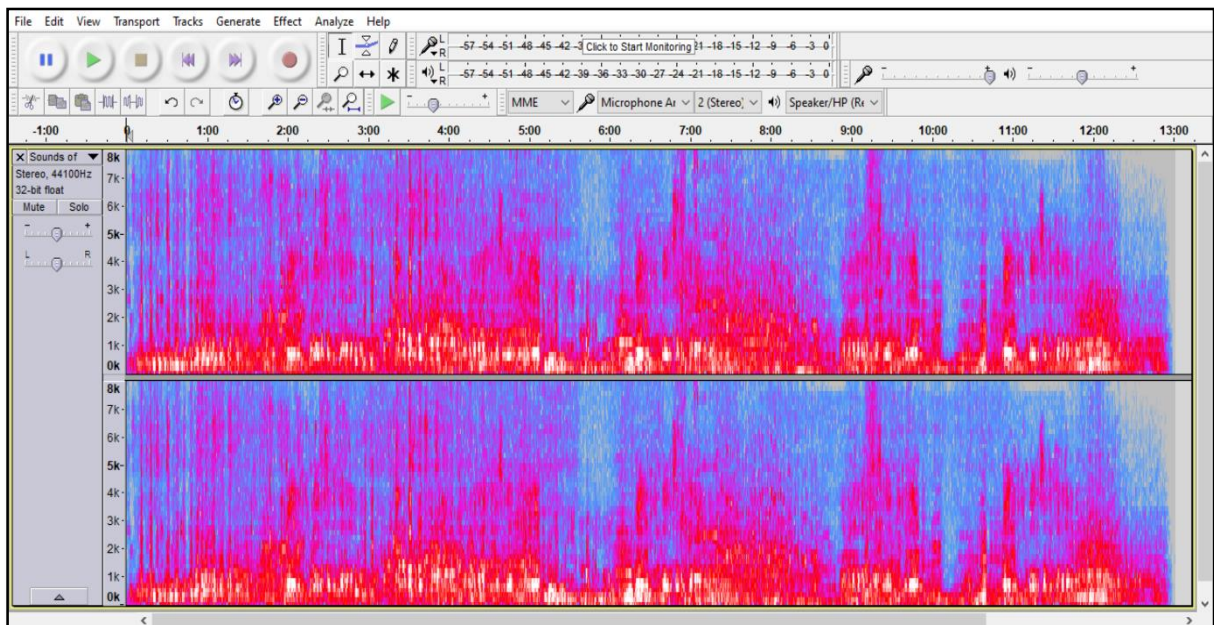
4.3.2: SOUNDS OF SUFFERING NO. 2: IN THE PRESENCE OF DEATH

4.3.2.1: Sounds of Suffering. No. 2, view from Audacity:

WAVEFORM

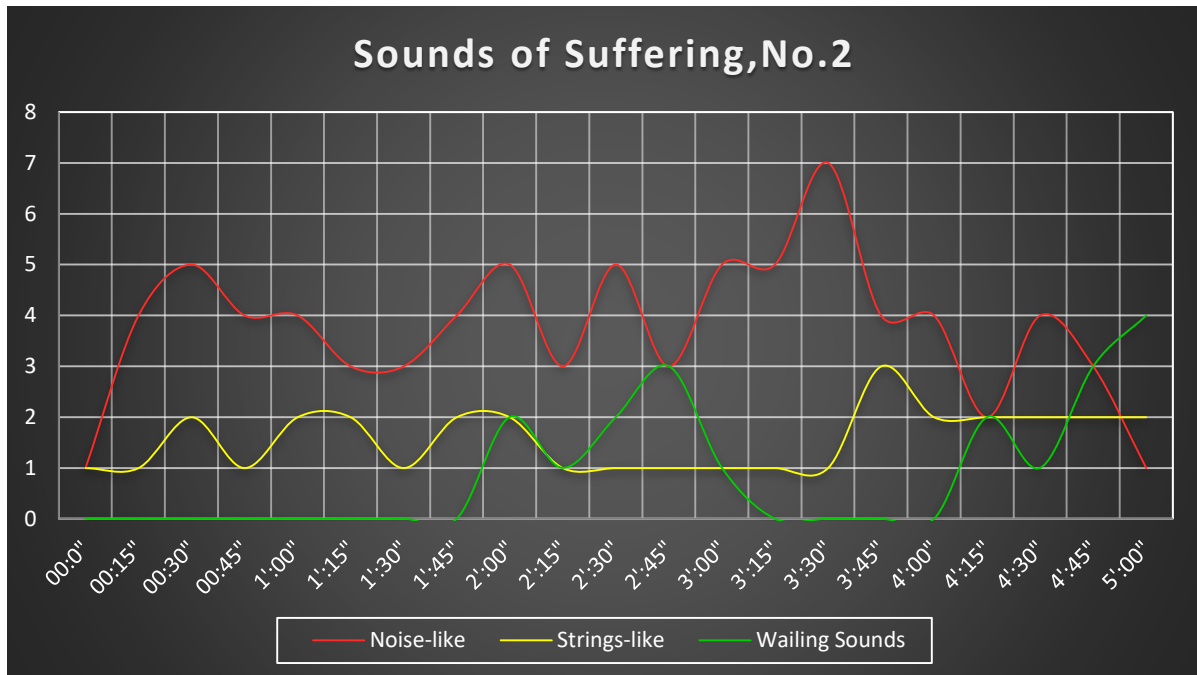


SPECTROGRAM

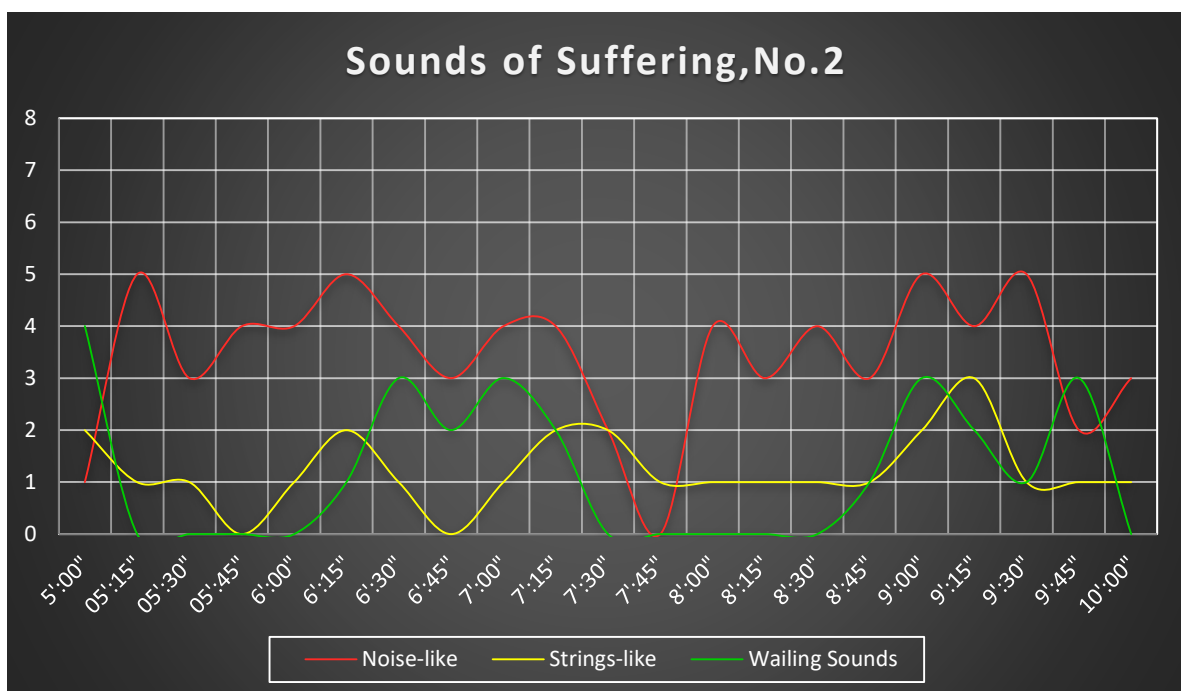


Most significant sound events in this piece were dealt with in terms of three main groups: Noise-like, Wailing Sounds, and Strings-like. The charts below show the dynamic changes and climaxes in each group and the music as a whole.

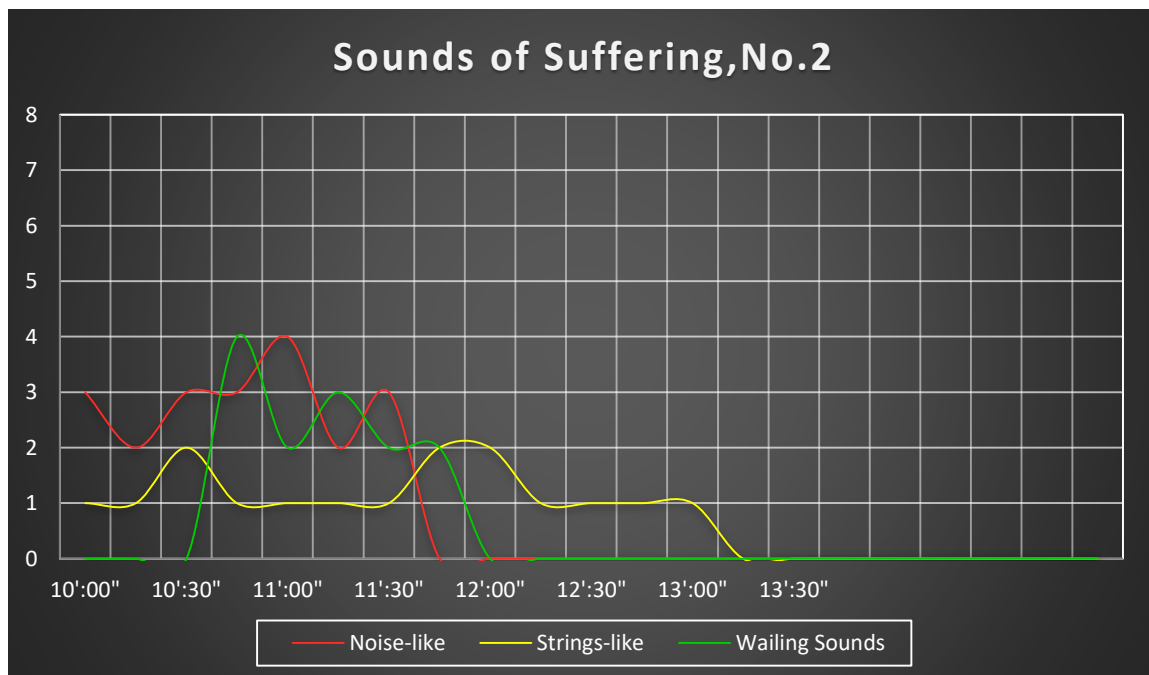
4.3.2.2: Sounds of Suffering, No. 2, ‘Dynamic contours: their bases and apexes over time’, [0’:00” – 05’:00”]:



4.3.2.3: Sounds of Suffering, No. 2, ‘Dynamic contours: their bases and apexes over time’, [05’:00” – 10’:00”]:



4.3.2.4: Sounds of Suffering, No. 2, ‘Dynamic contours: their bases and apexes over time’, [10’:00” – 13’:00”]:



4.3.2.5: Sounds of Suffering, No. 2: Sound Materials and Production

SOUND GROUPS	SOUND MATERIALS AND PRODUCTION
<p>Red line (Noise-like)</p>	<ul style="list-style-type: none"> - Starts with Ratchet (Cog Rattle) sample → in Audacity Amplify/Change Tempo/Change Pitch and Sliding Time Scale/Pitch Shift. - Recordings (fieldwork), in SPEAR → Select Harmonics (of wailing sounds) → export separately → in Audacity Amplify/Change Speed/Repeat/Reverb/Reverse/Sliding Time Scale/Pitch Shift⁵⁴. - Recordings (fieldwork) in Audacity → apply Vocal Reduction/Vocal Remover → export and analysis in SPEAR → Select Partial Below Duration 1" → export as two individual audio files → (a) Short waves used as noise (part of Red line) and (b) long waves manipulated in Audacity and forming part of the Strings-like (Yellow line).

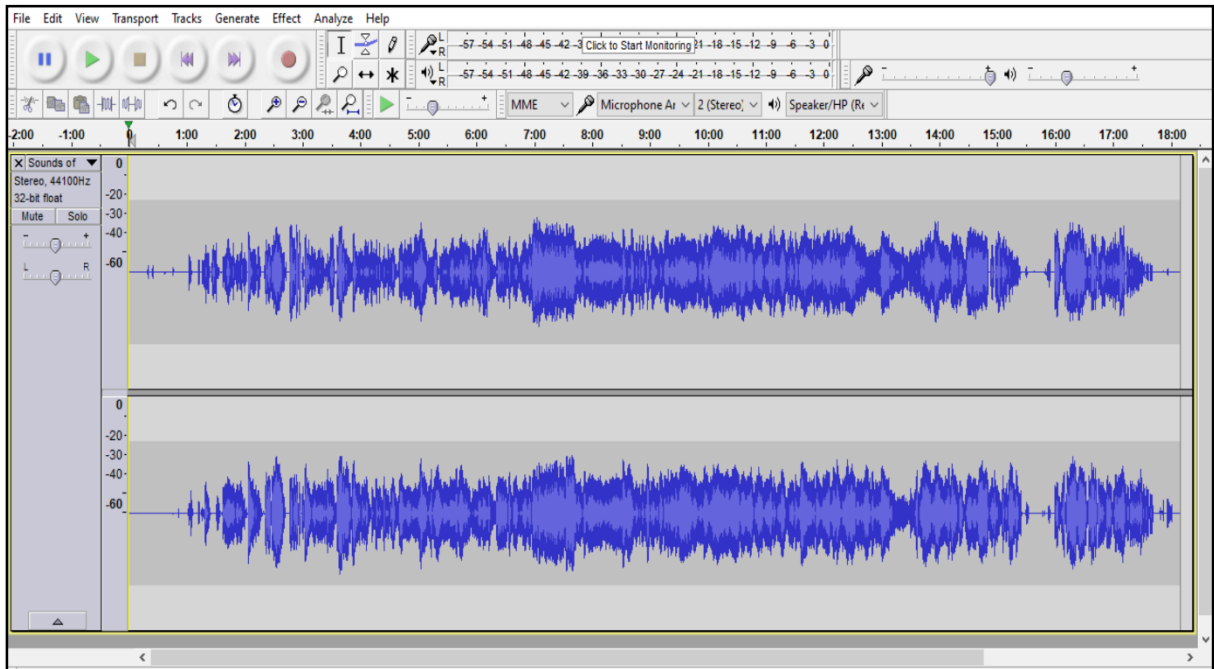
⁵⁴ Not necessarily in this order.

	<ul style="list-style-type: none"> - [5':45"] Short duration and high register waves, isolated in SPEAR → in Audacity Change Pitch/Amplify/Compressor/Wah-Wah. - [From 7':15"] high register and short duration waves → in Audacity → copied in several individual tracks that enter at different times → Repeat/Reverse/Tremolo/Change Pitch/Change Speed/Sliding Time Scale/Pitch Shift.
<p>Yellow line (Strings-like)</p>	<ul style="list-style-type: none"> - Define specific pitches → in Sibelius assign notes to strings + VST → import in Audacity → Slide Time Scale/Pitch Shift/Change Tempo/Change Pitch. - Recordings (fieldwork) in Spear → Select Partial Below Duration 1" → Invert Selection → export long durations → import in Audacity as individual track → Change Pitch. - Recordings (fieldwork) in SPEAR → Select Below Threshold (select lowest waves) → Select Complete Partial (of the lowest wave) → import in Audacity → - [From 1':45"] apply Change Speed, to obtain higher register and shorter tone. - [From 4':30" to 5':30"] in Audacity → apply Tremolo.
<p>Green line (Wailing Sounds)</p>	<ul style="list-style-type: none"> - Recordings of the fieldwork (male sound) → in Audacity Vocal Isolation/Amplify/Sliding Time Scale/Pitch Shift → Then in [2':00"] & [4':10"] & [6':15"] & [8':50"] & [10':53"] this Wailing Sound repeats in different places in its original form and in reverse → Change Pitch/Change Tempo applied in some repeats.

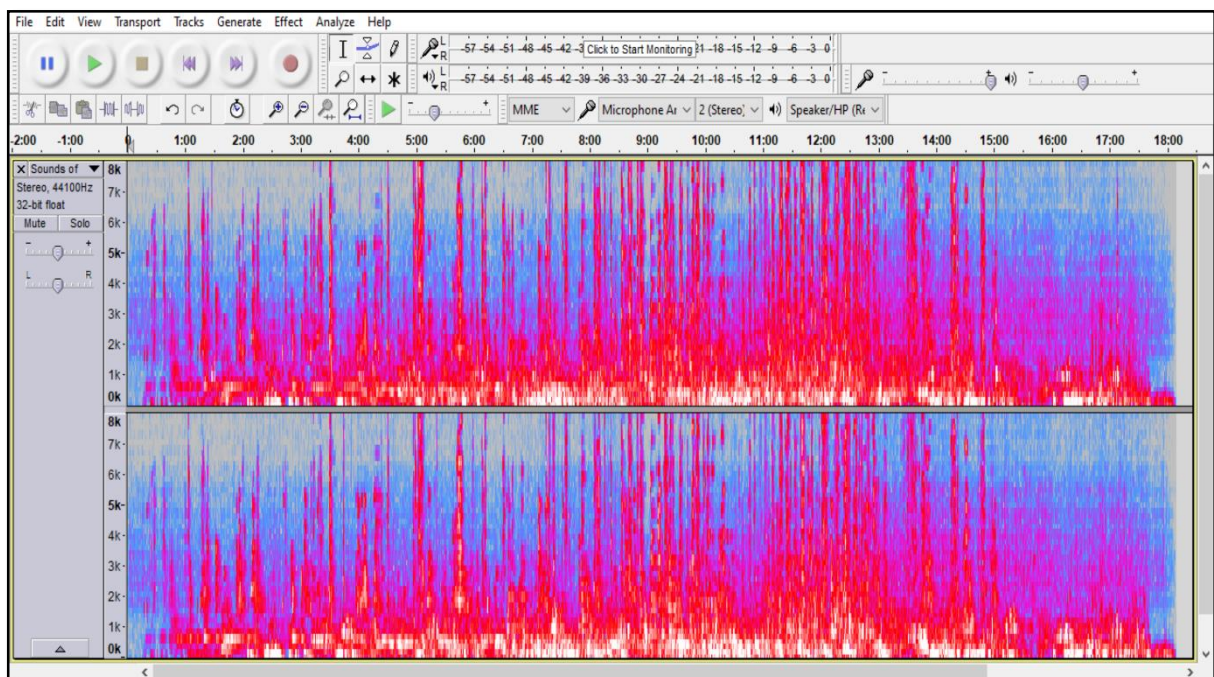
4.3.3: SOUNDS OF SUFFERING, NO. 3: IN MEMORY OF GOD(S)

4.3.3.1: Sounds of Suffering, No. 3, view from Audacity:

WAVEFORM

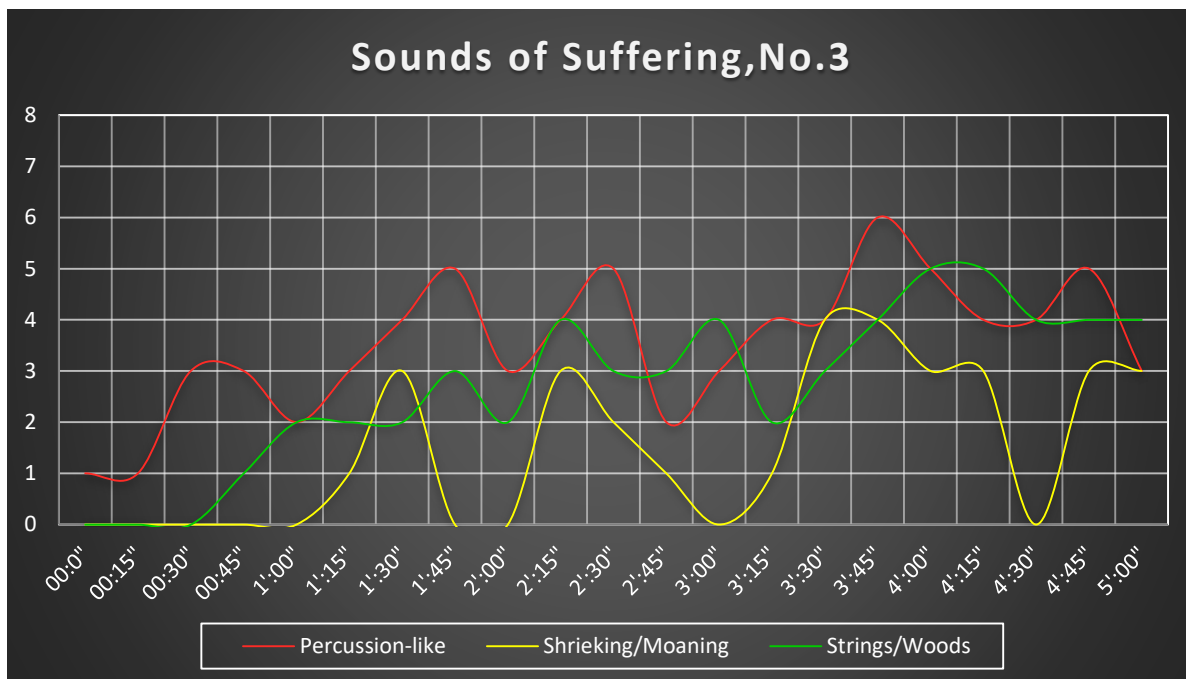


SPECTROGRAM

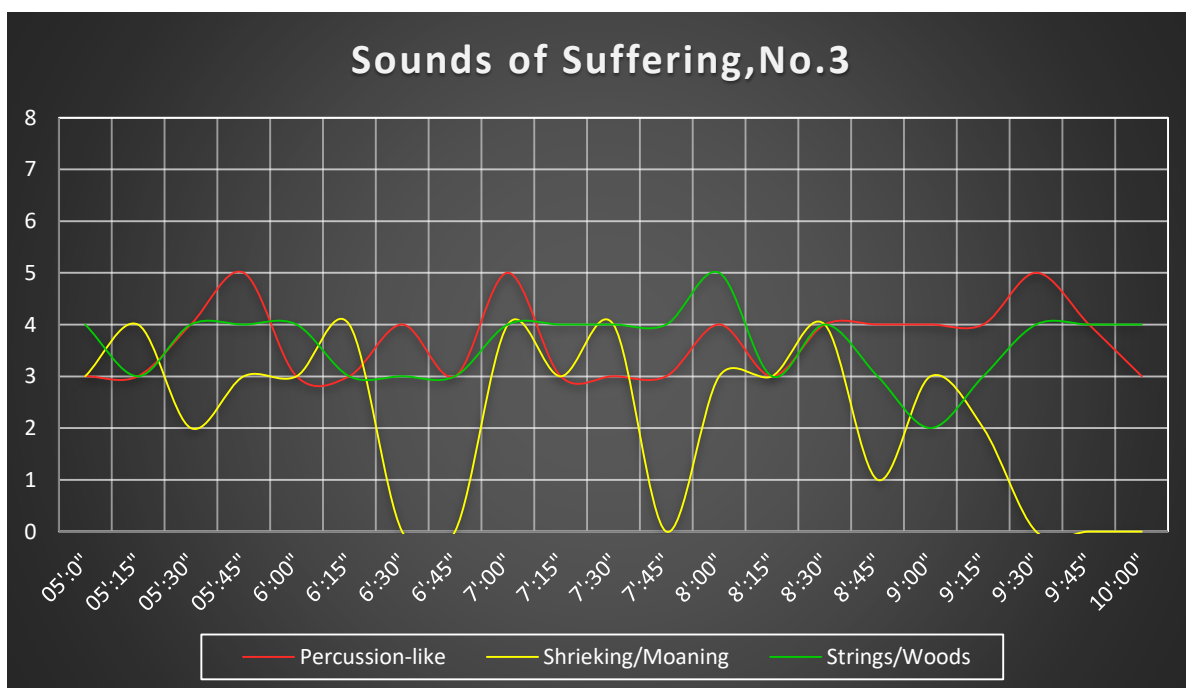


The major sound events in this piece can be discussed in terms of three categories: Percussion-like, Strings/Woods-like and Shrieking/Moaning.

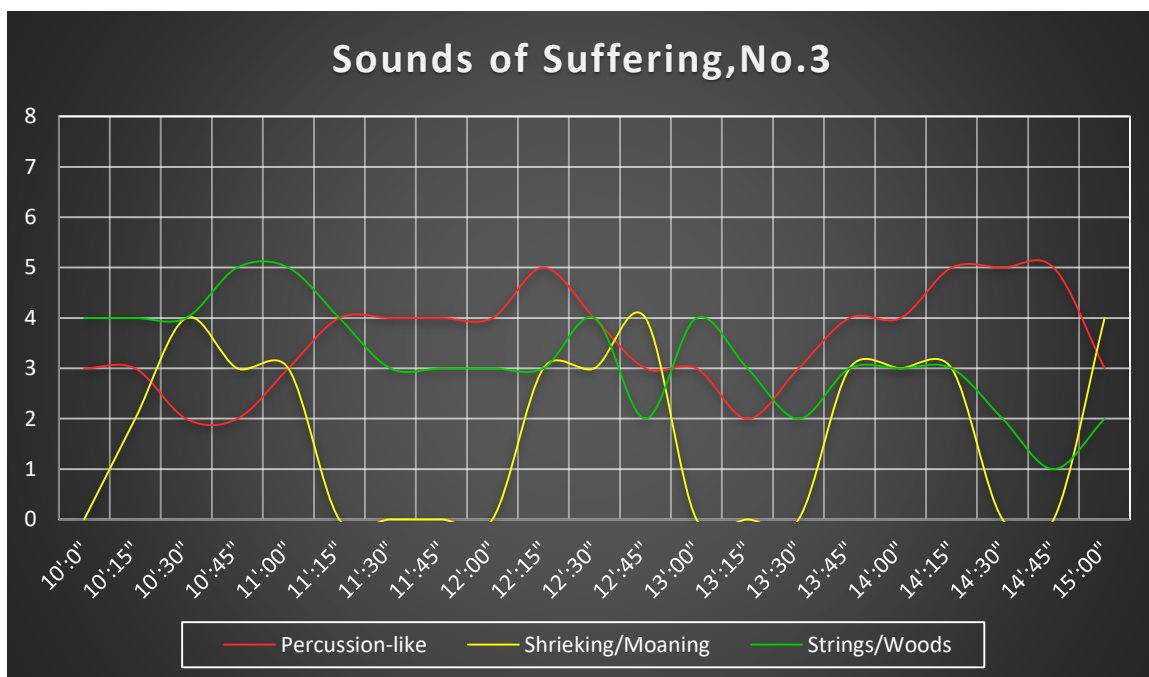
4.3.3.2: Sounds of Suffering, No. 3, ‘Dynamic contours: their bases and apexes over time’ [0’:00” – 05’:00”]:



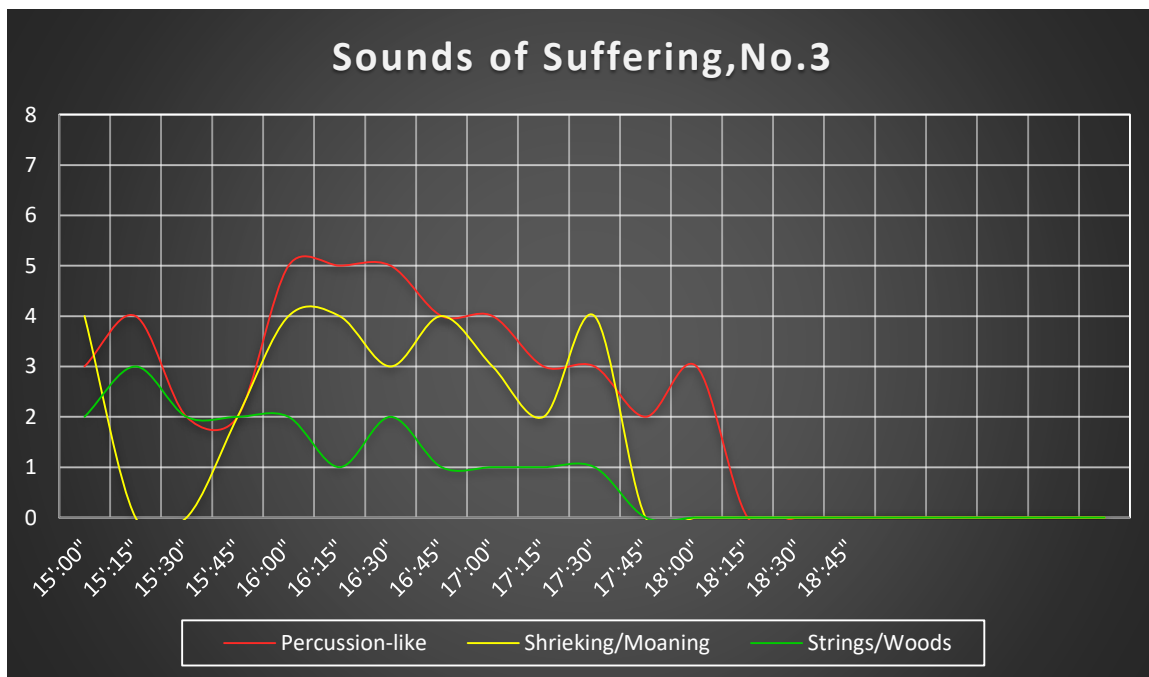
4.3.3.3: Sounds of Suffering, No. 3, ‘Dynamic contours: their bases and apexes over time’, [05’:00” – 10’:00”]:



4.3.3.4: Sounds of Suffering, No. 3, ‘Dynamic contours: their bases and apexes over time’, [10’:00” – 15’:00”]:



4.3.3.5: Sounds of Suffering, No. 3, ‘Dynamic contours: their bases and apexes over time’, [15’:00” – 18’:15”]:



4.3.3.6: Sounds of Suffering, No. 3: Sound Materials and Production

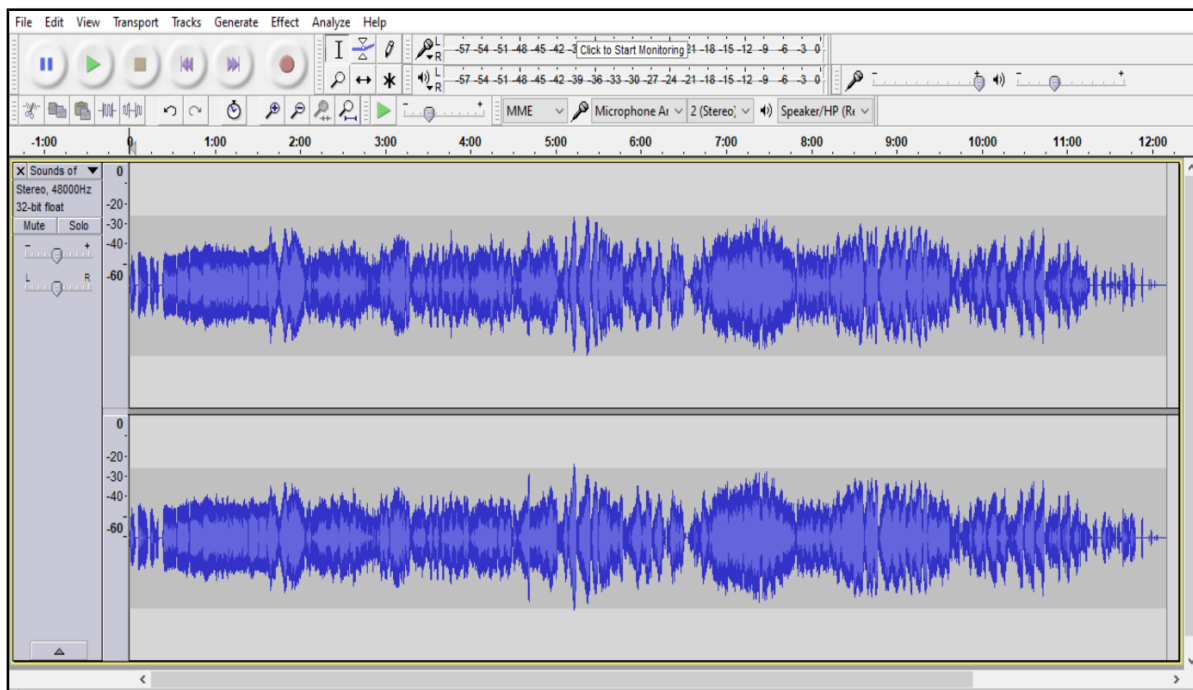
SOUND GROUPS	SOUND MATERIALS AND PRODUCTION
Red line (Percussion-like)	<ul style="list-style-type: none"> - Music starts with the sound of Ratchet (or Cog Rattle) → in Audacity → apply Amplify/Change Tempo/Change Pitch/Sliding Time Scale/Pitch Shift. - In Sibelius → writing a line for pitched and unpitched percussion (in case of pitched percussion, define specific pitches based on the numeric outcomes of the recording's analysis) → assign VST instruments to each percussion instrument → export → then either <ul style="list-style-type: none"> - (a) import in Audacity → apply Change Tempo/Change Speed/Reverb/Reverse/Repeat/Sliding Time Scale/Pitch Shift on some parts, or - (b) analyse in SPEAR → Select Partial Below Duration 1" → export into two different files (short and long waves) → import in Audacity as two Mono tracks (R & L) → apply Amplify/Wah-Wah/Reverse/Reverb/Click Remover/Change Speed/Change Tempo/Change Pitch. - Incorporate other samples of percussion → import in Audacity or analyse in SPEAR (any selections by rule).
Yellow line (Shrieking/Moaning)	<ul style="list-style-type: none"> - Recordings (fieldwork) of male and female voices → import in Audacity → apply Vocal Isolation/ Noise Reduction/Amplify/Change Tempo/Change Pitch/Reverse/Sliding Time Scale/Pitch Shift.

<p>Green line (Strings/Woods)</p>	<ul style="list-style-type: none"> - Define special pitches → in Sibelius assign notes to Strings and Woods (mostly Flute and Clarinet) + VST instruments → export either both instrumental groups (strings and woods) together, or individually → then import either - (a) in Spear → Select Partial Below Duration + Select Partial Below Threshold + Select Harmonics → export as individual Mono file for each type of selection → import in Audacity → apply Slide Time Scale/Pitch Shift/Change Tempo/Change Pitch, or - (b) import in Audacity as individual tracks → apply manipulations/effects/filters, etc.
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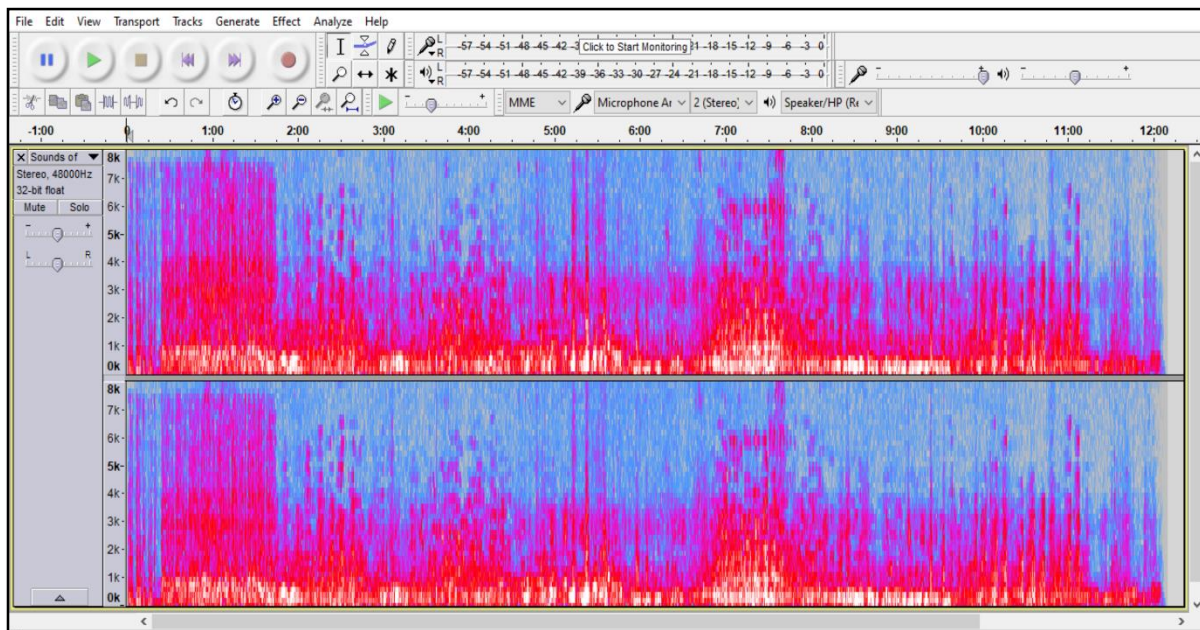
4.3.4: SOUNDS OF SUFFERING, NO. 4: LAMENTED IN AN ELEGY

4.3.4.1: Sounds of Suffering, No. 4, view from Audacity:

WAVEFORM

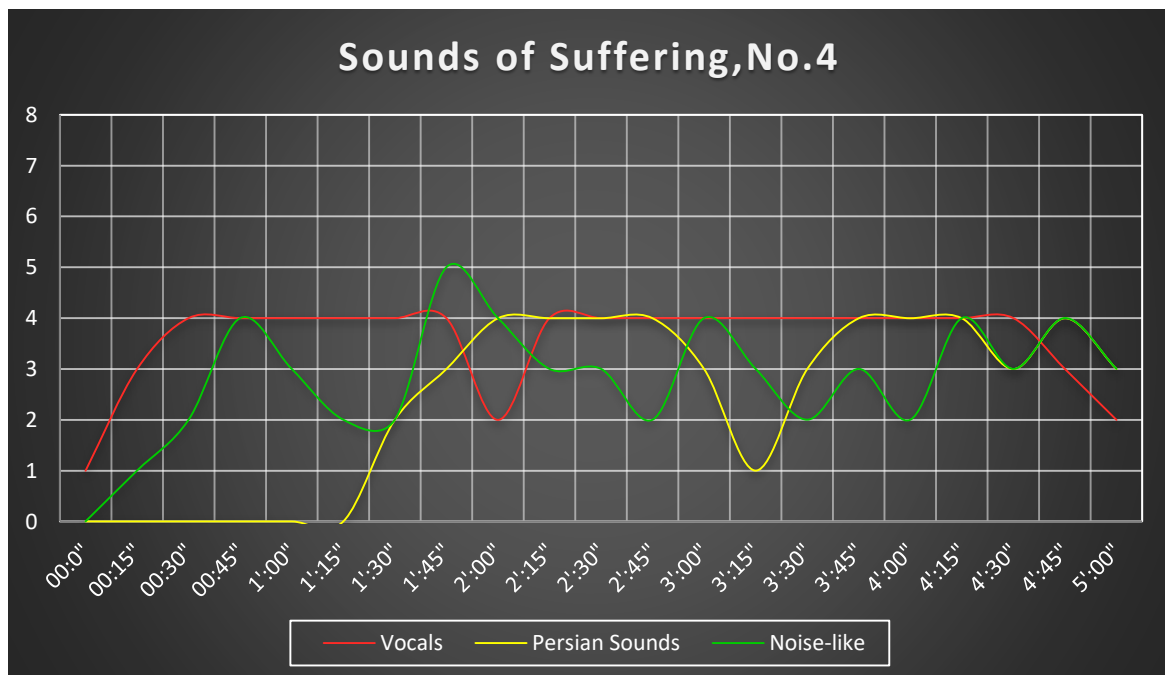


SPECTROGRAM

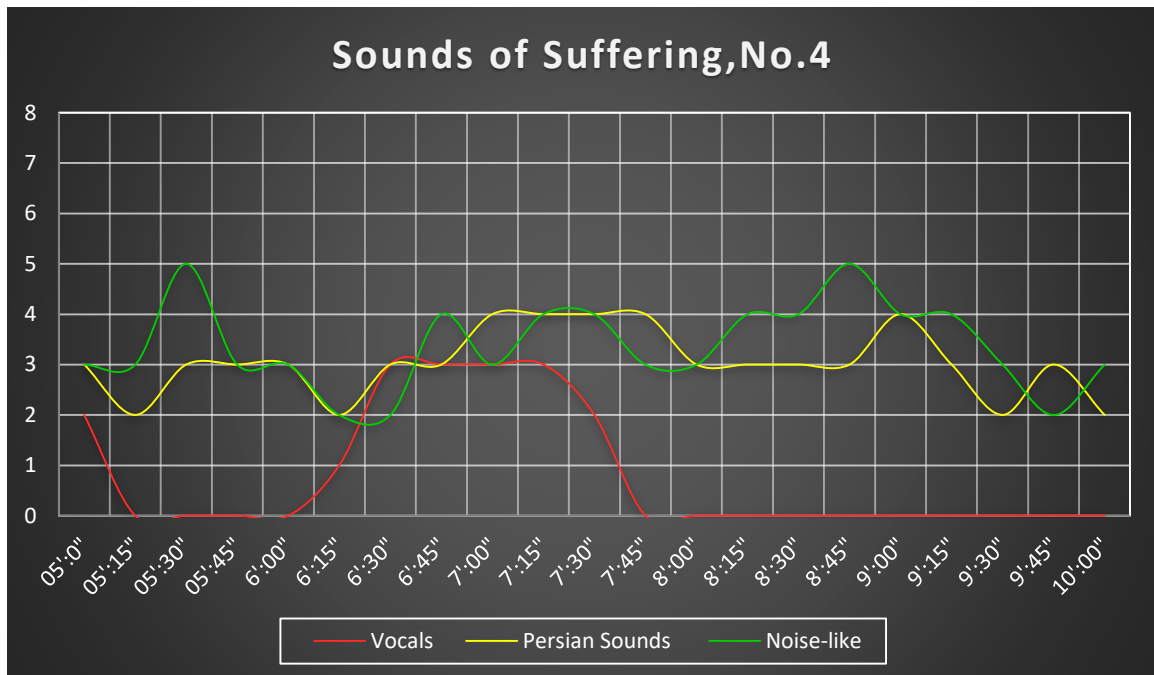


The three major sound groups of this piece are: Vocals, Persian sounds and Noise-like.

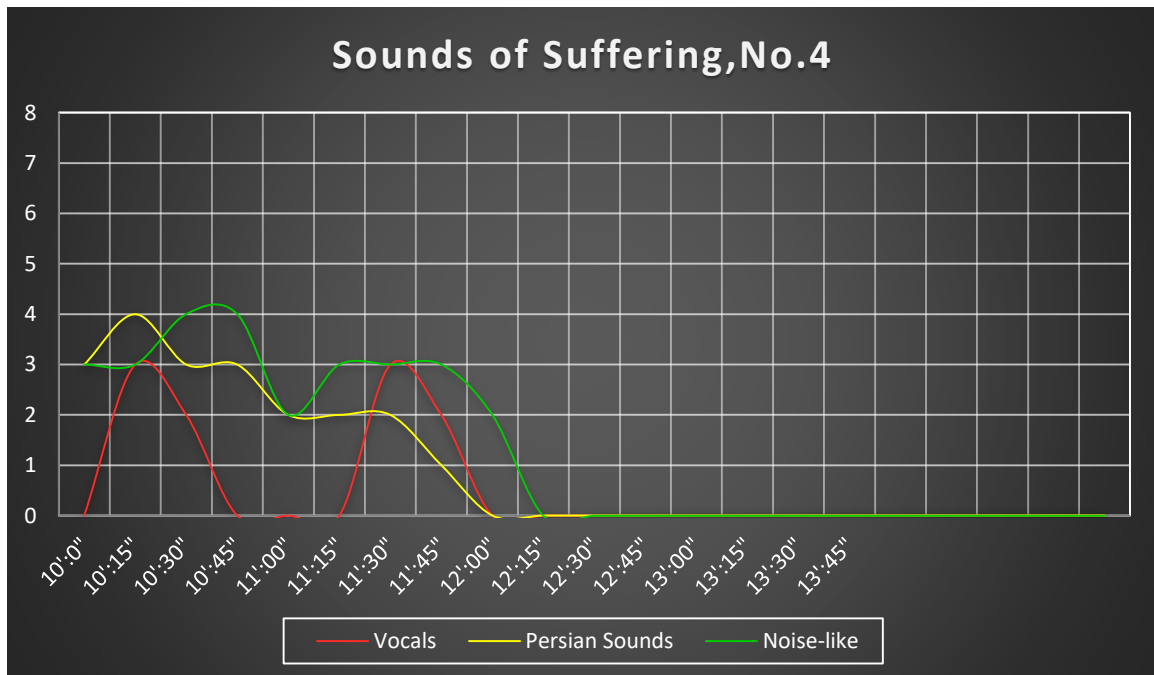
4.3.4.2: Sounds of Suffering, No. 4, ‘Dynamic contours: their bases and apices over time’, [0’:00” – 05’:00”]:



4.3.4.3: Sounds of Suffering, No. 4, ‘Dynamic contours: their bases and apexes over time’, [05:00” – 10:00”]:



4.3.4.4: Sounds of Suffering, No.4, ‘Dynamic contours: their bases and apexes over time’, [10:00” – 12:10”]:



4.3.4.5: Sounds of Suffering, No. 4: Sound Materials and Production

SOUND GROUPS	SOUND MATERIALS AND PRODUCTION				
Red line (Vocals)	<p data-bbox="635 353 1326 427">- [0':00" – 01':45"]: <i>Hassle-free Dead</i>, poem and voice by Hossein Panahi.</p> <table border="1" data-bbox="651 450 1337 1032"> <thead> <tr> <th data-bbox="657 459 1038 562">English⁵⁵</th> <th data-bbox="1038 459 1331 562">فارسی Persian</th> </tr> </thead> <tbody> <tr> <td data-bbox="657 562 1038 1023"> <p data-bbox="657 577 1038 613"><i>Hassle-free dead</i>⁵⁶</p> <p data-bbox="657 622 1038 689">Those who have died are such hassle-free visitors,</p> <p data-bbox="657 698 1038 766">Neither do they make any dish dirty with their hands,</p> <p data-bbox="657 775 1038 875">Nor do they cause a heartbreak with their words,</p> <p data-bbox="657 884 1038 981">They are content, only with a candle and a bit of silence.</p> </td> <td data-bbox="1038 562 1331 1023"> <p data-bbox="1038 577 1331 613">"مردگان بی دردسر"</p> <p data-bbox="1038 622 1331 689">چه میهمانان بی دردسری هستند</p> <p data-bbox="1038 698 1331 766">مردگان</p> <p data-bbox="1038 775 1331 875">نه به دستی ظرفی را چرک میکنند</p> <p data-bbox="1038 884 1331 981">نه به حرفی دلی را آلوده تنها به شمعی قانع اند و... اندکی سکوت</p> </td> </tr> </tbody> </table> <p data-bbox="635 1099 1326 1173">- [01':50" – 05':10"] sounds of prayers in Farsi, from recordings (fieldwork) at the graveyard.</p> <p data-bbox="635 1196 1326 1323">- [06':15" – 07': 45"] sounds of prayers in Arabic, reading from Quran. From the recordings (fieldwork), at the graveyard.</p> <p data-bbox="635 1346 1326 1518">- [10':00" – 10':35"] sounds of crying and wailing + a mother singing a lullaby for her dead son. From the recordings (fieldwork), at the graveyard, family and relatives visiting the grave.</p> <p data-bbox="635 1541 1326 1615">- [11':30" – 12':10"] repeat of the previous sound [10':00" – 10':35"].</p> <p data-bbox="635 1637 1326 1711">- All of aforementioned entrances → in Audacity → apply Amplify/Vocal Isolation/ Noise Reduction.</p>	English ⁵⁵	فارسی Persian	<p data-bbox="657 577 1038 613"><i>Hassle-free dead</i>⁵⁶</p> <p data-bbox="657 622 1038 689">Those who have died are such hassle-free visitors,</p> <p data-bbox="657 698 1038 766">Neither do they make any dish dirty with their hands,</p> <p data-bbox="657 775 1038 875">Nor do they cause a heartbreak with their words,</p> <p data-bbox="657 884 1038 981">They are content, only with a candle and a bit of silence.</p>	<p data-bbox="1038 577 1331 613">"مردگان بی دردسر"</p> <p data-bbox="1038 622 1331 689">چه میهمانان بی دردسری هستند</p> <p data-bbox="1038 698 1331 766">مردگان</p> <p data-bbox="1038 775 1331 875">نه به دستی ظرفی را چرک میکنند</p> <p data-bbox="1038 884 1331 981">نه به حرفی دلی را آلوده تنها به شمعی قانع اند و... اندکی سکوت</p>
English ⁵⁵	فارسی Persian				
<p data-bbox="657 577 1038 613"><i>Hassle-free dead</i>⁵⁶</p> <p data-bbox="657 622 1038 689">Those who have died are such hassle-free visitors,</p> <p data-bbox="657 698 1038 766">Neither do they make any dish dirty with their hands,</p> <p data-bbox="657 775 1038 875">Nor do they cause a heartbreak with their words,</p> <p data-bbox="657 884 1038 981">They are content, only with a candle and a bit of silence.</p>	<p data-bbox="1038 577 1331 613">"مردگان بی دردسر"</p> <p data-bbox="1038 622 1331 689">چه میهمانان بی دردسری هستند</p> <p data-bbox="1038 698 1331 766">مردگان</p> <p data-bbox="1038 775 1331 875">نه به دستی ظرفی را چرک میکنند</p> <p data-bbox="1038 884 1331 981">نه به حرفی دلی را آلوده تنها به شمعی قانع اند و... اندکی سکوت</p>				

⁵⁵ My own translation.

⁵⁶ Persian: (مردگان بی دردسر), Here "dead" (noun) refers to those who have died (plural).

<p>Yellow line (Persian Sounds)</p>	<p>Origin of sound recording: Improvisation in “Dastgâh” (Persian Music System), performed by “Kamâncheh” (string) and “Ney” (woodwind).</p> <ul style="list-style-type: none"> - In SPEAR → Select Partial Below Duration 1” (separate short waves from long waves) → two individual files exported → Short durations later made part of the noise in audacity (Green line). Long durations, again, went through selections in SPEAR → Select Partial Below Threshold (separate high from the low registers) → export two files (a) long duration/high register (b) long duration/low register → import in Audacity as individual tracks → apply Amplify/ Reverb/ Change Tempo/ Slide Time Scale/ Low-Pass Filter/ High-Pass Filter/ Noise Reduction. - In SPEAR → select only Kamâncheh’s waves → Select Complete Partial → export as individual file (only Kamâncheh)⁵⁷ → import in Audacity → manipulations. - In SPEAR → select only Ney’s waves → Select Complete Partial → export as individual file (only Ney)⁵⁸ → import in Audacity → manipulations.
<p>Green line (Noise-like)</p>	<p>Origin of sound recording: Improvisation in “Dastgâh” (Persian Music System), performed by “Kamâncheh” (string) and “Ney” (woodwind).</p> <ul style="list-style-type: none"> - In SPEAR → Select Partial Below Duration 1” → separate short waves from long waves → two individual files exported → Short durations made part of the noise in Audacity (Green line). - Define specific pitches → Generate Tone in Audacity (mostly high register) → copied and pasted at different times → apply Amplify/Slide Time Scale/Pitch Shift/Wah-Wah/Change Pitch/Change Tempo. - Recordings (fieldwork) → in SPEAR → Select Partial Below Threshold (separate high and low registers) →

⁵⁷ The export file will still have a touch of other sounds, i.e. Ney, which gives it a unique timbre (it includes the air quality of the sound of Ney).

⁵⁸ The export file will still have a touch of other sounds, i.e. Kamâncheh, which gives it a unique timbre.

	<p>Select Harmonics → delete harmonics of waves (changes the quality of the timbre and makes it electronic sound-like)</p> <ul style="list-style-type: none"> - Air quality of Ney's sound → in SPEAR → select the long waves of Ney → Select Harmonics → delete the fundamental waves (frequencies) → export only the harmonics as separate file → import in Audacity → manipulations. - Recordings (fieldwork) → import in Audacity → apply Vocal Reduction/Vocal Remover (leaves out the ambient) → export → import in SPEAR → Select Partials Below Duration + Select Partials Below Threshold → export separately → import in Audacity → manipulations. - Generate Noise in Audacity → manipulations.
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Since this dissertation is a contribution to the field of research-based practice, the composition *Sounds of Suffering, No. 1-4* should be considered as the most important outcome of this research project. Therefore, instead of a conclusion at the end of a conventional dissertation, this work serves as the conclusion to the present dissertation. It can be accessed in the sound files that accompany this dissertation in the document repository of Stellenbosch University (SunScholar).

APPENDIX A



UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

APPROVAL NOTICE Response to deferral

14 July 2017

Project number: SU-HSD-003944

Project title: The expression of human suffering and emotional pain in contemporary musical composition

Dear Nina Ghayem

Your response to deferral received on 15 June 2017 was reviewed by the REC: Humanities and has been approved.

Ethics approval period: 29 June 2017 – 28 June 2018

Members in attendance:

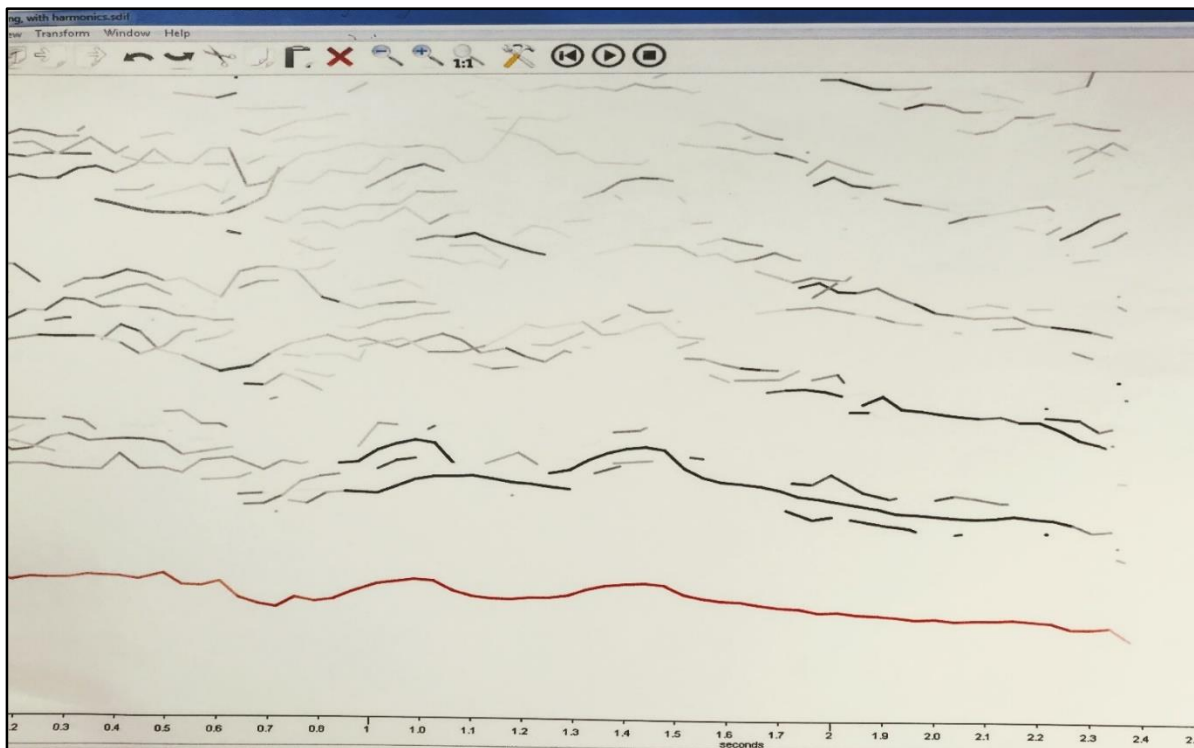
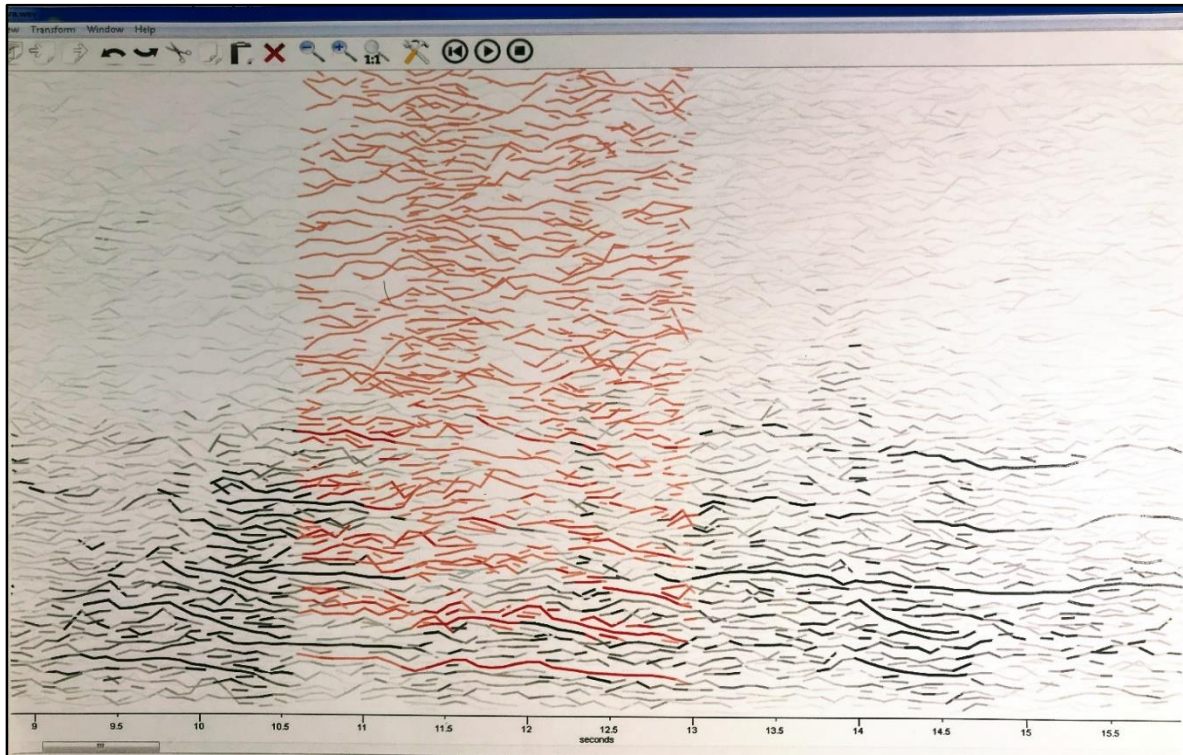
Mrs A. Brand
Dr A. Lesch
Mr. T. Mariri
Dr T. Nell
Mr. T. Erasmus
Dr S. Van Schalkwyk
Dr H. Prozesky
Prof D. Rawlings
Mr. J. Toi
Dr K. Welman
Dr. K.I. Thelatsane
Ms. A. Bijloos
Dr N. Harriman
Mrs M. Fouché
Mr A. Williams
Ms C. Graham

Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

*National Health Research Ethics Committee (NHREC) registration number: REC-050411-032.
The Research Ethics Committee: Humanities complies with the SA National Health Act No.61 2003 as it pertains to health research. In addition, this committee abides by the ethical norms and principles for research established by the Declaration of Helsinki (2013) and the Department of Health Guidelines for Ethical Research: Principles Structures and Processes (2nd Ed.) 2015. Annually a number of projects may be selected randomly for an external audit.*

APPENDIX B

TABLE.B-1: MALE, LONGEST WAVE



POINTS	TIME (Sec.)	FREQUENCY (Hz.)	KEY-NUMBER	NOTE
1.	0.025	312.674	63.086	Eb4
2.	0.037	328.823	63.958	E4
3.	0.050	327.792	63.903	E4
4.	0.088	316.797	63.313	Eb4
5.	0.100	316.110	63.275	Eb4
6.	0.138	305.114	62.662	Eb4
7.	0.162	289.309	61.741	D4
8.	0.175	291.371	61.864	D4
9.	0.187	293.776	62.007	D4
10.	0.200	294.119	62.027	D4
11.	0.213	296.181	62.148	D4
12.	0.224	299.961	62.367	D4
13.	0.237	301.335	62.446	D4
14.	0.250	299.617	62.347	D4
15.	0.263	297.212	62.208	D4
16.	0.275	296.868	62.188	D4
17.	0.287	297.555	62.228	D4
18.	0.300	298.586	62.288	D4
19.	0.312	306.489	62.740	Eb4
20.	0.325	308.550	62.856	Eb4
21.	0.337	304.427	62.623	Eb4
22.	0.350	290.683	61.823	D4
23.	0.362	284.499	61.451	C#4
24.	0.400	301.678	62.466	D4

25.	0.413	299.961	62.367	D4
26.	0.425	292.401	61.925	D4
27.	0.437	294.463	62.047	D4
28.	0.450	295.494	62.107	D4
29.	0.463	293.776	62.007	D4
30.	0.487	307.863	62.817	Eb4
31.	0.500	305.458	62.682	Eb4
32.	0.512	286.904	61.597	D4
33.	0.525	283.124	61.367	C#4
34.	0.538	2883.811	61.407	C#4
35.	0.551	283.124	61.367	C#4
36.	0.563	282.437	61.325	C#4
37.	0.575	283.124	61.367	C#4
38.	0.587	286.217	61.555	D4
39.	0.600	292.401	61.925	D4
40.	0.613	296.868	62.188	D4
41.	0.625	275.221	60.877	C#4
42.	0.637	256.667	59.669	C4
43.	0.650	245.672	58.911	B3
44.	0.662	245.329	58.887	B3
45.	0.675	243.954	58.789	B3
46.	0.688	242.236	58.667	B3
47.	0.700	283.800	58.420	Bb3
48.	0.712	237.082	58.295	Bb3
49.	0.725	246.703	58.983	B3
50.	0.738	257.506	59.725	C4

51.	0.750	259.265	59.843	C4
52.	0.763	259.485	59.858	C4
53.	0.775	256.406	59.651	C4
54.	0.788	250.029	59.215	B3
55.	0.800	247.170	59.016	B3
56.	0.813	252.228	59.367	B3
57.	0.825	255.527	59.592	C4
58.	0.838	260.716	59.940	C4
59.	0.850	267.929	60.412	C4
60.	0.862	271.905	60.667	C#4
61.	0.875	274.297	60.819	C#4
62.	0.888	277.534	61.022	C#4
63.	0.913	289.779	61.769	D4
64.	0.925	293.156	61.970	D4
65.	0.937	295.127	62.086	D4
66.	0.950	295.689	62.119	D4
67.	0.962	296.112	62.144	D4
68.	0.975	297.660	62.234	D4
69.	0.988	299.489	62.340	D4
70.	1.000	300.193	62.381	D4
71.	1.012	299.208	62.324	D4
72.	1.025	296.112	62.144	D4
73.	1.037	290.201	61.795	D4
74.	1.050	283.305	61.378	C#4
75.	1.062	276.127	60.934	C#4
76.	1.075	270.638	60.586	C#4

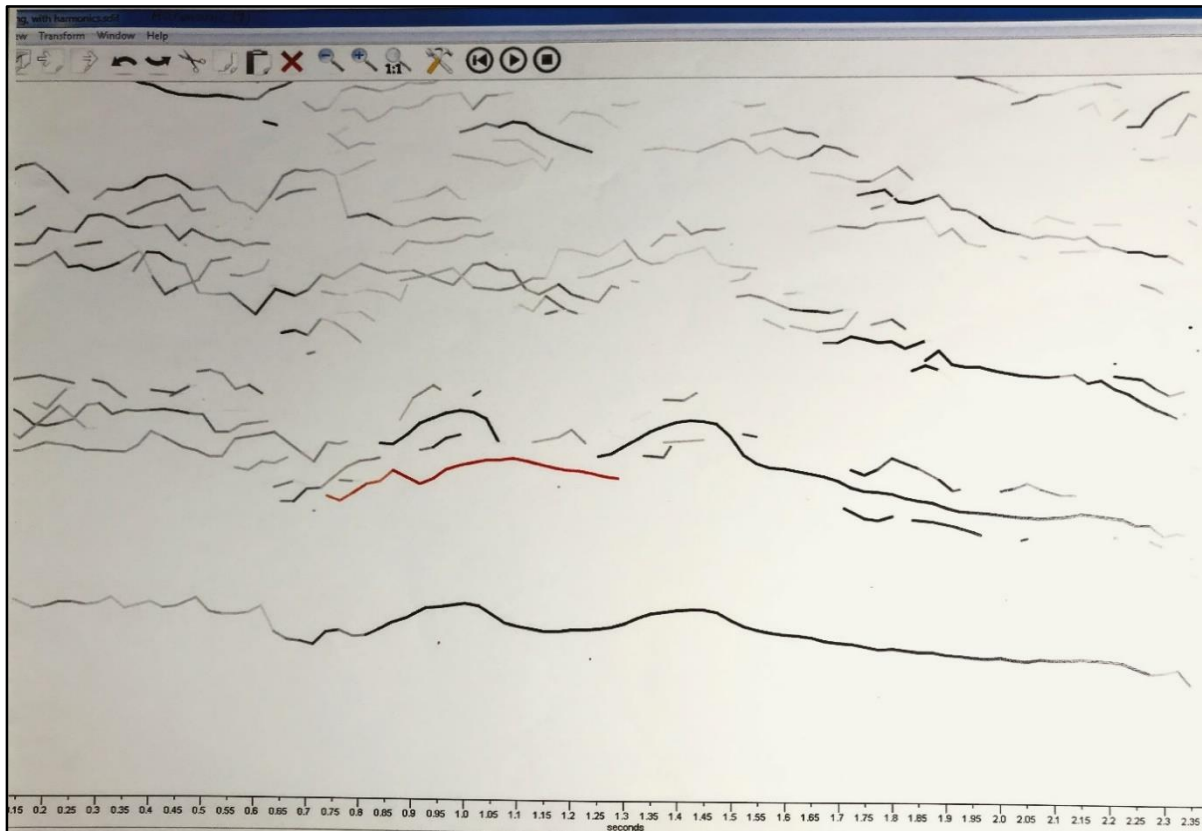
77.	1.088	266.838	60.342	C4
78.	1.100	264.586	60.195	C4
79.	1.113	262.898	60.084	C4
80.	1.125	261.350	59.982	C4
81.	1.138	259.520	59.860	C4
82.	1.150	257.550	59.728	C4
83.	1.163	256.424	59.652	C4
84.	1.175	256.846	59.681	C4
85.	1.188	258.253	59.775	C4
86.	1.200	259.942	59.888	C4
87.	1.213	260.224	59.907	C4
88.	1.225	259.520	59.860	C4
89.	1.237	259.379	59.851	C4
90.	1.250	260.927	59.954	C4
91.	1.262	262.335	60.047	C4
92.	1.275	263.742	60.139	C4
93.	1.288	265.712	60.268	C4
94.	1.300	269.231	60.496	C4
95.	1.313	273.171	60.748	C#4
96.	1.325	277.816	61.040	C#4
97.	1.338	282.038	61.301	C#4
98.	1.350	284.430	61.447	C#4
99.	1.363	286.119	61.549	D4
100.	1.375	287.386	61.626	D4
101.	1.388	288.793	61.710	D4
102.	1.400	289.779	61.769	D4

103.	1.413	290.764	61.828	D4
104.	1.425	291.327	61.862	D4
105.	1.437	291.327	61.862	D4
106.	1.450	290.904	61.836	D4
107.	1.462	289.779	61.769	D4
108.	1.475	287.808	61.651	D4
109.	1.487	284.149	61.4630	C#4
110.	1.500	275.142	60.872	C#4
111.	1.513	268.949	60.478	C4
112.	1.525	265.712	60.268	C4
113.	1.538	263.320	60.112	C4
114.	1.550	261.068	59.963	C4
115.	1.563	259.098	59.832	C4
116.	1.575	257.409	59.719	C4
117.	1.588	255.861	59.614	C4
118.	1.600	254.453	59.519	C4
119.	1.612	253.890	59.480	B3
120.	1.625	253.609	59.461	B3
121.	1.637	252.483	59.384	B3
122.	1.650	250.513	59.249	B3
123.	1.662	247.557	50.043	B3
124.	1.675	245.305	58.883	B3
125.	1.688	244.039	58.795	B3
126.	1.700	243.054	58.725	B3
127.	1.712	241.928	58.645	B3
128.	1.725	241.224	58.594	B3

129.	1.737	240.520	58.544	B3
130.	1.750	237.846	58.350	Bb3
131.	1.762	234.891	58.134	Bb3
132.	1.775	233.483	58.030	Bb3
133.	1.787	233.765	58.051	Bb3
134.	1.800	235.032	58.144	Bb3
135.	1.812	235.032	58.144	Bb3
136.	1.825	232.498	57.957	Bb3
137.	1.837	230.247	57.788	Bb3
138.	1.850	229.824	57.756	Bb3
139.	1.862	229.965	57.767	Bb3
140.	1.875	229.261	57.714	Bb3
141.	1.887	227.995	57.618	Bb3
142.	1.900	225.884	57.457	A3
143.	1.913	224.758	57.370	A3
144.	1.925	224.336	57.338	A3
145.	1.938	223.491	57.273	A3
146.	1.949	221.380	57.108	A3
147.	1.963	220.254	57.020	A3
148.	1.975	220.395	57.031	A3
149.	1.988	221.521	57.119	A3
150.	2.000	221.239	57.097	A3
151.	2.012	219.269	56.942	A3
152.	2.025	217.721	56.820	A3
153.	2.037	216.314	56.707	A3
154.	2.050	216.032	56.685	A3

155.	2.063	217.158	56.775	A3
156.	2.075	218.565	56.887	A3
157.	2.087	219.269	56.942	A3
158.	2.100	218.002	56.842	A3
159.	2.112	217.439	56.797	A3
160.	2.125	217.862	56.831	A3
161.	2.138	218.847	56.909	A3
162.	2.150	218.847	56.909	A3
163.	2.162	217.862	56.831	A3
164.	2.175	216.876	56.752	A3
165.	2.187	216.454	56.719	A3
166.	2.200	216.454	56.719	A3
167.	2.212	218.610	56.651	A3
168.	2.225	212.936	56.435	G#3
169.	2.238	210.262	56.216	G#3
170.	2.250	205.336	55.806	G#3

TABLE.B-2: MALE, HARMONIC 1

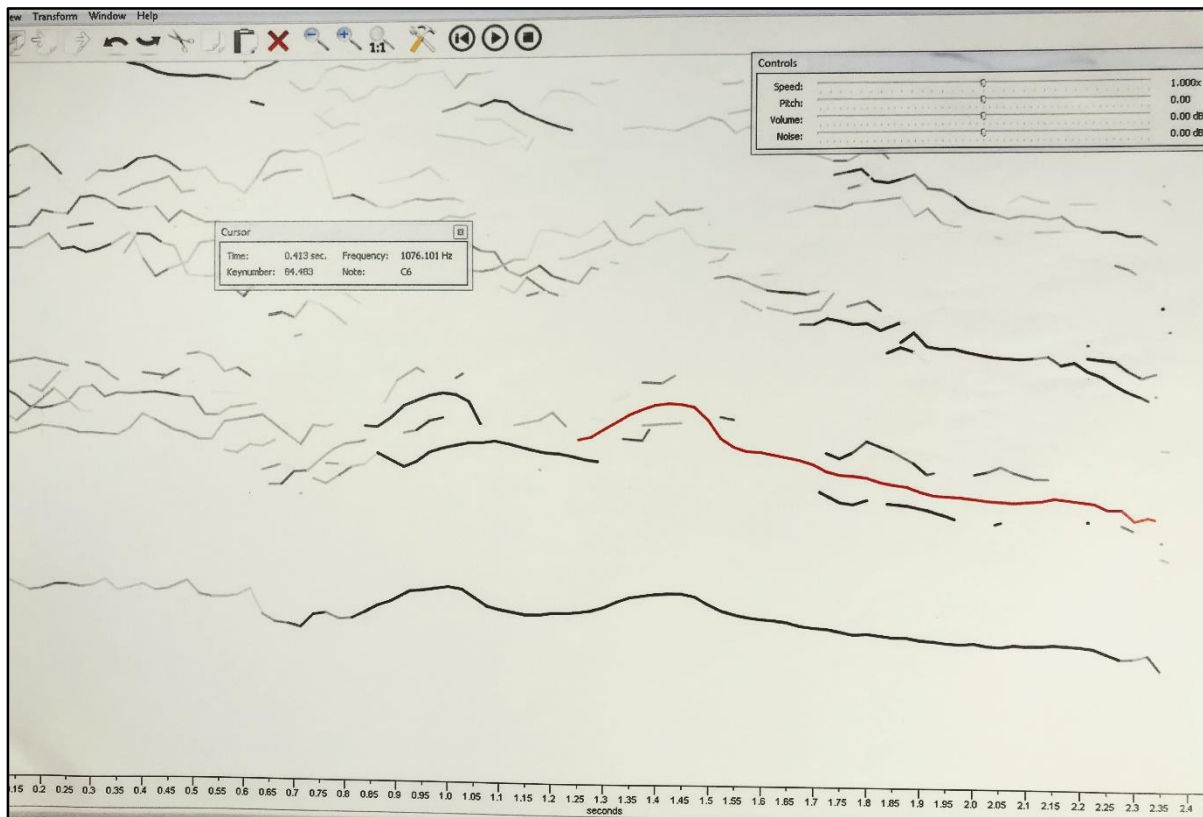


POINTS	TIME (Sec.)	FREQUENCY (Hz.)	KEY-NUMBER	NOTE
1.	0.737	466.967	70.030	Bb4
2.	0.750	461.197	69.815	Bb4
3.	0.762	458.523	69.714	Bb4
4.	0.775	462.604	69.867	Bb4
5.	0.787	472.315	70.227	Bb4
6.	0.800	485.967	70.720	B4
7.	0.813	484.418	70.665	B4
8.	0.825	483.715	70.640	B4
9.	0.838	489.203	70.835	B4
10.	0.850	488.218	70.800	B4

11.	0.862	505.529	71.403	B4
12.	0.900	478.648	70.458	Bb4
13.	0.913	485.122	70.690	B4
14.	0.925	489.344	70.840	B4
15.	0.937	493.003	70.969	B4
16.	0.950	499.900	71.210	B4
17.	0.963	507.077	71.456	B4
18.	0.975	512.144	71.629	C5
19.	1.000	515.803	71.752	C5
20.	1.012	518.336	71.837	C5
21.	1.025	520.588	71.912	C5
22.	1.037	521.714	71.949	C5
23.	1.050	520.869	71.921	C5
24.	1.062	521.292	71.935	C5
25.	1.075	522.980	71.991	C5
26.	1.087	523.684	72.014	C5
27.	1.100	522.418	71.972	C5
28.	1.113	520.869	71.921	C5
29.	1.125	518.477	71.841	C5
30.	1.137	515.381	71.738	C5
31.	1.150	512.284	71.633	C5
32.	1.162	509.751	71.547	C5
33.	1.175	507.359	71.466	B4
34.	1.188	505.811	71.413	B4
35.	1.200	505.248	71.394	B4
36.	1.212	505.107	71.389	B4

37.	1.225	503.840	71.346	B4
38.	1.237	500.744	71.239	B4
39.	1.250	497.929	71.141	B4
40.	1.263	496.100	71.078	B4
41.	1.275	494.552	71.023	B4
42.	1.287	493.003	70.969	B4

TABLE.B-3: MALE, HARMONIC 2



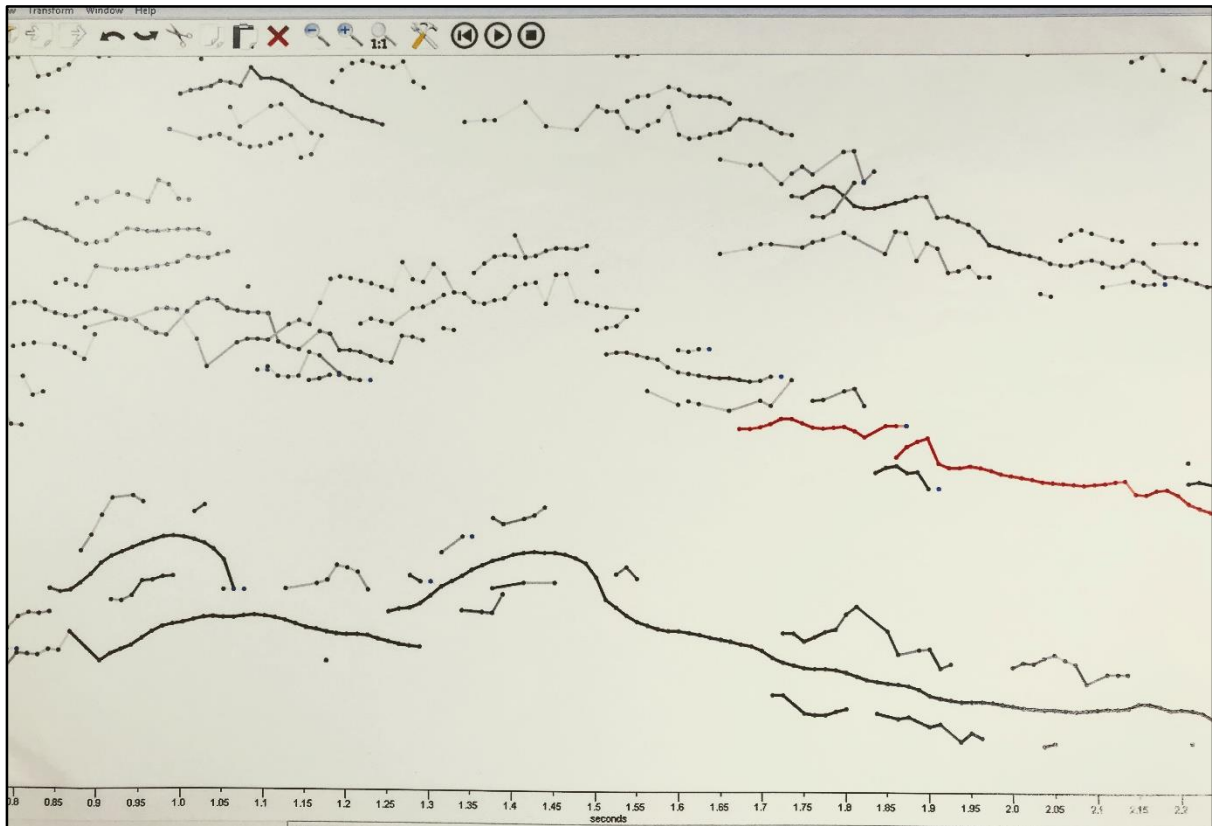
POINTS	TIME (Sec.)	FREQUENCY (Hz.)	KEY-NUMBER	NOTE
1.	1.250	527.062	72.126	C5
2.	1.262	529.032	72.190	C5
3.	1.275	530.299	72.232	C5
4.	1.288	534.662	72.373	C5
5.	1.300	542.261	72.618	C#5
6.	1.312	550.283	72.872	C#5
7.	1.325	555.069	73.022	C#5
8.	1.338	560.839	73.201	C#5
9.	1.350	566.468	73.374	C#5
10.	1.363	570.972	73.511	D5

11.	1.375	574.772	73.626	D5
12.	1.387	577.727	73.715	D5
13.	1.400	579.979	73.782	D5
14.	1.412	582.231	73.849	D5
15.	1.425	582.653	73.862	D5
16.	1.437	582.512	73.857	D5
17.	1.450	581.949	73.841	D5
18.	1.462	580.260	73.790	D5
19.	1.475	577.164	73.693	D5
20.	1.487	572.520	73.558	D5
21.	1.500	558.587	73.131	C#5
22.	1.512	537.476	72.464	C5
23.	1.525	530.158	72.227	C5
24.	1.537	522.558	71.977	C5
25.	1.550	517.210	71.799	C5
26.	1.562	513.557	71.676	C5
27.	1.575	510.173	71.562	C5
28.	1.588	508.907	71.519	C5
29.	1.600	507.921	71.485	B4
30.	1.612	507.077	71.456	B4
31.	1.625	504.966	71.384	B4
32.	1.637	502.433	71.297	B4
33.	1.650	500.462	71.229	B4
34.	1.662	499.196	71.185	B4
35.	1.675	497.085	71.112	B4
36.	1.687	494.692	71.028	B4

37.	1.700	490.892	70.895	B4
38.	1.712	484.278	70.660	B4
39.	1.725	480.196	70.513	B4
40.	1.738	477.663	70.422	Bb4
41.	1.750	474.707	70.314	Bb4
42.	1.763	474.004	70.289	Bb4
43.	1.775	473.722	70.278	Bb4
44.	1.788	473.159	70.258	Bb4
45.	1.800	470.908	70.175	Bb4
46.	1.813	466.826	70.025	Bb4
47.	1.825	464.434	69.936	Bb4
48.	1.837	462.604	69.867	Bb4
49.	1.850	460.774	69.799	Bb4
50.	1.863	459.508	69.751	Bb4
51.	1.875	457.819	69.687	Bb4
52.	1.887	454.019	69.543	Bb4
53.	1.900	449.234	69.360	A4
54.	1.912	446.560	69.256	A4
55.	1.925	444.308	69.169	A4
56.	1.937	443.182	69.125	A4
57.	1.949	443.323	69.130	A4
58.	1.963	443.182	69.125	A4
59.	1.975	442.197	69.086	A4
60.	1.988	440.930	69.037	A4
61.	2.000	438.960	68.959	A4
62.	2.013	436.990	68.881	A4

63.	2.025	436.005	68.842	A4
64.	2.037	435.582	68.825	A4
65.	2.050	435.301	68.814	A4
66.	2.063	434.457	68.781	A4
67.	2.075	433.612	68.747	A4
68.	2.087	433.894	68.758	A4
69.	2.100	435.442	68.820	A4
70.	2.113	436.145	68.848	A4
71.	2.124	436.145	68.848	A4
72.	2.138	437.131	68.887	A4
73.	2.150	441.212	69.048	A4
74.	2.163	441.775	69.070	A4
75.	2.175	438.397	68.937	A4
76.	2.188	435.582	68.825	A4
77.	2.200	435.723	68.831	A4
78.	2.213	435.582	68.825	A4
79.	2.225	432.486	68.702	A4
80.	2.238	427.138	68.486	G#4
81.	2.250	423.057	68.320	G#4
82.	2.263	422.072	68.280	G#4
83.	2.275	423.901	68.355	G#4
84.	2.288	422.072	68.280	G#4
85.	2.300	406.028	67.609	G#4
86.	2.312	411.939	67.859	G#4
87.	2.325	411.516	67.841	G#4
88.	2.337	409.265	67.746	G#4

TABLE.B-4: MALE, HARMONIC 3

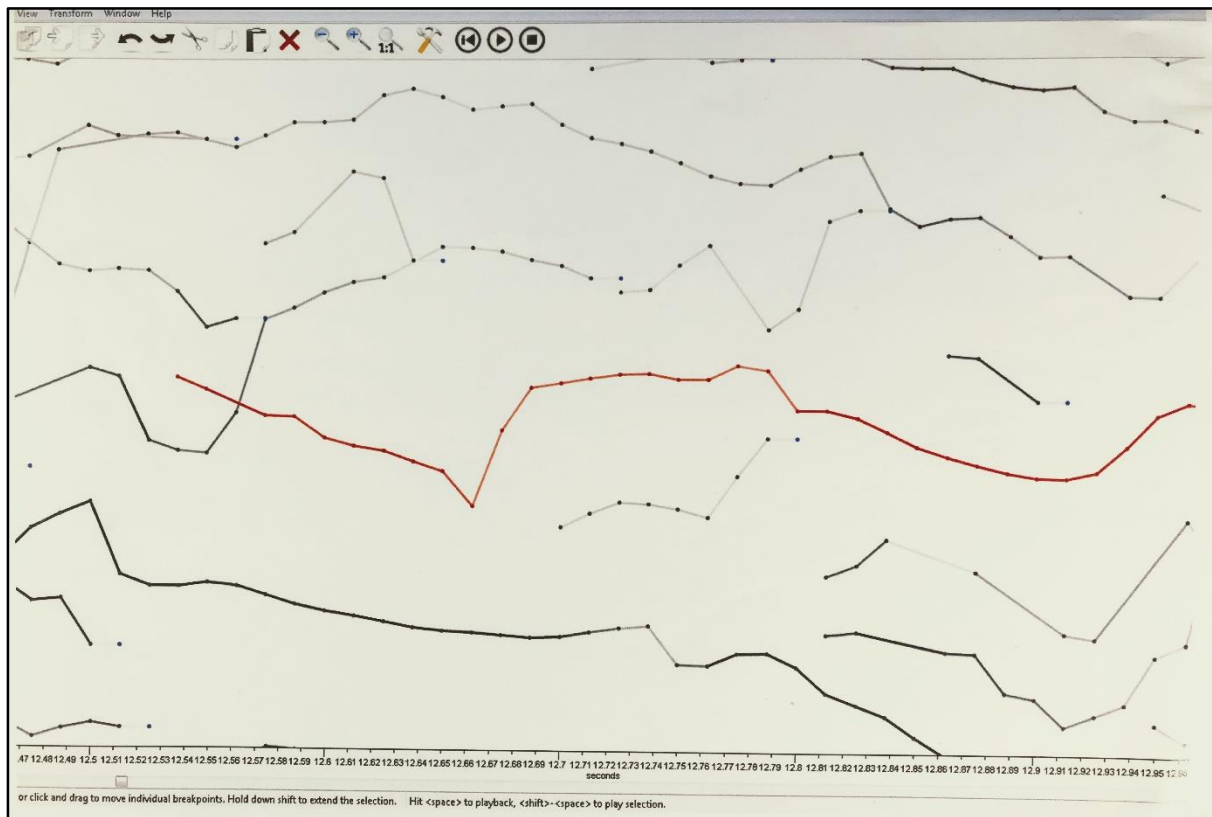


POINTS	TIME (Sec.)	FREQUENCY (Hz.)	KEY-NUMBER	NOTE
1.	1.675	703.265	77.119	F5
2.	1.687	703.265	77.119	F5
3.	1.700	704.532	77.150	F5
4.	1.712	708.332	77.243	F5
5.	1.725	713.257	77.363	F5
6.	1.737	713.539	77.370	F5
7.	1.750	708.895	77.257	F5
8.	1.763	704.391	77.146	F5
9.	1.775	703.406	77.122	F5
10.	1.788	704.954	77.160	F5

11.	1.800	705.235	77.167	F5
12.	1.813	701.295	77.070	F5
13.	1.825	695.102	76.917	F5
14.	1.850	706.784	77.205	F5
15.	1.862	706.784	77.205	F5
16.	1.863	675.962	76.433	E5
17.	1.875	685.673	76.680	F5
18.	1.888	691.021	76.815	F5
19.	1.900	694.821	76.910	F5
20.	1.913	670.192	76.285	E5
21.	1.925	666.533	76.190	E5
22.	1.937	666.251	76.183	E5
23.	1.950	667.518	76.216	E5
24.	1.963	666.533	76.190	E5
25.	1.975	663.436	76.109	E5
26.	1.988	660.340	76.028	E5
27.	2.000	658.229	75.973	E5
28.	2.012	656.822	75.936	E5
29.	2.025	654.851	75.884	E5
30.	2.038	652.881	75.832	E5
31.	2.050	651.896	75.806	E5
32.	2.062	651.333	75.791	E5
33.	2.075	650.348	75.764	E5
34.	2.088	649.644	75.746	E5
35.	2.100	649.926	75.753	E5
36.	2.212	651.333	75.791	E5

37.	2.125	652.740	75.828	E5
38.	2.137	653.725	75.854	E5
39.	2.148	640.215	75.493	Eb3
40.	2.162	640.215	75.493	Eb3
41.	2.175	644.718	75.614	E5
42.	2.188	644.155	75.599	E5
43.	2.200	639.933	75.485	Eb5
44.	2.212	631.489	75.255	Eb5
45.	2.225	627.548	75.147	Eb5
46.	2.237	623.608	75.038	Eb5
47.	2.250	616.993	74.853	Eb5
48.	2.263	610.660	74.674	Eb5
49.	2.275	603.341	74.466	D5
50.	2.287	600.104	74.373	D5
51.	2.300	597.853	74.307	D5
52.	2.312	592.645	74.156	D5
53.	2.325	587.438	74.003	D5

TABLE.B-5: FEMALE, LONGEST WAVE



POINTS	TIME (Sec.)	FREQUENCY (Hz.)	KEY-NUMBER	NOTE
1.	12.537	737.419	77.940	F#5
2.	12.550	733.366	77.844	F#5
3.	12.575	724.539	77.635	F#5
4.	12.587	724.179	77.626	F#5
5.	12.600	717.153	77.457	F5
6.	12.613	714.541	77.394	F5
7.	12.625	712.650	77.348	F5
8.	12.638	709.227	77.265	F5
9.	12.650	705.804	77.181	F5
10.	12.662	694.185	76.894	F5

11.	12.675	720.036	77.527	F#5
12.	12.687	734.447	77.870	F#5
13.	12.700	736.158	77.910	F#5
14.	12.713	737.870	77.950	F#5
15.	12.725	739.221	77.982	F#5
16.	12.738	739.311	77.984	F#5
17.	12.750	737.509	77.942	F#5
18.	12.763	737.509	77.942	F#5
19.	12.775	742.373	78.056	F#5
20.	12.788	740.392	78.009	F#5
21.	12.800	726.971	77.693	F#5
22.	12.813	727.151	77.697	F#5
23.	12.825	724.539	77.635	F#5
24.	12.838	720.000	77.526	F#5
25.	12.850	715.172	77.409	F5
26.	12.862	711.641	77.324	F5
27.	12.785	708.975	77.259	F5
28.	12.887	705.525	77.199	F5
29.	12.900	704.795	77.156	F5
30.	12.913	704.651	77.153	F5
31.	12.925	706.597	77.201	F5
32.	12.937	715.244	77.411	F5
33.	12.950	725.620	77.661	F#5
34.	12.963	729.799	77.760	F#5
35.	12.975	728.358	77.726	F#5
36.	12.987	724.899	77.643	F#5

37.	13.000	726.052	77.671	F#5
38.	13.012	730.088	77.767	F#5
39.	13.025	729.727	77.758	F#5
40.	13.038	726.617	77.691	F#5
41.	13.050	727.854	77.714	F#5
42.	13.063	731.385	77.798	F#5
43.	13.075	735.996	77.906	F#5
44.	13.087	740.248	78.006	F#5
45.	13.100	744.427	78.104	F#5
46.	13.112	749.399	78.219	F#5
47.	13.125	753.290	78.308	F#5
48.	13.135	755.019	78.348	F#5
49.	13.150	754.011	78.325	F#5
50.	13.162	750.782	78.251	F#5
51.	13.175	748.062	78.188	F#5
52.	13.188	746.816	78.159	F#5
53.	13.200	748.984	78.209	F#5
54.	13.212	754.195	78.329	F#5
55.	13.225	759.083	78.441	F#5
56.	13.237	762.635	78.522	G5
57.	13.250	764.202	78.557	G5
58.	13.263	763.880	78.550	G5
59.	13.275	763.280	78.537	G5
60.	13.287	763.695	78.546	G5
61.	13.300	764.341	78.561	G5
62.	13.312	764.064	78.554	G5

63.	13.325	761.666	78.500	F#5
64.	13.338	758.899	78.437	F#5
65.	13.350	757.977	78.416	F#5
66.	13.362	758.023	78.417	F#5
67.	13.375	758.253	78.422	F#5
68.	13.387	760.006	78.462	F#5
69.	13.400	764.802	78.571	G5
70.	13.413	766.508	78.610	G5
71.	13.425	766.554	78.611	G5
72.	13.438	766.647	78.613	G5
73.	13.450	766.370	78.606	G5
74.	13.462	765.263	78.581	G5
75.	13.475	764.756	78.570	G5
76.	13.488	765.678	78.591	G5
77.	13.500	766.923	78.619	G5
78.	13.513	767.103	78.623	G5
79.	13.525	765.817	78.594	G5
80.	13.538	764.018	78.558	G5
81.	13.550	761.998	78.507	G5
82.	13.563	759.600	78.453	F#5
83.	13.575	756.685	78.386	F#5
84.	13.888	753.365	78.310	F#5
85.	13.600	750.377	78.241	F#5
86.	13.612	748.384	78.195	F#5
87.	13.625	746.872	78.160	F#5
88.	13.637	744.916	78.115	F#5

89.	13.650	742.445	78.057	F#5
90.	13.662	740.268	78.007	F#5
91.	13.675	739.788	78.995	F#5
92.	13.687	741.006	78.024	F#5
93.	13.700	742.740	78.064	F#5
94.	13.712	743.920	78.092	F#5
95.	13.725	745.212	78.122	F#5
96.	13.738	747.351	78.171	F#5
97.	13.750	749.860	78.229	F#5
98.	13.762	752.184	78.283	F#5
99.	13.775	753.513	78.314	F#5
100.	13.788	753.439	78.312	F#5
101.	13.800	751.520	78.263	F#5
102.	13.813	745.949	78.139	F#5
103.	13.825	734.254	77.865	F#5
104.	13.837	719.054	77.503	F#5
105.	13.850	706.695	77.203	F5
106.	13.862	700.718	77.056	F5
107.	13.875	697.102	76.966	F5
108.	13.887	696.365	76.948	F5
109.	13.900	698.062	76.990	F5
110.	13.912	700.976	77.062	F5
111.	13.925	704.038	77.138	F5
112.	13.937	707.101	77.213	F5
113.	13.950	710.532	77.297	F5
114.	13.962	714.073	77.383	F5

115.	13.975	719.275	77.508	F#5
116.	13.988	724.440	77.632	F#5
117.	14.000	726.654	77.685	F#5
118.	14.013	718.390	77.487	F5
119.	14.025	711.343	77.317	F5
120.	14.038	710.163	77.288	F5
121.	14.050	711.195	77.313	F5
122.	14.063	714.147	77.385	F5
123.	14.075	716.545	77.443	F5
124.	14.088	716.951	77.452	F5
125.	14.100	715.660	77.421	F5
126.	14.112	715.512	77.418	F5
127.	14.125	716.139	77.433	F5
128.	14.137	715.180	77.410	F5
129.	14.150	712.118	77.335	F5
130.	14.162	709.904	77.281	F5
131.	14.175	709.056	77.261	F5
132.	14.187	705.957	77.185	F5
133.	14.200	699.685	77.030	F5
134.	14.213	695.590	76.929	F5
135.	14.225	692.417	76.850	F5
136.	14.237	690.203	76.794	F5
137.	14.250	690.462	76.801	F5
138.	14.262	692.897	76.862	F5
139.	14.275	692.048	76.840	F5
140.	14.288	688.654	76.755	F5

141.	14.300	661.869	76.069	E5
142.	14.313	664.710	76.143	E5
143.	14.325	671.093	76.308	E5
144.	14.337	677.291	76.467	E5
145.	14.350	688.469	76.751	F5
146.	14.362	690.425	76.800	F5
147.	14.375	690.277	76.796	F5
148.	14.387	687.732	76.732	F5
149.	14.400	685.518	76.676	F5
150.	14.412	686.625	76.704	F5
151.	14.425	687.953	76.738	F5
152.	14.437	686.662	76.705	F5
153.	14.450	683.710	76.631	F5
154.	14.462	683.378	76.622	F5
155.	14.475	685.112	76.666	F5
156.	14.488	685.887	76.686	F5
157.	14.500	685.038	76.664	F5
158.	14.513	683.673	76.630	F5
159.	14.525	681.497	76.574	F5
160.	14.537	678.029	76.486	E5
161.	14.550	675.040	76.410	E5
162.	14.563	673.970	76.382	E5
163.	14.575	673.712	76.376	E5
164.	14.587	674.376	76.393	E5
165.	14.600	675.667	76.46	E5
166.	14.612	676.663	76.451	E5

167.	14.625	676.221	76.440	E5
168.	14.637	674.376	76.393	E5
169.	14.650	671.277	76.313	E5
170.	14.663	667.993	76.228	E5
171.	14.675	665.669	76.168	E5
172.	14.687	663.603	76.114	E5
173.	14.700	661.205	76.051	E5
174.	14.712	659.619	76.010	E5
175.	14.725	659.139	75.997	E5
176.	14.738	657.922	76.965	E5
177.	14.750	655.523	75.902	E5
178.	14.763	654.048	75.863	E5
179.	14.775	654.122	75.865	E5
180.	14.788	654.380	75.871	E5
181.	14.812	655.007	75.888	E5
182.	14.812	655.007	75.888	E5
183.	14.825	656.815	75.936	E5
184.	14.838	658.327	75.976	E5
185.	14.850	658.106	75.970	E5
186.	14.862	657.110	75.944	E5
187.	14.875	656.925	75.939	E5
188.	14.887	656.741	75.934	E5
189.	14.900	655.966	75.913	E5
190.	14.912	655.265	75.895	E5
191.	14.925	655.671	75.906	E5
192.	14.937	656.630	75.931	E5

193.	14.950	656.852	75.937	E5
194.	14.963	656.741	75.934	E5
195.	14.975	656.889	75.938	E5
196.	14.987	657.147	75.945	E5
197.	15.000	627.258	75.947	E5
198.	15.013	657.479	75.953	E5
199.	15.025	657.995	75.967	E5
200.	15.037	657.958	75.966	E5
201.	15.050	658.032	75.968	E5
202.	15.063	659.213	75.999	E5
203.	15.075	661.611	76.062	E5
204.	15.087	663.640	76.115	E5
205.	15.100	664.673	76.142	E5
206.	15.112	664.599	76.140	E5
207.	15.125	663.345	76.107	E5
208.	15.137	662.201	76.077	E5
209.	15.150	662.349	76.081	E5
210.	15.162	663.492	76.111	E5
211.	15.175	665.190	76.155	E5
212.	15.188	665.854	76.172	E5
213.	15.200	665.411	76.161	E5
214.	15.213	664.083	76.128	E5
215.	15.225	662.865	76.095	E5
216.	15.238	662.755	76.092	E5
217.	15.250	663.935	76.122	E5
218.	15.263	665.927	76.174	E5

219.	15.275	667.772	76.222	E5
220.	15.287	669.691	76.272	E5
221.	15.300	671.978	76.331	E5
222.	15.313	674.450	76.394	E5
223.	15.325	677.512	76.473	E5
224.	15.338	681.718	76.580	F5
225.	15.350	685.444	76.6741	F5
226.	15.363	687.953	76.738	F5
227.	15.375	690.831	76.810	F5
228.	15.387	694.299	76.897	F5
229.	15.400	697.029	76.965	F5
230.	15.412	698.726	77.007	F5
231.	15.425	700.017	77.039	F5
232.	15.438	700.866	77.060	F5
233.	15.450	701.714	77.081	F5
234.	15.463	702.600	77.102	F5
235.	15.475	703.227	77.118	F5
236.	15.488	703.743	77.131	F5
237.	15.500	704.887	77.159	F5
238.	15.512	707.433	77.221	F5
239.	15.525	710.532	77.297	F5
240.	15.538	712.118	77.335	F5
241.	15.550	712.635	77.348	F5
242.	15.563	712.745	77.351	F5
243.	15.575	713.151	77.360	F5
244.	15.587	714.147	77.385	F5

245.	15.600	715.106	77.408	F5
246.	15.612	714.996	77.405	F5
247.	15.625	713.926	77.379	F5
248.	15.637	712.598	77.347	F5
249.	15.650	711.270	77.315	F5
250.	15.662	710.163	77.288	F5
251.	15.675	709.240	77.265	F5
252.	15.687	707.875	77.232	F5
253.	15.700	705.736	77.179	F5
254.	15.713	703.928	77.135	F5
255.	15.725	703.301	77.120	F5
256.	15.737	703.706	77.130	F5
257.	15.750	704.998	77.161	F5
258.	15.762	707.064	77.212	F5
259.	15.775	708.429	77.245	F5
260.	15.788	708.503	77.247	F5
261.	15.800	708.318	77.243	F5
262.	15.813	708.429	77.245	F5
263.	15.825	708.318	77.243	F5
264.	15.838	707.359	77.219	F5
265.	15.850	705.883	77.183	F5
266.	15.862	704.038	77.138	F5
267.	15.875	702.378	77.097	F5
268.	15.888	700.902	77.061	F5
269.	15.900	699.833	77.034	F5
270.	15.912	698.615	77.004	F5

271.	15.925	697.508	76.976	F5
272.	15.938	697.287	76.971	F5
273.	15.950	698.062	76.990	F5
274.	15.963	699.132	77.017	F5
275.	15.975	699.648	77.030	F5
276.	15.988	699.869	77.035	F5
277.	16.000	699.980	77.038	F5
278.	16.013	700.275	77.045	F5
279.	16.025	700.534	77.051	F5
280.	16.037	700.644	77.054	F5
281.	16.050	700.423	77.049	F5
282.	16.063	700.423	77.049	F5
283.	16.075	701.050	77.064	F5
284.	16.087	702.415	77.098	F5
285.	16.100	704.149	77.141	F5
286.	16.112	705.035	77.162	F5
287.	16.125	704.592	77.151	F5
288.	16.138	703.854	77.133	F5
289.	16.150	704.555	77.151	F5
290.	16.162	7063.510	77.198	F5
291.	16.175	708.613	77.250	F5
292.	16.188	711.417	77.318	F5
293.	16.200	715.106	77.408	F5
294.	16.213	717.172	77.458	F5
295.	16.225	717.800	77.473	F5
296.	16.238	718.722	77.495	F5

297.	16.250	720.936	77.548	F#5
298.	16.263	723.444	77.609	F#5
299.	16.275	724.625	77.637	F#5
300.	16.287	725.031	77.646	F#5
301.	16.300	725.400	77.655	F#5
302.	16.313	725.510	77.658	F#5
303.	16.325	725.363	77.654	F#5
304.	16.337	725.178	77.650	F#5
305.	16.350	724.957	77.645	F#5
306.	16.362	724.699	77.639	F#5
307.	16.375	724.551	77.635	F#5
308.	16.388	724.404	77.631	F#5
309.	16.400	723.629	77.613	F#5
310.	16.412	722.743	77.592	F#5
311.	16.425	722.116	77.577	F#5
312.	16.438	721.341	77.558	F#5
313.	16.450	720345	77.534	F#5
314.	16.463	719.275	77.508	F#5
315.	16.475	718.316	77.485	F5
316.	16.488	717.209	77.459	F5
317.	16.500	715.918	77.427	F5
318.	16.512	714.295	77.388	F5
319.	16.525	712.339	77.341	F5
320.	16.538	710.569	77.298	F5
321.	16.550	709.904	77.281	F5
322.	16.562	710.052	77.285	F5

323.	16.575	710.126	77.287	F5
324.	16.587	710.089	77.286	F5
325.	16.600	710.458	77.295	F5
326.	16.612	710.605	77.299	F5
327.	16.625	710.126	77.287	F5
328.	16.637	709.240	77.265	F5
329.	16.680	707.949	77.234	F5
330.	16.662	706.252	77.192	F5
331.	16.675	703.780	77.131	F5
332.	16.688	701.013	77.063	F5
333.	16.700	698.615	77.004	F5
334.	16.713	697.656	76.980	F5
335.	16.725	697.951	76.987	F5
336.	16.738	698.357	76.998	F5
337.	16.750	697.471	76.976	F5
338.	16.763	696.734	76.957	F5
339.	16.776	697.361	76.973	F5
340.	16.787	699.205	77.019	F5
341.	16.800	701.198	77.068	F5
342.	16.812	702.563	77.101	F5
343.	16.825	703.337	77.121	F5
344.	16.837	703.485	77.124	F5
345.	16.850	703.448	77.123	F5
346.	16.862	702.710	77.105	F5
347.	16.875	700.570	77.052	F5
348.	16.887	696.033	76.940	F5

349.	16.900	689.761	76.783	F5
350.	16.912	684.227	76.644	F5
351.	16.925	679.283	76.518	F5
352.	16.937	671.867	76.328	E5
353.	16.950	667.772	76.222	E5
354.	16.963	665.817	76.171	E5
355.	16.975	660.689	76.038	E5
356.	16.988	657.442	75.952	E5
357.	17.000	656.557	75.929	E5
358.	17.013	654.011	75.862	E5
359.	17.025	646.817	75.670	E5
360.	17.037	641.652	75.531	E5
361.	17.050	627.374	75.142	Eb5
362.	17.062	624.976	75.076	Eb5
363.	17.075	623.500	75.035	Eb5
364.	17.087	626.267	75.111	Eb5
365.	17.100	629.255	75.194	Eb5
366.	17.113	629.661	75.205	Eb5
367.	17.125	628.333	75.168	Eb5
368.	17.137	626.599	75.120	Eb5
369.	17.150	624.791	75.070	Eb5
370.	17.162	622.615	75.010	Eb5
371.	17.175	621.397	74.976	Eb5
372.	17.188	603.725	74.477	D5
373.	17.200	596.715	74.274	D5
374.	17.212	586.127	73.965	D5

375.	17.225	579.338	73.763	D5
376.	17.238	576.239	73.670	D5
377.	17.250	576.608	73.681	D5
378.	17.263	581.036	73.813	D5
379.	17.275	588.672	74.040	D5
380.	17.288	593.247	74.174	D5
381.	17.300	593.284	74.175	D5
382.	17.312	595.313	74.234	D5
383.	17.325	596.752	74.276	D5
384.	17.337	595.940	74.252	D5
385.	17.350	595.904	74.251	D5
386.	17.362	595.276	74.233	D5
387.	17.375	588.340	74.030	D5
388.	17.387	587.344	74.000	D5
389.	17.400	589.558	74.066	D5
390.	17.413	595.940	74.252	D5
391.	17.438	617.818	74.876	Eb5
392.	17.450	617.892	74.878	Eb5

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