Between Freedom and Fixity: Artistic Reflections on Composition and Improvisation

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Between Freedom and Fixity:

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Introduction

This PhD dissertation focuses on the relationship between freedom and fixity in music: the objects in question are composed works, intended to be played live. The core of this research project is the presentation, analysis, contextualization, and reflections on four of my compositions, on the initial intentions in composing them, and on the ideas that emerged during their composition process and their performance. In and through these works, and by thinking about my experiences as a performer, I will provide a distinct musical perspective that takes the relationship between freedom and fixity as its main point of departure. My aim and hope is that this will be a source of inspiration for other musicians and researchers as well as benefiting listeners in general.

As a composer I am interested in the responsibility to provide compositions with a musical identity which is to some extent fixed. This identity can be established by various factors, such as pitch and rhythm, characteristic sounds, specific roles for the performers and their interactions with each other, overall structure, and so on. In this sense, I have tried to establish a specific aesthetic for each composition: certain musical features which are conveyed in a score (or other performance material: for example, verbal instructions or computer code).

At the same time, the musical identity of my works is also explicitly free: dynamic relations between the musicians and between them and all kinds of other musical agents – the score, the computer, and so on – play a dominant role during the performances. The task of the musicians is not only to reproduce the fixed characteristics of the work but also to invent and generate materials which are not explicit in the score and to do so in real time, that is, while performing. In this sense, freedom is fundamental to the overall result and not just ornamental; it forms an essential part of the identity of my compositions, just as important as their fixed attributes. My current artistic practice thus encapsulates the idea of music as a self-organizing system (rather than a pre-designed blueprint), while simultaneously conveying concrete specifications for the performance.

The aim of this research is to present a distinct viewpoint on music based on artistic experiences and theoretical knowledge. The ideas I will discuss are conceived out of musical necessity, in response to encountering a deficiency in how freedom has been dealt with within the practice of composing and a gap in the knowledge and discourse around the issue. The art of composing has indeed claimed to at least acknowledge the existence of freedom and has, to a certain extent, succeeded in incorporating it into composed works, such as ornamentation in Baroque music, the instrumental cadenza in the Classical period, and indeterminacy in John Cage's works. However, it has failed to integrate freedom more substantially, overlooking its full potential as a functional element which can interact with a composed framework: freedom has seldom been given a structural role, and the possibility of a mutually interactive dynamic with the composed elements has not been fully explored. For example, Baroque ornamentation is explicitly marginal to the structure; the Classical cadenza is confined to a specific moment during the

performance; and the concept of indeterminacy, even though it can be seen as an attempt to address the immanent role of freedom in interpretation,[1] still does not allow the performers to reach their full inventive potential as improvisers. (In fact, indeterminacy was never intended to achieve that goal, as should be clear from Cage's objections to improvisation.)

My approach was not only to understand and use unpredictability and indeterminacy as discrete elements within an otherwise composed framework but to allow musical networks to emerge from the combination of freedom and fixity: dynamic situations and evolving musical processes which constantly oscillate between pre-composed ideas and the performers' real-time input. Moreover, my interest was in studying the potential relationships between freedom and fixity by combining them in such a way that it would be impossible to discern where the one ended and the other began. As a matter of fact, more than being interested in the *combination* of composition and improvisation, I was interested in their *integration*. The *Oxford American Dictionary* defines "integral" as something which is "necessary to make the whole complete; essential or fundamental" (Stevenson and Lindberg, 2011). The idea that freedom can be an integral part of the musical form – a building block, a musical component which not only stands next to composed ideas but also expands and develops them – appeared to me as a creative challenge, an artistic and theoretical hypothesis on which several works could be based.

In order to describe how my approach to composition combines fixed and free elements, I will use a basic division of the components of a musical work into two categories: those which are determined before the performance and those which remain open and have to be invented during the performance. The terms "fixity" and "freedom" were chosen to describe these, respectively. The terminology requires explanation: why freedom and fixity rather than improvisation and composition? Within a musical context, fixity and freedom can be conceptualized as re-assignable qualities, as variables within a formula to which any musical component can be assigned. A wide range of musical elements can be either fixed or free: from the rudimentary example of fixed rhythm or free pitch, to such complex properties as the interactions between a musician and a computer or the way a musical form can be stretched over indeterminate lengths of time. A composed structure, for example, can contain free rhythm and fixed notes or vice versa. A jazz improvisation might have a fixed structural framework, yet the notes and rhythms chosen to (re)create that framework are free. Or, to add just another example, also synchronicity and disintegration can be either fixed or free: I can easily think of music in which synchronicity is created through free, improvisation-based playing, while disintegration could be precisely notated, and thus fixed. In fact, composition and improvisation in themselves can be described as different mixtures of free and fixed elements, since both rely on distinct relations between freedom and fixity. The terms "fixity" and "freedom," therefore, provide a more nuanced vocabulary with which to discuss existing approaches to combining composition and improvisation, to analyze and explore the musical processes involved, and ultimately to move beyond them.

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[1] As asserted by experimental music composer Cornelius Cardew: "'Indeterminacy' is like a conviction: the relation between musical score and performance cannot be determined. If this is not realized, difficulties will always be encountered in composing, rehearsing, and performing (not to mention listening)" (Cardew, 1961, p. 22).

My initial goal was to try and understand the tensions I encountered between the two aforementioned concepts in my artistic practice – tensions which I felt were often positive, in the sense that they provided creative and productive drives. Sharing my knowledge and experience as a composer and performer interested in improvisation as much as in notation has influenced my ideas as an artistic researcher. Working with the constant oscillation between predesignated and unforeseen elements – making sure they are well articulated and not suppressed in any way – has been one of the inspirations for this research project.

One fundamental hypothesis of this research is that fixity and freedom cannot exist independently of each other. A "pure," unmixed manifestation of either is impossible: no musical performance is totally free from the influence of its preconditions or unaffected by its musical setting. Nor can a musical score exist which is completely fixed, which does not allow, enable, and in fact require some interpretation, that is, some kind of freedom during a performance. This "impossibility" – which implies a shared responsibility between performer and composer – is another inspiration for this research: it directs the attention to different mixtures of freedom and fixity. The effect of fixed elements on the real-time freedom of a performer, the idea of flexibility as a musical shape which is partially defined and partially open, and the potential of directed improvisations to follow different musical paths are all results of an understanding that freedom and fixity necessarily exist in conjunction with one another.

My research, undertaken through four principal case studies with related examples and associated theoretical considerations, is an attempt to open up and explore a creative space in which freedom and fixity are both present and active. I hope it might serve in turn as inspiration for other musicians and researchers. Finally, through my artistic practice I hope also to be able to formulate some thoughts regarding the concepts of freedom and fixity in extra-musical contexts, such as philosophical or socio-political theories.

Research Questions

The idea of a creative space in which freedom and fixity are both present and active, a space in which they define and determine each other, raises several questions with which I will deal in the subsequent chapters:

1. How can the concepts of freedom and fixity be embodied, practiced, and performed in composing music? Which elements of each of the compositions discussed in this thesis are primarily fixed and which are primarily free?

2. How can musical compositions express the tensions and balances between freedom and fixity and how is this effectuated in each of the four case studies? How do the relations between freedom and fixity shape the performances of these works?

3. What further consequences and ideas – extra-musical as well as musical – can be drawn, regarding the concepts of freedom and fixity and their interrelations?

These questions are a direct result of my experiences as a musician. They concern actual musical works and their performances, and by answering these questions I will establish an approach to concrete musical practices. But music can also provide an excellent basis from which to reflect "outwards," towards more general ideas: in this case, concerning structure and freedom, the role uncertainty and improvisation play in social structures, or the relationships between content and structure as a general aesthetic question. Providing answers to these questions might demonstrate how improvisation, freedom, complexity, and dynamic relations could play integral roles in pre-set frameworks beyond as well as within musical practices. I will elaborate more on the extra-musical implications of my research in the Conclusion, although these ideas will be described in general terms only, as that is not the basic theme of the present thesis.

Research Context

In order to contextualize my freedom-and-fixity narrative, I will discuss several ideas by musicians and scholars relating to improvisation, composition, notation, interpretation, performance, and musical instruments. Some of these ideas are drawn from the field of music, while others are from extra-musical disciplines, such as philosophy and science. The diversity of this discourse explains and enacts the complexity inherent in the relation between freedom and fixity, by taking into account the myriad elements at play as well as their interconnections. In each of the four chapters, I will apply various ideas which relate to the case studies themselves and provide a more theoretical framework for the musical examples.

An important concept in this dissertation is improvisation. Improvisation is often described as flexible or fluid – an interactive network of continuously shaped and re-shaped musical situations. The philosopher Marcel Cobussen and the musician-researcher David Borgo regard improvisation as a complex system in which musical, individual, and socio-political actors and factors interact with each other. A different approach is suggested by the philosopher Gary Peters, who describes improvisation as an ongoing struggle by the musician to remain open "against" the inherent demands of music to become fixed, thus counterposing a perpetual search for new, not-yet-explored musical territories with the tendencies of musical material to crystallize and form a stable identity. Another viewpoint is presented by the composer and performer Richard Barrett, who sees free improvisation as a musical framework that emerges in real time rather than being pre-set. In relation to Barrett's approach, I will also discuss some ideas of Erlend Dehlin, a researcher who has focused on the significance of improvisation within organization and management theories and practices. Dehlin's approach demonstrates the relevance of the concept of improvisation in an extra-musical context. These different perspectives on improvisation are important in order not only to establish a comprehension of the subject as a distinct phenomenon but also to understand the role of freedom within composed works: it interacts with the structure and the material and thus has an essential function in shaping the result.

Alongside improvisation, notated composition is also an integral part of the discussion. The term "work-in-movement" was introduced by the semiotician Umberto Eco to indicate a notion of incompleteness in composed works and was further developed by the musician-researcher Henrik Frisk as a way to create an ongoing dialogue between composer and performers. The philosopher Andy Hamilton links freedom not only to improvisation but also to interpretation, by pointing out the differences between what he terms macro- and micro-freedom. The philosopher Bruce Ellis Benson places improvisation at the core of the composition process as well as of the interpretation of notated works, thus creating a direct link between composition and freedom. These different approaches establish the musical work as a dynamic hub of interpretive freedom and pre-composed elements. In this sense, the role of the score and of musical notation is not only to fix certain elements of a composition, but also to evoke real-time freedom. The implication of these different approaches will be demonstrated in and through my various compositions, by examining the choices made in each concerning notation, structure, musical materials, and performance instructions.

Another theoretical and practical point of departure for this research is the use and influence of technology. Three of the four compositions use a computer as a musical instrument: in *Modo Recordar, Modo Olvidar* a computer and a MIDI keyboard are used to link improvisation and structure; *[Untitled, 2012]* is based on a pre-recorded electronic soundtrack which forms the composition's timeline; and in *The Instrument* the musical structure is generated live through an interactive system which connects the computer and the performers. The relationship between technology, structure, and freedom is thus an integral part of my practice and thinking. In this connection I will discuss ideas by the sociologist and philosopher Bruno Latour and the digital-studies scholar Aden Evens. Both value technology for its open-ended quality, that suggests multiple paths rather than providing determinate means to a particular end. As such, the computer becomes a tool for creating musical freedom. I will introduce the possible roles the computer might have as an autonomous improviser and as an interactive instrument in my discussion of *Voyager* by the composer, improviser, and researcher George Lewis and the writings of electronic musicians and researchers Robert Rowe and Simon Emmerson. Their suggested terminology establishes a distinct relationship between the freedom and fixity embodied in technology: a combination of the computer's output as an autonomous improviser, as a responsive system which reacts to a (human) musician, and as a tool for producing pre-composed structures.

Alongside my four compositions, I will also bring notated or recorded works by other composers and improvisers into the discussion, which will help to broaden the context of the research. For example, free-improvisation duets from an album by the bass player Peter Kowald will shed light on the idea of improvisation as a dialogue between musicians, musical material, and freedom. I will focus on the self-organizing quality of the interactions within these duets as an example of musical freedom and emergent fixity. I will also reflect on musical examples I have performed myself, drawing conclusions from my experience as a player and reflecting on the role of freedom in these works.

The Structure of The Thesis

Each one of the four case studies presents a distinct perspective on the freedom-and-fixity axis:

i. *Modo Recordar, Modo Olvidar* (for viola, contrabass, and computer) addresses the relation between structure and improvisation. How can the two be integrated in order to create a performance in which the improvisations form organic continuations of the composed ideas? As a way to integrate improvisation and composed structure, I will introduce in this chapter the idea of a flexible timeline.

ii. *[Untitled, 2012]* (for bass and pre-recorded soundtrack) brings fixity into focus as a central compositional thread. Through the pre-recorded soundtrack, the idea of "total fixity" is considered. The existence of a fixed electronic timeline is thus complementary to that of the flexible timeline in *Modo Recordar, Modo Olvidar*. However, the question I will deal with in this chapter is how freedom can be woven around a fixed electronic timeline? In order to contextualize this problem, three other works for fixed media and live performance will be discussed: *Plex* by Agostino di Scipio (1991), *Bump* by Amnon Wolman (2005), and *Bokeh* by Janco Verduin (2014). I will discuss these works from the point of view of a player, having performed each of them several times. As such, an additional perspective, interpretation, is added to the research alongside composing.

iii. *The Instrument* (an interactive electronic system, for any instrument(s) or sound source) focuses on the idea of the computer as a musical instrument, an interactive system, and an autonomous improviser. The central question in this chapter is how the concepts of freedom and fixity are embodied in this live-electronics composition.

iv. In *hasBara* (for ensemble) the discussion will focus on free improvisation and on notation and improvisation as two contrasting elements. A comparison between this composition and *[Untitled, 2012]* can be made: while in the latter fixity is the main thread, the former highlights the significant role of freedom as a main thematic element around which the musical structure unfolds.

Each of the four case studies presents different relationships between freedom and fixity. Together, they form a multilayered investigation into possible correlations between these concepts, appearing at different stages of the musical process – while notating, performing and designing the electronics, during human-computer interaction, and so on. For this investigation to materialize, I have used texts, scores, and audio-video materials. The reader is invited to follow the path I have been forming – or, in fact, wandering – during the research, from one composition to another in chronological order.[2] This thesis reveals my journey as an ongoing oscillation between two channels of creativity, freedom and fixity, and as an

[2] Of course the reader can also move freely between the chapters – to read the composed text in an improvisational manner – establishing their own path between the various freedom-and-fixity musical perspectives.

investigation of the dynamic interrelationships between them: how they are mutually complementary rather than contradictory, each being inevitably present and integrated in the other. This thesis reveals my journey as an ongoing oscillation between two channels of creativity, freedom and fixity, and as an investigation of the dynamic interrelationships between them: how they are mutually complementary rather than contradictory, each being inevitably present and integrated in the other.

An overview of my artistic research path can be described as follows: *MRMO* was my earliest attempt to investigate how notation can shape improvisation, and how the latter can be integrated in a pre-composed musical form. In this initial experimental step I chose to use a particular mix between traditional notation and a more loose, graphical blueprint of the structure, by leaving large parts of the score blank and the timeline flexible. I tried out several options until I found a solution which seemed appropriate, in the sense that the score could present both improvisation and precomposed structure in a clear way. The way Hatzatz (the group with which I have been performing this work) worked with this composition – growing more and more free in their performance, and further "away" from the written score – led me to imagine alternative possibilities for notation: a much more detailed – "fixed" – approach (see the case study *[Untitled, 2012]*); or an opposite approach, using notation that is much more open as a result of abandoning the idea of a structural blueprint, and letting the musical structure emerge as an outcome of free improvisation rather than being directed by the score (see *The Instrument* and *hasBara*).

The function of the electronics in *MRMO* is to sample the musicians in real time and play processed sounds based on this sampled material. The computer is controlled by a performing musician (playing a MIDI keyboard), and, as such, the electronics cannot be regarded as an autonomous system but, rather, as a human-controlled instrument. During the preparation work on the computer part of *MRMO*, I was already imagining a more elaborate system that could allow the computer to demonstrate both responsive and autonomous features, thereby also embodying freedom and fixity by combining interactivity with the musicians and pre-programmed, computer-generated output.

In the next composition, *[Untitled, 2012]*, I decided to work with a detailed score that would place different demands on the performing musician. *[Untitled, 2012]* was an experiment with a "high-resolution" approach to notation, to investigate a question with both artistic and theoretical dimensions: how can freedom exist in a thoroughly fixed musical environment? It was important to try and push myself towards the furthest possible point on the continuum between freedom and fixity by dealing with the idea of *absolute* fixity: a pre-recorded soundtrack that functions as a "hard-coded" structural element within the work, around which I could weave notational ideas that would create freedom for the performance. I tried to establish this kind of performative freedom at a musical "micro-level," that is, as a rhythmic synchronization between the playing and the soundtrack.

In this case study, I show how the concepts of musical time scales and groove helped to establish an approach to notation that could indeed suggest freedom while simultaneously marking pre-composed details. The performing musician adapts their part to the fixed soundtrack by making rhythmical micro-

fluctuations. However, I tried to extend this idea so that it would enable more than just interpretive freedom, becoming instead an opportunity for an improvisation-based performance. In connection with this approach, I refer to the terms macro- and micro-freedom, as suggested by the philosopher Andy Hamilton.

With *[Untitled, 2012]*, the process of experimentation through repeated performances is lacking, since it has been performed only once. Instead, my path of experimentation was formed here by my experiences as an interpreter of other composers' works. I elaborate on my experiences of playing three other works that, like *[Untitled, 2012]*, include a fixed soundtrack and notated score. Playing these works has provided me with a chance to investigate the idea of micro-freedom. Each reveals a different approach to synchronization between score and soundtrack: either entirely free (in Amnon Wolman's *Bump*, in which the musician plays together with a 4-channel soundtrack but without any direct reference to it), "anchored" in several structural moments but free for the rest of the composition (in Agostino di Scipio's *Plex*), or in precise alignment (in Janco Verduin's *Bokeh*).

Performing these pieces, as well as discussing with the composers how they understand the role of freedom in their work, raised the need to develop my own ideas in another direction. My aim became to create a direct relation between the instrument's part and a soundtrack, and, at the same time, to provide the performing musician with enough space to stretch, twist, or play around with the material. The realization that freedom could exist also in such a supposedly strict environment, implied by the concept of micro-freedom, has thus shaped *[Untitled, 2012]*.

The next piece I composed is called *The Instrument.* Here, freedom and fixity are embodied in computer code rather than in a notated score. The musical structure unfolds during a performance as a real-time interaction between the improvising musicians and the computer, and, as such, *The Instrument*'s structure is subject to a higher degree of unforeseenness than the previous two compositions. The computer code provides only a basic plan for the structure – mainly the order of sound events and certain responsive characteristics – so that the final result depends to a great degree on interaction with the musicians; possibilities for length, shape, density, and other characteristics of the music are in principle unlimited. My initial decision not to use a notated score liberated me from the obligation to render the musical ideas I imagined as graphic representation. Leaving out notation – a medium which was essential in the previous two works – meant I could now reach a more elaborate degree of structural freedom. Also, the concept of musical material – in *MRMO* referred to as local "style" or "idiomatic consistency" – does not exist here. The musicians explore the possibilities and limitations of the computer system rather than following a pre- or semi-determined path. Hence the performance pertains more to free improvisation than to a conventional interpretation of a notated work.

The Instrument marked a turning point in my working process: the computer system now became the main medium of composing (using the programming language SuperCollider). The tools I had been developing for several years (while working on *MRMO* and on *[Untitled, 2012]*, and even earlier) in

order to be able to use the computer as a musical instrument were sufficient to form a solid compositional "vocabulary." The role of the computer in *The Instrument* made me realize how essential the concept of a musical instrument could be: alongside agents such as composer, performer, score, and so on, the instrument plays a crucial role in investigating and (trans)forming relationships between freedom and fixity.

The evolution of *The Instrument* can be noticed on several levels: the repeated process of recording new samples (used for the real-time computer processing); the transformation of the musical structure (by adding newer samples or replacing older ones, and re-programming the code, thus implying new structural possibilities); the expansion of the responsivity of the computer system by adding new features, for example the idea of two operating modes – a direct mode, in which the computer triggers sounds in response to the performer's audio input, and an indirect mode, in which the computer constantly emits sounds, their rate of occurrence being determined by the performer's activity levels. The transformations of *The Instrument* occurred during the repeated performances, and according to the different circumstances each occasion implied: it was presented as an installation, a concert piece, and a free-improvisation set. The ideas of work-in-movement and the computer as musical instrument, the latter relating to the concept of technology, provided crucial abstractions with whose help I was able to reflect on freedom and fixity from several perspectives.

After having composed and performed *The Instrument* I received an invitation to compose a work, *hasBara,* for the ensemble Musica Nova Consort. In the first version of *hasBara* the score included a part for live electronics (performed by me). However, here my ideas took yet another direction: a dialogue between solo musician and group, each developing their own path, oscillating back and forth between notation and improvisation. In this work I wanted to explore free improvisation as a musical manifestation or materialization of freedom, transcending my composed instructions – however "open" they could be – and inciting negotiations between supposedly "absolute" indeterminacy and composed material. Free improvisation thus started playing an active role as a thematic element within *hasBara*'s structure. In response to an invitation from another group of musicians (ensemble MUTU) I continued to develop these ideas, and created another version of the score. The interplay between free improvisation and pre-composed structure created a dynamic experience also on repeated performances. The evolution between the first version and its later version revealed a process of "stripping down" the score, starting from a more elaborate version in which there is a greater degree of pre-composed "intervention," and ending with a more concise version (consisting only of a two-page score) relying more on decisions made by the musicians in real time to generate a musical structure. The development between the two versions revealed the path I traveled during the composing process, based as much on my experiences as a performing musician as on my experiences as a listener: in the final version (so far) I trusted that free improvisation, initially a less important element in this work, could also provide *hasBara*'s structure. In other words, the musical structures of both *hasBara* and *The Instrument* rely on free improvisation – a decision which I was not able to make in earlier works such as *MRMO*, even though in the latter the

process of “abandoning” the score (Hatzatz playing a free version of the structure) already revealed a similar approach.

The evolution between the four compositions presented in this thesis thus reveals a development in my thinking and working, regarding the nature of the concepts as well as their musical manifestations. However, to perceive the works merely as nodes on a research path would do injustice to the practice of music. The composer also has a responsibility for the works themselves, and not only for the evolution of artistic knowledge. What makes a work “complete”? What makes a composition “successful”? And what is the relation between artistic integrity and research? As will be clear by now, the main focus of this research is on the practice of composing with an emphasis on specific works written by myself and other composers, works intended to be played live. While creating them, composers take a certain responsibility for the musical act. To a certain extent, composers choose to foresee – or, better, to set in motion – a probable future, alongside the process of reflecting on past decisions by describing and discussing their artistic-research path.[3]

In this sense, my compositions provide a comprehensive working model of freedom and fixity and of the interaction between them. Creating “finished” works instead of experiments that are aimed only to raise questions is, for me, an essential goal. Without such works, musical practice would become meaningless, and artistic research would lose its solid ground. In other words, my contribution to knowledge should perhaps not be primarily evaluated on a theoretical-ontological level but rather on a practical level: proposing ways to put concepts into practice, however abstract the former may be, and working with ideas by others, thereby re-working them. As should already be clear from this Introduction, I have used several methods, several research strategies, to put these concepts into practice and to rework the ideas of others: a continuous (re)composing through an iterative process – making changes and adaptations between the various performances of a single work; using shifting perspectives in order to listen to my work both as an audience member and as a performing musician; creating feedback loops between theory and practice, the conceptual and artistic permanently affecting one another; evaluating and analyzing previous works in order to develop new ones.

However, as much as my work is committed to the realities and practicalities of musical practice, it can still pose questions regarding these concepts and ideas. In other words, although my direct concern is with compositional systems, this approach can provide insights at levels other than purely musical ones.

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[3] The relation between experimental thought and composition is described by Virginia Anderson, a scholar and practitioner of experimental music and free improvisation:

> The point at which an experimental composition can be considered to be “complete” depends on the composer and his or her compositional method. Sometimes . . . the composition is notated before performance in almost a traditional manner. . . . Sometimes . . . the final composition presents the traces and activities themselves: a collection of research data to be collated, ‘written’, and released by performers as experimental colleagues. And in a few cases, such as the Scratch Orchestra Research Projects, performers, given only the topic, have to amass the traces and create the experimental activity themselves. (Anderson, 2013, p.65)

The fact that music can evoke artistic and theoretical challenges – questions and solutions, suggestions and assumptions, explorations and experimentations – as much as it can demonstrate tangible models for conceptual ideas, is an essential assumption, upon which this thesis in artistic research is based. The direct conclusions I will draw are concerned more with the "how to" of freedom and fixity, rather than with their "what is": how improvisation might be integrated in a composed structure; how structural features might be notated together with their intrinsic potential for flexibility, augmentation, and opening up of unforeseen paths; how ideas might be transmitted to (improvising) musicians without restricting their real-time freedom.[4] By allowing reflection on and through my experiences as a practitioner, artistic research is enabled to contribute in its own specific ways to theoretical discourses. By transposing my knowledge from a practical domain to a more academic one and back again, I hope to offer some new perspectives which can play a part in future discussions, taking into consideration the personal and collective responsibility for both freedom and fixity, with the potential to remodel the way we think about dialogue and exchange of information, not only in the musical domain but also in more general, creative processes and discourses of many kinds.

[4] See for example, improviser/educator Stephen Nachmanovitch: "One rule that I have found to be useful is that two rules are more than enough" (Nachmanovitch, 1990, p. 83).

Modo Recordar, Modo Olvidar

1. Introduction

Modo Recordar, Modo Olvidar (*MRMO*) is a composition for viola, contrabass, and electronics (played by a third musician). I will use it as a case study to examine the relationship between improvisation and structure, or musical form.[5] I wanted the composition to have a definite shape, with clear transformations of sound and group dynamics, musical "turns," and changes of direction. At the same time, I wanted it to have a flexible structure, allowing passages to be stretched or compressed. This chapter will focus on how *MRMO* allows for this kind of flexible structure and the effect it has on the performance.

In Part 2, I will discuss a recording of *MRMO* by Hatzatz. This recording reveals fundamental "inaccuracies": differences between the score and what the musicians actually play. I will suggest that this relatively high degree of interpretative freedom is a result of my compositional approach. In Part 3, I will focus on the composition itself, describing how my prescribed ideas are developed through improvisation. I will describe the relationship between the notated and improvised parts, using the concept of style, or idiom, to show how the musicians assimilate the notated parts and elaborate on them through improvisation. The notation I use – boxes along a flexible timeline – is designed to make improvisation the basis of the musical form. Finally, I will describe the role of the electronics in linking improvisation and structure: the computer records the musicians as they play, processes the recorded samples, and plays them back to the musicians. The overall result is a combination of sampled and live sounds: an unfolding sequence of previous and current improvisations.

MRMO offers another perspective on freedom and fixity. The approach here differs from that of my other compositions. *MRMO* has a predefined shape that is, however, constructed from improvised building blocks. Improvisation, once comprehended as compatible with, rather than opposed to, structure, can serve as a model for a paradigm of freedom which does not oppose fixity but is complementary to it. *MRMO* is also the earliest composition of the four discussed in this thesis, and I will use it to introduce some of the ideas which will be developed in the other chapters: for example, flexibility or the relation between notation and improvisation.

2. *MRMO* Played by Hatzatz

[MEDIA: Hatzatz performing *Modo Recordar, Modo Olvidar*, image and audio. Maya Felixbrodt on viola, Tomer Harari on electronics, and Ilya Ziblat on contrabass. Recorded and mixed by Arne Bock.
Released on: https://hatzatz.bandcamp.com/.]

[5] I will use these two words interchangeably throughout this chapter.

This version of *MRMO* was recorded by Hatzatz in 2012 during a live concert. Comparing this particular recording with the score reveals many instances where the musicians play something different from what is notated. For example, at the very beginning the viola and bass "ignore" the notes in the score.

[IMAGE: *MRMO*, score excerpt.]

This kind of interpretation was possible because Hatzatz had performed *MRMO* regularly by the time of the recording. However, it was not only the ensemble's familiarity with the piece that had made a precise realization of the score seem unnecessary but also our experience – both as individual musicians and as a group – with other musical situations involving both improvisation and composed content. This meant that, instead of sticking to the notes and rhythms as they were written, the ensemble attempted to re-create the intention behind them even if that involved playing notes and rhythms that were not notated. We felt that, compared with earlier performances which had followed the score more closely, this "radically" free realization of *MRMO* was more engaging and produced a better flow of musical ideas and responses both within the group and between the musicians and the score. In that sense, my initial ideas entered into a network of effects and influences that allowed the performance to become much more absorbing than a more "faithful" interpretation of the score would have been – both in the sense of realizing the structure and of allowing the notated material to evolve through improvisation.

This raises the question of whether the score of *MRMO* could enable another group of musicians to perform the piece without my participation as a performer. In what follows, I will describe the structure of the composition, how improvisation is presented in the score as a musical resource in order to create structure, and the decisions I made about the notation in order to communicate my ideas to potential performers.

3. Musical Form and Improvisation

The most important aspect of *MRMO* is its musical form. I conceived a framework around which my ideas could be interwoven with those of the performers. To begin, I will take a closer look at the idea of musical form. The *Harvard Concise Dictionary of Music* provides two definitions:

> (1) In the most fundamental sense, the shape of a musical composition is defined by all of its pitches and rhythms. In this sense, there can be no distinction between musical form and musical content, since to change even a single pitch or rhythm that might be regarded as part of the content of a composition necessarily also changes the shape of the composition even if only in detail. (2) From this follows the application of the term *form* to abstractions or generalizations that can be drawn from groups of compositions for purposes of comparing them with one another . . . [e.g.] Binary and ternary form; Rondo; Variation; [etc.]. (Randel, 1978)

The two definitions describe music in which the material is composed prior to the performance, or, in other words, fixed. I wanted to introduce an alternative to that idea, one that would be based on

improvisation and in which the improvisation would be indispensable, that is, playing a functional role rather than just adding an extra layer of embellishment on top of an otherwise fixed framework. However, I did not want to dispense with the fixed framework entirely.

Once the musical material is not fixed, other structural building blocks that allow musical decisions to take place in real time have to be provided. In other words, the work must be structured so that it allows for specific characteristics to be retained in each and every performance. To a certain extent, my vision of *MRMO* agrees with the notion of form as an abstraction or generalization (the second definition, above), in the sense that the composition can generate various realizations that are substantially different from one another – involving different pitches and rhythms – yet can be seen to have the same origin, as they have similar structural characteristics. How could a composition that would allow improvisation to have such an essential role look?

As in my other works, the main consideration was that the score would set the relationship between the free and fixed components so that the improvisation and the pre-composed ideas would form an unbroken continuum. A performance of such a composition should make it impossible for listeners or performers to separate the process of realizing the score from improvisation.

MRMO consists of several sections that are played continuously without pause, forming a musical development. According to the *Harvard Concise Dictionary of Music*, "development" is defined as

> the working out of previously stated thematic material, usually by means of application of techniques such as sequence and imitation . . . in such a way as to produce a series of modulations and a sense of increased structural tension. (Randel, 1978)

Once more, this definition relates to a different musical context from *MRMO*: a traditionally notated composition in which the development is worked out by the composer in advance. But the idea of an evolving musical process which grows from a beginning statement and unfolds gradually fitted well with my intentions. It could be also carried out "spontaneously" – as an improvisation in real time.

3.1 Musical Form and Improvisation in *MRMO*

[IMAGE: *MRMO*, score excerpt.]

The process of musical development in MRMO can be described as follows. In the first section the viola and bass play a succession of bar-long phrases and silences. The repeating alteration of instrumental action and silence creates a characteristic momentum. It forms an opening statement that provides a thematic identity for the following development, and sets the performers' "behavior" for the next two sections. At this point, the music is still precisely notated, not allowing any improvisation whatsoever.

[IMAGE: *MRMO*, score excerpt.]

Next, the score starts to introduce improvisation (marked by gray boxes). The freedom of the musicians in this part is relatively restricted, since the improvisational instances are fixed within the timeframe of the bar lines. Instruments and electronics engage in an antiphonal call-and-response, which will stand as a point of departure for the following section.

[IMAGE: *MRMO*, score excerpt.]

In the third and last section, the electronics and acoustic instruments gradually intermix, and the role of the instruments decreases as the electronics become more and more prominent. Here, also a more elaborate freedom becomes possible. The starting point is the antiphonal alternation between acoustic and electronic sounds. However, at this point, precise timekeeping is no longer necessary: the previously stated thematic content and the distinctive timekeeping (alternating playing and silence) have already been embedded into the players' "instincts," and so the improvisation can become a natural continuation of the prescribed notes. As in the recorded version by Hatzatz, the musicians can freely use the information in the score in order to play new notes. The end of this section also ends the first part of the composition, reaching a brief climax (the takeover by the electronics) which is immediately cut by a new part: a new instrumental beginning, introducing more notated statements which will now function as the starting point for the following, similarly shaped development.

[IMAGE: *MRMO*, score excerpt.]

Each of the sections represents a different function in the overall structure of the composition. The first is a thematic exposition which establishes the tone for what will follow – setting a defined musical environment containing certain instrumental gestures, a characteristic musical momentum, and, as a result, a distinct sonority. The second section sets in motion the expansion of the exposition by introducing improvisation into the score. The third section takes the improvisation further by allowing the musicians to dwell freely within a "familiar" environment. The playing becomes increasingly open as the performers pass from one section to the next, and freedom is assigned to wider and wider levels of the composition, starting with the interpretation of notated phrases and gradually becoming the key factor that forms the overall musical shape, as the gray boxes become the dominant part of the notation

3.1.1 *Circles*

In order to put my ideas into a broader context, it would be useful to compare them with the works of other composers. Another piece which connects structural development and improvisation is *Circles* (1961) for voice and instrumental ensemble by Luciano Berio. This work also introduces freedom into the performance gradually, starting with notated gestures and using boxes to signify freedom.

[IMAGE: *Circles*, score excerpt.]

The performer "learns" the musical idiom – the identity of the composition formed by the notated sections – and later makes use of this knowledge in the improvisation. This is an important process, since it enables the transition from playing the prescribed score to improvising.

Although *Circles* uses a similar notation to *MRMO*, the freedom in *Circles* is fundamentally different. Berio was interested in leaving undefined only those aspects of the score which could stay so without "harming" the overall pre-composed identity of the piece. While Berio makes use of open notation as a single element embedded within an otherwise fixed environment, I tried to use it as the building blocks for the entire structure. In this way, improvisation in *MRMO* takes place not at the fringes of the musical activity, but at its very center; at the same time, there is no clash between musical freedom and the already existing structural framework. In the following, I will deal with my approach to the score: "box notation."

3.2 Box Notation

While working on *MRMO* I tried to come up with a notation system that could convey both the real-time freedom of the musicians as well as concrete structural features. After experimenting with several possibilities that did not satisfy me in the sense that they could not provide an adequate mix between freedom and fixed properties, I decided on "box notation."

[IMAGES: Score excerpts. Two earlier experiments in notation, and the eventual box notation method.]

Passages to be improvised are marked by gray boxes. As the gray boxes are "empty" the players are encouraged to "fill" them as they wish, that is, by improvising. The gray boxes can also be stretched or compressed, thus allowing for a flexible timeline, admitting various solutions to different musical settings: a more precise position in relation to the bar lines and traditional rhythmic notation or a freer approach with less exact timing of musical events and a looser relationship between the instruments (for example, *MRMO*, Part III).

[IMAGE: *MRMO*, score excerpt.]

By combining these qualities, box notation allows the musicians to weave predetermined features and improvisation into a single musical narrative.

3.3 Notation and Improvisation: Idiomatic Consistency, Evolving Freedom

The gray boxes mark a timeframe for the musicians to play but leave out the rest of the information (rhythm, pitch, and so on). However, instead of leaving the content of the improvisation entirely free, I chose to "interfere" by instructing the performers to base their improvisation on the notated material. These instructions, which contain rhythm and pitch material, playing techniques, and other musical expressions, set the tone for the improvisation to follow.

The relation between the prescribed material and the improvisations could be explained in terms of "idiomatic consistency": an established musical style which sets a local idiom for the composition. In that sense, I agree with Earle Brown, who states that it is the composer's responsibility to "create conditions which . . . won't be violated stylistically" (Brown in Bailey, 1993, p. 63). It is the task of the composer to define clear syntactical "rules," as much as to avoid providing the performers with exact "words," thus creating the necessary conditions that allow improvisation to be derived from a certain musical idiom.

My notion of idiomatic consistency also agrees with Derek Bailey's (1993) observation that the particular musical settings created by such genres as jazz, flamenco, or traditional Indian music are the creative engines behind the improvisations. However, Bailey uses this idea to designate a unique status for free improvisation, "non-idiomatic," thus creating a dichotomy which is less relevant here. My notions of freedom and fixity can be applied to any piece of music, improvised or composed. The more general division between idiomatic and free improvisation is, in my opinion, inadequate to establish a constructive perspective that could be used to understand or create music.

Another perspective from which we could observe the "agreement" between idiomatic consistency and freedom is by looking at the work of, for example,Sun Ra, The Association for the Advancement of Creative Musicians (AACM) and the Art Ensemble of Chicago, or Archie Shepp. The African or African-American traditions and roots which stand at the very base of this music aspire to improvisational freedom, rather than functioning as a departure point from which this music is trying to break away. In the work of these musicians there seems to be no dispute whatsoever between freedom and tradition or style. The improvisations stem directly from historical, folkloristic, and social circumstances, and continues the aesthetic conventions of free jazz or free improvisation. In *MRMO* I create such conditions through the notation, but I also let the music evolve freely, trusting that my input can become the root of an elaborately improvised performance.

3.3.1 *Blattwerk*

Another example of a composition that combines notation and improvisation is *Blattwerk* for cello and electronics by Richard Barrett (2002a). Barrett chooses to notate the improvisatory passages with the mathematical symbol for infinity (∞): "The 'silent' bars marked with ∞ (in the place of a rest symbol) are lacunae in which improvisation may take place" (Barrett, 2002a, n.p.).

[IMAGE: *Blattwerk*, score excerpt.]

Barrett discusses the inessentiality of stylistic (idiomatic) consistency:

> The high degree of discontinuity of the notated music is intended to create structural/expressive "questions" which can only be answered (if at all) by improvisatory actions. On the other hand *no* kind of musical material should be excluded *a priori* on grounds of consistency or taste. One

> could imagine a context for anything. . . . In any case, on a first hearing it will not always be possible to tell the difference between the notated and non-notated music; and there is really no reason why it *should* always be. (Barrett, 2002b, n.p., italics in original)

The lacunae bars are empty "placeholders" – signs that indicate improvisation. The improvisations in *Blattwerk* may, potentially, evolve in directions which have very little to do with the musical idiom in the rest of the piece. Yet this does not mean that Barrett's approach ignores the relation between the improvised and notated materials. Rather, it perceives improvisation as an answer to open questions. The improvisations are a way to respond to the notated material, reflecting on the the pre-composed ideas. In comparison, in *MRMO*, I chose to explicitly direct the attention of the improvisers to the notated material. This seemed to me a more straightforward solution, which better serves my objective of creating the structure of the composition from the improvisation, which requires a certain degree of control over the content.

But even though my approach involves a direct intervention in the improvisation, my aim was not to restrict the freedom of the musicians. Instead of providing a context which is entirely open, I chose to focus the creative energy of the improvisers through a more precise filter. The result should not be judged for its restraining effect, but, rather, for its creative quality: the players, after internalizing the notated parts, can produce new sounds and gestures which stem from the prescribed information as an improvisatory language. By specifying a "local" idiom for each part of the composition, these fine-tuned improvisations establish the structure of the composition.

3.4 Flexible Timeline

According to the *Oxford Dictionary of English*, a timeline is "a graphical representation of a period of time, on which important events are marked" (Stevenson and Lindberg, 2011). So, for a composer, a timeline can be used to communicate the order of musical events and the temporal relations between them.

The score of *MRMO* indeed presents all the events in the order in which they will take place during a performance.[6] However, *MRMO*'s timeline can also be described as flexible, as it extends the traditional notion of a timeline and connects it with the notion of freedom. There are two aspects to this flexibility: the vertical and the horizontal. Vertical flexibility describes the misalignment between the different staves of the musical system, which are "floating" in relation to each other. I chose to use dashed bar lines to indicate that events which are lined up vertically do not necessarily have to happen simultaneously. The score indicates: "The synchronization between the instruments should be only loosely kept: although notated in the score as such, the result should sound out of phase." Vertical flexibility points towards an enhanced freedom of interpretation, starting from the composed material and lasting the entire score.

[6] Compare the score of *hasBara*, in which musical processes are described only by their starting and end conditions and not in relation to a continuous timeline. These processes can be stretched over time, doubled or overlapped with each other, creating a more open multilayered structure rather than a linear one.

Horizontal flexibility describes the relationship between the timeline and real time: the order of musical events is set by the score, but their durations can vary. The score provides a continuous graphic representation of time but does not specify how long anything should last. This allowed me to include various notation methods within the same score – prescribed notes and rhythms, text instructions, gray boxes, and the use or absence or bar lines – presenting different proportions of composed material and improvisation.

The flexibility of the timeline establishes a strong connection between performer and score based on the existing relationship between the visual representation and performative aspects of time and sound. The following comment by Morton Feldman originally referred to Earle Brown's idea of time-notation,[7] but it also describes accurately the effect of a flexible timeline:

> The sound is placed in its approximate visual relationship to that which surrounds it. Time is not indicated mechanistically, as with rhythm. It is articulated for the performer but not interpreted. (Feldman in Bailey, 1993, p. 60)

Time is suggested as a musical component with elastic qualities, shaped both by the composer and the performers. My notion of a flexible timeline enables a clear description of musical structure, while allowing space for improvisation.

3.5 The Electronic System in *MRMO*: Sampling, Structure, and Improvisation

[IMAGE: Diagram of the control MIDI keyboard. A SuperCollider patch is controlled by a MIDI keyboard: the lower octave records samples of the instruments as they are being played onto one of 12 discrete "memory banks"; the upper octave plays the samples back to the musicians. Additional knobs and sliders control the processing parameters.]

Electronics play an essential role in *MRMO*. The computer system samples the instruments in real time and plays back a processed version of the recorded material.

Certain parts of what the musicians are playing are recorded and saved as digital buffers.[8] These contain distinct sounds from different parts of the piece (different "idiomatic" improvisations). They are then played back to the musicians, who react to them in real time. The buffers are being repeatedly recorded,

[7] In time-notation, which is sometimes also referred to as proportional notation, a fixed ratio between real time and its graphic representation is maintained, e.g. one centimeter equals one second.

[8] The computer's "memory banks."

newer content written over older content, so the overall electronic soundscape goes through a continuous transformation.[9]

Steve Lake, producer of the Evan Parker Electro-Acoustic Ensemble's ECM releases, discussed the relation between sampling and improvisation:

> The musicians play, and their sounds are sampled by the treatment stations and fed back to them[10] (think of encountering a duplicate of yourself from a parallel universe, almost you but not you). There are many more unknowables than in 'normal' improvising. The players have to see the whole soundscape unfolding and contribute to it tellingly while having no idea of what may happen to the notes and phrases they are generating. Those phrases might be returned to them immediately, back-to-front or upside down, or come back to haunt them half an hour later. (Lake, 2004, n.p.)

The impact of the improvised notes is thus extended beyond the moment in which they are first played. "Echoes" of former improvisations mix with the current one, creating a developing matrix of old and new musical ideas – which is, in fact, the gradual unfolding of a musical structure. As understood by Lake, this process not only forms the listeners' experience but also affects the improvisers who have to interact with their own ideas.

The notion of sampling within a notated/improvised setting is central to this case study. The inherent ephemerality of the improvisation is overridden, "crystallizing" the improvised sounds and allowing them to mix with the composed elements, notated or recorded. The score of *MRMO* also uses gray boxes for the computer part. Like the gray boxes in the staves for the viola and contrabass, these represent the material which will be sampled. The notation thus combines the samples and live sounds into one compositional structure.

4. Conclusion

In *MRMO*, I tried to develop a framework that clearly defines musical information – the notated material, the relationship between the instruments and the computer, the structure – as much as it relies on improvisation. The detailed notation, the linear timeline, the relatively straightforward functionality of the electronic system (compared with the interactive computer system in *The Instrument*), all demand from

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[9] The title of this work, *Modo Recordar, Modo Oldivar*, can be translated as: "a way of remembering, a way of forgetting." Besides recording the musicians, the computer also distorts the sampled material using various digital processing procedures – but not so much that the resemblance to the original sounds is lost.

[10] A similar setting that has an additional layer of complexity has been suggested by Lawrence Casserley, who, in his work with the Electro-Acoustic Ensemble, developed an electronic system in which the source input of the "treatment stations" can be re-assigned in real-time, thus enabling flexible relationships between different ensemble members and the computer. This idea makes sense for a larger group of musicians, such as the Electro-Acoustic Ensemble, but not for *MRMO* which is written for only two instruments and a computer.

the musicians a precision in their realization. At the same time, most of the information is “missing,” in the sense that notes and rhythms have to be invented in real time.

It is the structure of the composition – the overall musical shape which unfolds during the performance – that provides the center around which both prescribed information and improvisation exist. Making use of the potential of my notation system (the emptiness of the gray boxes, their graphic elasticity, and their relationship to the instructions), I designed the structure so it can demonstrate clear and recognizable features – a musically ”logical” development, sharp changes of sounds, and so on – yet at the same time remain flexible. The main conclusion to be drawn from this case study is that musical form should avoid being too amorphic as much as being too rigid. Many works, composed or improvised, tend towards one of these poles, making the experience of listening or playing tiring. A balance between the two is, in my opinion, essential to the creation of an engaging musical result.

The score of *MRMO* opens a creative space that is shared by the performers and the composer. The notation defines certain interrelations between the players themselves, and between them and the composed ideas. In this sense, the score can be perceived as an opening for a collective musical act. It is a framework within which musical interactions can take place rather than a rigid and restrictive set of prescribed instructions.

MRMO demonstrates the ability of a composition to admit improvisation without losing any of its potential merits. Being the earliest of the four pieces discussed in this thesis, *MRMO* was an important phase in developing compositional tools that could be reused in other works and hopefully also by other composers and improvisers.

[Untitled, 2012]

[IMAGE: *[Untitled, 2012]*, score excerpt.]

1. Introduction

[Untitled, 2012] is a composition for solo contrabass and electronics. Unlike my other compositions, it involves no live processing or real-time interaction between a musician and a computer, just a pre-recorded soundtrack which is played uninterruptedly throughout the performance (with one exception, which will be discussed later).

This case study provides the opportunity to revisit the theme of freedom and fixity within a particular situation: a comprehensively composed musical environment. The soundtrack plays a dominant role in this composition, as it presents a strong pole of fixity and provides the skeleton for the entire structure. In this sense, *[Untitled, 2012]* supports philosopher Andy Hamilton's claim that "pre-realized electronic music stands at the far limit of pre-structuring since, although possibly possessing spontaneity at the level of composition, at the level of performance or 'sounding' it is fixed" (Hamilton, 2007, p. 197).[11] The soundtrack in *[Untitled, 2012]* can thus be perceived as a fixed time grid within which the performer can exercise real-time freedom. I will discuss the relation between fixed soundtrack and live performance (Part 2.1) and introduce two concepts that establish a notion of freedom in the interaction of musicians with fixed media: musical time scales (2.1.1) and groove (2.1.2).

The score of *[Untitled, 2012]* can be described as particularly detailed (at least in comparison to my other compositions). It confronts the player with specific instructions regarding pitch, rhythm, dynamics, articulation, and other sound-production techniques such as bow position, bow pressure, glissandi, and portamenti. This level of precision remains constant throughout the entire composition. Nevertheless, despite the complex notation, the degree of freedom here is not less than in the other works; rather, the approach is different. The dense notational environment implies a link to interpretation, perhaps more than it does to improvisation. I will elaborate on the differences and similarities between these two concepts in Part 2.2, making reference to various notational approaches which create a space for collaboration between composer and performer: "non-finished" forms and complex notations.

In order to put *[Untitled, 2012]* within a broader context, the chapter will include a discussion of three other relatively recent compositions (Part 3): *Plex* by Agostino di Scipio (1991), *Bump* by Amnon Wolman (2005), and *Bokeh* by Janco Verduin (2014). Beside the general resemblance between these works and mine (all combine live performance with fixed media), the decision to include a

[11] This description of fixity is to a certain extent arguable, since it does not take into account the interaction between the pre-recorded soundtrack and its environment (the sound system and the performance space). The spatial diffusion and dispersion of the electroacoustic sounds can be modified during the performance, a practice which is normally associated with acousmatic music and that allows for real-time adaptations (see Windsor, 2000, pp. 23–31).

comprehensive discussion of these works was influenced by my involvement in them as a performer. *Plex*, *Bump*, and *Bokeh* have become parts of my regular repertoire as a bass player. I learned the scores, practiced the pieces, and performed them on several occasions. In addition, I had the chance to discuss the works with the composers themselves, asking them directly about the way they understand the relation between their works and the idea of freedom. Hence the discussion will not only be based on my personal approach to composition but also on my experience as a performer and my conversations with the composers of these works. In that sense, the three compositions form a path that leads towards *[Untitled, 2012]* as an experiment in artistic research, musically formulating my ideas on freedom and fixity through the "collision" between fixed media and live performance.

Finally, a note about the title of the work: clearly, *[Untitled, 2012]* provides nothing more than a temporary placeholder for a more proper name. The reason is this work's lack of "mileage": its sole performance was its premiere in 2012. Unlike the other compositions presented in this thesis, *[Untitled, 2012]* has not had the chance to grow between one performance and the next and thus should not be regarded as a fully developed *work* (compare with the case study *The Instrument*). However, although its relative compositional "immaturity," *[Untitled, 2012]* has been included in this thesis because of how it relates to such central concepts as notation and interpretation, and because it demonstrates my personal approach to these concepts based on the notions of freedom and fixity.

2. Music-theoretical Context

Here I will present various music-theoretical concepts that will help to explain the interaction of the musicians with the soundtrack and how the notation weaves real-time freedom around the fixed electronic time grid.

2.1 Fixed Media and Live Performance

[Untitled, 2012] is my own take on a fixed media and live performance work. Common during earlier stages in the development of electronic music,[12] this format has become in a certain sense obsolete, pushed aside by later technological developments based on more reciprocal relationships between computer and musician, such as live-processing and interactive computer systems. An inherent limitation of the format is that the performing musician is straitjacketed by the tape's progress, the latter imposing significant constraints on the freedom of interpretation. The challenge to overcome this limitation is a creative opportunity in itself, which formed the drive to compose *[Untitled, 2012]*.

The question of how to employ freedom effectively in a fixed environment without giving up a clear relationship between the performer's part and the soundtrack influences the notation and the way in which the score is aligned to the soundtrack. Instead of allowing the bass player to play freely within designated time frames (for example, during an entire section of the soundtrack) – a somewhat looser

[12] For example, Karlheinz Stockhausen's *Klavierstück XV* (for piano and tape) and *Kontakte* (for electronic sounds, piano, and percussion), and Luciano Berio's *Thema (Omaggio a Joyce)* (for voice and tape): three examples dating from the 1950s; or ... *sofferte onde serene* ... (for piano and tape) by Luigi Nono from 1976.

compositional approach – I chose to use more precision in the notation, challenging the musician to be flexible within the fixed time grid while keeping in direct relation to its sound content. In the following subsections I will introduce two concepts that locate my approach within a broader context: musical time scales and groove.

2.1.1 Musical Time Scales

The terms "meso"[13] and "sound object," suggested by electronic music composer and theorist Curtis Roads to describe different concepts of musical time scales, can offer a better understanding of freedom in a live performance with a fixed soundtrack. While meso relates to the "divisions of form, groupings of sound objects into hierarchies of phrase structures of various sizes, measured in minutes or seconds," a sound object is "a basic unit of musical structure, generalizing the traditional concept of a note to include complex and mutating sound events on a time scale ranging from a fraction of a second to several seconds" (Roads, 2001, p. 3). The two concepts demonstrate the distinction between, on the one hand, seeking freedom of interpretation within larger time frames, and, on the other hand, establishing accurate relationships between smaller fractions of sound. The different time scales provide the performer with a range of ways of aligning themselves with the soundtrack: the interaction with the electronic sounds occurs at different compositional levels, each of which demands a different kind of attention and results in different playing and sound quality. For example, the performing musician relates to the single beats (provided by the electronic soundtrack) or to entire sections of the composition, each of which demands the use of a different improvisational/creative faculty: rhythmical hyperawareness or a more "remote" listening. Although the two terms originally come to suggest a taxonomy of electroacoustic sounds, the concern here is not "the myriad types of electroacoustic sound objects and structures," but, rather, "the relation of these to our live performer . . . [for example] supportive/accompanying, antagonistic, alienated, contrasting, responsorial, developmental/extended" (Emmerson, 1994, p. 32). These different dispositions between the musician and the fixed time grid are, in fact, ways in which freedom is already incorporated in the composition.

2.1.2 Groove

Another concept which can assist in settling the (seeming) contradiction between freedom of interpretation and direct attention to details is "groove." This term describes the ability to "[select] salient features out of a sequence of sounds and [relate] these features in such a manner that . . . a sense of regularity, differentiation, and cyclicity in the music" can be identified (Meelberg, 2011, n.p.). Particularly focusing on the differentiation between simultaneously played musical lines and their gradual falling into synchronization, electronic musician Tomer Baruch introduces the notion of "participatory discrepancies," which addresses "the slight deviations which occur every time more than one person is playing music (together)" (Baruch, 2016, p. 13; see also Keil, 1987). Baruch's definition is based on a "relation between music and a listener [which might be also a performer] which involves *entrainment* and

[13] The complete term, as it is used by Roads, is "meso time scale." In will use only the prefix.

participation" (Baruch, 2016, pp. 15–16, my italics). "Entrainment" refers to the synchronization of musician and music, whereas "participation" refers to the involvement of a musician in the music.

The way in which a musician engages with a fixed soundtrack is comparable to groove. The soundtrack can be perceived as a rhythmic frame which allows interpretive freedom as much as rhythmical synchronicity and around which the live playing develops. In this sense, the combination of rhythmic stability and instability (the participatory discrepancies) creates an effective mix of freedom and fixity, allowing for real-time adaptations rather than posing musical constraints.

2.2 Between Interpretation and Improvisation

The degree to which the score of *[Untitled, 2012]* provides detailed instructions suggests a link to the concept of interpretation. At the same time, the score of *[Untitled, 2012]* also remains substantially open, thus creating a link to improvisation. What is the difference between these two concepts, and should they be discerned as fundamentally different from each other? A possible answer is provided by Andy Hamilton, a philosopher interested in the aesthetics of composition and jazz:

> As interpreters get to know a work intimately, they internalize it and make it their own – just as actors do not merely recite the lines of a play but become the part. A certain freedom then develops. In contrast to the macro-freedom of improvisers, there is a micro-freedom for interpreters to reconceive the work at the moment of performance, involving many subtle parameters such as tone and dynamics. A performance will then feel like a 'leap into the unknown' and will have an improvised feel. (Hamilton, 2007, p. 212)

Following Hamilton, it would be wrong to exclude freedom from either case. Yet the way in which it appears is different. For the improviser, freedom exists at a macro level: it is the liberty to invent from scratch, creating something which did not exist until the moment of playing. In contrast, interpretation encompasses micro freedom: this is the liberty of the musician to stretch or to compress, to emphasize or to understate, or to flex an already existing musical text in any way. The same notion also fits the idea of extemporization – embellishing a given melody by adding ornaments, yet without changing the pre-established structure. Preserving the prescribed information is in fact what makes this kind of freedom possible, since it provides the material which affords flexibility to the musician: "not only do performers have *room* for improvisation but also it is *required*: for there can be no performance without filling in [the] *Unbestimmtheitsstellen* [places of indeterminacy]" (Benson, 2003, p. 82, italics in original).[14] In this sense, the notion of freedom is relevant to interpretation as much as it is to improvisation since it can

[14] Isaiah Berlin, in his oft-quoted discussion of positive and negative freedom, agrees with this idea: "For the musician, after he has assimilated the pattern of the composer's score, and has made the composer's ends his own, the playing of the music is not obedience to external laws, a compulsion and a barrier to liberty, but a free, unimpeded exercise. The player is not bound to the score as an ox to the plough, or a factory worker to the machine. He has absorbed the score into his own system, has, by understanding it, identified it with himself, has changed it from an impediment to free activity into an element in that activity itself" (Berlin, 1969, p. 14).

reanimate the (already existing) material – the process which Hamilton describes as "an improvised feel" or a "leap into the unknown."[15]

In practice, however, the interesting question is not how to distinguish between interpretation and improvisation, but, rather, how to combine them on the basis of one factor which is common to both of them: freedom. Composer Pierre Boulez, in a harsh criticism of indeterminacy in music in his essay *Alea*, attempted to configure a way of incorporating what he refers to as "chance" into the compositional process using – in his opinion – a well-established, responsible approach: "If the interpreter can modify the text as he likes, this modification must be implied by the text and not merely added afterwards. The musical text should contain inherently this 'chance' of the interpreter" (Boulez, 1964, p. 46). Even if not meant as such, this statement can perhaps suggest a bridge between interpretation and improvisation. The performative process revolves around both micro and macro freedoms – a liberty which emerges out of the already existing text, yet also exceeds its pre-established boundaries. The freedom to improvise while, simultaneously, realizing an existing composition, should be afforded by the composition. The same idea which could be also encountered from the perspective of the performer, for whom "the interpretive act is an assertion of . . . individual values and ideas, as well as a rendering of the composer's intentions" (Waterman, 1994, pp. 154–5).

2.2.1 "Non-Finished" Notations

A good example for the combination of interpretation and improvisation is the work of composer and improviser Anthony Braxton. Braxton acknowledges only sociocultural (rather than inherent) differences between interpretation and improvisation. According to music journalist Graham Lock:

> Notation plays a different role in Western classical music than it does in African American creative music, where improvisation *on* written material is more highly prized than the correct execution *of* it. . . . In many black musics . . . notation is used as a guide or platform for improvisation – for example, in the way a written-out ensemble riff might underpin an improvised solo – so that the score is only one component of the total performance, whereas in the Western classical tradition there is generally more emphasis on a faithful rendition of the score as being the main focus and purpose of the performance. (Lock, 2008, p. 8, italics in original)

The difference between improvisation and interpretation, according to Braxton, is thus not inherent to notation, but to the way it is used (see also Lewis, 2002). In his own written compositions Braxton indeed recognizes the coexistence of interpretation and improvisation. As noted by Lock, Braxton's notations

[15] In principle, Benson's approach also disrupts the seeming opposition between improvisation and interpretation, since he recognizes no fundamental difference between these two performative acts (Benson, 2003, pp. 33–76). In this sense, the concept of freedom can indeed suggest an alternative discourse which recognizes both the common factor between interpretation and improvisation and their differences.

> represent a kind of porous or [intentionally] non-finished form in which tiny pockets of improvisational space permeate the musical structure. This embedding of space within the formal fabric of the composition, via the visual 'improviser's notation', means it is virtually impossible to play these works, even as a straight run-through of the score, without 'individual presence' and the 'feeling of the moment' suffusing the performance. (Lock, 2008, p. 8)

The space within the compositional fabric, however, should not be reserved only for improvisation, which happens in real time; it might also provide an invitation for the interpreter to participate in a creative process which takes place *prior* to the performance and goes beyond just learning and practicing a given part. In addition to Hamilton's ideas, here interpretation is permeated by macro freedom too. In works such as those by Braxton,

> the processes of revision and annotation inherent to the preparation of a performance often turn the score into something active and rather more transitory than the bound collection of printed sheets suggests at first sight. (Rebelo, 2010, pp. 21–2)

The emphasis here should be on "active" and "transitory" processes, which reconfigure the score into something which cannot be foreseen by the composer. The performers' preparations exceed the notion of interpretation in its more traditional sense, blurring the division between interpreter and composer where the former is responsible for the realization of the material provided by the latter, while the latter's responsibility is to communicate his or her ideas in a "finished" form.

2.2.2 Complex Notations

The notion of freedom as an integral part of interpretation should not be reserved only to so-called incomplete notation forms. What if the score does not *underspecify* the material, but in fact *overspecify* it?[16] In the latter case, the interpreter is obliged to omit certain parts of the information, since the entire aggregate of instructions is sometimes impossible to execute. This involves significant preparations by the musician, exceeding the process of simply practicing the notated music. Describing the score of *Cassandra's Dream Song*, a particularly complex composition for solo flute, composer Brian Ferneyhough writes: "This work owes its conceptions to certain considerations arising out of the problems and possibilities inherent in the notation – realisation relationship" (Ferneyhough, 1970, n.p.). The discrepancies, so to speak, between the information conveyed and its execution are perceived as a virtue rather than as a disadvantage.

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[16] In linguistic studies, these two terms describe two concepts of universal grammar (the foundational principles of human language carried within us as our innate ability to learn a language): one which perceives it as incomplete and one which perceives it as overabundant. In other words, underspecification describes a more rudimentary model which has to be completed in normal human language, whereas overspecification refers to certain excess details that have to be filtered out (Baker, 2005, pp. 156-61). Here I apply the two terms to music: a score can be interpreted by a process of extrapolating from incomplete information or by filtering out excess information. The terms helped me to establish a view of notation which, as detailed and precise as it may seem, is nevertheless not contrary to the idea of freedom.

It is important to realize, then, that even if the notation is highly detailed, requiring the musician to perform many simultaneous actions, the intention is not necessarily musical determinacy. Extremely detailed notation may promote freedom as much as it can imply fixity: an idea which has not been overlooked by composers who are fully aware that "the final sounding result is not precisely definable in advance, arising as it does from the intent of the performer to realise as many of the highly-specific notated actions as possible" (Ferneyhough, 1974, n.p.). The same point of view is shared by composer and improviser Richard Barrett, who writes: "Complexity is not a forbidding exterior but an endlessly attractive interior, a strange attractor" (Barrett, 1992, n.p.). Complex notations clearly point towards freedom being inseparable from the musical information conveyed by the score. The endless "mystery" behind complexity demands the attention of the performer, and his or her commitment to go beyond a simplistic view of the relationship between score, the actions of playing and the sounding result, in order to discover new and unexpected paths which may have been unforeseen by the composer.

3. Musical Context: Works for Fixed Media and Live Performance

How would the ideas discussed so far come through as part of a composed musical text? In the following sections I will discuss three compositions – *Plex* by Agostino di Scipio, *Bump* by Amnon Wolman, and *Bokeh* by Janco Verduin – each of which is based on a different approach to weaving instrumental instructions around a fixed soundtrack. I will comment on the advantages and disadvantages of the choices made by these composers regarding notation, soundtrack, and their combination.

While each of the three compositions has a distinct notational and compositional approach, they also have one important common factor: they define a relatively broad reference point for the musician(s) to follow the soundtrack. The relation between the live performance and the electronics is formed through wide musical gestures that relate to the overall texture of sound rather than to particular details or that occur at the level of entire sections of the composition (a meso time scale rather than a sound object). The outcome of such an approach is that the musicians develop their sound independently of the soundtrack without being "interrupted" by the electronics events and are free to explore various paths within entire sections or even throughout the whole piece. *Plex*, for example, lets the sound of the bass evolve independently of the electronics, disregarding (in most parts) the alignment between bass part and soundtrack. *Bump* has even less of a concrete relation between bass and electronics, since the performer is free to explore the musical material within what seems to be a surrounding environment of unrelated electronic sounds. And in *Bokeh*, although the score does introduce an exact alignment between the instrumental parts and the soundtrack, the performance does not necessarily depend on this idea, but relies on other qualities of the composition which are far more open.

While all three works rely on a less precise relation between the live parts and the soundtrack, *[Untitled, 2012]* asks the musician to lock tightly into the soundtrack, rhythmically engaging with the electronic sounds at the (micro) level of the beats and the individual phrases. But rather than implying a rigid synchronization between the instrumental part and the electronics, this particular focus is in fact what permits the performer's freedom. My approach, which I see as essentially different from that of the other

three composers, provides an alternative musical manifestation of the ideas I have discussed so far and fills a certain gap between freedom and fixity which I have become aware of through my interaction with these works.

3.1 *Plex*

[IMAGE: *Plex,* score excerpt.]

Plex (1991) by Agostino Di Scipio is a composition for contrabass and electronic soundtrack.[17] The score is divided into four parts, and apart from their starting moment and a few other events that have to be synchronized with the soundtrack (the player uses a stopwatch in order to keep track of time), the notation does not relate directly to the electronic part.

The score introduces a relatively small amount of notated material, one stave only for each of the four parts. This basic material is elaborated by what Di Scipio calls "backtrack paths": the performer is invited to repeat smaller segments of the part, freely advancing forward and backward between the designated paths. The repetitions are enhanced with an extra layer of musical information: indications of speed, dynamics, or technique are superimposed on the material, allowing a single phrase to sound different each time. This stretches the interpretational micro freedom beyond its conventional boundaries and transforms the original content into smaller fractions of idiosyncratic material. The idea of musical development in *Plex* is derived directly from this flexibility, "harvesting" the expansion of the basic material from the decisions of the performer.[18]

However, I am ambivalent about whether *Plex* really allows the musician to exercise improvisation effectively. Di Scipio encourages the performer to "plan what paths should be followed in his/her way through the score, rather than taking random decisions while playing" (Di Scipio, 1991). And, indeed, from my experience as a player, realizing all the necessary factors for the performance – choosing which backtrack path to follow, applying the speed, dynamics, and playing technique for each part, while at the same time keeping track of the stopwatch – has proved an almost impossible task. After several experiments and performances with which I was less than content, I decided to fix my performance path by preselecting the backtrack paths.

[IMAGE: My annotated rendition of the score.]

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[17] This is an early work of Di Scipio, before he developed his more comprehensive, ecological approach to composition. In his own words: "At the time I made *Plex* . . . I was still searching for my path and researching both compositional techniques and computer-processing techniques. In retrospect I consider *Plex* one of the most convincing works I did in my younger years, although I see today many things that I could have worked out better" (Di Scipio, personal communication, November 10, 2014).

[18] This particular approach towards notation resembles *Klavierstück XI* for solo piano by Karlheinz Stockhausen, which features 19 fragments to be played in any order: "The performer looks at random at the sheet of music" (Stockhausen, 1956, n.p.) and moves freely from one fragment to the next. The dynamic level and speed are also flexible, decided by following the indications at the end of each fragment, which affect the way the next chosen fragment will sound.

[MEDIA: *Plex* (excerpt, part B) played at haTeiva (Ilya ziblat, contrabass).]

Each backtrack path segment was cut and pasted in the correct sequence for the performance. I also marked in advance the playing technique for each segment, using a color code. Regarding spontaneous performance, Di Scipio commented: "Well, I was aware that 'spontaneous decisions' would have been too difficult to make, as you have seen for yourself. 'Improvisation' here would be possible only by very very deeply 'internalizing' the particular materials and the performance praxis. . . . It would be like an ideal target situation, but not achievable in actuality" (Di Scipio, personal communication, November 10, 2014).

In fact, in my interpretation of *Plex* the original notion of flexibility suggested by the navigation between the backtrack paths was eliminated from the performance itself, because I was relying on a pre-prepared path. Yet this proved a more practical solution for performing the piece, and my *interpretation* gained a greater sense of conviction that was lacking in earlier performances where I was *improvising* my path in real-time. The decision to remain within the limits of micro freedom has proved a liberating factor, allowing for musical flow to properly emerge during the performance.

What, then, stands behind the decision to use the backtrack paths? According to Di Scipio:

> The same notated gesture would reveal different nuances of timbre if played with different timing and variable dynamics. I wanted everything to be more qualitatively merged in the sound flow heard from the tape, and I wanted to leave room for the performer to listen to the taped materials and find his/her way into the pace and rhythm of the whole thing. I never wanted instrumentalists to be under the spell of a click track. What was new, for me, in *Plex* was the . . . 'local' freedom to recycle and vary the notated materials, and the fixed matrix of larger-scale time spots where synch with the tape is requested. I have used these dual arrangements in many other pieces after that: sound matter evolves more qualitatively, 'against' a fixed frame of deadlines to be matched. I assume that creates in each section a sense of growing anxiety for the bassist (which reflects the overall form of the piece: a very long 'anacrusis', leading to no downbeat). (Di Scipio, personal communication, November 10, 2014)

Di Scipio's approach seems first of all sound-oriented. The player is given the space to find his or her way during the performance in order to develop the instrumental part. This is also how the connection between the musician and the fixed soundtrack can be established: the bass part develops uninterruptedly, in parallel with the unfolding electronic soundtrack and independently of exact synchronizations. The player's attention is directed towards a wider perspective than the small-scale level of the rhythmic details, which intensifies the listening experience and lets the live performance immerse with the pre-recorded soundtrack: "[By] leav[ing] room for the performer to listen to the taped materials . . . everything [is] more qualitatively merged in the sound flow heard from the tape" (Di Scipio, personal communication, November 10, 2014).

Finally, Di Scipio also discussed the relation between the flexibility of the score and the freedom of the performer and his interest in the subject, which is evidently different from mine:

> It seems to me that, being more interested in timbre, texture and noise, as a composer I'd better provide an interpreter with ways to find his/her way, not prescribing a fixed result. A 'fixed result' would anyway remain an ideal. I am not about the actualisation of an ideal image of what a sound or a gesture should exactly be, I am more about opening up specific material conditions for the kind of sound events or gestures that can be acceptable and consistent with the context I propose. (Di Scipio, personal communication, November 10, 2014)

While my approach relies mainly on establishing freedom as the key notion of the composition itself, Di Scipio's concern is more with sound: "timbre, texture and noise." The difference can perhaps be best perceived in terms of the composer's focus: towards the audience, who experiences the composition more as an auditory or performative experience, or towards the performer, who has to be concerned with "under-the-hood" practicalities which are essential for negotiating between the live performance and the requirements of the work. As asserted by electronic-music composer Simon Emmerson, the concern of the composer should not ignore

> the frustrations of the real performer, straight-jacketed by a tape part, unable to hear the overall effect of live electronics, etc.; perhaps our position has moved to too great an extent towards the listener. One of the greatest dislocations of western art music (the performer/listener distinction) must not blind us to the need to let the performer have some control even over those elements which may not articulate 'expressive' detail. (Emmerson, 1994, p. 33)

Perhaps triggered by my experience as a performing musician, the real-time freedom of the performer has become an indispensable focus for my compositions – a focus point which to a certain extent is lacking in *Plex*.

3.2 *Bump*

[MEDIA: *Bump*, video excerpts from concert at Nutshuis, the Hague.]

Bump (2005) by Amnon Wolman is a composition for bass and electronic soundtrack. Unlike the other works discussed in this chapter, this work is not meant to be part of a "normal" concert program but to be presented as a performance piece or installation with no determined length, "in an open space where people are usually standing or walking but not sitting. A gallery, a lobby, a foyer of a concert hall, or the middle of a park could all serve as places for the performance of the piece, but not a traditional concert hall" (Wolman, 2005, n.p.). The bass player wanders around the performance space, chooses one audience member, "stand[ing] as close as possible to that person . . . in the most intimate way" (Wolman,

2005, n.p.), and performs a short segment of the composition (simultaneously singing and playing the bass) before moving to the next person.

[IMAGE: *Bump*, score excerpt.]

Each system in the score contains three staves: one for the instrumental part, a second one for the vocal part – both notated in hand-drawn, broken/curved lines (graphic notation) - and a third stave that contains only a single note as a reference pitch for tuning the playing and singing.[19] This graphic information has to be rendered into a performable version, and so, similarly to *Plex,* this work necessitates a certain amount of preparation before the performance, an active revision and annotation of the score by the performer. This is, in fact, an open invitation by the composer to the performer to share compositional responsibility. Wolman described this decision-making process to me in an email: “In general, with my scores, I decide in advance which factors I find important to define explicitly, and for which factors I would be willing to accept any decisions made by the player, as a presentation of my work. After that, I will leave it in their [the interpreter’s] hands” (Wolman, personal communication, June 4, 2016). I decided to “complete” Wolman’s "non-finished” notation, making my own version of the score:

[IMAGE: *Bump*, My rendition of the score.]

Although the score has only one page, the duration of the entire performance might last up to one hour (which is the total duration of the soundtrack) or even longer (in a live-electronics version of *Bump* in which the electronic sounds are generated by a Max/MSP patch). This intended discrepancy between the length of the bass part and the electronics opens another channel of freedom for the performing musician, who has to make choices concerning the distribution of the notated material, dividing it into shorter segments and moving across the performance space from one "private" performance to another.

The feelings of intimacy and awareness, which arise from experiencing the work lead to an unusual musical encounter. The player shares his or her interpretation of the score, making use of the material learned in advance, and does so spontaneously (in real time). This constitutes the musical identity of *Bump* as an ever-changing and flexible but simultaneously fixed work. It requires a demanding combination of mental faculties (memorizing, playing, singing, tuning, improvising), and the sharing of these performance “risks” with the audience in a direct and intimate way. Although the result cannot said to be improvised (the score clearly indicates: “This is not an improvisation but rather the performer is asked to prepare a fixed version before the public interaction” [Wolman, 2005, n.p.]), it still involves a substantial degree of freedom for the player, which is communicated to the audience at first hand, in a one-on-one interaction between performer and audience.

[19] A similar notation method is used by James Tenney in *Beast* for bass. That score introduces a single curved line, representing the deviation of one (moving) pitch in relation to the static reference pitch, resulting in a continuously evolving interval (performed on two adjacent strings of the bass: one stopped, one open).

Although the playing does not align with the soundtrack but rather floats independently in the same space, a sense of enhanced awareness can be experienced while playing *Bump*, enforcing a strong feeling of engagement between the performing musician, the electronic soundtrack, and the audience.[20] The discovery of such a quality within a compositional framework which can be easily labeled "experimental" – avoiding any structural arrangement that would suggest a link between soundtrack and score – offers an interesting, even if distinct approach towards notation and composition on the one hand, and a particularly rewarding experience as to how these can be transmitted to an audience on the other.

3.3 *Bokeh*

[MEDIA: *Bokeh* (audio excerpt), performed by Elisenda Pujas and Ilya Ziblat.]

Bokeh (2014) by the Dutch composer Janco Verduin is a composition for bass, voice, and electronic soundtrack. The score comprises eight parts (four vocal and four bass), of which six are pre-recorded, processed (passing through a reverb effect with various settings, creating the simulation of different recording spaces), and mixed down as a fixed 2-channel track. The remaining two parts, one for voice and one for bass, are performed live, simultaneously with the pre-recorded soundtrack. The entire aggregate of overlapping parts creates a richly woven tapestry which appears somewhat blurry (the term "bokeh" refers to out-of-focus parts of a photograph).

[IMAGE: *Bokeh*, score excerpt.]

The score is more traditional than most of the others described in this thesis. It uses metric notation, dividing the music into bars, beats, and their subdivisions (a constant 1/8 or 1/16 pulse is maintained throughout the entire work). This kind of notation implies precise synchronization between the parts – those that are played live and those that are pre-recorded. The score prescribes not only notes and rhythms but also dynamics and different playing techniques: for example, the position of the bow on the string (sul ponticello, sul tasto), different vocalization techniques for the singer (open/closed mouth). This layer of information is superimposed over the notes and rhythm, together creating an aggregate of undercurrent rhythmical pulses and textural changes.[21] While this score appears to leave very little room

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[20] Another work in which the performer has to move in the space in a similar way to *Bump*, is Luigi Nono's *La Lontananza Nostalgica Utopica Futura*. As described by Tim Rutherford-Johnson:

> The soloist's part is divided into six parts. The order is fixed, but each sheet is to be distributed among six music stands, spread around the auditorium. During the course of the piece s/he walks from one stand to the next – the piece is after all subtitled "madrigal for many 'travellers' with Gidon Kremer." (Rutherford-Johnson, 2012, n.p.)

While the performance is fixed, here it is the electronic part which is to a certain extent unpredictable: it is performed live by a sound technician, who controls the levels of the separate electronic channels and is free to fade them up or down. Richard Barrett, who has performed the electronic part for this piece, has described his experience during the performance as "the [enhanced] awareness . . . of all the pathways the music *might* have taken but on this occasion doesn't" (Barrett, personal communication, September 3, 2018, italics in original).

[21] [IMAGE: *Bokeh*, score excerpt.]

for the musician, performing *Bokeh* does involve, in fact, a significant amount of freedom. How does the notation here convey flexibility to the performer?

Based on my views as a composer and performer I would have opted for a notation that represents the sound transformations differently, particularly the weaving of the individual parts. An open notation would contribute to a freer performance, liberating the musician from a more restrictive mode of playing, and reducing the risk of losing the alignment between score and soundtrack. But more fundamentally, open notation could help to shift the attention of the musician more towards *listening* and less towards *following* the score. Playing an open score would contribute to interlacing the different parts more loosely. In an email interview, I asked Verduin if, in his opinion, his composition would not have gained from a more flexible notation. His answer was:

> I don't agree. Not because of the advantages you mention but because of the concept of the piece itself. . . . [In] *Bokeh* I wanted to explore the idea of sound as the sum of transitions through different acoustical environments. As you know, the piece is like four duos of voice and double bass where each duo has a different environment (up close, far away and two intermediates of which one is the live duo). Rhythmically, I could have chosen more fuzzy textures, but for the bass I wanted a steady pulse so there would be a kind of unity that travels through these spaces, as if it were one sound made up by four particles in different circumstances. The total sound would be a compound creature, the sum of those four elements. (Verduin, personal communication, October 24, 2014)

Verduin's description, "the sum of transitions through different acoustical environments," refers to the textural transitions prescribed in the score and the way that they blend into an eight-part matrix, in a way which could perhaps be compared to the process of mixing an electronic track using the faders in order to blend in different channels. But at the same time the underlying pulse is an essential part of *Bokeh*'s identity (in a manner which can be considered as typically Dutch, demonstrating an obvious link to the rhythms and drive of works by Louis Andriessen and his followers). Without this pulse, the rhythmic drive would be lost, and "more fuzzy textures" would appear instead of the powerful drive which carries the performance in its current version.

In our performances of *Bokeh*, the singer and I interpreted the score in a relatively flexible manner, renouncing, to a certain extent, the strictness of the rhythmic alignment between live and pre-recorded parts and, as a result, attaining freedom without abandoning the rhythmic "engine." In this way, despite its traditional notation, *Bokeh* could allow a considerable degree of freedom without losing its rhythmic drive. This form of extended interpretational micro freedom – on the verge of improvisational macro freedom – has proved practical in the sense that it has allowed the performance to accumulate enough energy while also respecting the composer's directions.

4. *[Untitled, 2012]*

Each of the works described so far presents a distinct approach to interweaving live performance with fixed media. However, none was entirely satisfying to me, and *[Untitled, 2012]* stands as an experiment in overcoming the disadvantages I see in all three works. The compositions *Bump* and *Plex* let the bass part develop independently of the soundtrack and, to a certain extent, give up any clear sense of a relationship between the two. *Bokeh* offers a more elaborate relationship between performers and soundtrack, yet, to my mind, it fails to provide a sufficient degree of freedom (or, once such freedom is anyhow "claimed" by the musicians, they, the score, and the soundtrack become disconnected). How could my composition provide an answer to these shortcomings?

Although these reflections are mainly based on my personal experience, these shortcomings seem inherent to compositions that combine live performers and fixed soundtracks. *[Untitled, 2012]* is my tentative musical answer to the question of how a composition based on these two ingredients can form a more elaborate connection, while at the same time providing real-time musical freedom. It demands a tight engagement from the performers – "tight" being a jazz term to describe the speed of response and level of engagement within a group of improvising musicians. I wanted to focus the attention of the performer on the rhythmical aspects and not only on the texture of the soundtrack; to require the performer to stay alert to particular details, rather than allowing a wider, and more distant perspective; and to create a more idiosyncratic connection between player and soundtrack, allowing the immersion of live sounds into electronics to compensate for the inherent unresponsive quality of the fixed soundtrack.

[MEDIA: *[Untitled, 2012],* audio excerpt. Performed by John Eckhardt, ISCM New Music Days, 2012, Antwerp.]

The soundtrack of *[Untitled, 2012]* provides the rhythmic grid into which the bass player interweaves the instrumental part in real time. While the electronic sounds provide the role of accompaniment – a pre-composed "rhythm section" – the bass player takes the lead role as the "soloist." A comparison to jazz improvisation seems logical: there, the soloist usually keeps a tight connection with the rhythm section. In *[Untitled, 2012]* the role of the rhythm section is filled by the soundtrack, yet, rather than preventing freedom, this has to supply the necessary creative drive for the bass player. The key feature that provides that freedom is that the score can be played in different tempi, so the orientation of the instrumental part to the soundtrack can be adjusted during the performance. This stretching or compressing of parts of the score enables the bass player to "lock in" to the accompanying electronic soundtrack, intertwining it with an additional layer of live instrumental sounds without the loss of freedom that would result from rigid submission to the soundtrack.

The score of *[Untitled, 2012]* consists of small units, several of which have flexible speed indications. The very beginning provides a good example: the first two bars are played repeatedly for 30 seconds, during which the soundtrack features a single layer of percussive-sounding periodic pulses. While the speed of the electronic beats is gradually accelerating (that is, the gap between each electronic beat and the next is getting shorter), the musician is instructed to perform his or her part slower on each repeat.

The effect of these opposite processes – acceleration of the soundtrack and slowing down of the live part – is that a decreasing amount of notated material will be played with each repeat, "trimming" the end of a bar more and more.

[MEDIA: *[Untitled, 2012]*, audio (performed by John Eckhardt) and score excerpts: This part is played repeatedly, each repeat lasting 3 beats (marked in the score as an encircled "p" with a down arrow). The bass starts bar 1 in sync with the first beats, but the rest of the material in this bar (non-continuous glissandi, with separated bows) will be cropped incrementally every time it repeats because of the accelerating speed of the soundtrack's beat.]

In order to allow for greater flexibility, the soundtrack, for the most part, features several overlapping layers of sound that are perceived as a multilayered polyrhythmic grid. Although it is fixed in advance, this grid still allows freedom in the interaction between bass player and soundtrack. The relation to musical groove should be clear: the soundtrack presents a rhythmically regular structure, based, however, on a selection process performed in real-time by the musician. The strong multilayered nature of the soundtrack simulates, to a certain extent, the interactions within a group of improvisers. The bass player can choose which sound layer to respond to and adjust the notated material in relation to it, creating the effect of momentarily synchronizing with the rhythm; more specifically, playing "before" or "after" the beat or with a double- or half-time "feel." The flexibility of the notation, in combination with the compound rhythms implied by the electronic soundtrack, allows the bass player to shape the material, thus expanding interpretation beyond its traditional boundaries. The relation between the performed part and the electronics does not only rely on the perception of the sound quality: instead of that relatively amorphous frame of reference, the bassist interlocks more precisely at the level of the individual beats. As an example, the last system of the first page (in the audio recording starting from 1:06) features a sequence of five successive crotchets, corresponding to an accompaniment of five beats ("p" marks), which is repeated several times. But as the accompaniment is an amalgam of several overlapping rhythms, it provides the player with multiple options of how to synchronize with it.

[IMAGE: *[Untitled, 2012]*, score excerpt.]

Hence, this freedom is situated more at the level of Roads' sound object than the larger meso time scale.

Another feature of *[Untitled, 2012]* which overcomes fixity is the ability to interrupt the composed narrative: the player can stop the tape at any point for an unlimited period and freely elaborate on one notated event on the paused electronic timeline. In the score I have described these interruptions as a "comment on the given material, or as a possibility to break away from the compulsory motion of time," suggesting that the player has the ability to break away from the automated tape progression in order to reflect on the composed content by improvising. This creates an explicit contrast with the fixity of the soundtrack.

[MEDIA: *[Untitled, 2012]* (excerpt), performed by John Eckhardt.]

By using the methods described above, I have ensured that the live part and the soundtrack connect in a "safe" way, eliminating the risk that the musician loses his or her place in relation to the electronics. But more fundamentally, this approach introduces freedom as an inherent facet of the composition. Although the soundtrack is fixed – a "frozen" aggregate of sounds and rhythms – the performance is still an open dialogue between bass player and soundtrack.

5. Conclusion

In each of the compositions I have described in this chapter, a soundtrack functions as the main structural backbone. These soundtracks present inflexible, hard-coded time grids to which the performers have to align themselves. They raise a compositional challenge: how to allow freedom while also retaining a clear relation to the electronic sounds? How not to fall into either of the two "traps": creating a performance situation in which the musician is straitjacketed by a totally mechanical clock, or letting the live performance float freely without a coherent relation to the electronic part?

The scores I have discussed attempt to provide the missing link between the soundtrack and the live performance. The notations provides the space for the live sounds to develop as an interaction between the performer's real-time decisions, the pre-composed contents, and the soundtrack. The directions remain open enough to allow freedom, while also directing the attention of the performer to the fixed electronics. The soundtrack becomes the primary source for evoking real-time creativity, rather than functioning as a restricting factor.

The presence of fixity in all these case studies is highlighted. By confronting the hard-coded framework, the three other composers and myself had to look for alternative ways to introduce freedom. On the border between improvisation and interpretation, freedom can be embodied at different levels of the composition: the musical material (especially the rhythm), the instrumental instructions, or, more generally, the sound quality. These different musical ingredients provide choices of how to "inject" real-time freedom into the fixed soundtrack.

My compositional strategy in *[Untitled, 2012]* was different from those of the other composers: the score is much more condensed, and richer in detail. I allowed the fixity of the soundtrack to influence my notation, making it more precise than in any of my other compositions. Nevertheless, freedom is still very much present: it is embodied in the accurate details and in the way these are superimposed on the soundtrack's multilayered rhythmic grid; for example, the way in which relatively short gestures can be stretched or compressed in relation to the electronic pulses. And, prior to any played gesture, freedom exists in how the musician listens to the soundtrack's groove, which provides a myriad of potential paths to follow. Freedom appears in *[Untitled, 2012]* in its micro-scale form more than it does in any of my other compositions; this, however, should not mean that the freedom is less concrete. This fine-tuning of freedom calls for close attention, careful listening, and fast responses. The outcome should be evaluated according to the close focus and "tightness" it requires from the performing musician, which hopefully is also transferred to the listener.

How does this case study provide a new perspective on the idea of freedom and fixity, that can add to the ideas presented in and through my other compositions? To start with, the fixed soundtrack in *[Untitled, 2012]* presents a different approach from those works in which I am using a *flexible timeline*: *hasBara* and *MRMO*. While the latter implies innate freedom, the soundtrack of *[Untitled, 2012]* is a fixed skeleton around which the musician exercises real-time freedom. Also the notation here is different from the other two case studies: the scores of *hasBara* and *MRMO* present traditional notation only at the beginning of each section, in order to establish a local musical idiom from which point on the performer is asked to continue improvising in the same "style." In *[Untitled, 2012]*, on the other hand, the notation remains detailed throughout the entire score. The same idea applies also to the electronics which in *[Untitled, 2012]* is fixed from beginning to end, while in *The Instrument* the computer part is interactive and shaped by the musicians in real-time. Finally, a comparison could be made between the role of the soundtrack in *[Untitled, 2012]* and that of the undirected improvisation in *hasBara*. In the latter case free improvisation functions as a compositional void around which a musical narrative is formed, thus playing a central structural role which is similar to that of the fixed electronics in *[Untitled, 2012]*. In this sense, the two compositions can be understood as each other's antipodes, highlighting either fixity or freedom as their main musical-gravitational forces.

What next? What this case study might suggest in terms of future musical works and fresh artistic visions is not an easy question, since the path I have been exploring since composing *[Untitled, 2012]* was directed at live-processing and interactive computer systems, on the one hand, and open, "improvisatory" notation, on the other. A possible continuation would be to combine the score with a real-time generated electronic part and challenge the bass player's flexibility even more by forcing him or her to react to a much less foreseen timeline. Another possibility would be to expand the electronic part, rendering the material as a multichannel track, thus creating a sonic environment which is richer in possibilities. Such an elaborated, multilayered electronics part could play on the range between "local" and "field" paradigms (Emmerson, 1994), offering the performing musician the choice to relate to a more direct, nearby sound source or to a more distant sonic environment. Such a work could take the shape of an installation (inspired by Wolman's *Bump*), where audience and performer are free to move around in a large space in which several sound sources are placed, thus changing the sonic perspective of both player and listeners as the music unfolds. As a concluding idea, it would be good to indicate that the compositional "restraint" in form of a fixed soundtrack has served as a creative challenge, providing different paths for composing, performing, and discussing the material – many more than I might have thought at the outset.

The Instrument

1. Introduction

My composition *The Instrument* consists of an interactive live-electronics computer system programmed in SuperCollider,[22] with supplementary audio material; it can be played by any number of musicians connected to the computer through its audio input. Any musical instrument may be used to trigger the system, as well as other kinds of resonating objects which are not traditional musical instruments. The composition does not involve a score or any other prescribed instructions for performance. This chapter will focus on the patterns and behaviors according to which the computer and the musicians interact and, as a result of this interaction, produce, in real time, a musical structure. Throughout the chapter I will show how the musical identity of the composition is based on the combination of freedom and fixity.

I will start with an account of *The Instrument*'s performance history (Part 2). During the period from the first performance (which took place in 2013) until today, the work has had several realizations, reshaping the composed content and presenting it in different staged contexts.[23] For example, what was initially thought of as an installation – an open-ended piece, not presented in a concert situation – later transformed into a "normal" concert piece by presenting the same live-electronics system in the form of an improvised set. The content of the composition itself (the programmed code) has remained largely the same throughout these later realizations. I will give a detailed account of the different realizations and propose that the reason why a single source of composed material has the potential to manifest itself in such a variety of ways is the outcome of various combinations of its free and fixed properties. In that sense, the different derivations of the composed material of *The Instrument* are a direct result of the fundamental idea of my research.

In Part 3, I will concentrate on the composition. This part will be divided into three subsections, focusing on the structure, the audio material (used for the digital processing), and the interactive features of the live-electronics system. In section 3.1, I will use the term "flexibility" to refer to *The Instrument*'s musical form which emerges only in the course of performance, based on the interactions between the musicians and the computer. This flexibility is generated by the system's presets (the SuperCollider code), but these patterns are activated in real time, triggered by the musicians' live input. In that sense,

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[22] SuperCollider is an open source software for audio synthesis and algorithmic composition. It includes a real-time audio server and a programming language. Initially released by James McCartney in 1996, it is now maintained and developed by an online community of musicians, programmers, and researchers. Supercollider has become my main tool for electronic music, enabling me to create and process sounds and to design real-time interactive systems. https://supercollider.github.io/

[23] I am making a distinction here between the "composition" and the "work." This is an essential difference, which will be used frequently throughout the chapter. By "composition," I refer to a composed framework: the designed "architecture" and musical materials which are included. The term "work" includes to the array of possibilities of performance: the different realizations or materializations of the composed framework. These include not only the existing performances, of which a detailed account will be given later on, but also the potential for further, unforeseen possibilities. The term "work" is also related to the concepts of "open work" and "work-in-movement," which will also be discussed in Part 4.2.

the freedom of the musicians to act spontaneously (in the sense of not acting according to any prescribed path, but by following impromptu impulses) is necessary for the structuring, while at the same time, this freedom is always intertwined with fixed elements (the responsive behaviour of the system, and the audio material used for processing).

In section 3.2, I will focus on the audio material processed by the computer. This consists of a collection of samples, mostly of people reading a list of music-related words and phrases: names of instruments, musical terms, and so on. The audio samples form the building blocks or "raw" material from which the structure will be molded during a performance. On the various occasions *The Instrument* was played, I continued to collect new recordings by additional speakers, so that the collection of samples has been constantly evolving. This collecting process suggests freedom at a different level from the structural one: in this case, it is the sonic material, the pre-processed "core" from which the musical form will be later generated, which undergoes modification.

In section 3.3, I will describe the real-time interactive system of *The Instrument*. This system combines several different patterns of interaction between the computer and the musicians, including direct and indirect modes of operation, depending upon how the computer responds to the musicians' input. Furthermore, the system is designed to include both preset and random patterns. In order to gain a wider perspective on the subject of real-time interactivity, I will discuss two different schemes of interactive computer systems, those of Robert Rowe and Laurence Casserley (3.3.1). Each involves its own taxonomy and, by comparing their approaches to mine, I will be able to uncover some of the musical potential of *The Instrument*.

In Part 4, I will present several different viewpoints from researchers and musicians on live-electronics systems and what these systems may provide for performers. This will contextualize my project and allow me to reflect on the ideas which have guided me while composing the work, such as the various different functions which can coexist within a single musical work. In section 4.1, I will discuss the work *Voyager* by composer, performer, and researcher George Lewis. Like *The Instrument*, *Voyager* consists only of a computer code, which runs an interactive live-electronics system. Lewis regards the computer as an autonomous improviser: it is capable not only of interacting with the musicians but also of generating independent sounds without any input from the musicians. Although comparable to *Voyager, The Instrument* also differs in significant ways from Lewis' work. *The Instrument* is, for example, designed to be more subordinate to its human performers. Rather than establishing the computer as an autonomous improviser, my focus has been on the real-time generation of a musical structure. I have tried to create a structure which can be stretched and reshaped and with which the musicians interact by improvising: the system in itself does not act autonomously.

In section 4.2, I will focus on the concepts of "open work" and "work-in-movement." These terms, suggested by semiotician Umberto Eco, point to a notion of incompleteness in composed works. Works of this kind are not entirely fixed, but rather remain explicitly open, providing an array of possible paths

which the performer can follow in their interpretation. This idea is further developed by composer, performer, and researcher Henrik Frisk as an ongoing negotiation between composer, system, musical material, and performer, for example in his composition *Repetition Repeats All Other Repetitions.* In my work, I tried to embody the work-in-movement concept inherently within the structure of the composition, which can take different shapes depending on the actions of the performer. My notion of openness is not restricted to only one particular part within a modular structure – an idea which is in itself rather limited, since it allows freedom only in a controlled manner, that is, within an otherwise determinate compositional fabric. In *The Instrument*, the entire structure is generated in real time. The computer code does define certain fixed variables – a "blueprint" or framework for the musical structure – but the way in which this design will be rendered into music is dependent on the interaction between the musicians and the electronics during the performance. This quality of the system, reinforced by the absence of any prescribed score, embodies a more substantial degree of openness or freedom in comparison with Frisk's approach.

Finally, I will discuss the idea of the computer as a musical instrument (section 4.3). I will suggest that a reciprocal relation exists between the musicians and the computer system: the musicians trigger and control the system, which cannot function without them, but the computer also influences the behavior of the musicians. This relationship between the computer and the musicians links *The Instrument* with certain present-day ideas on technology. I will discuss the thoughts of two scholars, philosopher and sociologist Bruno Latour and Aden Evens, whose research focuses on digital studies and contemporary culture, and who both link technology to openness. Both Latour and Evens do not regard technology as having a determinate function, as a "means to an end." Instead, they propose a more open view, based on the palpable range of possible paths which can be opened by technology, and which are not necessarily foreseen in advance. In this sense, a performance of *The Instrument* can be perceived as a process of learning in which the musicians can freely explore the principally infinite characteristics of the system, and through this exploration create music. I will conclude this chapter with a summary of the topics discussed, reflecting on some further possibilities which this work might generate.

2. Performance History

The creation of *The Instrument* began at a week-long workshop/residency, organized by Musica[24] in July 2013, tutored by composer and sound artist Volker Staub and composer Wim Henderickx. The initial concept I had in mind was to develop a sound installation with two basic preconditions: firstly that it would allow for audience participation, and secondly that it would be presented in a format other than that of a staged concert.

[IMAGE: The first version of *The Instrument*: an installation (Neerpelt, July 6, 2013). The sounds of the suspended triangles, captured by the microphones, trigger the interactive electronic system.]

[24] Musica is a Belgian institute dedicated to the creation of new music. https://www.musica.be/

The first performance was realized at the end of my residency, on July 6, 2013. Two large metal triangles were hung from the ceiling, and their sound, captured by two microphones, was used to trigger the computer. For audience members, who were walking across the performance space and striking the triangles, the combination of percussive sounds and electronic "responses" produced a sonic environment which they could freely explore.

[MEDIA: Video excerpt from the first presentation of *The Instrument* in Neerpelt.]

Already during the residency period, while working towards the first version of *The Instrument*, I began to realize that the same work could in fact function not only as an installation but also as a concert piece. This would suggest a "normal" stage presentation with a formal beginning and end, contrary to the open-ended and continuous presentation of the sound installation. In addition, presenting *The Instrument* as a concert piece would also mean that the interactive computer system could be triggered onstage by performing musicians instead of by an audience of "passers-by."

Apart from these alterations, there is no fundamental difference in the basic design. The composition – comprising the interactive system and the pre-recorded audio samples – allows for a range of realizations of the same material. I regard these as different manifestations of one single work: *The Instrument* allows for realizations which are distinctively different from each other, while at the same time retaining certain stable elements connecting the different versions (I will elaborate more on this in section 4.2). At this point, I include an outline of the performance history of *The Instrument*, demonstrating the different possibilities for rendering the same material:

- In a performance at the Laaktheater (The Hague, December 8, 2013), *The Instrument* was included as part of a concert program alongside other musical pieces. The performance opened with two musicians playing onstage – contrabass and voice. This was then followed by an invitation to audience members to come on stage and replace the musicians, taking over the performance. The participants could use their voices or explore the sonic possibilities provided by the contrabass. No further instructions were given. This performance could be described as a hybrid of interactive installation and concert piece. The event provided the opportunity to establish a staged concert presentation, and to disrupt that conceptual frame as audience members became active participants in the performance. The idea fitted well with the rest of the concert program, which included compositions that were performed off-stage or explored audience participation.

- I have performed *The Instrument* in Israel, the UK, and the Netherlands in 2012 and 2013 with two different groups – a voice–bass duo (together with singer Elisenda Pujals), and Hatzatz (together with viola player Maya Felixbrodt and Tomer Harari on MIDI keyboard). The composition has become part of the standard repertoire of both groups, exclusively performed as a concert piece. The rest of the repertoire of the voice–bass duo consists mainly of notated works. Hatzatz, on the contrary, has created music in collaborative processes, often by exploring the possibilities of non-notated compositions. *The Instrument*,

however, seems to have sat well in both habitats. Its openness has provided a wide-ranging palette of performative possibilities that works well in both settings.

[MEDIA: Hatzatz – *The Instrument*.]

• In 2014 and 2015, the composition went through another metamorphosis with guitar player Roberto Garretón and myself on contrabass. We approached *The Instrument* not as an autonomous composition, but as part of a more elaborate "toolkit." This toolkit consisted of several (other) interactive live-electronics systems, involving our musical instruments in combination with computers. *The Instrument* fitted within this constellation: the instruments functioned as sources for two separate computers, giving us the opportunity to play *The Instrument* alongside other software, creating spontaneously chosen combinations of several of the "tools" available. The overall result was shaped using this variety of acoustic/software instruments as a free-improvised set.

[MEDIA: *The Instrument* (retitled *The Voices*) played by Roberto Garretón and Ilya Ziblat.]

• On September 30, 2016, I presented *The Instrument* at the Nutshuis in The Hague, again as an installation. This time I used two sets of percussion instruments for the sound input, hanging from the ceiling of the venue's main hall, available for the public to play. This became the central hub around which the rest of the evening's performances took place. The sound of the percussion and the electronic system could be heard in various parts of the building, sometimes even during the performance of other pieces in the program. In that sense, the ongoing, continuous character of the original installation idea kept resonating throughout the entire evening, giving *The Instrument* not only the role of a musical work in its own right, but also of a central axis around which the rest of the program revolved.

To sum up: any performer, on any instrument, professional or otherwise, could participate in playing *The Instrument*. It could be featured either as a separate piece or as part of a more involved performance setting. At the same time, a presentation of *The Instrument* would always maintain certain compositional features for which reason I still treat all renditions of *The Instrument* as a single work.[25] The ability of this

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[25] The relation between the content of a composition and its performance is made clear by the following paragraph, in which musicologist and composer Christopher Small describes the concept of "musicking":

> All ways of musicking have some kind of syntax, some way of controlling the relationships between the sounds that are made; it is a necessary condition for the creation of shared meanings between those taking part. A necessary condition, we note, but not a sufficient one. Musical meaning is not accounted for by syntax alone. If that were so, there would be no need to perform a piece at all, and we could sit at home and read the score as we do a novel. No meaning is created until a performance takes place; it is the performance that makes the meanings, and the syntax is part of that meaning but is not the whole of it. (Small, 1998, p. 122)

While Small does not ignore the importance of the "syntax" – which is established by the composition – he also recognizes the necessity of an actual performance in order to create meaning. By introducing the term "musicking," through which music is perceived as an activity rather than an object, Small asserts the inseparability of the musical act from the concept of the work and its identity. In that sense, the composed content of *The Instrument* is only a part of what constitutes it as a musical work.

work to re-adapt, by responding to different performance situations, in combination with the "stability" of the material, resulting from the retention of certain compositional features, points towards an interesting and challenging combination of freedom and fixity. In the next section I will describe the different features of *The Instrument*, paying attention to the specific choices I have made during the creation processes, in order to better explain how they reflect ideas of freedom and fixity.

3. The Composition: Structure, Audio Material, and Interactive System

In the following subsections, I will describe the design of *The Instrument*, divided into three different components: the structure, the audio material, and the interactive computer system. In each part, I will elaborate on how various free and fixed properties are intertwined, thus forming a composed framework for improvisation.

3.1 Structure and Flexibility

The software of *The Instrument* uses a list of pre-recorded audio samples, processing them into shorter particles with varying properties, for example, length or envelope (amplitude shape). This procedure takes place in real time, that is, during the performance: at each moment, the preset code selects one particular sample which will then be processed into an electronic sound with distinct characteristics. The changes between the different samples and the resulting sonic transformations become the defining feature of the musical form. In this sense, the structure of *The Instrument* is based on (composed) preset patterns, but it is generated in real time, as a live, electronic process.

The patterns according to which the samples are selected determine a fixed number of times that each sample will be processed before moving on to the next one. While this number is fixed, the time it takes to move between one sample and the next is indeterminate, since it depends on the interaction with the musicians who operate the system: upon each trigger, the computer selects one sample and emits one processed sound. Furthermore, the code offers the possibility of cycling through the collection of samples endlessly, so that the musicians can decide on the length and shape of the performance through their interactions with the system in real time and not according to any composed prescription. And finally, if more than one musician is playing, the computer can run several independent systems simultaneously (each one triggered separately by a different audio input of the computer), so in that sense more than one "*Instrument*" can function at the same time, creating parallel layers of sound which combine into a single multi-layered structure. The structure of *The Instrument* can therefore be described as flexible or elastic: it is influenced both by fixed features and by the behavior of the musicians during the performance.

3.2 Audio Material: Recorded Samples

[IMAGE: The SuperCollider code, showing the list of buffers used by the program, which contain the pre-recorded voice samples of multiple readers (Ilya, Tania, Mai, etc.).]

In order to collect the necessary samples, I recorded various audio materials. This task, which has formed a significant part of the composition process, manifests the idea of freedom at another level than the real-

time structuring of the music. The sampled material has kept evolving independently of the structure, allowing *The Instrument* to remain open also at a more preliminary compositional level – that of the "raw" material (the unprocessed samples).

Initially, the source material was supposed to consist only of pre-recorded "untrained" voices reading a list of music-related terms: names of musical instruments, performance instructions ("slow," "loud," etc.) and music-related actions ("pluck," "bow," "improvise," etc.). Later, with the intention of providing additional samples, further recordings were made, and the inventory of source material became more diverse. In subsequent versions of *The Instrument*, additional material was included: sung or played parts, which served as a contrast to the original spoken samples. In another version, a decision was made to add the possibility of real-time recording: the computer's audio inputs would be recorded and updated continuously into a buffer,[26] thus forming an additional source for the live processing.

As demonstrated by all of the above cases, *The Instrument*'s structure remains open to "absorb" different materials. These will define the most basic characteristics of the performed result – the "color" of the processed audio. The search for specific voices and other materials, and the recording process itself, gave rise to a particular type of involvement in the composition process which sets *The Instrument* apart from the other case studies discussed in this thesis: there is an ongoing freedom to shape the basic sonic material, a process which is separate from any decision made regarding the structure. Here, freedom is embodied by the fact that certain choices have to be made before each performance: selecting specific audio material and distributing it through the structure of the composition in order to "charge" the structure with the necessary content.[27]

3.2.1 "Auxiliary" Influences: The Significance of the Recording Process and Searching for Audio Materials

Why is the idea of a structure which is open to absorb into itself different materials important? Why not leave the idea of freedom embodied within the structure and generated during the performance? One answer is that in this way *The Instrument* can embrace a range of materials (spoken, played, sung, pre- or live-recorded), which adapt to specific situations or circumstances. For example, for the performance of *The Instrument* in Israel, the original text was translated into Hebrew, Arabic, and Russian. Instead of reusing the original material, this version was tailored to a particular situation, that is, relying on local ingredients and addressing "native" ears.

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[26] A buffer is a region of a physical memory storage used to temporarily store digital data.

[27] A comparison could be made with Bach's *Musical Offering*, which does not specify any instrumentation, thus leaving the choice in the hands of the performers – a choice which will of course affect the outcome to a substantial degree, even though the structure of the composition remains fixed. In that sense, *The Instrument* can also be compared to other open instrumentation scores in which the freedom to shape the sonic result exists on a separate level from the structural one. An example is Karlheinz Stockhausen's *Prozession*, which includes instructions for the musicians to create "events" based on quotes from the composer's earlier work (Chang, n.d.). The musicians have to choose the material, and the instruction-based score uses plus and minus signs in order to instruct them how to relate to the initial "quote," creating sounds which are, for example, higher in pitch or softer. Again, the freedom to shape the music exists also preliminary to the performance itself, in the choice of the particular material – very much like the selection process of the samples in *The Instrument*.

This kind of reciprocal influence between the performing circumstances and the composition's structure is also described by Henrik Frisk in relation to his work process on the composition *Repetition Repeats All Other Repetitions*:

> Many circumstances, some of which are auxiliary to the actual process of 'composing' (i.e. the tasks traditionally assigned to the labor of the 'composer') had a great influence on the way the piece developed. However, in the end it would turn out that these 'circumstances' or 'processes' were not in fact 'auxiliary': They were, or would become, an integral part of the process of composing (now also in the extended sense of the term). Some of these were planned and others came about as a result of the ways in which the project developed. (Frisk, 2008, pp. 45–6)

The role of the recorded samples, initially understood as a response to a technical demand (to generate the necessary audio material for the real-time processing), developed substantially, facilitating greater and more nuanced artistic expressions. It has allowed the composition to adapt itself to the different situations in which it was performed and the musical result to be influenced by the changing circumstances of each performance.

3.3 The Real-Time Interactive System

The main processing function of the computer program operates through a sound synthesis method called granular synthesis.[28] It slices up the specified audio sample into tiny sound grains or particles, targeted here at durations between 100 and 1000 milliseconds.[29] The program controls various parameters of each grain, such as duration, envelope, or frequency (pitch shifting), so that each grain will have distinct sound properties. Additionally, the individual grains are grouped into discrete sets of successive sound blocks (grain tails). The length of each set of grains is determined by the number of grains it contains (between 3 and 9), and by the time span of each grain (between 100 and 1000 milliseconds). These discrete sets of grain tails, derived from the original vocal (or other) materials, form the basic sound blocks of *The Instrument*. The accumulation of these sound blocks provides an electronic soundscape or "sound mass," with distinct colors (characteristics of the individual grains) and densities (the number of grains being distributed), based on the original source material. Throughout each performance, these sound masses will undergo a series of fluctuating textures and grain densities, which will form the overall musical structure.

The system operates by triggering the onsets of the sound blocks through either a direct response to the performer's audio input or an indirect response in which the frequency of triggering of grain tails is

[28] For further information about granular synthesis, see: https://granularsynthesis.com/guide.php and Roads, 2001.

[29] I use "grain" not in its normal definition, since granular synthesis according to Roads's concept of "microsound" usually involves a shorter duration, of between 10 and 50 milliseconds. My SuperCollider patch does use a granular synthesis method, but with considerably longer grains.

determined by the performer's activity levels, calculated as the amount of input onsets per second. The musicians can freely switch between these two modes during a performance.

Both modes operate in response to the performer's activity levels: the "busier" it gets, the higher the triggering rate will be. What is then the difference between the two modes? For each mode of operation, a different elastic quality is superimposed onto the sound properties and materials. Performing *The Instrument* is in fact based on the exploration of these different qualities: how each one affects the transformation of sound material and how it allows the performers to find an emerging mode of engagement or interaction between themselves and the system. In other words, both the direct and indirect modes of response allow the structure of *The Instrument* to become flexible: it will be shaped, in real time, according to the decisions of the performers. But the fact that each mode reveals a different responsivity – creating a different interaction with the computer system – presents different states of flexibility.

The combination of freedom and fixity exists not only in the way in which the system sets off the grain tails, but also in the way it controls specific parameters of each individual grain. While some of these parameters are mapped from the data extracted from the audio input (level, frequency, etc.), others (duration, envelope, speed, etc.) are determined through preset patterns which do not rely on the audio input. These latter patterns do not just demonstrate a deterministic nature but may at certain points also act randomly.[30] Various degrees of randomness are embedded in the SuperCollider code and incorporated in combination with the input of the players or with the preset pattern values. I deliberately use the quantitative term "degree" in relation to randomness, since the programming language can in fact define a specific proportional value for distributing the control over the system's generated values, divided between responsiveness, preset control, and randomness. For example, by multiplying the grain's amplitude value (mapped from the input level) with random values between 0.9 and 1.1, arbitrary micro-fluctuations can be achieved, giving the whole system a slight instability in its reaction. This will loosen, up to a certain degree, the sense of predictability displayed by the system and introduce a sense of freedom.

A combination of patterns which are predetermined, or random, or which rely on the performer's input, creates a flexible, unfixed, and open-ended structure, generated in real time and shaped both by the behavior of the musicians and the pre-set features. This kind of structure demonstrates a combination of freedom and fixity, embodied within a real-time interactive computer system. The structure can stretch or compress, condense or become rarefied. It is a live structure, which will come into existence only through the interaction with the musicians.

In the following section I will discuss two alternative schemes for live-electronics interactive systems, in order to gain a broader perspective on how my work deals with freedom and fixity.

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[30] According to either uniform or non-uniform distributions: the different functions I used were either equally distributed or weighted (see Ames, 1990).

3.3.1 Two Paradigms of Interactive Systems: Instrument–Player (Rowe) and Local–Field (Emmerson)

The various features of *The Instrument*'s interactive system – its direct and indirect modes, its preset patterns, and its real-time input-dependent parametric control – bring to mind the frequently used taxonomy of computer systems which divides them into "instrument" and "player," as suggested by electronic music composer and researcher Robert Rowe:

> Instrument paradigm systems are those that treat the machine contribution as an extension or augmentation of the human performance. Player paradigm systems present the machine as an interlocutor – another musical presence in the texture that has weight and independence distinguishing it from its human counterpart. (Rowe, 2001, p. 302)

In the most basic, technical sense, the direct triggering mode bears a resemblance to the instrument paradigm: the computer augments the sound of the performer by emitting the grain tails in direct response to the instrumental onset. The indirect triggering mode resembles the player paradigm, since no input is required for the computer to create sounds (although the rate of triggering is influenced by the input).

Another relevant viewpoint, concerning the relation between the sound of a live musician and electroacoustic sounds, is suggested by Simon Emmerson, a composer of electroacoustic music. Emmerson suggests the terminology "local" and "field," which, according to him

> has its roots in a simple model of the situation of the human performer (as sound source) in an environment. *Local* controls and functions seek to extend (but not to break) the perceived relation of human performer action to sound production. While *field* functions place the results of this activity within a context, a landscape or an environment. (Emmerson, 1994, p. 31, italics in original)

Emmerson's focus is mainly on issues of amplification and diffusion in works that combine live and electronic sounds; nevertheless, his ideas can also make a useful contribution in the present discussion of live processing.[31] In *The Instrument*, the differences between local and field processes are made apparent by the duration of the electronic responses (the length of one grain tail or the accumulation of several) compared to the source sound that triggered it: a shorter response will be perceived as local, whereas longer responses will create a more extended, global field of sound. In this way, a single grain tail directly triggered by an onset provides a local function which extends the original acoustic sound source, while

[31] The application of Emmerson's terminology to live-processing can be found in an essay by electronic musician Lawrence Casserley, who describes a local process as one which adds an extra electronic layer that will "remain, in general, 'attached' to, or [an] extension of, the sound of the source instrument" (Casserley, 1997, n.p.). In a field process, on the other hand, "the connection between the original sound and the [electronic processed] echo is more tenuous, or even entirely obscured" (Casserley, 1997, n.p.).

the accumulation of several grain tails provides the function of a field by creating an electroacoustic environment.

The ideas proposed by Rowe and Emmerson are not presumed to provide strong binary classifications, which would derive the function of an electronic music system from *either* a player- or instrument-related paradigm, or on the other hand from *either* local or field processes. Such extreme cases would probably produce results that are predictable and not interesting from a musical point of view. A more expanded viewpoint, and one which is probably more realistic in terms of performed music, would be to look *within* the range of possibilities that might emerge between the extremes of these ideas. This is well understood by Emmerson himself, who asserts that "the listener's perspective on the relationship of local to field may vary continuously and hence so can the composer's aims. Local is continuous to field: the borderline varies with musical context and may in fact not exist" (Emmerson, 1994, p. 33). This idea is also understood by Casserley: "Clearly many processes can fall into more than one category according to how they are used. In addition, these are not discrete conditions; there is a continuum between them, and there are many areas of ambiguity" (Casserley, 1997, n.p.).

Also, the idea of a middle ground between the instrument and the player is not a novel one: in *Voyager* (which I will discuss more extensively in the next section), George Lewis suggests that these "two models of role construction in interactive systems should be viewed as on a continuum" (Lewis, 2000, p. 34). Additionally, Frisk – who applies Rowe's ideas to the discussion of his own work – states that "these are not fixed positions but possible starting points" (Frisk, 2008, p. 21). How then does a performance of *The Instrument* explore this middle ground between the instrument and the player or between the local and the field? Furthermore, how can my work contribute to the already existing discussion?

The SuperCollider patch generates the structure of the music during the performance, as a musical form which is indeed composed, yet also flexible: it is based on a balance between predetermined properties and freedom with which the musicians interact in real time. This flexible structure can provide a middle ground or continuum between the local and the field, between the instrument and the player paradigms. For example, the local–field continuum is embodied in the rate at which the grain tails are being triggered: it is governed in real time by the performer's activity rate, which produces what is perceived as either a more direct, local response (separate, single grain tails) or a field process (the accumulation of various grain tails). Also relevant is the balance between the duration and shape of the individual grains, the overall duration of the grain tails (the aggregate of several grains), and the triggering rate of the system's response. Since the triggering rate is influenced by the performers' activity, the response has to be carefully adjusted in order not to cascade into an over-dominating texture (when the musicians' level of activity is high and the durations of the grains/grain tails are too long) or to evaporate too fast into complete silence (when the activity level is too low and the durations are too short). Also the continuum between instrument and player paradigms is explored in and through *The Instrument*: the way in which the system interacts with the input is kept unpredictable to a certain extent. The samples and grain tails are generated by several functions which may be directly or indirectly responsive to the input, thus

demonstrating a behavior on the range between a more dependent instrument[32] and a more autonomous player.

All of the above ideas are combined within one system, so the musicians cannot rely on a single, stable response pattern. Furthermore, the design of the system is based on constant change: processes of transformation in the distinct characteristics of the sound (changing samples) and textural density (single versus multiple grain-tails). Performing *The Instrument* can be perceived as an ongoing exploratory process (even on repeated performances with the same musicians), which requires the players to stay alert, whereas more straightforward solutions would provide simpler, more predictable conditions for the performance, and hence, be less surprising. The result is a complex network that combines the different paradigms – the instrument (as an "augmentation" for the actions of the musicians) and the player (as an independent "interlocutor"), the local (as a single triggered electronic response) and the field (as the accumulation of several responses) – and integrates all of them into a single musical structure.

4. Contextualization and Discussion

In the following three subsections I will present and discuss the views of several musicians and researchers whose ideas are relevant within the context of developing and reflecting on *The Instrument*. George Lewis' composition *Voyager* is a classic example of the use of a computer in a musical context. Lewis composed this work during the late 1980s, working on it at STEIM in Amsterdam, and since then it has occupied an important role in discussions of music technology and improvisation. I will compare Lewis' work to mine from the perspective of the computer as an autonomous improviser. Another important concept is work-in-movement. Proposed by Umberto Eco, this is a paradigm of a flexible musical structure that incorporates freedom into the performance. I will discuss this concept in the work of Henrik Frisk and compare his interpretation with mine. Finally, I will discuss several ideas by Bruno Latour. Latour suggests that the notion of openness is inherent in technology, and, as such, his thought has a bearing on my work. Continuing from Latour's views, I will also present some ideas by Aden Evens, who has discussed the computer as a musical instrument. In each subsection, I will note direct links to *The Instrument* as a live-electronics interactive system which calls for improvisation during its performance.

4.1 The Computer as an Improviser

In the work *Voyager*, George Lewis explores the idea of the computer as an improviser. Like *The Instrument*, Lewis' system is designed as computer code which runs an interactive electronic system. It is played by and together with live musicians who influence the system while also responding to it. The comparison between the two works raises important issues regarding the autonomous role of the computer during a performance and the interaction between humans and computers within the domain of music. How autonomous is the behavior of the computer and in what ways is it dependent on the musicians? What function can an interactive computer system have within a musical performance?

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[32] What Casserley describes as "a series of 'effects', a secondary layer of the musical argument" (Casserley, 1997, n.p.).

Lewis describes *Voyager* as a "virtual improvising orchestra" which is responsive to the actions of "up to two human improvisors, who are either performing on MIDI-equipped keyboards or playing acoustic instruments through 'pitch followers', devices that try to parse the sounds of acoustic instruments into MIDI data streams" (Lewis, 2000, pp. 33–4). In addition to being responsive to the player(s), *Voyager* also functions as an independent system: "In the absence of outside input, the complete specification of the system's musical behavior is internally generated. In practical terms, this means that *Voyager* does not need to have real-time human input to generate music" (Lewis, 2000, p. 36). These two modes of behavior – the responsive and the independent – make *Voyager*'s system a computational improvising partner to the musician(s) in an improvised dialogue: it grants the machine the role of an "active contributor to the unfolding creative process" (McCormack and d'Inverno, 2016, p. 98), or a "collaborative musical improvisor" (Linson, Dobbyn, Lewis, and Laney, 2015, p. 3).

The way in which *Voyager* creates communication between the musicians and the computer, as two autonomous yet interactive sound-generating streams, can be compared to the interaction within a group of human improvisers. Every interaction between the computer and the musicians takes place sonically, without involving other channels of control:

> Since the program exhibits generative behavior independently of the improviser, decisions taken by the computer have consequences for the music that must be taken into account by the improvisor. With no built-in hierarchy of human leader/computer follower – no 'veto' buttons, foot-pedals or physical cues – all communication between the system and the improvisor takes place sonically. (Lewis, 2000, p. 36)

Yet there are also certain limitations to this system, for example "the fact that the computer is given no information about *the sound* itself – the timbre. Only the pitch is fed to the computer" (Frisk, 2008, p. 22). This is, according to Frisk, a fundamental limitation in Lewis' work, since "the particularity of that which is 'said' is encoded in the *sound* rather than the *pitch*" (Frisk, 2008, p. 23). Frisk finds *Voyager* lacking in its ability to improvise:

> When I listen to George Lewis and Roscoe Mitchell improvising together with/in *Voyager*, that is what I hear: I hear that the interaction between the two musicians and the computer is of a different order than the interaction between Lewis and Mitchell. (Frisk, 2008, p. 73)

In his own work Frisk tries to bridge the gap between the computer and the human player by creating a system which is sensitive and responsive to timbre changes, as well as being able to produce convincing timbral results, thus to establish a situation which is as close as possible to what happens between human improvisers.

Both Lewis and Frisk have designed computer systems that are capable of improvising. They seek a non-hierarchical relation between the computer and the human musician, comprehending the two as equal. *The Instrument*, on the other hand, is designed to be more subordinate to its human performers: the electronic sounds are triggered in real time by the musicians and would not exist without their constant input. In comparison to Lewis' or Frisk's approach – both highlighting improvisation as the starting point for musical interaction – my focus with *The Instrument* is on the musical structure: its ability to stretch or absorb different audio materials, and to combine improvisation and pre-determined structural features through the interactive features of the system. Rather than an equal counterpart for an improvising musician, the electronic system of *The Instrument* should be perceived primarily as composed, even if it demonstrates flexibility (of its real-time generated structure) and unpredictability (due to certain autonomous or random patterns which are embedded in the computer code), and even if the performance involves improvisation (by the musicians).

Following this interpretation, I would situate *The Instrument* as part of what Lewis regards as

> the overwhelming majority of computer music research and compositional activity [which] locates itself . . . within the belief systems and cultural practices of European concert music. *Voyager*, [on the other hand] exemplifies an area of musical discourse using computers that is not viewed culturally and historically as a branch of trans-European contemporary concert music and, moreover, is not necessarily modeled as a narrative about "composition." (Lewis, 2000, p. 33)

This view, which is rooted in Lewis' commitment to his African-American tradition and involves a certain sense of criticism, provides a dichotomy which is not entirely relevant to my work. Even though *The Instrument* should be perceived first and foremost as a composed work, it still contains a substantial degree of freedom. The fact that the computer is subordinate to the musicians does not disrupt this idea: it embodies it within a composed structure.

Lastly, it is also worth mentioning that as several decades have already passed since the creation of *Voyager*, some of the methods Lewis has employed might seem outdated.[33] However, an important

[33] Although the focus of this chapter is not on technical issues which allow the computer to act as an independent improviser, but rather on musical questions, it seems unavoidable to mention here also other approaches which are more technology-oriented. The following examples are more recent than Lewis' work: musician and researcher Adam Linson explores the idea of the computer as an improviser in relation to artificial intelligence and robotics (Linson, Dobbyn, and Laney, 2012; Linson, Dobbyn, Lewis, and Laney, 2015). Within the SuperCollider community, the work of electronic musician and researcher Nick Collins [http://composerprogrammer.com/code.html#SC] is relevant: the libraries SCMIR (for audio content analysis) and BBCut2 (for beat tracking), for example, are machine listening tools that can analyze audio data in real time, and which can thus be used as part of an interactive computer system. An important source of information is the article "Computational Systems For Music Improvisation" (Gifford et al., 2018), which establishes a taxonomy of improvisational music systems [https://doi.org/10.1080/14626268.2018.1426613]. And finally, an article which records much earlier resources and is therefore useful from an historical perspective, is "Automated Composition in Retrospect: 1956-1986" (Ames, 1987).

statement made by Lewis helps to shift the focus from the technological issues towards the musical ones – and these are still relevant today:

> *Voyager* is not asking whether machines exhibit personality or identity, but how personalities and identities become articulated through sonic behavior. Instead of asking about the value placed . . . on artworks made by computers, *Voyager* continually refers to human expression. Rather than asking if computers can be creative and intelligent – those qualities, again, that we seek in our mates, or at least in a good blind date – *Voyager* asks us where our own creativity and intelligence might lie – not 'How do we create intelligence?' but 'How do we find it?' Ultimately, the subject of *Voyager* is not technology or computers at all, but musicality itself. (Lewis, 2000, p. 38)

In a similar way to Lewis' approach in *Voyager*, the focus of *The Instrument* is not on any technological research question; rather, it is a musical question: How to create freedom within a (live-electronics, interactive) composition? And what is the reciprocal relationship between structure and improvisation in such a case? Instead of situating the technical issues in the center, it is how they address ideas of freedom and structure that is my main concern in this work.

4.2 Work-In-Movement

Earlier in this chapter I described how *The Instrument* can provide different performance possibilities. The fact that a single work can yield an array of potential realizations suggests a link to the concept of the "work-in-movement." In his book *The Open Work*, Umberto Eco proposes a "search for suggestiveness [which] is a deliberate move to 'open' the work to the free response of the addressee" (Eco, 1989, p. 9). In other words, the artwork does not determine one fixed interpretation, but allows for multiple readings, depending on its addressee. Eco describes this by using the term "open work." He goes further to present a more elaborate idea, and one that is also more relevant in the context of this research. It is a more drastic degree of openness, which he calls the work-in-movement. Works of this kind

> characteristically consist of unplanned or physically incomplete structural units. . . . In other words, the author [of a work-in-movement] offers the interpreter, the performer, the addressee a work to be completed. . . . It installs a new relationship between the contemplation and the utilization of a work of art. (Eco, 1989, pp. 12–23)

Applying this concept to music implies that the completion of the work is entrusted to the performer. He or she shares the process of "organizing and structuring" the music, in collaboration with the composer (Eco, 1989, p. 12). This idea fits well with each of the compositions discussed in this chapter – their open, free qualities, and the involvements of the performers in impromptu playing processes. The idea that the performing musicians (and not only the composer) are involved in the organization and structuring of the music stands at the very basis of this research.

Concurrently, Eco's idea as it stands does not provide a more objectified understanding of the nature of the musical work itself. What are the qualities we would need to allow for this kind of openness, and how should the work-in-movement be constructed? Within the context of artistic research Eco's ideas seem too general and a further elaboration would still be required.

Such elaboration can be found in Henrik Frisk's approach to composition. Frisk builds upon Eco's approach, suggesting a further interpretation of work-in-movement:

> It was in the radical way that we [Frisk and his collaborator, guitarist Stefan Östersjö] gave up the notion of the work, and even the open work and established a re-interpretation of Eco's *work-in-movement* that the full consequences of my altered composer role became evident. The work-in-movement is focused on the process rather than the result, in itself not a novel idea at all. However, in the context of computers and interaction and in combination with the idea of the augmented score, the focus on the process allows for an altered view on musical interpretation as well as composition. The score as a growing container of musical experience, all of which is open-sourced to allow for any kind of transformation but with the request to let the interactive narrative, the collaboration, guide the additions, alterations and removals of material from the score. (Frisk, 2008, p. 104)

Here, the work remains ever open, as an ongoing negotiation between composer and performer. Making use of his composition *Repetition Repeats All Other Repetitions* as a case study, Frisk describes a process of "collaboration, negotiation and interaction" (Frisk, 2008, p. 91) between himself, in the role of the composer, and guitar player Stefan Östersjö, in the role of the performer. The composition is subject to constant transformations, developing from one version to the next through various performances. According to Frisk's approach, this kind of process brings into question the very concept of the musical work itself, suggesting an unfixed entity instead of the more traditional notion of a stable one. The score is no longer a representation of a complete and finished work; instead, it functions as a dynamic, mutable set of instructions.

Frisk's thought and work imply that the traditional roles of composer and performer should be redefined. A system of feedback between the two can be established, through which the work can be repeatedly re-modified for different performance occasions. It requires a commitment not only to the interactive narrative between composer and performer but also between instruments and electronics.

As much as Frisk's work may seem progressive, in the sense that it represents a commitment to fluidity and constant change, I would claim that a more genuine integration of openness and structure is possible, creating a work which profoundly manifests both. Once the composing process is over, Frisk's work-in-movement essentially leaves a structure which is modular: it has to be "completed" during the performance by "putting the pieces together," but it does not remain unrestrictedly open for any kind of input by the performer, in the sense that it can enable an unbiased and free process of exploration of the

structure's properties, and not just call for the interpretation of prescribed material. For example, in *Repetition Repeats All Other Repetitions*, Frisk describes how the different "sections are 'modular' and may be combined in any way the performer sees fit" (Frisk, 2008, p. 185). This approach to the score is indeed open, as "the performer is not even restricted to using entire sections as building blocks [but] the sections themselves may be broken down into smaller units" (p. 185); nevertheless, the openness is still, to a great extent, contained or determined by the score. Frisk emphasizes the fact that "one must be careful not to distort the identities [of the notated materials] beyond recognition" (p. 185), which narrows down the idea of freedom. With Frisk's approach, flexibility is reduced to a simple scheme, where each part is interchangeable; yet, in my opinion, this fails to unlock a fuller potential, which can be inherent to the structure itself: to stretch the whole work into different shapes, to transfigure it into different appearances or different realizations by relying on the performer's freedom and their proactive involvement in the creative process.[34]

With *The Instrument*, I have tried to widen the capacity to explore freely the musical properties of the work by addressing the idea of openness on a different level. The musical structure is created in real time, and the work is (re-)shaped by the interactive processing of original source material. Instead of introducing modular fragments of partly notated and partly improvisatory material, the musical form of *The Instrument* is generated live, during the performance, through the real-time processing of the "raw" source material, the audio samples. The entire structure of *The Instrument* is based on the notion of flexibility, since the selection of the samples and the processing relies on the live interactions with the musicians. *The Instrument* does not only "offer the interpreter . . . a work to be completed" (Eco, 1989, p. 12); instead, it allows for the emergence of a musical structure during and through the performance. The performance itself is based on this real-time generated structure and on it alone, in the absence of a notated score or any other method of instruction. In this sense, *The Instrument* manifests Frisk's idea of focusing "on the process rather than the result" (Frisk, 2008, p. 104) adequately, since through it "the outcome of the process exceeds any foreknowledge of it; the musician manages to not foresee even when the productive algorithm is known in advance" (Evens, 2005, p. 150). *The Instrument*'s system enables exactly this state: freedom is a result of the structure, even though the latter contains certain fixed attributes. The result remains genuinely free, and does not have to restrict the musician in any way in order to keep the identity of the work intact.

4.3 Instruments, Technology, and Openness

In the previous sections, I suggested two viewpoints that could be used to describe my work: the first perceives *The Instrument* as a composed work, in which the role of the predetermined structure is prominent (as opposed to Lewis' notion of *Voyager* as a computer system which is an independent improviser and, as such, provides less concrete directions for the performance); the second draws on the

[34] Perhaps further evidence to this claim is the fact that Frisk includes two different (notated) versions of this composition in his dissertation (Frisk, 2008, pp. 173–92). This would have been unnecessary if a more elaborate degree of freedom had originally been included, in which case the composition would have been flexible enough to provide a range of possible realizations.

work-in-movement concept, based on the different performance possibilities which are made available by the material. In this section I propose an additional perspective, by describing this composition as an "instrument." This latter concept does not relate only to the idea of a musical instrument but can also be comprehended as a device in a more general sense, thereby creating a direct link to technology.

During a performance of *The Instrument*, the musicians are connected to the computer's sound input, influencing a variety of parameters that shape the live-electronics sounds. In this sense, the performers are operating a device: they control an instrument which cannot function autonomously and therefore should not be considered as an independent actor; rather, it is an object which is activated by its user – without human interference it would do nothing. At the same time, the musicians also engage in a dialogue with the system: it responds, demonstrating unexpected behavior at times because of its autonomous or random elements. This two-way interaction raises several questions: What is the effect of *The Instrument* on the musicians? In other words, how can a live electronic system, which is triggered by and responds to the musicians, also influence their behavior – their sound, their instrumental and physical gestures? And in what way can a musical instrument provide its player with freedom? By perceiving this composition as an instrument, a reciprocal relation is established: the instrument is being used, while, at the same time, also affecting its user. I will shed light on the correlation between my composition and the musicians who perform it.

A possible starting point from which to answer these questions would be to acknowledge that an instrument – a musical one, as much as any kind of device – does not just serve as a means to an end by fulfilling a certain predetermined function. Rather, an instrument holds within itself a wide range of possible effects, some of which may be anticipated while some others remain unforeseen. In this sense, a musical instrument should be perceived not only according to its sonic and tactile features but also according to the palpable range of musical paths that it might open up for the musicians.[35]

This understanding of a (musical) instrument corresponds with the thought of Bruno Latour, a philosopher and sociologist of science who focuses on the role of technology. For Latour, technology is not (only) instrumental: it does not exclusively serve a designated and predefined aim, but, rather, its purpose remains open in the sense that unknown paths and unanticipated experiences can be revealed to its user. Technology, instead of filling a "functional utility . . . has never ceased to introduce a history of enfoldings, detours, drifts, openings and translations that abolish the idea of function as much as that of neutrality" (Latour, 2002, p. 255). Latour describes the way in which an instrument can open up the path of its user:

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[35] The idea that an instrument should not be comprehended only in terms of its characteristics but according to the possibilities it opens up for its user, brings to mind the term "affordance," coined by psychologist James J. Gibson. "Affordance" is the manner in which "the 'values' and 'meanings' of things in the environment can be directly perceived" by its user (Gibson, 1986, p. 134). The important thing to understand here is that this view does not try to "perceive all the variables [of a given device or environment] separately. It is never necessary to distinguish all the features of an object and, in fact, it would be impossible to do so" (Gibson, 1986, p. 134). In the same sense, it would be insufficient to perceive *The Instrument* as a sum of its features; instead, a more useful approach would be to try and trace the different ways the player can use it in order to create music.

> With [an instrument] in hand, the possibilities are endless, providing whoever holds it with schemes of action that do not precede the moment it is grasped. . . . [An instrument offers its user the possibility of] exploring heterogeneous universes that nothing, up to that point, could have foreseen and behind which trail new functions. (Latour, 2002, p. 250)

It is the unforeseen possibilities provided by an instrument that are important for Latour, rather than a single, functional, predetermined purpose. The users of an instrument may discover new paths and unforeseen directions, directions that they would not initially be aware of. The instrument is being used, and, at the same time, it affects its user, opening up for them a broader horizon.

A computer used as a musical instrument influences its performers in the same manner. In his book *Sound Ideas: Music, Machines, and Experience* (2005), Aden Evens discusses music in the digital age – how we perceive it, the way we play it, and how this is influenced by contemporary technology. According to Evens, the computer is not a transparent device. It does not simply react to the actions of its user but carries with it an added, unforeseen value which is significant and cannot be ignored. The computer is not only an extension of its user but also a countervailing force. However, rather than posing this as a problem, this is exactly what grants the computer a role as an expressive musical instrument: "It offers to the musician a resistance; it pushes back. The musician applies force to the instrument, and the instrument conveys this force, pushing sound out and pushing back against the musician" (Evens, 2005, p. 159). And it is precisely through this act – playing with the computer's resistance – that music is created. In this sense, Evens agrees with Latour, by perceiving a musical instrument not as a means to an end, but as a portal to unknown paths:

> Like any instrument, a musical instrument is a means. The player makes sound by means of the instrument, which transduces force into vibration. But a musical instrument is no mere means: it does not disappear in its use. The musical instrument remains opaque, and one does not know how it will respond to a given gesture. (Evens, 2005, p. 82)

Also a computer, in order "to become an expressive instrument, to allow the generation of ideas, . . . must not disappear, neither into the sensation nor the desire of the user. On the contrary, the computer must become resistant, it must become a machine for posing problems." (Evens, 2005, p. 164)

A performance of *The Instrument* is directed by the exploration of the computer system: the players interact with the live-electronics system, and gradually, throughout the course of the performance, they get to know the system's "behavior."[36] Through the interaction with the system, the behavior of the musicians also inevitably alters: forced away from their common performance practice, either through the

[36] This applies not only to the first encounter between the musicians and the system, since the features of the latter are complex and unpredictable enough for the performer's engagement with it to be able to go further and deeper at each subsequent performance.

attempt of “taming” the machine (for example, by trying to create a denser or sparser sound from the electronics, which might lead to unexpected results due to the system’s autonomous or random features), or by reacting to the system’s sounds (for example, playing together with the computer in an open dialogue), the performers will find themselves on unknown musical territory. This can be perceived as a learning process in which music is created simultaneously: “To play is to learn (to play), and one invents in concert with one’s instrument” (Evens, 2005, p. 82). During this process, the “persistence” of the computer – its idiosyncratic behavior, unforeseen results, and independent or random patterns – are translated into music. In this sense, the system is not only fed with input, it “pushes back,” providing its user with constant feedback.

5. Conclusion

Of the four case studies which are the focus of this dissertation, *The Instrument* is the most "open" one. It does not include a score or any instructions for performance, and its structure is not only flexible – featuring elastic length and shape, and a capacity to absorb different material (audio samples) – but also interactive: the live-electronics system depends on the input of the musicians to create the sounds, to shape them, and to generate, in real time, a musical form. At the same time, this "open" quality does not exclude certain fixed properties, which are as essential to the structuring: pre-recorded samples which order of appearance is set in advance, and designed patterns of interaction upon which the processing of the samples will be triggered during the performance.

Perhaps the main conclusion that can be withdrawn from this case study is that a single work could be observed from different perspectives: *The Instrument* is a composition, as much as it is a work-in-movement. It is an interactive live-electronics system as well as a musical instrument. The coexistence of these different identities was not just realized in retrospect, as part of a scholarly analysis; it was taken into consideration during the composing process itself, providing a rich “toolbox” for composing. The multiplicity of identities raises questions about the nature of the musical work, and of musicality in itself. For composer and performer alike, these are open question which encourage the exploration of unknown musical territories and set off unexpected interactions between different creative modes.

One final question which can be asked is: what comes next? Which musical paths are worth exploring further? Perhaps the issue which has remained the most underdeveloped in *The Instrument* is that of the computer’s autonomy. Although the interactive system allows for certain autonomous features, a more thorough exploration seems unavoidable. For that, a more in-depth study of the technical possibilities and of the existing knowledge should be undertaken, for example by introducing a code which is based on machine learning paradigms, rather than the task-specific algorithms which I have used here. The design of such a system should also be a modular one, allowing for greater flexibility and complexity within a network which combines separate units of machine listening, audio analysis, and sound generation. Without avoiding the notions of a composed work or a musical instrument, such a system would provide a far more autonomous behavior, making the interaction during the performance more “musical”: a true dialogue between the computer and the musicians, within the context of improvisation.

hasBara

1. Introduction

My composition *hasBara* deals with notation and improvisation as two contrasting elements. The musicians are asked to orient the performance away from the notated ideas by improvising or, in the opposite direction, by gradually "surrendering" to the guidance of the score. The reflections I present here are based on one essential difference between notation and improvisation: while the former contains explicit directions for a performance – composed material which implies a certain musical fixity – the latter remains undefined, unexplained, "blank." Improvisation, in the context of this work, should be understood as a compositional void, left open for the creation, in real-time, of unforeseen musical elements. This particular combination of undirected improvisation and notation, between which connections are formed during the performance, brings in an additional perspective to the freedom-and-fixity theme: a musical space which is shaped by notation, and "warped" by the gravitational force of freedom in its purest and most abstract form.

The role improvisation plays in *hasBara* is very different to the role it plays in *[Untitled, 2012]*. In that piece, the electronic soundtrack presents a reference point which is absolutely fixed and around which fields of freedom are woven. In *Modo Recordar, Modo Olvidar*, to make another comparison, the improvisations are supposed to be a direct continuation of the notated material: after the players have assimilated the notated ideas, they are required to improvise in a given "style." In *hasBara*, on the other hand, the musicians are asked to move away from the notated material, towards indeterminacy – precisely what the notation does *not* convey. A similar situation is described by free-jazz musician Ornette Coleman, who observed that "the jazz musician is probably the only person for whom the composer is not a very interesting individual, in the sense that he prefers to destroy what the composer writes or says" (Coleman in Derrida, 2004, p. 320). Although not intended to be performed by jazz musicians, *hasBara* also calls for the destruction of the composed material – the process of de-composition (or the "melting down" of notation, see image below). Here, improvisation can be understood as a way to "summon" freedom by introducing extrinsic ideas to a composed structure, in the same way as Coleman's jazz improviser challenges the role of the composer.

[IMAGE: Excerpt from the score of *hasBara*, in a version arranged for ensemble Champ d'Action.]

Rather than starting with *hasBara,* I begin this chapter with a musical example that will help to put the focus on the concept of improvisation (Part 2): the album *Bass Duets* by Peter Kowald (1999) provides an impressive example of the relationship between freedom and fixity within the context of free improvisation. The participating musicians manage to exhibit constant innovation and an intense instrumental and performative drive, side by side with musical consistency: in certain moments, the music has a more stable quality, for example when the improvisers seem to agree on a certain recognizable musical path or theme. I will approach improvisation by addressing this idea of the

preservation of certain musical features, which (at least to my ears) demonstrate a more static state and in which the music is subject to fewer changes rather than a flow of new ideas. The idea that free improvisation inherently relates to fixity as much as it does to freedom will provide an exposition of some of the ideas that will be discussed later in relation to *hasBara*.

In Part 3 I will discuss the scholarly views on improvisation of Gary Peters, Richard Barrett, Marcel Cobussen, and Erlend Dehlin. Here, the chapter will follow a more philosophical approach, by discussing such concepts as the absence of any pre-existing framework in free improvisation and the inherent openness which allows the musicians to keep continuously moving forward, searching for new ideas. As suggested by improviser Joe Morris, "if pioneering a creative frontier is the goal of a musician, how does he avoid stopping at one place in that frontier? How does he continue the search? Is it possible to maintain a perpetual frontier?" (Morris, 2012, p. 1). The notion of freedom expounded here resonates with the "perpetual frontier," a perspective which defers fixation and, as such, can provide an endless source of inspiration.

In Part 4 I will discuss *hasBara*. Reflecting on a documented video of the performance (by ensemble Mutu) and on the score, I will explain how I attempted to interweave the aforementioned concepts and viewpoints into this composition. I will discuss the role of improvisation in this work and how the musicians are supposed to navigate between the improvised and the notated parts. The musical identity of *hasBara* is based on the links between the undirected improvisation and the notated ideas, and I will examine how that identity comes through in the performance. The chapter will be concluded with a short reflection (Part 5) on the topics discussed and suggest directions for future works that could continue and develop the ideas presented here.

2. Musical Context: Peter Kowald's *Bass Duets*

The album *Bass Duets* features three separate contrabass duets played by Peter Kowald with, respectively, Barre Phillips, Barry Guy, and Maarten Altena. In discussing the bassists' free improvisations I will elaborate on the ideas of fixity and freedom and highlight the ever-evolving interrelations between them. This focus provides an important background because of the specific character improvisation takes in *hasBara*, namely an undirected, "blank" musical element. Approaching *Bass Duets* as an outsider – a listener rather than a composer or player – provides the opportunity to observe certain musical ideas from a distance, and to form arguments which I will use later in the chapter.

What can be learnt about freedom, fixity, and the network of connections between them from the free improvisations of *Bass Duets*? Throughout the entire album the musicians negotiate fluently between an elaborate sense of freedom and a more stable musical "logic." On the one hand, the performances are in a state of constant flux, continuously evolving through a series of transformations of the musical material. What appears as an almost inexhaustible stream of ideas, powered by the bassists' intense instrumental drive, results in a seamless, ongoing musical momentum. On the other hand, a strong sense of musical stability can also be recognized. The musicians seem to know how to restrict themselves to more

confined material, in other words, to specific musical patterns. They remain within these temporarily localized boundaries, exploring them from the "inside" rather than immediately continuing to another area; figuratively speaking, in such moments the musicians know how to follow the rules rather than break them.

It is important to note that both tendencies – the elaborate, ever-transforming freedom, and the more-fixed characteristics – do not contradict each other. Rather, they emerge from each other, in a continuous game of arranging and re-arranging the musical material. A good starting point for listening to the music on this album is indeed by focusing on its fixed properties. The improvisations feature a continuous series of recognizable sound signatures: distinct musical characteristics which set a specific moment apart from the next one (which is not a trivial fact, bearing in mind the somewhat limited instrumentation: only basses). At particular moments of their improvisations, the musicians might focus on a single sound production technique, for example *tremolo con legno* or the "preparation" of the instrument with added objects[37] that distort the normal sound (for example, in "B→C").

[MEDIA: *B→C* (audio excerpt) played by Kowald and Altena.]

Another way in which the musicians distinctly "color" the improvisations is by focusing on specific musical properties, for example, a certain rhythmic pattern: in "Die Jungen: Random Generators" a perpetual rhythmic pulse is established at the beginning of the improvisation and remains an undercurrent instrumental drive for the rest of the performance.

[MEDIA: "Die Jungen: Random Generators" (audio excerpt) played by Kowald and Phillips.]

The ability of the musicians to "orchestrate" each improvisation to produce distinct sonic results establishes an underlying fixity which is apparent at all times and which plays a fundamental role in the creation of a musical form. The interaction within each of the three duets seems to be supported by this kind of solid foundation: emergent stability and clearly distinguishable musical contexts which are defined by different fixed musical attributes.

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[37] It is clear that certain decisions regarding the improvisations were not made spontaneously but prior to the performance: for example, the preparation of the instruments with added objects. This is not an uncommon practice among instrumentalists: Barry Guy very often prepares his instrument before or even during improvisation, for example, from 3.05:

[MEDIA: Double bass solo by Barry Guy (video).]

Another example is the album *Handicaps* (1973) by Maarten Altena, in which an old cast (previously used to treat Altena's arm injury) is used throughout the entire album as a preparation and sound transformation device. The preparation of the instrument, one could claim, compromises the musical freedom since it imposes a pre-defined factor on the exclusively free improvisations. However, I would claim that despite the existence of such restrictions, other values of freedom, which are more important, are not jeopardized. This idea is further discussed later on (see "handicapping" below and Part 3.

Alongside the fixed attributes, the presence of freedom can also be clearly recognized. None of the situations I have described is ever static; rather, the music is in constant flux. While the players dwell within the borders of one fixed musical "zone," they are also free to explore all possible variations of its content: the material which constitutes that zone. Through the exploration process further "hidden" paths are discovered, unexpected musical idiosyncrasies which emerge from within the material and lead the music in different directions. In this way, the improvisation is created as a ceaseless sequence of dis-organizing and stabilizing processes, opening up or narrowing down the musical materials.

It is important to note the musicians' sensitivity to the innate "potential" of the material: while dwelling on the different variations and derivation which stem from the fixed musical elements, the musicians seem to never overpass the moment in which the potential for freedom gets worn out. Listening to the music, I hear how, once the intrinsic capacity for change within a certain musical zone has been exhausted, a new direction will be immediately initiated. In that sense the investigation of freedom is entangled with an underlined responsibility: not only to extract all the possibilities from the material but also to introduce new ideas, establishing fresh ground ready for further exploration.[38]

The way in which stability and change emerge from one another can be clearly heard in "Ein Stück ins Blaue-Chops."

[MEDIA: "Ein Stück ins Blaue-Chops" (audio excerpt) played by Kowald and Phillips.]

The piece begins with two clear musical "statements," played successively (each one by a different bassist): the first is a wildly expressive, eruptive bowed phrase, played *sul ponticello*; it is followed by a rapid *tremolo* rattle, created by using the wooden tip of the bow quivering between two adjacent strings. The improvisers continue to alternate between these two unmistakably distinct sounds while developing them in new directions: fast tremolo played with the bow *sul ponticello* (starting at 0:30); a percussive, rhythmic pattern on one bass, alongside a calmer melodic gesture, slowly descending in pitch on the other (starting at 1:20); a subtle sounding dialogue between plucked harmonics and soft *col legno* gestures (starting at 1:55); an almost melodic-like bowed part (starting at 3:05); and a development into a wilder bowed part, which somehow refers back to the beginning statement (but this time with an added fast vibrato effect), alongside fast and virtuosic *pizzicato* phrases (starting at 3:50). Although it is possible to describe the distinct (fixed) character of the musical choices, it is clearly the constant changes and transformations which are the strongest elements in *Bass Duets*. In that sense, it is impossible to disconnect concrete manifestations of freedom from fixity at any given moment.

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[38] A different viewpoint, which regards freedom and responsibility as opposite tendencies, is suggested by jazz musician and scholar Paul Rinzler: "Freedom and responsibility are opposites because freedom explores options and multiplies possibilities, whereas responsibility limits action through obligation" (Rinzler, 2008, p. 58). My view is thatresponsibility is essential precisely *in order* to preserve freedom – for example, by being aware of the moment where the innate capacity for variation in one musical zone has been exhausted and a "scene change" should occur. It is this kind of responsibility which can make improvisation musically effective and as "free" as it can be (that is, since it is supposedly lacking any pre-existing directions). In a similar way, Marcel Cobussen coins the term respons*a*bility to refer to the musicians' ability to respond to unforeseen musical situations (Cobussen and Nielsen, 2012, pp. 59–90).

In *Sync or Swarm* (2005), David Borgo, an improvising musician and musicologist, suggests the term "handicapping" for adopting a musical or technical limitation which restricts the area in which the improvisation occurs in order to pose a creative and productive challenge. A similar idea is suggested by Edgar Landgraf, who claims that improvisation is always playing with and within certain constraints: "The practice of improvisation as art celebrates the freedom enabled by the mastering of constraints in a creative process" (Landgraf, 2016, p. 24). The ideas of handicapping also relates to improvisation as a collective notion, as it "may appear to limit individual creativity, [yet] can also remind each participant to focus attention on the collective statement" (Borgo, 2005, p. 25). Handicapping, constraints, limits to individual creativity, and focus on collective statement are all notions which explain how freedom and fixity emerge from each other rather than contradict each other. The exploration of sound material in *Bass Duets* is the very outcome of such self-imposed limitations.

It is important to realize that the terms used in the discussion so far are to a certain extent inadequate to fully describe improvisation if they are taken literally and separately from each other. Both the restrictive nature of the term "fixity" and the limitlessness of the concept "freedom" come to describe different foci of attention rather than absolute performative situations. It is the negotiation, rather than the contradiction, between freedom and fixity which stands at the base of improvisation, the constant oscillation between opening up unforeseen paths and the contraction and stabilization of the musical "arguments." The struggle to break away from the fixation of the musical material – perceived as a creative and productive notion – will be further elaborated in the next part.

3. Philosophical Context

While the focus so far has been on a concrete music example, in the following sections I will introduce three scholarly viewpoints on improvisation. These can help to better understand the internal processes which exist during improvisation. I will discuss ideas by Gary Peters, Richard Barrett, Erlend Dehlin, and Marcel Cobussen, and create a discourse between their thoughts and my work.

3.1 A Struggle for Freedom

In *The Philosophy of Improvisation* (2009), musician and philosopher Gary Peters outlines a philosophy-based approach to improvisation. Peters' point of departure is, foremost, conceptual: it does not rely on concrete musical example but instead turns for inspiration to the thoughts of various musicians and philosophers who write about the concept of improvisation. As remote as it may seem from the realities and practicalities of improvisation, I find the narratives which Peters explores significantly inspiring. Peters manages to trace the subtle impulses which stand at the very base of improvisation and that normally remain "hidden" in order to protect the fragility of the improvisatory act itself.

One challenging idea presented by Peters is that of the struggle of the improviser who tries to preserve freedom by fighting against the "demand" of the musical material to become fixed. The full narrative can be described as follows: the improviser begins by playing a first note, interrupting the (relative) silence

which existed until that moment and replacing it with sound. However, beginning also means that a certain decision has to be made: the improviser chooses one single gesture – one out of (at least in theory) an infinite number of possibilities. From that point on, a set musical trajectory, which invalidates the limitlessness of the initial potential of the improvisation, has begun. It becomes an almost deterministic musical path – and therefore, no longer completely free. According to Peters:

> The art of improvisation is the art of making something happen and, as such, a liberation from the absence of the work. Silence, stillness, blankness are all valorized as originary aesthetic essences only to be cancelled by sound, movement, or figuration. The problem however, is that once at play with the marked space, the improvisor or improvisors risk being enticed or indeed forced into the given structure of the gameplay, thus posing a threat to the positive freedom desired and demanding, in turn, a liberation from the game. (Peters, 2009, p. 26)

In that sense, the very same gesture that initially interrupted the silence jeopardizes freedom – regarding the latter as the opposite of "given structure" – and forces the improviser to struggle to regain it.

It is important to understand that there are two actants participating in this process: on one side, the improviser and, on the other, the musical material. The latter makes certain demands on the improviser as it calls for a continuation: "The absence of art . . . does not demand art whereas the presence of art . . . demands a continuation that is governed by the available mark-making resources" (Peters, 2009, p. 12). Additionally, the musical material is reminiscent of "historical patterns of human engagement and creativity that impose limits on what can and cannot be done on the occasion of the material's subsequent reworking, whether improvised or not" (Peters, 2009, p. 11). The struggle is then to simultaneously produce more material while sustaining the fluidity of the already existing material (the "inherent tendency" of the material, if one chooses to use a more "Adornian" dialectic).[39] The fact that Peters includes the (musical) material side by side with the (human) improviser is essential for the discussion. It establishes a common sphere in which both operate, side by side, affecting one another.

The idea of a struggle between musician and material can be heard in the improvisations in *Bass Duets*. The (relative) stability of the more-fixed moments, constantly broken by new ideas and unexpected turns, can be easily understood in these terms. The "demand" of the musical material, set out at the beginning of the improvisation (for example, by the choice for one particular gesture at the beginning of "Ein Stück ins Blaue-Chops"), marks the rest of the improvisation. However, this does not, of course, completely restrict the freedom of the improvisers; rather, the effort to come up with new, fresh material is the result of the encounter with the "inherent tendencies" of the material.

The idea of a struggle is further explored in *hasBara*. The directions require the musicians to break free from the notated material (in earlier versions of the work I used such instructions as "breaking apart" and

[39] Peters enters into a discussion with Adorno, whose philosophical viewpoint relies to a great extent on the notion of inherent tendencies in music.

"melting down" the notated material in order to describe that process). The musical structure is constituted through a process of gradual de-composition, and, while the demand of the material is prescribed (rather than spontaneously formed during the improvisation itself), the players try to disassemble that fixed state by improvising "away" from the notated ideas. The fact that the target remains entirely open (that is, undirected) creates a motion which contrasts with the composed parts.

It would be true to say that this narrative exemplifies nothing more than a particular attitude, and the choice to adopt it here is a personal preference. Based on my experiences both as an improviser and as a composer, I think that Peters' approach manages to establish a fruitful dialogue between the idea of personal freedom – to choose whatever direction in which to take the musical path – and the existence of the musical material, which, once listened to carefully and sensibly, might call for different directions by submitting its own conditions.

Adopting a perpetual discourse between what is yet to come – that which the improviser has still to mold into a certain shape – and what has already sounded and unavoidably echoes in the space – thus posing certain "demands" – should be perceived as a creative and productive approach.[40] In the most practical sense, it can be seen as a tool that enables the negotiation between playing and listening. Rendering Peters' philosophical – and, indeed, personal – views into music would mean an ongoing dialogue between spontaneous innovation and the fixed musical material. The awareness of the tension between these two forces can provide a powerful musical drive and is suggested here as one practical conclusion and a product of artistic research.

3.2 Improvisation and Complex Systems

In *The Field of Musical Improvisation* (2017), music philosopher Marcel Cobussen makes a link between improvisation and the theory of complex systems. The latter is used in various scientific fields to describe the behavior and growth of systems in which a network of different components produces complex – and to a certain extent unpredictable – results. Although each one of the different factors that make up the system might be, in itself, simple, the interaction between all the factors leads to a high degree of complexity.

In Cobussen's view, improvisation can be described as a complex system, being an "emergent, self-organizing, and adaptive structure, growing through constant adjustments and readjustments . . . and resulting in a perpetual negotiating between order and disorder, structure and chaos, free and fixed elements, stability and fluidity, etc." (Cobussen, 2017, p. 84). Free improvisation saxophonist John Butcher agrees, describing improvisation as "an extraordinarily complex matrix of influences, intentions, innovations, visions, idiosyncrasies, habits, and insights filtered and fed through different intelligences into the music of the actual moment" (Butcher, 2011, n.p). Both descriptions highlight several qualities of

[40] The same idea applies if we replace "improviser" with "composer" and "sounded" with "written." In that sense, the act of composing could be perceived as an improvisatory process in which the composer negotiates between personal freedom and the demands of the material (see Benson, 2003, pp. 33–76).

improvisation which can be traced also in *Bass Duets*: the improvisers are entangled in a constant game of shaping and reshaping the musical properties. In each moment, the unexpected "cracks" within a certain arrangement of musical elements provide the improvisers with the opportunity to slide towards another arrangement and repeatedly so. A complex system allows for a myriad of factors and possibilities to take part, and, through the interaction between them, the music can fluctuate dynamically. For example, an occasional irregularity in a periodic bow tremolo will emerge into a more elaborate rhythmic pattern and change the character of the music entirely, affecting the actions of the players who immediately respond by "re-evaluating" their path ("Ein Stück ins Blaue-Chops", between 0:40 and 2:40). In this example, it would be extremely difficult to isolate each and every musical "situation" since the flow of ideas and sound transformations is constantly and rapidly changing. Instead, tracking down the "ingredients" of the improvisation – the materials which the players introduce, each of which might be simple in itself – together with the realization that the interaction between these elements leads to a dynamic, constantly evolving structure might establish a more appropriate perspective.

This creative power is self-generative: instead of being governed by external "regulations," a complex system accumulates its energy from the interaction between its different components. As noted by Cobussen, "instead of a hierarchical, top-down system that uses a centralized decision-making process based on abstract rules to guide behavior, complex, self-organizing systems are established through a bottom-up processing of a small number of rules by several interacting actants" (Cobussen, 2017, p. 179). This idea of a spontaneous, self-emerging structure may result from the absence of any prescribed musical material upon which the improvisation is based. However obvious this idea might seem nowadays, this was not always the case. As explained by one of the pioneers of free improvisation, AMM's guitar player Keith Rowe:

> One important difference between AMM and the other musicians is this question of repertoire. I don't think I know of any other group that set out to work without a repertoire before AMM. That was a central part of what we were about, and that's a very very significant part of what we are about. Much more significant than people realise. A seismic shift in mentality in music. (Rowe, 2001, n.p.)

The importance of this idea is rightly highlighted: the "seismic shift" points towards the essential difference between free improvisation and other kinds of improvisation. The absence of repertoire allows for an emergent complexity of a higher degree than would be possible in the presence of a concrete "regulating" framework, for example, notation.

This idea is one starting point of *hasBara*. Improvisation in *hasBara* stands as an autonomous entity, inherently different from the notated parts. Since no instructions are given for the improvisation, the production of the material does not rely on my compositional "authority," but exclusively on emergent, self-organizing, and adaptive processes. In that sense, *hasBara*'s improvised parts embody the idea of self-generated complexity, articulated within a composed structure.

3.3 The Genuinely New: Inventing Context Through Improvisation

Richard Barrett, whose notated works are strongly connected to improvisation (some are discussed elsewhere in this thesis), is also active as a free improviser, playing on a set of various electronic instruments. Barrett describes free improvisation as a creative process in which the "framework or model itself is brought into being at the time of performance, rather than being a pre-existent model of whatever nature" (Barrett, 2019, p. 44). In other words, free improvisation can be distinguished from other kinds of improvisation, as it does not only involve innovation *within a certain context* but also *of the context itself* as it emerges during the performance. This is not the case of, for example, the head/solos/head format, which we might encounter in a jazz performance, but a newly created format, which is not based on pre-existent formulas. In this sense, free improvisation can be identified as instant composing, since the liberty of inventing a musical form, on whatever structural or sonic level, is in the hand of the improvisers and occurs during the performance and through the musical interaction. Peters discusses Adorno's "immanent criticism" of improvisation and jazz in order to understand how improvisation could succeed in transcending "pseudo-individualization," which celebrates originality and authenticity but, in fact, "leaves [the improviser] with little more than a stock of clichés, offering no real insight into the complexity or potential of their own practice" (Peters, 2009, p. 78). One could say that Adorno's fundamental criticism is countered by Barrett when he talks about a "framework or model . . . brought into being at the time of performance" – a model of (free) improvisation based on an intrinsic reorganization of the very fundamentals of music, which can be manifested on different levels along the range between individual notes and the entire musical structure.

It is important to understand that, in this sense, the difference between free improvisation and other kinds of improvisation is not just relative but fundamental: free improvisation involves musical innovation at a meta-contextual level and therefore cannot be reduced to extemporization on a given structure. Barrett's approach resonates with an assertion made by Erlend Dehlin, a researcher whose focus is on improvisation within organization and management theories and who distinguishes between the "granted ambition of creating the *contextually new*; recognizing inevitable variation within emerging contexts" (in the case of "regular" improvisation) and the "granted ambition of creating the *genuinely new*: a unique context of innovation" (in free improvisation) (Dehlin, 2008, p. 225, italics in original). Borgo agrees, asserting that "free improvisation moves beyond matters of expressive detail to matters of collective structure; it is not formless music making but form-making music" (Borgo, 2002, p. 167).

For me, the importance of Barrett's and Dehlin's insights is that that they establish free improvisation as a distinct element, inherently different from any other performance process (for example, interpretation of notated parts, or improvisation within a certain style or genre). This "unique" status of free improvisation stands as a conceptual background to *hasBara*, allowing for the the juxtaposition of free and fixed elements as contrary to each other. The score allows for a type of freedom which exceeds the original compositional framework and which sets in motion creative impulses that may stretch beyond the scope of pre-existing ideas. Connecting the composed material with the "meta-contextual process" – the

undirected improvisation – is the central challenge for the musicians. The attempt to transform prescribed material into freedom and vice-versa will shape the performance.

At the base of this approach to free improvisation lies the understanding that any combination of musical elements is appropriate and that the acceptance or rejection of different sounds should be based exclusively on the prevailing musical context:

> The possibility of improvising the structural-expressive framework of a piece of music comes into being, I believe, as a direct consequence of the realisation that any sound may be combined with any other sound in a musical context. (Barrett, 2019, p. 44)

This last idea is explained by Barrett in a broader musical and historical context. The following passage relates to the music of Gruppo di Improvvisazione Nuova Consonanza:[41]

> It might be noted that the principles on which this improvised music was based are very similar to the motivations behind the development of serial composition a decade earlier – a disciplined avoidance of hierarchy and received assumptions, in order to open up the possibility of discovering and exploring new relationships between sounds and structures. Principles like these [Franco Evangelisti's "commandments" for the group], along with Bailey's "non-idiomatic" formulation, may have been necessary at a certain moment in the development of the music, in order to establish a *tabula rasa*, however fictional. (Barrett, 2019, p. 45, italics in original)

This acceptance of *any* possible sound can explain the function that undirected improvisation has within a composed form. In such a context, the improvisation represents the "antimatter" and stands in contrast to the very idea of prescription. Even though the latter description might sound somewhat prosaic, the aesthetics it suggests can be rendered in concrete musical ideas, whether composed or improvised.

Perhaps a useful, if somewhat peculiar, way to describe the role of improvisation in *hasBara* would be as a kind of ritualistic process which is supposed to summon the elusive, sought-after concept of musical freedom by elevating its participants into an ecstatic state. However, this does not mean that the notation in itself should be regarded as a restricting factor for the real-time freedom of the musicians, as suggested by Barrett, whose compositional approach questions a familiar trope: "the idea that including improvisatory features in a notated composition has the intention, or the effect, of 'freeing' performers from the 'tyranny' of precise notation" (Barrett, 2019, p. 40). The notated content can communicate with improvised materials which might be entirely foreign to any pre-existing context:[42] different rhythms, sounds, or musical approaches are imported, and this exogenous material mixes with what the score

[41] Rome-based ensemble dedicated to the exploration of avant-garde and free improvisation techniques (founded in 1964). Alongside AMM, they are considered the first experimental composers collective.

[42] See Richard Barrett's "lacunae" notation in *Blattwerk*.

prescribes. In the following part I will investigate this particular combination of improvisation and notation and their coexistence as two complementary "themes" within a consistent musical narrative.

4. *hasBara*

[MEDIA: *hasBara* (video), played by MUTU ensemble.]

This last part will focus on my composition *hasBara*, a case study of the role of improvisation within a composed work. I have tried to create a musical narrative which features improvisation and notation as two contrasting elements. The oscillation between them forms the central idea of this piece and sets it apart from my other compositions.

To start the discussion, it is necessary to first observe more carefully how improvisation exists in other works mentioned in this thesis. The comparison to other works will help to demonstrate the particular role improvisation plays in *hasBara*. For example, in *MRMO* and *[Untitled, 2012]* improvisation is confined to more-or-less defined boundaries and, even though the exact notes are missing and the shapes of the phrases remain, to a certain extent, flexible, the overall structure is predefined. This restrains the degree of freedom and keeps the musical characteristic of these pieces pretty much fixed. Conversely, in *hasBara* improvisation does not exist only as content which has to be spontaneously "completed" by the musicians but also requires them to deviate from the pre-existing framework and independently develop both content and shape. In this sense, the borders of the structure as a whole are indeterminate not only to a degree of flexibility (that is, a shape which is "elastic," but not entirely undefined) but by remaining extensively more open. In *The Field of Musical Improvisation*, Cobussen presents the idea of a field which "develops, expands and shrinks, crosses borders, incorporates aporias and paradoxes" (Cobussen, 2017, p. 50). This description applies well to *hasBara*: it is impossible to define the exact and fixed borders, as the improvised parts have an unpredicted shape and length.

Another essential difference between *MRMO, [Untitled, 2012]*, and *hasBara* is that in the first two the improvisations are formed as a direct continuation of the notated ideas. The musicians rely on the information prescribed in the score and follow a guided path. The improvisations are always based on the assimilation and absorption of the prescribed information, and real-time musical freedom is achieved only from that point onwards. In *hasBara*, however, the musicians are not supposed to continue the notated music, extending it into their improvisations, but the opposite: the score instructs the musicians to de-compose the prescribed parts. This can perhaps be perceived as the opposite of the traditional notion of interpreting music, whereby musicians are expected to realize the information given by the score and not move away from it. The intention in *hasBara* is to gradually "nullify" the composed material in order to invite new ideas into the composition. Gary Peters' notion of struggle, in which the musicians try to break away from the tendency or "demand" of the material so as to achieve continuation and preserve freedom, provides a useful description of this process of de-composition.

Lacking any prescription, direction, or even a general shape, improvisation in *hasBara* is a self-governing force, capable of generating musical content by itself. Ideas and decisions are allowed to develop spontaneously, based on real-time creativity and feedback within the group, without any relation to the pre-composed ideas. This results in emergent complexity – dynamically fluctuating textures in a constant state of change. "Anything" can happen, without any restrictions on the content or the character of the material, and, as the recording demonstrates, this kind of openness eventually leads to musical ideas away from the notated material.

However, the core idea of this work is not the independence of improvisation. Rather, it is the connection between two opposite musical poles – undirected improvisation and notated prescriptions – which is key here. After an introductory opening chord, a short notated statement is played repeatedly, while the musicians are instructed to gradually de-compose the material: the notation slowly transforms into free material, opening up to exogenous influences. Later on, the opposite occurs: the musicians are asked to abandon their freedom and come back to playing prescribed material, "surrendering" to the demand of the material to become stable and organized. Improvisation and notation are always linked together, either by "melting down" the pre-composed material or by "collecting" the improvisation back into the pre-defined material.

[IMAGE: *hasBara* (score excerpt).]

The gradual transformation between improvisation and notated material (and back) is something which needs more unpacking. The improvisers use this to generate the musical development – a key element in my work. Anthony Braxton, whose work also oscillates between free improvisation and notation, introduces the term "narrative," which can also help to explain what is expected from the performers in *hasBara*:

> Narrative is one thing that distinguishes the music of the great improvisers, whether it's Charlie Parker or Paul Desmond or Miles Davis; [it] is their ability to understand how to go from A to B in a way that keeps the friendly experiencer's interest from beginning to end. Now, there are many ways to go from A to B with radiance. But certainly, the phenomenon of narrative linear radiance is a component that could be talked of as a way of looking at a solo by Max Roach playing on a Charlie Parker album: the way he puts a solo together, the logic of decision-making. A good story, like a good form, celebrates the ongoing moment in a way that is magnetic. . . . What we're really talking about is how something unfolds and moves into the forward space in a way that holds your interest because of how the musician is setting the propositions up. It's narrative in the sense that, when it's all over, someone can say, "Oh, that made perfect sense," someone else might say, "Oh, that was a great story, it was complete, it was a multi-veer, and he expanded it in this way and ended it in this way and it kept my interest." What for me is most important is that it keeps my interest and demonstrates what I'll call fundamental music proclivities. We tend not to want to look at our music in terms of fundamental proclivities, but

> even so, it still can be factored. Everything that happens can be factored in some way, and used or duplicated or transformed. (Braxton, 2003, n.p.)

According to Braxton, a musical narrative provides musicians and audience with a clear trajectory, a "logical" musical impulse – the "ability to understand how to go from A to B in a way that keeps the friendly experiencer's interest from beginning to end." It is interesting to note that Braxton recognizes in this process not only the improvisers themselves but also "fundamental music proclivities": the musical material with its own orientation or, according to Peters, its own "demands." The concept of narrative can also be applied to the connection between composed (and to a certain extent, fixed) ideas and undirected (free) improvisation, as it exists in *hasBara*.

Another point is about the notation itself. What is implied by composed "material," not only on the path towards or from free improvisation but on a musical semantic level? My score seems to be no more than a rough sketch, an unfinished draft which requires the bigger part to be completed by the musicians. [IMAGE: *hasBara* (score excerpt).] I have devised the notation exactly for that purpose, leaving out such details as staff lines (thus marking the note heights only relatively), the choice of instrumentation, register, or playing technique, as well as other structural considerations (for example, how many times Part A should be repeated during the process of deconstructing the material and arriving at free improvisation). On the other hand, small "hints" that point towards more specific expressive details are notated (for example, "light, airy, improvise in a major scale"), calling for focused attention from the performers. In his description of Cecil Taylor's work, Alexander Hawkins writes:

> Instructions were often delivered in such a way (cryptically, speedily) that instrumental sections within the ensemble would find themselves negotiating and deciding among themselves how to interpret them; in other words, they were forced to organise themselves and decide on a course of action, within the overarching structure of mutual enterprise. (Hawkins, 2018, n.p.)

With an established sensitivity not only to how the improviser creates but also to the essential interactions within a group of improvisers and finally between performer and musical instructions, Taylor understands the potential of these instructions as a presentation of both fixity and freedom. My work follows these lines, creating a self-organizing collective unit which will engage in the acts of negotiation and interpretation as guiding principles. In a second performance of this work by ensemble Mutu (this time without my participation as a player), I was happily reassured that such "cryptic" notation works well. The particular balance between the relative impreciseness of the notation, the undirected improvisation, and the presence of explicitly articulated ideas proved to be successful, in the sense that the performance expressed my ideas as much as the musicians' own ideas without the one overshadowing the other. This strengthens my conviction that any other group of musicians, even without my participation as a performer, could articulate my initial plans as a composer.

Watching the video recording, it is clear that the instruction to move away from notation towards a (more) free state forced the group to be aware not only of the score but also of the spontaneous impulses which emerge during the performance. The responsibility to link the realization of the score and the real-time invention of new material, on the one hand, while also being aware of the balance between individual actions and the overall activity within the group, on the other, forces the musicians to find an effective equilibrium between freedom and fixity. *hasBara* does not only contain both improvisation and notation but provides a true link between the two – a connection which I sometimes find lacking in other works. In addition, oscillating between notation and undirected improvisation has proven to be useful while working with only classically trained musicians; I noticed that the collective improvisation pushes them beyond their (often-encountered) inexperience with improvising.

5. Conclusion

hasBara presents an encounter between notation and improvisation, which forms a specific musical narrative. Notation and improvisation are juxtaposed as two contrasting elements, and the tension between them is particularly highlighted by the distinct nature of improvisation: it is presented as the antithesis of notation – an attempt to move away from the notated material.

The decision to highlight the contrast between improvisation and notation did not come because I believe in any inherent opposition between the two but as a way to add a distinct musical perspective to the already existing knowledge about their combination. By suggesting this particular narrative, I have tried to create a situation in which notation and improvisation can dynamically coexist, while the inherent possibilities of each of them are maintained. While the improvisation remains entirely free, the notation can still convey the information I wanted to communicate to the musicians; and between the two, unforeseen situations can emerge during the performance. Departing from the notated parts, the musicians establish their own, self-formed musical paths – even though it is clear that this exploration will be unavoidably affected by the composition. The attempt to avoid the fixity of the material – the stabilization of a deterministic musical path – leads to a constant process of destabilization, which I regard as musically creative and productive.

hasBara thus presents another angle on the freedom-and-fixity encounter. Creating links between improvisation and notation forms the main task for the musicians. They have to simultaneously operate on two levels or different playing modes: improvisation, by spontaneously generating new material and constantly forming and re-forming musical interconnections, and the realization of the score, by making sure the notated ideas can be correctly carried out. The result relies on both the performers' and the composer's input, and integrates these two channels of information organically, as necessary parts of the work. The main conclusion to be drawn from this chapter is that there are two ways of looking at improvisation: it can be seen as independent musical activity, driven by a struggle between change and stabilization, which allows structures to emerge and develop through a process of constant readaptation; or as part of a network that also includes pre-established elements. This twofold approach reveals

improvisation as a powerful, inherent force – which can exist alongside other creative forces – in music and, indeed, in any other human endeavor.

One last question which should be discussed is what could come next? Which directions would it be interesting to explore in order to create new pieces? One almost obvious direction would be to create a situation in which improvisation can feed back into a composed framework and alter its content. Practically speaking, this will involve a perpetual re-organizing of structure and material by creating a continuous process of interweaving free materials with composed ones. Developing ways of achieving this through notation is an interesting challenge which can provide a direction for future works.

Conclusion

In this thesis I have focused on the concepts of freedom and fixity as the central topic of my artistic practice and thinking. The case studies discussed in the four main chapters are different paths on a journey to find musical identities which are as explicit as they are open: even though my works contain concrete shapes and hard-coded components, they aim to trigger open-ended processes rather than be restrictive; they evoke perpetual transformations of musical elements rather than demanding slavish adherence to notation. In this sense, the pre-composed materials become sites for exploration, inviting musicians and audiences to a real-time investigation of their latent potentials.

By addressing these musical works through various freedom-and-fixity narratives – embodied in such concepts as free improvisation, notation, instrument design, and computer systems – I have established a number of musical perspectives which are generic enough to become useful tools for other musicians and scholars. The terms "freedom" and "fixity," and the relationships between them, suggest new approaches to listening to, playing, or analyzing a musical work. These concepts provide a way of thinking about a work's components, structure, and the way these are realized during performances. For example, the inherent tension between an attempt to follow a notated score and the real-time decisions of the musicians on stage can become key to understanding the inner dynamics of a work.

The concepts of freedom and fixity are in fact abstractions, placeholders for musical agents such as rhythm, notes, structure, timeline, electronic instruments, and computer systems. In each of the case studies I have discussed in this dissertation, the two concepts are embodied differently, thus different relationships develop between them in each piece.

In *Modo Recordar, Modo Olvidar* improvisation forms a continuation of the notation, the latter determining the players' approach to their parts. By setting out several ideas to be elaborated improvisationally, the composition's structure is not just realized – faithfully constructed by the musicians who execute the notated template as accurately as possible – but developed, in the sense that the composition triggers off real-time processes that will evolve into a complete musical structure. The way in which the musicians developed the outlined structure by improvising led me to the idea of a flexible timeline: an approach to notation that can present pre-composed ideas – fixed starting, ending, or even middle points of musical processes – without having to compromise the real-time freedom of the performers.

In *[Untitled, 2012]*, the structure is based on a fixed timeline – a pre-recorded soundtrack. While the performer has to synchronize the notated part with the fixed timeline, the musical material itself is flexible: it can be stretched or compressed, providing a certain amount of freedom to the performer. Furthermore, although the soundtrack is fixed, its interpretation remains free to a certain extent: how the player responds to the electronic sounds, and extracts from them the musical beat is open.

Acknowledging freedom at the level of listening – instead of merely concentrating on freedom in playing – is another way of encountering freedom within fixity: even if the material is entirely pre-determined, the performer can still navigate freely within it.

In *The Instrument*, the interactivity of the computer system is central to the composition. By interacting with the computer the musicians create a musical structure in real time. Just as in *Modo Recordar, Modo Olvidar*, the prescribed form is flexible: although it features a predetermined set of sounds that are organized in a particular order, the computer processes and triggers the samples according to the live actions of the musicians so that the overall result remains largely open. More than in the other case studies, technology here is essential. By evoking open-ended – rather than pre-determined – interactions, the computer system presents a particular relation between freedom and fixity: hard-coded elements next to live interaction and pre-determined responsive patterns next to randomness.

In *hasBara* the role of free improvisation within composition is explored. In this piece I created a dialogue between free improvisation and notation, in which freedom is a thematic element within the composed structure. The tension between freedom and pre-composed elements charges the performance with a creative drive: it evokes a struggle between the tendency to remain within the realms of already established musical patterns and the attempt to break these patterns and head towards the unknown.

The subjects of this research are of course the practices of musicking: composing, performing, improvising, human–computer interaction, co-creation, and so on. But the discourses I have been dealing with also address other issues: extra-musical, general questions concerning human interaction and the function of communication and creativity within collaborative processes. The relationship between ideas and actions which are set in advance and those that are created on-the-spot is one such important notion. My work demonstrates the dynamic interrelationships between these two channels of creativity, rather than their contradiction or exclusion. The marking of an aesthetic space does not restrict the potential depth of the creative process; on the contrary, it opens up unforeseen paths and plants the seeds of new directions and possibilities. In this sense, my compositions provide contexts and frameworks in which emerging and fluctuating situations are fully integrated within pre-existing conditions. The way in which freedom and fixity, in all its complexity and diversity, coexist in my compositions can set an example for human interaction in all its complexity. Real-time choices, actions, and interactions – what I have referred to in this dissertation as “freedom” – are integral to any creative setting and always evolve in conjunction with predesignated, “fixed” parameters. Sensitivity to the interdependency of freedom and fixity is suggested as a general approach: it embodies a personal and collective responsibility, as much as a liberating attitude, through which playfulness receives a fundamental role within any activity. This thesis suggests ways to rethink this relationship, not, however, by implying predetermined, prescribed recipes, but, rather, by applying the integration of freedom and fixity and emphasizing how these two terms are complementary to each other, rather than contradictory. This observation can shed light on the inner dynamics of creative processes of whatever kind – artistic, academic, or simply any exchange of information through human dialogue; furthermore, more concrete ideas may arise regarding education,

management and organizational practices,[43] political systems, urban planning, or any other activity that involves the exchange of pre-existing information together with the generation of new information.

I will – very briefly – discuss three examples, two concrete ones on a micro-scale and a more abstract general one. After discussing my ideas concerning freedom and fixity with a university professor and literature scholar, she told me that she decided to re-structure part of her teaching in such a way that the students can decide on the subject of each seminar, choosing one part out of the entire course's curriculum in advance. In my opinion, the dialogue and negotiations between the students' wishes, the teacher's reaction to the flexible situation, and the responsibility to the "demands" of the course subject and the overall curriculum, have some resemblance to the dialogue between performers, composer, and musical material. Although there are of course fundamental differences between a university course and a musical work, the freedom-and-fixity narrative can provide a useful approach also in education. Another example is the work *hasBara*. *hasBara* was composed from the viewpoint that musicians could, and should, take positions in debates concerning moral issues, and, as such, this work can serve as an example of how freedom and fixity exist also in an extra-musical context. A serious discussion about how music can present political, ethical, or social ideas is beyond the scope of this thesis. At the same time, it is important to note that the relationship between freedom and fixity, or, as it is rendered in this work, between free improvisation and precomposed ideas, can reflect also on such issues. The division of the ensemble into group and soloists refers to the individual "responsibility" of each citizen to contribute their effort to the propaganda machine by functioning as an active voice.[44] The way in which this responsibility should be discharged is represented by the deconstruction of notated structures, literary disassembling the original message and substituting it with the musicians' own voices. The way musical structure emerges through improvisation serves as an example for the power of the collective, and the way self-organizing structuring is entangled with pre-composed material demonstrates the agreement between freedom and fixity, rather than their contradiction. More generally speaking, some musical ideas developed in this dissertation could materialize in any cultural field in which encounters or negotiations between various agents – participants, ideas, objects, physical conditions – take place, by bringing together the different forces I discuss into a coherent yet contingent assemblage. The dialogue between freedom and fixity could provide a guideline by which the various agents engage with each other, and develop an awareness of the possible points of tension, balance, and interaction within the relevant context. By deconstructing the opposition between freedom and fixity and by pointing out the perpetual

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[43] As suggested by Erlend Dehlin in relation to improvisation and management theory, for example by pointing out the inherent nature of improvisation, and by not excluding it as a separate approach, in the sense that it can exist together with other organizational practices: "improvisation is an inextricable feature of human practice, and hence, of organizing processes. From this stance I seek to overcome a perspective on improvisation as an either-or phenomenon" (Dehlin, 2008, p. X). See further discussion about Dehlin's ideas in *hasBara* part 3.3.

[44] The title *hasBara* literally translates from Hebrew as "explanation," or, more specifically, "an act of explanation." This is also the name of the department of the Israeli Ministry of Foreign Affairs which is responsible for communicating the policies and actions of the state of Israel to the media abroad. Hasbara has been suggested as the personal responsibility of any Israeli citizen abroad to explain and justify the actions of the (currently right-wing) government to a supposedly non-understanding, "hostile" environment.

interaction of the two concepts, I have attempted to make a useful contribution to already existing artistic practices and theoretical discourses.

One final question which might be asked is: what next? What could form the next step in the freedom-and-fixity narrative? In my recent composition *Stations and Journeys* from 2018 (commissioned by Ensemble Modelo62) the musicians walk between several "stations" – moving from one notated part to another at different locations on stage. The constant movement of the musicians between the stations gradually re-arranges the instrumentation in each section as the group accumulates and breaks apart, and the emerging combinations between the various simultaneously played parts create a free-flowing spatial setting for the performance.

[MEDIA: Stations and Journeys, video excerpt (played by Ensemble Modelo62).]

In this work, the musical perception of the players is also addressed: they are asked to "capture one idea [while walking between the stations] – a sound, a gesture, a musical expression – and bring it to the next station" where it will be incorporated into the score. I have used the symbol [IMAGE] in order to incorporate the players' own ideas into the notation, for example:

[IMAGE: Stations and Journeys, score excerpt.]

The result is musical as much as theatrical: it combines improvisation and notation, physical movement (between different locations on stage) and movement within the parts (the musicians can freely "travel" between the staves of each part while playing), and allotted paths alongside spontaneously emerging combinations. *Stations and Journeys*, which was written for a large ensemble, can be seen as a direct continuation, effect, and consequence of the research presented here. In a sense, it can be understood as a summary and artistic translation of many of the concepts I have been dealing with: free improvisation, open notation, interaction between structure and flexibility. I tried to articulate my ideas so that they will not only open *musical* paths but also *physical* paths on stage, embodying freedom and fixity in the movement of performers in space. In this sense, this composition offers a next step in the encounter between freedom and fixity.

What to explore further? How to imagine new compositions and new conceptual paths that might go beyond the scope of the four case studies? In a certain sense, my research has only scratched the surface of integrating freedom and fixity into contemporary composing practice. The discourses I have explored can certainly offer more possibilities than what has been demonstrated in my work so far: the dynamic relations between, for example, score, computer system, and soundtrack, on the one hand, and structure, notated ideas, and timelines, on the other; the identity of the work, comprehended as a concept that does not suggest a single, but multiple paths; and the notion of the work as a tool or an instrument, which opens up new ways of thinking and doing rather than determining a means to a particular end; and so on. Together, these discourses – which have both theoretical and practical components – suggest an approach

to the act of composing which can perhaps be described as “modular”: the various elements of a work as well as the different concepts that contribute to the identity of a work can be assigned and re-assigned to several pieces, thereby hinting at a compositional practice which is more open than a simple chain of single compositions with distinct identities. Musical identity thus becomes a fluid notion, shifting between different works and different performances. In this sense there can be no clear beginning or end to a musical work, the ultimate consequence being that there is no need for this concept to start with. Instead, I imagine a compositional practice which facilitates a constant metamorphosis of materials, ideas, manifestations, enactments, and explorations of unforeseen possibilities. The practice of composition can thus be understood in terms of tool design – notations, musical concepts, performance processes, and so on – which can be used to create events, which in their turn might become new tools. In its essence, the interaction between free and fixed elements I have described in this thesis gives rise to this kind of approach to composing, which is based on processes of change as much as on stability.

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Summary

This thesis focuses on the concepts of freedom and fixity as two central topics of my artistic research. I present, analyze, and contextualize four of my works which have explicit links to freedom and fixity and which demonstrate the dynamic interrelationship between the two. By looking at the musical contents of these works, by reflecting on my initial intentions for composing them, and by dwelling on the ideas emerging during the composition process and their subsequent performances, I contribute a distinct musical perspective on freedom and fixity which can inspire other musicians and researchers on their theoretical and/or practical paths.

The compositions demonstrate my interest in establishing, on the one hand, a specific aesthetic – a musical identity which is, at least to some extent, fixed. However, on the other hand, they keep this identity explicitly free by creating dynamic relations between the musicians themselves and between them and compositional elements – structure, pitch, rhythm, and so on. Integrating freedom and fixity suggests an approach to musical structures as open processes which evolve in real time. Conversely, it excludes neither an explicit description of musical materials nor the existence of tangible musical shapes.

By asking questions regarding the relationship between freedom and fixity and the role they play in musical works, I make observations about the nature of each of the concepts. How can they be embodied, practiced, and performed in composing music? Which elements of each of the compositions discussed in this thesis are primarily fixed and which are primarily free? How can musical compositions express the tensions and balances between freedom and fixity and how is this effectuated in each of the four case studies? How do the relations between freedom and fixity shape the performances of these works? The various ways in which these two concepts are embodied as musical shapes, the dynamic relationship between them, and the understanding that their existence is inherent to any musical work, marks them as essential elements in a creative dialogue – in musical as well as extra-musical contexts.

In order to contextualize my works and ideas I have studied the work and writings of musicians active in the fields of composition, improvisation, and electronic music. I have analyzed their terminology and perspectives, and I have reflected on the ways in which they deepen my understanding and practical adaptations of freedom and fixity in music. To broaden my perspective I also looked at scholarly ideas which belong to non-musical disciplines, for example philosophy and technological studies. This wider context also points towards the omnipresence of the concepts of freedom and fixity: their combination should also be comprehended as a social, philosophical, and even ethical – rather than a strictly musical – issue. My observations could be applied in such disciplines as education, socio-political thinking, or organizational theories, and suggest that freedom – explained as the individual's ability and responsibility to invent, interact, and adapt to dynamic situations in real time – can integrate with pre-existing intentions, ideas, and structures, and that this integration can establish a creative and productive approach.

My research revolved around three general domains, each of which forms a path towards understanding the musical works: composition, improvisation, and technology. I suggest that the role of the score and of musical notation is not only to fix, but also to evoke the creation of musical material in real time, thus establishing a link between composition and freedom. The term "work-in-movement" is introduced, indicating a certain incompleteness in composed works, and a way to create an ongoing dialogue between composer and performers. I examine the relation between structure and improvisation, either by looking at improvisation as an element within a composed framework, or by focusing on it as a musical practice inits own right by addressing the term "free improvisation." I point out the perpetual dialogue between the musicians themselves and between them and musical elements, and the emergent, self-organizing, and continuously evolving structures brought into life by this dialogue.. The relationship between technology, structure, and freedom is discussed, for example by rethinking technology as an open-ended concept which can reveal multiple paths rather than providing determinate means to a particular end. Three of the four compositions use the computer as a musical instrument, a fact which provided me with the opportunity to understand the computer as a tool for creating musical freedom, and through which the relationship between freedom and fixity can be reflected.

The thesis is divided into four chapters, each presenting one case study which forms a distinct perspective on the freedom-and-fixity axis. Together, the four case studies form a multilayered investigation of possible correlations between freedom and fixity, approached through different levels of the musical process – notation, performance, design of the electronics and the interaction with the computer, etc. – and by using text, scores, and audio/video material. The work *Modo Recordar, Modo Olvidar* (for viola, contrabass, and computer) addresses the relation between structure and improvisation. *[Untitled, 2012]* (for bass and pre-recorded soundtrack) brings fixity into focus as a central compositional thread. The pre-recorded soundtrack in this work is discussed as a notion of "total fixity," suggesting a framework around which freedom is weaved. *The Instrument* (an interactive electronic system, for any instrument(s) or sound source) focuses on the idea of the computer as a musical instrument, an interactive system, and an autonomous improviser, asking how the concepts of freedom and fixity are embodied in this live-electronics composition. In *hasBara* (for ensemble) the discussion will focus on free improvisation and on notation and improvisation as two contrasting elements.

Obviously, theory has affected my artistic work: a strong focus on the concepts of freedom and fixity has left its traces on the compositions themselves, on the development of notation, and on the design of the SuperCollider code. However, by composing, performing, and reflecting on and through my experiences as a musician, my artistic work simultaneously contributed to theoretical discourses: transposing my knowledge from the practical domain to a scholarly discourse offered a distinct perspective which highlights the important role of freedom and fixity, and the inherent quality of the dialogue between them. By taking into consideration the personal and collective responsibility for both freedom and fixity, we can remodel the way we think about dialogue and exchange of information, not only in the musical domain but also in relation to many other creative processes. The continuous re-adjustment of structures

and content, which is the result of the constant negotiation between the participants of a social framework of any kind – teachers and students, designers and executors, or the different positions and functions of a working institution, to give a few examples – permits a continuous evolution of knowledge, and prevents a state of stagnancy and rigidity which is unsuitable to deal with an ever-changing reality.

Samenvatting

Dit proefschrift richt zich op de concepten “vrijheid” en “fixatie” als twee centrale onderwerpen van mijn artistieke onderzoek. Ik presenteer, analiseer en contextualiseer vier van mijn werken die expliciet gelinkt zijn aan vrijheid en fixatie, en die de dynamische verhouding tussen de twee concepten demonstreren. Door te kijken naar de muzikale inhoud van deze werken, door te reflecteren op mijn aanvankelijke intenties om hen te componeren, en door stil te staan bij de ideeën die ontstonden tijdens het componeerproces en de daaropvolgende uitvoeringen, herdenk ik vanuit een muzikaal perspectief de begrippen vrijheid en fixatie, zodanig dat het andere muzikanten en onderzoekers kan inspireren op zowel theoretische als praktische vlakken.

De composities tonen, aan de ene kant, een specifieke esthetiek - een muzikale identiteit die, tot op zekere hoogte, gefixeerd is. Aan de andere kant echter, houden zij deze identiteit expliciet open door dynamische relaties te creëren tussen zowel de uitvoerenden onderling, als tussen de musici en de compositorische elementen: structuur, toonhoogte, ritme, enzovoort. Door vrijheid en fixatie te integreren worden de muzikale structuren benaderd als een open proces dat ter plekke, en *in real time*, evolueert. Tegelijkertijd sluit het een expliciete beschrijving van muzikale materialen en het bestaan van concrete muzikale vormen niet uit.

Door de relatie tussen vrijheid en fixatie te bevragen en de rol die ze spelen in muzikale werken te onderzoeken, observeer ik tegelijkertijd de aard van deze concepten. Hoe kunnen deze belichaamd, gepraktiseerd, en uitgevoerd worden in het componeren van muziek? Welke elementen van elk van de composities die besproken worden in dit proefschrift zijn in hoofdzaak gefixeerd, en welke vrij? Hoe kunnen muzikale composities de spanning uitdrukken tussen vrijheid en fixatie en hoe is dit bewerkstelligd in de vier case-studies? Hoe bepalen de relaties tussen vrijheid en fixatie de uitvoeringen van deze werken? De verschillende manieren waarop de twee concepten zich als muzikale vormen manifesteren, de dynamische relatie tussen hen, en het idee dat hun bestaan inherent is aan elk muzikaal werk, typeert hen als essentiële elementen in een creatieve dialoog – in zowel muzikale als buiten-muzikale contexten.

Om mijn werken en ideeën te contextualiseren heb ik het werk en teksten van musici bestudeerd die actief zijn in compositie, improvisatie en elektronische muziek. Ik heb hun terminologie en aandachtspunten geanalyseerd, en heb gereflecteerd op de manieren waarop zij praktische adaptaties van vrijheid en fixatie, zoals ik ze definieer, in muziek inbedden. Om mijn perspectief te verbreden heb ik ook gekeken naar wetenschappelijke ideeën uit niet-muzikale disciplines, waaronder filosofie en technologie. Die uitgebreide context toont de alomtegenwoordigheid van de concepten van vrijheid en fixatie: hun combinatie moet, naast een muzikale, ook begrepen worden als een sociale, filosofische, en zelfs ethische kwestie.

Mijn observaties zouden toegepast kunnen worden in disciplines zoals educatie, socio-politiek denken en organisatieleer, en opperen het idee dat vrijheid, begrepen als mogelijkheid en verantwoordelijkheid van het individu om te scheppen, interacties aan te gaan, en zich aan te passen aan dynamische situaties, met reeds bestaande intenties, ideeën en structuren kan integreren, en dat deze integratie een creatieve en productieve benadering behelst.

Mijn onderzoek vond plaats binnen drie algemene domeinen, die ieder een pad vormden om de muzikale werken te begrijpen: compositie, improvisatie en technologie. Ik werp het idee op dat de rol van de partituur niet alleen is om te fixeren, maar ook om uit te dagen tot de creatie van muzikaal materiaal *in real time*, en dus een link tussen compositie en vrijheid te bewerkstelligen. De term "werk in beweging" wordt geïntroduceerd, die een zekere onvolledigheid van een gecomponeerd werk aantoont, en een manier om een voortdurende dialoog tussen componist en uitvoerende musici te onderhouden. Ik onderzoek de relatie tussen structuur en improvisatie, zij het door improvisatie te bezien als element binnen een gecomponeerd raamwerk, zij het door ernaar te kijken als een muzikale praktijk in haar eigen recht, gerelateerd aan zogenaamde "vrije improvisatie". Binnen deze context wijs ik op de voortdurende dialoog tussen musici, en die tussen hen en muzikale elementen, en de zelf-organiserende, zich continu ontwikkelende structuren die door deze dialogen ontstaan. De relatie tussen technologie, structuur en vrijheid wordt besproken, bijvoorbeeld door technologie te beschouwen als een domein dat, in plaats van bepalende middelen voor een al vastgelegd einde te leveren, meerdere wegen naar een mogelijk resultaat kan openen.
In drie van de vier composities wordt de computer ingezet als muzikaal instrument: dat maakt het mogelijk om de computer te zien als een element om muzikale vrijheid te creëren, en op die manier de relatie tussen vrijheid en fixatie opnieuw te presenteren.

Het proefschrift is onderverdeeld in vier hoofdstukken, die ieder een *case study* voorstellen die een onderscheidend perspectief op de vrijheid-en-fixatie as vormen. Samen vormen de vier case studies een gelaagd onderzoek naar de mogelijke correlatie tussen vrijheid en fixatie, benaderd vanuit verschillende elementen die samen deel uitmaken van het muzikale proces: notatie, uitvoering, het programmeren van de elektronica, interactie met de computer, et cetera, in combinatie met tekst, notenschrift en audiovisueel materiaal. Het werk *Modo Recordar, Modo Olvidar* (voor viool, contrabas en computer) adresseert de relatie tussen structuur en improvisatie. *[Untitled, 2012]* (voor bas en vooraf opgenomen soundtrack) stelt fixatie centraal als compositorische rode draad. De vooraf opgenomen soundtrack kan hier opgevat worden als een muzikale manifestatie van fixatie, een vooropgesteld raamwerk waaromheen vrijheid is vervlochten. *The Instrument* (een interactief elektronisch systeem, voor om het even welk instrument of geluidsbron), richt zich op de computer als muzikaal instrument, interactief systeem, en autonoom improvisator, en bevraagt hoe de ideeën van vrijheid en fixatie belichaamd zijn in deze live elektronische compositie. De bespreking van *hasBara* (voor ensemble) gaat voornamelijk in op vrije improvisatie, en op de partituur en improvisatie als contrasterende elementen.

Vanzelfsprekend heeft theorie mijn artistieke werk beïnvloed: een sterke focus op de ideeën van vrijheid en fixatie heeft zijn sporen nagelaten op de composities zelf, op de ontwikkeling van de partituren, en op het programmeren van de SuperCollider code. Aan de andere kant heeft mijn werk - het componeren en uitvoeren ervan , en het reflecteren op mijn ervaringen als uitvoerend musicus, ook bijdragen opgeleverd aan theoretische discoursen : het omzetten van mijn kennis van het praktische domein naar een wetenschappelijke heeft nieuwe inzichten opgeleverd aangaade de belangrijke rol van vrijheid en fixatie, en de inherente kwaliteit van de dialoog tussen hen. Door de persoonlijke en collectieve verantwoordelijkheid voor vrijheid en fixatie in acht te nemen, kunnen we de manier waarop we denken over dialoog, en uitwisseling van informatie, aanscherpen en bijstellen, niet alleen in het muzikale domein maar ook in relatie tot vele andere creatieve processen. Het voortdurend aanpassen van structuren en inhoud, zoals dat resultaat kan zijn van voortdurend overleg tussen participanten binnen een sociaal raamwerk, van welke soort ook – docenten en studenten, ontwerpers en uitvoerders, of de verschillende posities en functies binnen een instituut, om maar enkele voorbeelden te noemen, staat een voortdurende evolutie van kennis toe, en voorkomt stagnatie en een rigiditeit die niet passen bij een steeds veranderende realiteit.

Biography

Ilya Ziblat is a composer and performer based in the Netherlands. His work integrates composition and improvisation using a combination of instruments and live electronics. Through interdisciplinary collaborations involving text, dance, visual and video art, he explores new means of expression beyond the purely musical.

Together with the group Hatzatz he has performed widely with live video art. He has composed and performed new scores for films from the silent period (*Nosferatu* and *The General*). A new soundtrack for *The Faithful Heart* is forthcoming in 2020, in collaboration with Marie Guilleray and Ziv Taubenfeld. He has worked with the choreographers Loïc Perela (Dansateliers Rotterdam), Leine & Roebana, and Hilde Elbers (International Choreographers Week Tilburg). He has composed for such ensembles as Modelo62, ASKO, MAE (Maarten Altena Ensemble), Klang, Meitar, Musica Nova, and for soloists John Eckhardt, Germaine Sijstermans, Dan Weinstein, and many others. His work has been performed at the Muziekgebouw (Amsterdam), Schouwburg Rotterdam, Tivoli Vredenburg (Utrecht), Teatros de Canal (Madrid), National Philarmony (Lithuania), De Singel (Antwerp), and Nanko Sunset Hall (Osaka), and programmed in festivals such as ISCM World Music Days 2012 (Antwerp), International Review of Composers (Belgrade), Tenso Dagen (Amsterdam), stateXnewForms (The Hague), La Escucha Errante (Bilbao), among many others. He has been invited to give lectures at MIAM – Centre for Advanced Studies in Music (Istanbul Technical University) and at the The Buchmann-Mehta School of Music (Tel Aviv University), as well as a three days masterclass in the School of Music, University of East Anglia (Norwich).

Ilya plays contrabass and bass guitar both as an improviser and as a performer of composed repertoire. As a bassist he has performed at the Muziekgebouw (Amsterdam), Acker Stadt Palast (Berlin), haTeiva (Tel Aviv), Auditorium Vila-Seca (Catalonia), and many others.

After studying composition and contrabass in the Buchmann-Mehta School of Music (Tel Aviv University) he moved to the Netherlands, obtaining his Master's degree from the Royal Conservatory, The Hague.

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