Cuts and Loops as Musical Movement and Interaction

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# Table of Contents

1. Introduction
   1.1 The problem
   1.2 The method

2. Classical Music, Platonian Epistemology and the Cut
   2.1 Fixed musical entities
   2.2 Plato’s notion of knowledge and its aftermath
   2.3 Musical performance of the Platonian idea
   2.4 Musical messages
   2.5 Nattiez and structural approaches towards meaning and narrative
   2.6 Absolute music
   2.7 Summary

3. Loops, Interactions and EDM
   3.1 Introduction
   3.2 What is the loop and how does it differ from the cut
   3.3 Shannon
   3.4 Repetition, Deleuze, Nietzsche and the particular
   3.5 Loops in music
   3.6 Raster Noton and Carsten Nicolai
   3.7 Musicological analysis of EDM and loops
   3.8 Perception and space

4. Loops and Affordances as a Dynamical System
   4.1 Affordances
4.2 Affodances offered by the beat as a dynamical system..........................51
4.3 Classical music as a dynamical system..............................................52
4.4 Complications for empirical research...............................................53
4.5 Summary.............................................................................................53

5. Conclusion

5.1 Conclusion.............................................................................................55
5.2 Works cites............................................................................................56
1. Introduction

1.1 The problem

Music, so intimately engaged with perception, lights up the mind. Music, being immaterial, touches on the immaterial - on the drift of thought and feeling, on divinity and death. Music, as sound, can represent the auditory world: the moan of wind, the repeated whispers of calm waves. The calls of birds. Music, as idealized voice, can sing or sigh, laugh or weep. Music, as rhythm, can keep pace with our contemplative rest and our racing activity. Music, in proceeding through time, can resemble our lives. (Griffiths, 2006: 3)

The above citation of Paul Griffiths is part of the opening chapter of *A Concise History of Western Music* (2006). In this citation, Griffiths attempts to illustrate why people deal with music. Clearly music moves us, this is not a shocking revelation. But what exactly is it that moves us? In any domain of science, there is strong disagreement about the ontology of the objects of study, particularly in the case of something immaterial such as music. What is music? People are likely to find an agreeable answer to this question, but this question becomes a lot harder when one asks: what does music do, how does music move us, and what meanings can music convey, or what knowledge does music bring? These are questions dealing with a complex entanglement of epistemology and ontology. Different domains of musicology would surely answer these questions in different ways. Consider again the above citation by Griffiths. It exposes preconceptions about concepts such as the mind, the immaterial, divinity, death, representation, auditory worlds, idealization, voice, time, and lastly our lives as a whole. All indefinite concepts, to say the least, that are likely to cause disagreement when one approaches these concepts scientifically. In science, one has to opt for a certain empirical approach and these different approaches all depend on ontological choices.

For example: consider music from a neuroscientific perspective. Its domain is the functioning of the brain. Therefore, music, from the perspective of neuroscience, is something that deals with brain functions. Listening to music in different spaces, or the listening to different kinds of music, will lead to differences in brain activity. If music is believed to represent the call of a bird, the neuroscientist would compare the brain activity that is perceived when the subject is listening to the music, to the brain activity that is perceived when his test subject actually listens to the call of a bird, therefore finding the effects of sounds and music on brain activity. This is the consequence of ontological choices: music, as a neuroscientific object of study, exclusively deals with brain activity. A neuroscientific ontology of music does not encompass any social processes regarding the making of meaning. Music to a sociologist, on the other hand, is a social process, and therefore sociomusicology will focus on social interactions in relation to music. The sociologist would find out whether people agree on hearing the calls of birds in music, what this would mean to them, and why people believe they hear the call of the bird. The sociologist studies the social behavior of people. But a sociological ontology of music does not encompass notions of brain activity. Each scientific domain has its own epistemology, and as a consequence a

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1 *Ontology*: coming from the Greek ὄντος which means 'being', and λογία, which can be translated as 'study'. In analytical philosophy, an ontology concerns the determination of elements that are fundamental for something 'to be'. In other words it encompasses an inquiry into 'being'.

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different ontology and a different object of study, and each scientific domain is therefore oblivious to particular aspects of its object of study.

Furthermore, all scientific domains that study music have their own tools to do so, deriving from their epistemology and their particular research questions. Neuroscience uses brain scans, sociology uses quantitative and qualitative methods. Structural approaches use solfege and musical scores. These methods all strive to provide more or less objective/scientific answers to their research questions (Leezenberg & De Vries 2001:16). The research questions are determined by the scientific view of the object of study, thus objective or scientific knowledge is always connected to- and determined by the ontological choices preceding any research.

In general we feel that objective knowledge is more truthful than subjective knowledge, and, in modern day, science is our main way of acquiring objective and true knowledge. Scientific knowledge is regarded to be true in a general sense, under many different circumstances. For example: if we hear a bird under these given circumstances, our brain will always respond in this fashion. This is a hypothesis that can be scientifically tested. If this turns out to be true (or false), this is considered to be a scientific fact, as a type of true knowledge with a more or less universal validity.

This notion of objective and universal knowledge first took shape in Plato's epistemology. Plato believed that true knowledge is knowledge that is forever true. But due to changing and temporal particular circumstances we encounter here on earth, true knowledge cannot exist in physical form. It can merely exist as a theoretical idea, only accessible through rational thinking, in a world generally known as Plato's 'world of ideas': a realm in which physical entities cannot enter, and in which the ideas can exist in its most perfect form. The idea of a perfect bed is forever perfect (Plato, Republic: Book X). However, a bed existing here on earth is always flawed due to poor craftsmanship and tools, or rotten and imperfect wood.

Science, in the aftermath of Plato's philosophy, strives to find true knowledge through theory. The changing particular (and also temporal) circumstances, for example the physical and emotional scientist, should either be banned or approached in a rational sense as much as possible. We do not expect quantum physicists to express their emotions regarding black holes, since we do not believe that they matter for objective knowledge about black holes. Sociologists attempt to undermine any personal prejudice, since science believes that personal feelings block the way to finding knowledge with a general validity. Science strives for objective and rational results.

Plato's own student Aristotle questioned the possibility of the existence of this type of universal and objective knowledge, mainly in regards to the preconditions of this type of knowledge. He voices his criticism by discussing the example of 'dry foods' (Nicomachean Ethics, Book VI). Aristotle asserts that it is generally known that dry foods are healthy. This knowledge is considered to be true and objective and that it has universal validity: dry foods are healthy for everyone and this will always be so. But according to Aristotle, this type of universal knowledge is not always applicable: if we know that dry foods are healthy, but we don't recognize the food in front of us as being dry, then we don't know that the food in front of us is good for us (Aristotle, Nicomachean Ethics: Book VI). We have to recognize the fundamental particular and earthly elements under which the universal knowledge is valid, before we can apply the knowledge in a practical way. If the circumstances are as such that the food in front of us is not recognized as being dry, then the food is not healthy for us, because we will not eat it. If we do eat it, then the food is healthy for us, but we will not have any
knowledge about it. This is not the only criticism Aristotle expressed. He also claimed that true knowledge can have a temporal nature: “a white wall that is forever white does not make it more white” (*Nicomachean Ethics*, Book I).

These examples expose that the temporal and particular circumstances matter in regards to knowledge. Particular circumstances have to be considered a part of the ontology of a being, even though these circumstances are liable to change, best expressed by Heraclitus: “No man ever steps in the same river twice, for other waters are ever flowing onto you.” If one does not incorporate these particular circumstances in the ontology of your object of study, then one will find a different knowledge.

The dichotomy between the *universal* and the flowing *particular* has interesting consequences when it is applied to music. Let’s review the question ‘what is music?’ again, but this time in the light of the dichotomy. First, the Platonian universal side that considers knowledge to be a more of a fixed entity. In the romantic period, a highly Platonic era, the idea of the genius composer started to take shape. Beethoven, as well as other composers from this time period, started using printed sheet music as a medium to spread his musical ideas. This sheet music is a fixed transcription of Beethoven’s musical ideas, containing all the information for musicians to play the music. General belief in the romantic period was that Beethoven’s symphonies were so good that they worked uplifting: a belief that we become better humans by listening to the symphonies, because they teach us something about our deeper inner selves. The Beethoven symphony was, and for many still is, regarded as a work of high art that should not be altered. For the symphony to be the best work of art as possible, to transfer its uplifting content completely, it has to be performed as well as possible. Sheet music plays an important role in this performance. This is so, because it is the only ‘objective’ connection to Beethoven, because Beethoven himself wrote it down. The score contains the structure of the symphony, and instructions for how to play it the way Beethoven himself intended. The symphony itself, through its sounds, through its rhythm and motifs, is believed to express all the kinds of immaterial subjects, as mentioned by Griffiths in the opening citation of this chapter. Therefore, the sheet music is not only the most objective connection to the fixed musical structure, but also to Beethoven’s original intentions and meanings. If the music uplifts, it must be so because of something Beethoven put in the music. From this ontological perspective, the score plays an important part in the ‘being’ of the music.

Even though these intentions and meanings are not always quite clear, they can still be placed in a Platonian realm, as something that is a part of the symphony, and as something that all musician’s should strive for. We belief that Beethoven, as the genius creator of the symphony, had in mind the most perfect way that his symphony should be played. It is up to the musician to strive for these intentions. In theory, the perfect symphony has to be played by the best musicians, in the best concert hall, on the best instruments, with the best conductor, and the most appropriate audience, to get the most truthful performance of the symphony. The sheet music functions as the Platonian law that drives the performance forward. The theoretical perfect performance of the symphony is disconnected from earthly and particular circumstances and does not deal with inferior musicians and violins, just like the earthly carpenter does not have the perfect tools and perfect wood to build the perfect bed. But just like the carpenter, trying his best to build the best bed possible, the musician’s strive for playing the

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2 Described in Plato’s *Cratylus* dialogue.
symphony the way that Beethoven himself had intended it to be played. As Leonard Bernstein put it:

All his efforts, however strenuous or glamorous, be made in the service of the composer's meaning. (Bernstein 1959)

The listener of the symphony has no other option than to sit still, to act appropriate, and contemplate on the symphony in order to grasp Beethoven's meanings and intentions. Because these ideas are connected to the Platonian idea, the orchestra functions as a Socratian midwife of these ideas. The etiquette in the concert hall is specifically designed for this silent contemplation, to allow the audience to grasp the uplifting content Beethoven offers with his symphony.

Because the idea of the symphony is fixed in this Platonian type of ontology, and because the sheet music provides the only 'objective' connection to this idea, we can recognize methods of research dealing almost exclusively with the sheet music and the musical structure. In structuralist and formalist musicology, the meaning that the music is believed to convey is found through analysis of the musical structure, through the harmonies and motifs. These are aspects of the symphony that never change: they have a fixed place in the symphony, no matter which violinist or pianist plays the piece. Therefore, structuralist approaches to music deal with fixed musical entities, connected to the fixed Platonian idea of the composer. Examples of this structuralist mode of thinking can still be found in many narrative approaches to music, such as Nattiez (1990), Tarasti (1994) and Almén (2003), who explore how a meaningful narrative can be found in structural elements of the music, by studying musical semiotics.

As opposed to the idea of music as a fixed entity, we can also imagine music that fully depends on changing particular circumstances. As Heraclitus might have put it: a music that deals with the constantly changing flowing nature of the river. In this scenario, the musicians have to be more or less like fishermen. A fisherman in general knows how the river changes from season to season in relation to the dynamics of the weather, but still everyday offers unforeseen particular circumstances that she has to deal with. she does not exactly know what the weather will be like, and she does not know how many fish he will catch. In jam sessions, the musicians have to be like the fishermen. They create the music in social interaction and in response to the other musicians. Club DJ's in the field of electronic dance music (EDM) alter their beats in response to the audience and to the sound. They respond to the feel of the event at that particular moment, adapting to the flowing nature of the event. This causes the music to be treated as much less of a fixed entity than a Beethoven symphony, who can be seen much more as a cartographer of the river. A cartographer does not have to deal with the weather or the fish, she presents the river as an unchanging fixed entity. From a romantic perspective, the Beethoven symphony, like the map of the river, offers us a type of universal information about our souls, neglecting the flowing and changing particular circumstances due to the use of a different ontology and epistemology of music.

As a consequence of the flowing nature of EDM, many studies hereof focus on social interactions and the meaning of these interactions, rather than focusing on the musical structure. Structural approaches are not common, and if attempted, they do not appear to capture the nature of EDM (Butler 2006:11). Mapping EDM is hard to do. Mark

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4 The Socratian midwife helps others to give birth to intellectual ideas. Plato, *Theaetetus.*
Butler exemplifies this in *Unlocking the Groove* (2006). Butler quotes Buckland (2002) as example of a structuralist description of an EDM track:

David Morales’ remix of ‘Goldeneye’ by Tina Turner exemplifies the cues DJs served up for the dancers. After building up layers of rhythms, which acquainted dancers with the tempo and timbre of the track, and after repetition had made it familiar, the explicit rhythm track was pulled way, leaving the unembellished key signature chords of the harmony chiming out. A key chord sustained itself under the second repeated cycle of these chords to create a dramatic tension of expectation. (Buckland 2002)

Butler adds:

What exactly are ‘key signature chords’ (or ‘key chords’?) Tonic chords? ‘Primary chords’ (tonic, subdominant, dominant)? Chords belonging to a particular key? Although most of Buckland’s musical descriptions are relatively clear, this use of terminology is curious given the absence of notational symbols such as key signatures in [EDM]. (Butler: 11)

Butler further adds that certain concepts in classical music, such as harmony, do not appear to carry as much descriptive meaning when applied to DJ music, such as EDM, because dance music is more focused on rhythm (Butler: 11).

How is it possible that methods used for the analysis of musical structure seem inadequate for the analysis of EDM? Why do these concepts carry less descriptive meaning? Both musics, symphonies by Beethoven and EDM, are sounds that move people in various ways, emotionally, physically, intellectually, and both have rhythm, chords and melodies; the key ingredients for a musical structure. Also both musics lead to interaction in one way or another. What is the crucial difference?

This paper sets out to explore an answer to this question. An analysis of epistemology surrounding highly fixed approaches to music, as is the case with Beethoven, will be compared to an analysis of epistemologies surrounding music created with loops, such as EDM. This will elaborate on the before mentioned shortcomings of structural approaches in the field of EDM, as discussed by Butler (2006), and will expose that the more fixed and Platonian the approach to the music is, the less room there is for social interaction and change. A fixed musical piece and its segments are always played from beginning to end in a straight linear movement, directed towards an ending. If the music depends more on social interaction, as in many types of music created with loops, methods that derive from Platonian epistemologies, dealing with fixed entities, become less adequate. As opposed to fixed Platonian music, the most interactive kinds of EDM are created exclusively with loops, encompassing interactive feedback loops, which allow the audience to influence and shape the music through the DJ. An act that in return determines the response of the audience.

Interactive physical relations, in a general sense, but which are also highly significant in EDM, are an important part of theories regarding *embodied cognition* and *externalism*. These approaches to cognition suggest that conscious perception is not merely the result of a rational analysis of our perception, predominantly taking place inside our heads and in our brain, but that our environment is indissoluble to our consciousness. Our body, our actions and environment shape our consciousness (Noë 2004, Varela Thompson & Rosch 1991, Rowlands, Shapiro 2011). From this follows that musical experience is determined by bodily movements (Leman 2008, Krueger 2010). Movements, such as dance, matter. We experience music in a different fashion when we sit still as opposed to when we jump or sing. But the music in return determines the way
we move in a subconscious and direct fashion. This is an interactive and looped process.

On the basis of these approaches to cognition and interaction, this paper proposes a model of EDM as a dynamical system. The constituents of this system are the DJ, the music itself, and the audience. Our environment offers affordances, or possibilities to actively act upon our environment (Chemero 2011). When this theory is applied to music, we see that music offers certain affordances as well: the beat of the music provides the opportunities to dance. The dancing of the audience in return offers affordances to the DJ to alter the beat. In this model, the structure of music is linked to physical social interactions. The model suggested in this paper, exposes that in EDM the constituents of this system play an equal role, whereas a performance of music by Beethoven is exposed as a simplified version of this system in which some of the interactions between the constituents are neglected. This approach leads to the conclusion that the degree of interactivity and variability in relation to the music determines the epistemology suited for the analysis of music, therefore providing an explanation of why structuralist methods seem to be inadequate for the analysis of EDM.

1.2 The method
The goal of this research is to analyze in detail why structural analyzing methods appear to be unfit for the analysis of electronic dance music, based on scientific and epistemological grounds. In order to find an answer to this problem, I will first engage in an extensive exploration of viewpoints and methods commonly encountered in structural and fixed approaches to Western art music, in particular to Beethoven as an extreme form of Platonically fixed music. This exploration leads to familiarization with epistemologies dealing with fixed notions of knowledge. During this process we acquaint ourselves with knowledge and tools that will help to critically review and analyze different approaches to EDM. The next step, in chapter three, is to explore the ontology of EDM and to familiarize ourselves with corresponding methods of analysis in the field. I will focus on the problems that these methods carry with them. In order to understand why these analyzing methods fail to capture the nature of dance music, we have to resort to a meta-theory of musical analysis. To a large extent this will be an analytical undertaking, in which the limitations of the epistemologies and approaches become evident through the interpretation and comparison of philosophical and musicological sources. In this comparison, the philosophical sources act as a tool for the critical analysis of the musicological sources. This will create a deeper understanding of the ontology of more fixed classical music on the one hand, and flowing EDM on the other. This will allow for the forming an argument on why the methods of the former do not seem fit for the analysis of the latter.

The above analytical method leads to the following set-up of the paper: chapter two deals with Plato, structuralist epistemology, Beethoven and the cut. This provides an analytical background to structural analyzes of EDM involving loops, since any domain of science in a general deals with many of the principles dealt with in chapter two. Chapter three focuses on electronic dance music. The approaches in this field will be analyzed and compared to the classical epistemology dealt with in chapter two. Next is the identification of the problems that occur when these methods are applied to dance music involving loops. These problems will then be analyzed by approaches towards situated and embodied cognition, which encompass a different epistemology in which conscious perception is not a process that exclusively takes place in the brain. The body and its movements are a part of our consciousness as well. In the process, these
approaches criticize Platonian epistemologies and will provide new viewpoints on methods of analysis for EDM involving loops, exemplified by the analysis of musical structure and interaction as a dynamical system.
2. Classical Music, Platonian Epistemology and the Cut

2.1 Fixed musical entities
This chapter intends to analyze the ontology and epistemologies connected to fixed and teleological musical entities. Musical entities with a fixed musical structure that ideally never change. A symphony by Beethoven can be seen as an example of highly fixed music. The symphony will always be played from beginning to end, as close as possible to the way Beethoven intended. The symphony is believed to carry a form of uplifting knowledge, which it can only do due to its fixed nature. In order to better understand this we will first dig into Plato's epistemology that involves notions of idealized and eternal knowledge.

2.2 Plato's notion of knowledge and its aftermath
Plato, as any philosopher, was interested in knowing about the world, and also exposed a keen interest in epistemology. What do we know? What is truth? What is knowledge? This classical quest for knowledge was the birth place of modern science, which in the modern era has become our instrument of choice for finding knowledge and truth. Science has come a long way since Plato. Knowledge about the world has been categorized in many domains and subdomains, such as the social sciences, mathematics, physics, economics, biology and the arts. Each of these scientific domains developed their own skills, methods and approaches to find knowledge about their domain. But what they have in common is that they all descend from Plato's notion of knowledge.

According to Plato, true knowledge is not found here on earth, because we cannot perceive the things as they really are. What we perceive are shadows of the real objects (The Republic, Book VII). These shadows are mere reflections of the true form of the objects, but these objects do not exist here on earth. The true form of these objects resides in the world of ideas. This is a divine world, consisting of ideas and concepts of all objects in their most perfect form. Knowledge about this world of ideas is considered to be true or good knowledge. Take for example the before mentioned craftsman who wants to build a good bed. The idea of a perfect bed, existing in this Platonian world of ideas, is a better bed then any craftsman can ever make. The craftsman, despite this, will attempt to build a bed as close to the perfect bed as possible. But in order to build this bed, the craftsman needs to have knowledge about the idea of the perfect bed. A good craftsman might come close to approaching this ideal bed, since he has knowledge about the ideal bed (The Republic, Book X). So knowledge about the idea is good knowledge, because it helps to build good beds. And it is good to strive for perfect beds, since they provide a good night's rest.

However, earthly beds are never perfect. They are always flawed: there is no perfect wood and there are no perfect tools to create perfect beds. The idea of the perfect bed is divine, or godlike, and does not suffer from these earthly, material and temporal imperfections. The perfect bed is universally and eternally good, because what is forever good is better than something that is good for a short while. The conceptual perfect bed is the bed that all craftsmen strive for (The Republic, Book X). These ideal

5 Plato's philosophy of knowledge is explained in the cave allegory in The Republic Book VII (514a- 520a).
forms also apply for natural categories (*Republic* Book VI, VII); we cannot find a perfect horse on earth. We only perceive flawed versions of perfect divine horses.

What we can conclude from this, is that, according to Plato, perfection only exists in theory, in an immaterial and divine realm. And, since this realm is divine, we do not have physical access to it\(^6\). The idea exists in a domain that is only accessible through our minds. And since only ideas relate to true knowledge, we can only acquire knowledge through our minds, through rational thinking. Emeritus Professor E.B. Davies of King's College, London puts it the following way:

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\text{[One]} \text{ aspect of Platonism is that it involves a definite claim about how the brain functions. Platonists believe that our understanding of mathematics [or any science] involves a type of perception of the Platonic realm, and that our brains therefore have the capacity to reach beyond the confines of the physical world as currently understood, albeit after a long period of intense concentration.} \text{ (*Let Platonism Die*, EMS Newsletter, June 2007: 24)}
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Therefore, in order for humans to achieve true knowledge, we have to dissemble our minds from earthly and material matters.

One of these earthly matters we have to part from is bodily affection. Emotions are temporary and particular, earthly and personal, and thus cloud our way to finding true and eternal universal knowledge. They affect our bodies, they make us weak, and they interfere with rational thinking\(^7\). Furthermore emotions only correspond to particular individuals, whereas true knowledge is true for everyone, just like perfect beds are perfect for everyone. In order to do the right thing we have to think rationally and degrade the role of emotions.

Modern science and academia have inherited many aspects of Plato's notion of knowledge. As mentioned before, we do not expect quantum physicists to express their emotions regarding black holes. We believe that emotions do not matter for their findings and that they have nothing to do with knowledge about quantum physics. This completely makes sense to us. We feel science has to be objective and truthful. Emotions are subjective, and as a consequence they have to be excluded from many domains of science (Leezenberg & De Vries, 2001: 16-17). Objective scientific knowledge is found by rational thinking, and we have to separate our minds from our bodies as much as possible, since they block the way to this knowledge.

The first philosopher to disagree with this Platonian notion of knowledge was Plato's own student Aristotle. He criticized the notion of universality and the eternal validity of knowledge. He stated: “a white wall that is forever white, does not make it more white” (*Nicomachean Ethics*, Book I). With this example Aristotle effectively illustrates the temporary aspects of knowledge. Furthermore he illustrates the importance of the earthly aspects of knowledge with the before mentioned example of 'dry foods'. One can have universal knowledge about the fact that dry foods are good for you, but if one, under particular circumstances, does not recognize the particular food as being dry, he does not know that the particular food in front of him is good for him (*Nicomachean Ethics*, Book VI). The examples as such are not sufficient to overthrow Plato's in its entirety, but they do provide a simple, yet cutting critical perspective on Plato's divine eternal notion of knowledge.

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6 Plato's gods are *extracosmic*. This means, they are not really part of our universe, unlike the Olympian gods who are *intracosmic*. Plato's god transcends all categories of space-time reality. They are perfect and self-subsistent. (Drew, Jean F. *On Plato, The Early Church, and Modern Science: An Eclectic Mediation*, 2004.)

7 The importance of the controlling of emotions is discussed in Plato's charioteer myth in *Phaedrus* (245c-257b).
Two millennia later, the temporary and particular aspects of knowledge took on greater importance in the philosophy of Friedrich Nietzsche, which will be discussed in depth in chapter three. In *The Birth of Tragedy* (1872) Nietzsche recognizes a dichotomy: the Apollinian versus the Dionysian. The Apollinian comprises of Platonian rational thinking man, who, guided by his ratio, makes decisions and structures his life. The Apollinian represents order, universality, and the non-temporal. The Dionysian on the other hand, is untamed nature, the earthly, the physical, emotions and chaos. It cannot be apprehended rationally. It involves dancing and singing to music, without any rational Apollinian intervention. The Dionysian deals with feeling, and thus has an important bodily aspect to it. According to Nietzsche, people create the Apollinian as a veil in order to deal with the true Dionysian nature of the world. With regard to traditional science we can assert that the Apollinian involves Platonian rational notions of knowledge, because it divides the world in objects of study and tries to find universal laws and theories applicable to these objects. Even a science such as history structures dynamic and chaotic events like wars and political revolts in order to tell its story, and thus puts a veil between us and the events we would rather neglect in relation to the story. The Dionysian does have a place in traditional science, but only as an object of study.

Knowledge, as objective and true as possible, seems to be the final goal of science, therefore making it teleological in nature. In our society, it makes sense when a problem is approached rationally. Scientific methods block out bodily emotions, which distort our objective view of the world. When we are sad or angry, our objective view of the world is decreased to an even higher degree than in our neutral state, causing a significant reduction in our ability to act rationally. This is one of the two main reasons why Plato wanted to discard the arts in his perfect state: arts make people emotional, and therefore less rational and truthful. For example: music can make people melancholic or weak, or ready for battle, prepared to face danger and death, depending on the harmonies in the music (*The Republic*, Book III). The other reason for discarding the arts, is that the arts are representative, at least they used to be in classical days. Painting, for example, had a clear representative nature; the painter made a copy of an object perceived and he was judged on how well his painting represented the object. This meant that a painting of a bed was basically a copy of a bed, which was already a copy of the perfect idea of a bed. A painting was a copy of a copy, and to Plato this had no value. According to Plato, we should strive for true knowledge about the world, and ideas, instead of knowledge about copies of the ideas (*The Republic*, Book X). And in order to achieve this, the body and emotions should be undermined in order to clear the path for thinking in its purest form.

Science deals with knowledge in a broad sense, and therefore, in extension to Plato’s notion of knowledge, we believe that science should be rational. The emotional scientist is of no importance. Science is in essence a method to exterminate any physical aspects of the quest for knowledge, which is proven by the fact that we create tests and methodologies that undermine our own personal observations. We do not just trust our observations to be objective and truthful. “[In science] human experience has to be checked and systematically cleansed from subjective influences” (Leezenberg & De Vries 2001: 16). Science needs measurement according to universal rules, in order to develop universal laws with eternal validity.

In addition, science is not just a method, it is also a movement directed towards knowledge. The quest for new knowledge always starts with the identification of a problem that somehow needs solving, and the solution or answer is the final goal of the
process. A good scientific process conventionally works its way towards the solution by means of methodologies. This movement towards knowledge can also be recognized in the way research results are presented. Scientific papers follow universal rules and conventions that guide or move one through the process: first the domain is described, then the research question is posed, then the method is described, which is then applied to the subject matter. The scientific paper thus follows a conventional and universal structure that has to be followed from beginning to end, or a movement from beginning to end, in order to transfer the knowledge in a comprehensible and acceptable scientific manner. A scientific paper is a linear directed communication of knowledge to a reading audience, with the presented knowledge being securely fixed in the Platonian realm.

It is clear that we can identify many aspects of Plato's philosophy in science. This also seems to be the case for the science of music, even though music makes people emotional. From Plato's viewpoints, this would reduce its scientific value significantly; music is, to a significant extent, a bodily experience, while knowledge mainly deals with the ratio. This leads to a form of schizophrenia: we have separated mind and body, and we believe that the mind is superior. We should strive for the mind and rational knowledge, the res cogitans above the res extensa. This creates a tendency to treat our emotions as a form of knowledge with logical causes that can be approached rationally. In musicology we recognize this tendency to explain emotions, from the outside, as physical processes that follow a logical and rational cause-and-effect-chain.

2.3 Musical performance of the Platonian idea
Music and movement share a dynamic structure that supports universal expressions of emotion, recently exposed in research by Sievers, Polansky, Casey and Wheatley [SPCW] (2012). Faster and aggressive beats make us feel more 'upbeat' and 'bouncy', whereas slower rhythms can be soothing (SPCW 2012). Music imitates human physiological responses, and humans in return imitate the music, experiencing the corresponding emotions (SPCW 2012). SPCW's research exposed that the evocation of emotions by musical movement is a universal process. Research by Kate Hevner (1936) uncovered a similar connection to musical harmony. It exposed that significant groups of people, from different upbringing and class and geographical location, experience similar emotions when confronted with particular harmonies in music, for example minor harmonies were experienced as 'sad', and major harmonies were experienced as being 'happy' (1936).

The above researches provide empirical evidence that music moves us emotionally and physically, and that the experience of these emotions is more or less universal for a given musical event. Because music moves us all in a similar way, it seems as though the music or the composer communicates a meaningful entity to us. This is a meaning that we share to a high degree. Chopin's Nocturnes make many of us feel melancholic, therefore we feel that this emotional movement is part of the meaning of the music. Just like meaningful and deep melancholic words spoken to you by someone you deeply appreciate, we are moved by the Nocturne in a similar fashion. The music is almost like a deep message, with the deep message causing the emotions. But what does this musical message concretely encompass, if it says anything at all, and why do we treat

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8 The distinction between res cogitans and res extensa, the thinking matter and the extended matter, was coined by René Descartes. It is commonly known as the cartesian cut or cartesian divide.

9 This tendency is famously criticized in Descartes' Error by Antonio Damasio (1994), who claims emotions and reason are intrinsically connected.
Western art music, such as Chopin and Beethoven, as meaningful communication?

Until around the 18th century, it was considered appropriate to respond to music at concerts in the spur of the moment. People were allowed to cheer and shout. They were also allowed to drink, eat or go to the bathroom in a much more leisurely fashion. With the rise of institutional art music this all changed. A concert became an important and weighty event. To many also a meaningful and moving event, with the consequence that a present day audience is merely allowed to respond to the music at a concert in controlled and conventional ways in order to respect the importance.

Where does this weightiness come from? Why does the audience attempt to grasp the meaning of a Beethoven symphony, and why do we believe that its content is so important? It is as though a symphony by Beethoven is believed to carry a form of meaningful knowledge, present in the symphony, and for the audience to grasp. A vague knowledge perhaps, but since our emotional response is universal, we more or less share an understanding of what the symphonies are about. The meaning of the symphony, like our physical response, appears to be more or less universal. An example of this is can be found in the general belief that Beethoven's fifth represents 'fate knocking at the door', as described by E.T.A. Hoffman (1813). According to Antony Hopkins (composer, pianist, b. 1921), this idea survived as a general myth10 existing to this day.

This representative aspect is believed to be connected to the intentions of the symphony, as an expression of what Beethoven wanted to express. These intentions survive as a universal idea, similar to the idea of 'the perfect bed' in the Platonian realm. These intentions constitute the meaningful reading of the symphony. When we know that Beethoven's fifth represents fate knocking at the door, we are likely to 'understand' the symphony in such a fashion. The intentions are a fixed belief, a closed entity, even though the conductor and the musician's give an interpretation of these intentions. But as stated by Bernstein, these interpretations are always in service to the composer's intended meaning (1959). The score plays an important role in the performance of this meaningful idea, since it is the only objective link to this idea. It is the only connection of the idea of the composer himself. Therefore, the score acts as a fixed Platonian universal law, for all musicians to follow.

The concert hall is specifically designed for the communication of this meaning. It has become a space that allows for silent contemplation, which allows the audience to grasp the meaning of the subject of the symphony, very similar to traditional educational institutes. Canadian composer Daniel Marshall writes:

The traditional concert hall reminds me exactly of an 'industrial' classroom. We are the students, the music is the information to be taken in, and the unwritten rules of concert etiquette is the teacher always bearing down on us and whose permission we need to talk, have a drink of water, or go to the bathroom. Everyone must come in on time, sit down in their designated seat, be quiet, and absorb the music independently. If we disobey, we are “punished” via the public embarrassment that comes from the exposure of our not knowing the rules. These are our social rituals which, if you think about it, are quite anti-social, as if we were are all turned into that awkward quiet kid who doesn’t like to speak to people. (Marshall 2012)

The concert hall seems to have become a classroom drenched with social values surrounding education. There is a general belief that a Beethoven symphony is intellectually uplifting, not in the least by Beethoven himself. Beethoven stated:

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Music is the one incorporeal entrance into the higher world of knowledge, which comprehends mankind, but which mankind cannot comprehend. (Thayer, Forbes, Krebiel 1991: 496).

The above citation clearly exposes a Platonian separation of mind and body, and even hints of Plato's higher incorporeal world of true knowledge. Since we cannot physically enter this world, we have to suppress our bodily responses in order to give room for our intellect. Music contains knowledge and teaches the audience. From this perspective, the concert hall can be compared to a school with a one way musical communication of this knowledge, directed from composer to the audience. The orchestra is the messenger, and performs the symphony, regardless of the presence or response of the audience. There is a 'fourth wall' (Schiffman 2006). A wall between the music and the audience, the divine idea and the earthly, only to be breached by the intellect.

Clara Shandler discusses the barriers of classical performance in *The Musical Experience: Product or Process?* (Shandler: 2). Shandler states that Western art music has cultivated values of flawless performance and preserving the composer's intentions, as opposed to other genres such as pop music that encourage participation. This creates a barrier between these kinds of music. In Western art music, the musicians are highly trained and present their flawless technique to a body of listeners (Shandler: 2). The musicians remain largely mysterious and unfamiliar (Goffman 1959). Western art music reinforces secluded and anti-social behavior (Shandler: 2). She states that in Western art music the talented are framed for convenient viewing. A concert becomes a type of living museum (Shandler: 2). And one of the main purposes of a museum is to educate and stimulate intellectual upliftment. The concert communicates the composer's original idea, which is fixed in the Platonian realm. Shandler writes:

The classical musician's ultimate goal is to play Mozart's music the way that it would have been played during the eighteenth century, to refine one's baroque technique in order to play Bach with its 'intended' characteristics, and to interpret Debussy's musical directions in order to try to understand what the composer would have wanted. There is no tenured professor of musical performance that will tell you that an individual musician's interpretation is more desirable than the composer's intentions. (Shandler: 3)

And Shandler cites Bruno Nettl:

[The present conception of the great composers] as deities beyond criticism supports the interpretation of the culture of western art music in the contemporary world as a kind of religious system... the pantheon of great masters who have scriptures (the manuscript, the authoritative, the scholarly urtext edition reflecting the earliest sources, and the authentic performance); who are served by a priesthood of performers, musicologists; who are celebrated in and surrounded by rituals such as concert, rehearsal, lesson and practice session. (Nettl 1995)

In this view of classical music we can recognize all the aspects of the Platonian divine idea that we have previously discussed. The composer is out there as a deity in a divine world, and his idea is universal, communicated in a one way directed movement through rational means: the scriptures. The students of WAM try to approach the original idea of the composer through these scriptures.

Shandler remarks that all recorded versions, even though they differ, try to approach this ideal. The goal is, at least most of the time, not to give an individual
interpretation of a piece:

I admit there have been several attempts to record and perform the works of WAM in different ways. However, the contrast from rock/pop/folk/etc. lies in the fact that a conductor, musician or ensemble is not necessarily trying to make their interpretation better and perhaps ‘more authentic’ than the last composer/musician/ensemble who recorded or performed it. (2012: 4)

This again supports a view of a classical composition as a divine Platonian idea. The musicians should at all time attempt to approach the intended way of playing the composition in order to approach the fixed Platonian meaning of the composition as close as possible. When the orchestra plays Beethoven’s fifth incorrectly, fate might not be knocking at the door anymore.

The popular Dutch TV show De Wereld Draait Door recently broadcasted an interview that clearly exposed this way of Platonian thinking. The host, Matthijs van Nieuwkerk, interviewed Pieter Wispelwey, a well known Dutch cellist, who had recently released recordings of Bach’s cello suites. These cello suites are particularly hard to play, because the sheet music lacks the necessary instructions, forcing the musicians even more to give a particular interpretation. However, this was not the first time that Wispelwey had recorded the cello suites. Twenty years ago, he had recorded the suites for the first time. Now, in 2012, for the third time. Why would one record these suites three times?

Before recording the suites this time, Wispelwey had conducted thorough research into Bach and baroque playing styles, and he even visited prof. dr. Lawrence Dreyfus and dr. John Butt, who are known authorities in the field of playing Bach. Wispelwey did this in order to obtain more knowledge about playing Bach. This caused him to play the suites on a baroque cello this time, tuning it to 390 Hz; almost a semi-tone lower than standard tuning. Matthijs van Nieuwkerk replied in response to this research: “So now you are the first to be allowed to play Bach, the way Bach intended.” Wispelwey's response: “Well maybe that is a bit too pretentious”11. The perfect Bach cello suite, existing in the Platonian realm, can never be played in reality, no matter how hard one tries. Frederick Dorian describes the interpreter of a romantic piece as a type of Sherlock Holmes looking for truth:

The classical score releases the interpreter from the task of a musical archeologist who has to dig for information in dust-laden volumes in libraries. Often enough, even the few available treatises on the old manner of performing are a complete disappointment to the truth-seeking modern interpreter. Then, as it were, he may find himself in a detective’s role - a kind of musical Sherlock Holmes, who faces certain facts in the score, but must trace further clues in order to bring the complete truth to light. (1942: 60)

The score is an important element to finding Platonian truth. The script becomes binding (Dorian 1942: 155), and thus becomes a fixed entity and a law.

2.4 Musical messages
It is clear that the orchestra and the musicians try to communicate the composer's divine idea as good as possible. But what exactly does this idea encompass? What does music tell? And how does it tell? We have discussed how the idea of the composer is

11 De Wereld Draait Door, Vara, 09-20-2012
dealt with as rational, ideal, and true knowledge. The performance is organized as a one way communication of the knowledge in a \textit{sender → message → receiver} model, from composer to audience in a linear directed movement. The symphony itself exists as a divine Platonian idea, the score being its scripture and law. We feel that the music has meaning and conveys a form of knowledge that is somehow connected to the composer’s intentions. But how are these intentions and meanings conveyed through the music?

Structuralist approaches focus on the fixed aspects of the music, such as the musical structure, played from beginning to end. The score acts as an important guideline in these approaches, as described by Dorian (1942). A significant wave of structuralist musicologists have attempted to find the knowledge or meaning of the music through these types of analyzes. Some of them believed that a decoding of the fixed musical structure would lead to an understanding of the meaning of the music, and the effects caused by the music. They would approach music as a language, and through linguistic methods they attempted to find concretely what the music is telling us. They attempted to find musical narratives.

Well known contemporary advocates of structuralist approaches to musical narrative are Byron Almén (\textit{Narrative Archetypes: A critique, Theory and Method of Narrative Analysis} 2003, \textit{A theory of Musical Narrative} 2008) and Eero Tarasti (\textit{A Theory of Musical Semiotics} 1994). Both Almén and Tarasti recognize musical syntax: musical elements that represent something else, similar to words having meaning. Meaning is conveyed through the arranging of these elements, however not in a concrete sense. Almén states that narrative in music should be seen as the articulating of dynamics and possible outcomes of conflict or interactions between musical elements (2003). Musical elements lead to certain expectations, similar to how events in stories lead to certain expectations of what will happen next. A discussion of Jean Jacques Nattiez’ review of musical syntax and narrative will help to get a grasp on the epistemological mechanisms behind the idea that musical structure can convey meaning and message.

2.5 Nattiez and structural approaches towards meaning and narrative

Jean-Jacques Nattiez famously reflected on narrative approaches to music in his essay \textit{Can One Speak of Narrativity in Music?} (1990). Coming from a structuralist semiotic background himself -one of his most famous works being \textit{Musicologie générale et sémiologue} (1987)- he provides an overview of some of the structuralist and literary narrative approaches to music and the problems he recognizes with regard to these approaches.

Nattiez’ first step is to find a working definition for narrative in music. For this he employs Seymour Chatman’s three propositions for a narrative: (1) “Stories only exist where both events and existents occur,” (2) “One cannot account for events without recognizing the existence of things causing or being affected by those events, and (3) “Causation may be explicit or implicit.” (Chatman 1978: 113, 34, 14).

Nattiez asserts that proposition (1) involves the minimum ingredients for a story: “When I read the sentence: ‘The duchess left at five o’clock, I do not need a title in order to realize that I am dealing with a Narrative” (Nattiez: 242). Musical pieces, in contrast to this literary example, do need a title in order for the listener to approach it as a narrative; the title evokes a particular narrativizing listening strategy. What he concludes from this is that music cannot be a narrative in the sense that language can. Music is less explicit. To express the lyrical sentence ‘the duchess left at five o’clock’ on a piano would be impossible.
Proposition (2) implies two things: the first is that you need existents in order for events to take place, the second is that only a succession of events can constitute a narrative, and that causality is inferred when one is confronted with these events. Proposition (3) regards this causality. *Explicit causality* means that causality is expressed in the text itself, *implicit causality* means that causality can be inferred by the reader when it is not expressed in the text. From these statements we can conclude that narrative is grounded both in the reader's mind and in the text.

However, to Nattiez, these propositions are not sufficient. He adds that a narrative is not just a plot or a story, but also an act. The reader creates a series of causal events, which may or may not correspond to the causal relations intended by the writer. Readers fill in the gaps between events. Nattiez illustrates this process by comparing it to reading a comic book in which the reader has to fill in the gaps between each of the depicted scenes. According to Nattiez, this process is also what happens when we listen to music in a 'less spontaneous mode of listening'. Nattiez is a bit unclear here, but I suspect that a 'less spontaneous mode of listening' means listening in a way in which one is consciously looking for the narrative in music. For example: Vivaldi's *Four Seasons* expresses the course of the weather during the year, so it offers the possibility to consciously look for that message in the music while listening to it. But does music express this in a straight forward semantical way, since it is not as explicit as language? Nattiez states:

If so many composers have chosen to write musical works explicitly derived from literary ones, it is no doubt because they had confidence in the semantic possibilities of music. In fact, short of adopting a normatively formalist conception of music as Hanslick did, it is difficult to deny that purely sonorous configurations of music, independent of any textual suggestion, do indeed have a power of evocation. Studies in experimental psychology, from Francès to Imberty, show empirically not only that listeners associate images, feelings, and impressions with music, but also that in the percentage of responses obtained, while there is no unanimity, there is a convergence of opinion regarding the experience evoked. (Nattiez: 243)

From the above citation we can conclude the following:

1. Composers have chosen to write musical works because they had confidence in the semantic possibilities of music.
2. Music has semantic possibilities.
3. Sonorous configurations have power of evocation, independent of textual suggestion.
4. People associate images, feelings and impressions with music.
5. People more or less experience the same things when experiencing music.

One can ask how music can have semantic possibilities? Many musicologists have tried to answer this question with theories of *musical syntax*. According to Nattiez, these attempts are the main reason why people speak of narratives in music in the first place. To Nattiez, musical syntax consists of repetitions, returns, preparations, expectations, resolutions and techniques of continuity, similar to linguistic syntax. In linguistic syntax there is always a logical relationship between subject and predicate, but in music this relation is less apparent. A symphonic poem, for example, cannot be summarized or put

13 Five is in accordance with empirical findings by Hevner (1936) and SPCW (2012).
into past tense. It is also not clear what is happening in a concrete sense. We cannot actually hear people jumping or playing chess, or whatever event the symphony is supposed to express. Nattiez states: “I recognize returns, expectations, and resolutions, but of what, I do not know. There is a wish to complete through words what the music does not say, because it is not in its semiological nature to say it to me” (Nattiez: 244). Nattiez quotes Edward Cone:

If music is a language at all, it is a language of gesture: of direct actions, of pauses, of startings and stoppings, of rises and falls, of tenseness and slackness, of accentuations... Instrumental utterance, lacking intrinsic verbal content, goes so far as to constitute what might be called a medium of pure symbolic gesture. (The Composers Voice: 164)

And also: “The elements of music - notes, chords, motifs - normally have no referents,” but Nattiez adds: “There is still a serious risk of slipping from narrative metaphor to an ontological illusion: since music suggests narrative, it could itself be a narrative”. So if we believe music to be narrative, or if we feel it suggests narrative, we might find one.

Narratives in music seem to be extra-musical constructs. Nattiez illustrates this with an experiment he once conducted. Three hundred children, aged eleven to fourteen, were assigned to listen twice to Paul Duka’s L’Apprenti Sorcier. They were told that the music expressed a story, but not what the story was. After this briefing the children were required to write down the story they themselves heard in the music. This led to the following outcome: forty seven out of the three hundred children were not able to write a narrative story at all. They simply wrote down that they liked or disliked the work. The other two-hundred-and-fifty-three stories were first summarized, then analyzed and formulated in more general terms, and when possible placed into sections that somehow correspond to the intended narrative (Nattiez: 246-247). Nattiez recognized major semiotic difficulties: “If one of the kids in the story wrote about someone chasing someone, we don't know who he was referring to” (Nattiez: 249).

Nattiez concludes: “... for the listener, any 'narrative' instrumental work is not in itself a narrative, but the structural analysis in music of an absent narrative” (Nattiez: 249).

Nattiez points out that it is hard to find a narrative in music or a musical language capable of communicating concrete messages. If Beethoven transfers an idea to his audience, it is not a linguistic one, and in an anonymous composition we would also not be able to identify a narrator. We cannot hear it. Meaning is not explicit if a story is not somehow provided. In fact, it is not clear if music communicates a message at all.

This assessment of musical narrative is important for my research, because of the general feeling that classical music has the capacity to tell us something. The orchestra attempts to bring across Beethoven's intended meaning and message, and narratives are a way of communicating meaning. However, narratives in music are not evident by any means. Nattiez points out that they are constructed by the listener, and opinions about the narrative vary. So how is it possible that we feel that Beethoven's music communicates a particular message? Perhaps music communicates to us through a non-narrative structure?

Furthermore, the above section illustrates and criticizes a classical structural way of conducting research on classical music. It discloses that if classical music in fact does communicate a message, then it cannot be through a linear directed movement in a sender → message → receiver model, because, according to Nattiez, the listener seems to construct almost the entire message, instead of decoding a preconfigured one. Finding a narrative message in music is the structural analysis of an absent narrative
2.6 Absolute music

What if music does not communicate its message in the form of a narrative? Every musicologist will agree that we can pinpoint chords, returns and motifs. They are the foundation and structure of the symphony and drive it forward towards its ending. The repetitions and returns create certain expectations. Is this not a form of communication? Not all musicologists believe in explicit musical narrative. Theorists of **Absolute Music** believe that music can be enjoyed without program and still touch us and communicate to us, but in a different way. Their ideas developed during the 18th century in the writings of Wagner, Hanslick, Wackenroder, Tieck and Hoffman (Treitler 1989: 176). They argued that music can be enjoyed as pure sound. Hanslick stated: “Music has no subject beyond the combinations of notes we hear, for music speaks not only by means of sounds, it speaks nothing but sound” (Hanslick, 1891).

A good example of this philosophy is found in E.T.A. Hoffman's account *Beethoven's Instrumental Music* (1813), which at the time was widely admired. Hoffman states that music, when regarded as an independent art, should solely be instrumental music, since this expresses the unique essence of the art best. He states it is the most romantic art, since its only topic is the infinite. It unlocks an unknown realm to men. So music communicates something about ourselves that has to do with the infinite and this unknown realm. Hoffman states that Beethoven in particular opens up the realm of the monstrous and immeasurable. He writes:

> Glowing rays shoot through the deep night of this realm, and we sense giant shadows surging to and fro, closing in until they destroy us, but not the pain of unending longing in which every desire that has risen quickly in joyful tones sinks and expires. Only with this pain of love, hope, joy - which consumes but does not destroy, which would burst asunder our breasts with a mightily impassioned chord- we live on, enchanted seers of the ghostly world! (Hoffman 1813)

An almost religious and sublime description that seems to fit the untamed and horrible Dionysian nature. Hoffman adds:

> Beethoven's music wields the lever of fear, awe, horror, and pain, and it awakens that eternal longing that is the essence of the romantic. Thus he is a purely romantic composer, and if he had less success with vocal music, is this because vocal music excludes the character of indefinite longing and represents the emotions, which come from the realm of the infinite, only by the definite affects of words? ... (Hoffman 1813)

From this we can conclude that he believes that Beethoven's music speaks to us by awakening emotions that cannot be described by words. Beethoven's music awakens a Dionysian experience. There is no story, because a story would be definite. Music is merely a development of sounds. Music deals with the infinite, and according to Hoffman there is no single piece of music that describes this better than Beethoven's fifth. It is worth quoting Hoffman's assessment of the fifth it in full in order to better capture the feeling of his affective writing style, which will make us feel and imagine what the fifth communicates:

> What instrumental work of Beethoven confirms this to a higher degree than his magnificent and profound Symphony in c-Minor. Irresistibly, this wonderful composition
leads its listeners in an increasing climax towards the realm of the spirits and the infinite. Nothing could be simpler than the first principal idea of the Allegro, consisting of only two bars that, to begin with as Unisono, does not even indicate the key to the listener. The character of the fearful, restless longing that is contained in this movement, all the more clarifies the secondary theme! The human heart, frightened and driven back into itself by premonitions of the unspeakable, threatening destruction, appears to be convulsing and expanding in its search for relief; soon, however, a friendly spirit appears to be emerging and brightening the dark, terrible night. (The lovely G-Major theme that has been touched by the horn in E-flat-Major, first). How simple, let this be said, once more, is the theme that the master invented as the basis of the whole, but how wonderful are all secondary and side phrases arranged in their rhythmic relationship so that they only serve to gradually unfold the the character of the Allegro, which the main theme was only hinting at. All phrases are short, almost all consisting of only two, three bars, and, at that, even distributed in a constant interchange between wind instruments and strings; one should think that, out of such elements, only something fragmented, unintelligible could emerge, but instead, it is this very arrangement of the whole as well as the constant repetition of the phrases and of single chords that intensifies the feeling of unspeakable longing to the highest degree. Irrespective of the fact that the contrapuntal treatment bears witness to a profound study of this art, these secondary or side phrases, these constant allusions to the main theme, demonstrate how our sublime master conceived and thought the whole through in his mind, with all those passionate traits. Does not the lovely theme of the Andante con moto in A-flat Major sound like the wondrous voice of a spirit that fills our heart with hope and comfort? However, even here, the terrible spirit that frightened our hearts in the Allegro, steps threateningly out of the storm cloud in which it had vanished, and the friendly spirits that surrounded us, flee from his bolts of lightning.--What shall I say of the Minuet?--Listen to the unique modulations, to the endings in the dominant Major chord--which the bass takes up as tonic of the following theme in minor--the ever-widening self, by a few bars! Are you not, again, filled with that restless, unspeakable longing, that foreboding of the miraculous realm of spirits in which the master rules? But what bright sunlight does the wonderful theme of the final movement spread in the jubilant rejoicing of the entire orchestra. What wonderful contrapuntal weavings are streaming back into the whole. The entire work may well pass by some like a genial rhapsody, but the mind and heart of every careful listener will certainly be deeply filled with a feeling that is this very unspeakable yearning and longing, and until the final chord, nay even in the moments following these, he will not be able to emerge from this wonderful realm of spirits, where pain and delight surrounded him, cloaked in sound. By their inner design, the movements, their execution, instrumentation, the manner in which everything is sequentially arranged, everything is aimed at one goal; however, it is predominantly the close relationship of the themes to each other that create that unity that alone is able to hold the listener under its spell. Often, this relationship will become clear to the listener when he can recognize it by listening to the various movements or when he discovers the through-bass that is common to two different movements, often, however, a more profound relationship that does not reveal itself in this manner, only speaks to kindred spirits, and it is this very relationship between the two Allegro movements and the Minuet that pronounces the master's thoughtful geniality in this wonderful manner. (Hoffman 1813)
emerge, but instead, it is this very arrangement of the whole as well as the constant repetition of the phrases and of single chords that intensifies the feeling of unspeakable longing to the highest degree.

and:

Listen to the unique modulations, to the endings in the dominant Major chord--which the bass takes up as tonic of the following theme in minor--the ever-widening self, by a few bars! Are you not, again, filled with that restless, unspeakable longing, that foreboding of the miraculous realm of spirits in which the master rules?

There are plenty of examples like this in Hoffman's writing. The music communicates through its structure, passages and motifs, even though it is not narrative. There is a vagueness, but according to Hoffman, we know what it is about. Even though Hoffman's writing style is very affective and emotional, the causes for these emotions are grounded in the structure of the intramusical relations, as illustrated by the above citations. Hoffman rationally and logically locates the Dionysian emotional effects of the music in the Platonian musical structure, therefore describing a process of the Apollinian structuring the Dionysian.

Hoffman calls Beethoven a master with geniality for evoking emotions through the short motifs. Even though the subject matter of the music is romantic and emotional, the approach is still Apollinian and Platonian. Because the emotions are explained through a logical cause-and-effect chain, they enjoy a universal validity. Every time one hears the symphony, one moves through the fixed musical structure, and each time it will cause these emotions. The “unique modulations to endings in the dominant major chord” will keep filling us with “restless unspeakable longing”, as described by Hoffman. It is presented as a universal law. The temporal and personal aspects of emotions are neglected, thus placing the emotions in a structured and theoretical Platonian realm. Hoffman's account tells us how the musical structure moves us in a general and universal sense. But this is only so if the symphony is performed in accordance with Beethoven's idea, as good as possible. That is why Hoffman does not mention a particular performance. The performance is good when it evokes these universal emotions, and it can only be good if there is knowledge of the Platonian idea. The emotions are a logical and mathematical consequence of the structure of the idea.

Leonard Meyer describes this process in *Emotion Meaning and Music* (1956), in which he recognizes two approaches to the meaning of music. He writes:

The formalist would contend that the meaning of music lies in the perception of and understanding of the musical relationships set forth in the work of art and that meaning in music is primarily intellectual, while the expressionist would argue that these same relationships are in some sense capable of exciting feelings and emotions in the listener. (1956: 3)

The formalist approach is in accordance with many theories of musical narrative, the latter approach is in accordance with E.T.A. Hoffman. Meyer states that these approaches are complementary: “for the same musical processes and similar psychological behavior give rise to both types of meaning” (1956). In his work, Meyer relates musical structure to meaning through psychological principles, with these principles functioning as an explanatory tool. Meyer develops this thesis through theory of Western art music and concepts such as syntax, but as Nattiez (1990) pointed out,
theory of musical syntax is quite problematic, and syntax itself is hard to recognize if one is unfamiliar with it. Steven Feld criticizes Meyer for similar reasons in *Motion and Feeling through Music* (1994). Feld states that Meyer reduces music to Western art music, and fails to extend these generalizations to other styles of music outside the Western stream, due to the fact that syntax forms the core of his theory. Different cultures will exhibit a different syntax. According to Feld, approaching music in this fashion is a procedure that assumes that music, for analytical purposes, is “fixed or frozen as an object”, and that it implies “a one-to-one relation between syntactic form and expression, with a weighting in favor of the former to the detriment of the latter” (1994: 54).

This statement by Feld confirms the view of Western art music being treated as a fixed entity, and it also exposes the mind/body duality in which form and structure are disconnected from expression and emotion, with the Apollinian above the Dionysian. Feld cites Meyer as an example of this way of thinking:

> On the one hand it, it seems clear that almost all motor behavior is basically a product of mental activity rather than a kind of of direct response made to the stimulus as such. For aside from the obvious fact that muscles cannot perceive, that there seems to be no direct path from the receptors to the voluntary muscles systems, motor responses are not as a rule made to separate, discrete sounds, but to patterns and groupings of sounds. The more order and regularity the mind is able to impose upon the stimuli presented to it by the senses, the more likely it is that motor behavior will arise. Such grouping and patterning of sounds is patently a result of mental activity. (Meyer 1956: 81)

This citation is in accordance with a classic view in which minds perceive and structure, and to which the body is then able to act. Feld casts his doubts on this assertion. He states that multiple experiments have exposed that muscles are perceptive and that muscles can remember, for example by Freedman 1963, Penfield and Roberts 1959, Hebb 1949 (1994: 56). This more embodied approach to 'experience' provides a number of critiques on the treating of music as an analysis of groups of structured sounds, as will become clear in the following chapters. Recent research on embodied cognition (Rowlands 2010, Noë 2004, Shapiro 2011, Chemero 2011), in accordance to Feld, suggests that the relation between perception, action is much more direct than Meyer suggests.

So, in conclusion, how does musical syntagm, such as motifs, function in the symphony? And how do they become meaningful? We can take a short look at Beethoven's fifth in order to get a clearer understanding.

![Beethoven's Fifth Symphony](image)
The motif of Beethoven's 5th allegro con brio.

We can recognize this famous short rhythmic motif throughout the entire allegro of the symphony (see image 2).

The motifs are structural building blocks:

We see a great number of repetitions and variations of the motif that even someone who cannot read music well can identify. They form the founding building blocks on which the structure of the symphony is built; they constitute the idea of the symphony. A building block with a beginning and end, always played all the way through. They are small fixed entities ending with a clear cut. It is because of the fact that they are played all the way through, from beginning to end, and because of their fixed position in the composition, that they constitute the structure of the symphony. For example, if one would alter the patterns and cut up the motif differently, say a cut after three notes instead of four, the structure of the symphony would be lost.

The motifs are meaningful:

The building blocks are part of the Platonian idea and push the symphony forward through repetitions and variations. Each building block has a carefully fixed place in the symphony, put there by Beethoven as the grand architect. The building blocks with their cuts constitute the feeling or message that the symphony transfers, as seen in Hoffman, and as asserted by Meyer. They are fixed in the sheet music that represents the idea, and so the building blocks constitute the idea with its attributed message. This makes the motifs meaningful.

The motifs are Beethoven's tools to give birth:

The message can only be transferred, because the entire symphony is a fixed universal entity, with fixed building blocks and movement. A change of the building blocks would mean a change of the message. This however, is not allowed. The composition has a divine nature, as described by Nettl (1995). That is why the cut is the pre-eminent compositional tool of choice; no cuts would mean no building blocks and no fixed message. Beethoven's symphony is a Platonian divine entity, so its message must remain intact. We believe in this message. Beethoven uplifts us from an unreachable divine Platonian world, and gives birth to our intellectual uplifting like a Socratian midwife:

And like the midwives, I am barren, and the reproach which is often made against me, that I ask questions of others and have not the wit to answer them myself is very just! The reason is, that the god compels me to be a midwife, but forbids me to bring forth. And therefore I am not myself at all wise, nor have I anything to show which is the invention or birth of my own soul, but those who converse with me profit. Some of them appear dull enough at first, but afterwards, as our acquaintance ripens, if the god is gracious to them, they all make astonishing progress; and this is the opinion of others as well as their own. It is quite clear they have never learned anything from me; and the many fine discoveries to which they cling are of their own making. But to me and the god they owe their delivery. (Plato, Theaetetus)

I want to stress that the above analysis is not a criticism on structural and Platonian approaches. On the contrary, these approaches seem quite fruitful since they are in accordance with Beethoven's own romantic ontology. To approach Beethoven in the way that E.T.A. Hoffman did, is to think like Beethoven himself, leading to a greater
understanding of the music within this particular ontology.

2.7 Summary
A glance at the ontology of romantic Western art music exposes many different aspects of Platonian epistemology. A symphony can then be seen as a fixed entity in the Platonian realm. One should strive to approach the original idea of the symphony as close as possible in order to achieve the uplifting knowledge that the symphony is capable of transferring. We feel that romantic symphonies have this capacity, as proven by the fact that all musicians strive to approach the original idea. If the idea is indeed fixed, then the composition has to consist of fixed entities as well. The motifs in a symphony function as building blocks ending with a cut, carefully placed in the symphony by the composer. They are fixed in the symphony by the sheet music, which functions as the ultimate law for the musicians. It communicates the composers idea, which allows the musicians to communicate it to an audience. The audience has to sit still and contemplate on the musical message, which is communicated in a linear directed movement, from Beethoven to orchestra, and from orchestra to audience, starting and ending with a cut. Romantic symphonies, and in particular Beethoven, are an extreme form of Platonian approaches to music.
Symphony No. 5

in C minor Op. 67

transcription for piano solo*

L. van Beethoven (1770-1827)

* originally for orchestra

www.virtualsheetmusic.com

image 2: Symphony #5 in C minor, op. 67. Transcription for piano solo by F. Liszt. Source: www.virtualsheetmusic.com
3. Loops, Interactions and EDM

3.1 Introduction
The loop differs from fixed musical entities. Fixed musical entities encompass short segments or motifs and deal with Platonian divine ideas and linear movement directed towards an ending. In this section I will discuss the loop by exploring how the loop deals with notions of the particular, looped movement, feedback, and a fusion of inner and outer space\(^1\). This fusion focuses both on the performing space (outer space) and the musical structure (inner space), but more importantly it will expose an interaction between the two that is not as apparent in music dealing with fixed entities. Creating music with loops is a more earthly process taking place under particular circumstances, as opposed to musicians striving for a divine Platonian idea. Furthermore I will attempt to describe the loop as a \textit{dynamical system} and explore the possibilities that this approach has to offer.

\textit{Notions of interactions and loops:}
Because I will make use of two different notions of loops, it will make it easier to distinguish these beforehand in order to prevent any confusion. I named them \textit{loop}\(_1\) and \textit{loop}\(_2\):

1. \textit{Loop}\(_1\): A physical and phenomenal loop, for example a tape loop, or a vinyl loop. The loop is audible.
2. \textit{Loop}\(_2\): An experiential loop, which can be altered by feedback. In this chapter I will argue that music involving \textit{loop}\(_1\) inherently encompasses \textit{loop}\(_2\) and feedback.

Another point that might lead to confusion is the notion of \textit{interaction}. I will define interaction as two or more objects effecting each other in a \textit{loop}\(_2\) model, involving feedback. For example \(a\) effects \(b\), \(b\) effects \(a\), etcetera. The active relation between \(a\) and \(b\) does not have a clear starting point or ending and can be altered by feedback.

3.2 What is the \textit{loop}\(_2\) and how does it differ from the cut?
In order to find out how \textit{loops}\(_1\) function inside and outside music, it is necessary to define looped movement. The \textit{loop}\(_2\) is a continuous and never ending circular motion. It is a circuit encompassing looped movement involving feedback. Feedback changes the loop and manipulates its movement, but it does not break or end it. A cut, at the end of a fixed entity, involves a linear directed movement from a starting point \(A\) towards an ending \(B\) (cut). A simple diagram, for example \(A \rightarrow B \rightarrow A \rightarrow B\) is not possible for the \textit{loop}\(_2\) even though at first glance one might call this a loop. It is in fact a repetition of the same straight arrow directed movement from \(A \rightarrow B\), the final point of ending still being \(B\). The \textit{loop}\(_2\) is not a cut or a repetition. In order to better understand the difference between looped movement and the cut at the end of a fixed entity we will look at Shannon's notion of looped movement and feedback.

\(^{14}\) Referring to Krueger's idea of inner/outer space in music, which is discussed in 3.6
3.3 Shannon
Claude E. Shannon developed his conception of looped movement while working for the US defense in WW II. He was covertly assigned to a group of scientists who were ordered to develop rockets that were able to counter and take out enemy guided missiles. But since these missiles were guided, Shannon's rockets needed to be able to change their course in-flight, as well as being able to constantly calculate the interception course of the enemy missile. The only way to achieve this is through constant communications and interaction with the rocket; the communication signal has to move in a loop; a new and non-classical model of communication. A loop in which the signal is open to manipulation in order to change the commands to the rockets: feedback\textsuperscript{15}. Feedback manipulates the loop, but it does not break it. This element strongly distinguishes looped movement from the cut. If one would influence the signal (or the movement for that matter) of a linear directed movement, e.g. A → B, then the final ending point would not be B.

Seeing the importance of looped movement and feedback in communications technology sparked Shannon's interest in juggling, which he uses as a metaphor for looped movement involving feedback. In juggling, a perfect looped motion and feedback by the juggler are the key. Shannon was struggling to create a perfect communications loop for his rockets, because feedback was hard to theorize; there were many factors that had to be incorporated in the feedback, and not just the universal laws of physics. For example: a juggler has to make minute adjustments to the course of her juggling objects to keep the loops intact and the objects flying. One could imagine a juggling robot programmed to calculate the exact weight of the objects, wind speeds and forces needed in order to juggle; all factors that seem to fall under the universal laws of physics. And since computers are better calculators than humans, one would expect a computing robot to perform better as a juggler than a human. However, to this day there has not been a computer that was able to beat any, even amateur, human juggler. It seems that the particular circumstances are hard to theorize and structure, since they constantly change. The juggler has to feel what is going on and what she is doing. She needs an advanced sensorimotor understanding of her location and her juggling objects, and also an understanding of the changing particular circumstances. These particular circumstances cannot be described in a fixed universal and computational theory because of their complex and unpredictable nature, but they have to be incorporated in order to provide perfect feedback. In a perfect scenario the juggling robot needs to have a human body with all its perceptual abilities, situated in the particular here and now.

After discovering the importance of feedback in looped movement, Shannon famously stated: “Newton Schnewton. He didn't even catch the apple and take a bit out of it.” Newton failed to incorporate feedback in his universal laws of movement.

3.4 Repetition, Deleuze, Nietzsche and the particular
It seems that the possibility to provide good feedback depends on dealing with changing particular circumstances, and dealing with them as well as possible. Deleuze discusses the importance of the particular in relation to repetition in \textit{Difference and Repetition} (1968), which makes it a suitable source for our purposes, since loops have a repetitive nature. In fact, it seems as though Deleuze's notion of repetition has many points in

Deleuze states that from a scientific point of view it seems hard to deny a relationship between repetition and law, but these laws leave us in generality and are universally applicable (1968: 35). However, to Deleuze, repetition has something to do with the particular. According to Nietzsche and Aristotle, this particular has earthly qualities. And if repetition has these earthly qualities, one must be able to experience these qualities physically. But what do people experience when they are exposed to repetition?

According to Deleuze, repetition makes us forget. It disconnects us from our Platonian rational thinking minds. He states: “It is in repetition that forgetting becomes a positive power, while the unconsciousness becomes a positive and superior unconsciousness” (1968: 8). The unconscious takes over our being and we no longer ‘think’, our rational analyzing minds fading to the background. Deleuze also acknowledges repetition as a type of movement: “movement which affects the mind in a non-rational way, outside of representation, without interpositions, whirlings of gravitations which directly touch the mind. It is a question of making movement itself a work” (1968: 9). I suggest that we change the word mind in Deleuze's statement to human or consciousness, since the word mind is often closely connected to notions of rational thinking, which might make it hard to imagine a non-rational mind.

What Deleuze is stating here is that repetition is a physical experience, that is if you believe that notions of non-rational experience of movement have something to do with the body. One thing that becomes clear in these statements is that repetition is experienced in the particular here and now, disconnected from rational analysis. We cannot forget in the past or future. The forgetting happens now, during this movement. It is about the movement itself, which does not suggest a starting or an ending. It does not matter. Deleuze's repetition deals with actualized particular circumstances, just like Shannon's loop. In fact, it would make more sense to look at Deleuze's repetition as being an expression of Shannon's loop.

Even though Difference and Repetition is not about music, Deleuze mentions Nietzsche's The Birth of Tragedy (1872), which is a treatise about music. According to Nietzsche, the main function of music and Greek tragedy is to expose the Apollinian as a mere veil on top of the Dionysian nature of the world. The Apollinian/Dionysian dichotomy is of interest to us, since it elicits the difference about the earthly/particular and the universal/ideal world. In this dichotomy the Apollinian represents Plato's world of ideas and encompasses structure, rational thinking, the mind and 'true knowledge'. It is 'up there' in the Platonian realm and it is universal, as discussed in chapter two. The Dionysian, on the other hand, encompasses all earthly and temporal matters, such as emotions, the body, and applies to the particular. According to Plato, one has to try to separate oneself from this Dionysian if one wants to acquire true knowledge, since the Dionysian involves temporal matters and thus block the way to true knowledge. Nietzsche, on the other hand, insists that it is precisely this Dionysian that is the foundation of our lives. The Apollinian acts as a mere veil on top of the Dionysian. A good human being (the often misinterpreted Übermensch) is capable of inherently combining both the Apollinian and Dionysian.

This Dionysian aspect of our lives cannot be grasped rationally; it can only be experienced, and a good way to experience it is through good music. Good music being music that exposes the Dionysian as being the foundation of life. In short: good music brings us a type of knowledge about our lives through experiencing the music, disconnected from our Apollinian ratio. So we acquire this knowledge not by rationally
interpreting the music, but by dancing and singing to the music. A type of knowledge, only available through physical interaction; through feedback. Nietzsche here agrees with Aristotle, who stated that in order to achieve *catharsis*, one has to be present at the theater, sitting in between the rest of the audience\(^{16}\). One has to experience and physically mimic (*mimesis*) the play in that place and time in order to acquire knowledge about what is being presented. This knowledge is not merely a rational interpretation, but also a type of knowledge that is acquired by physically experiencing the emotions. A knowledge that applies for that moment, for the particular. According to Nietzsche, music helps us understand and experience this kind of non-rational, non-Apollinian knowledge.

Nietzsche criticized Wagner for making Apollinian music, which is basically the music discussed in chapter two; music that represents an idea, a message that has to be rationally decoded. A divine message from Wagner to his audience. Therefore, Wagner's opera's are not played at rave parties, even though they seem long enough. The people at rave parties just want to forget and let go of their tiring routine of office jobs and schools. They need a break from intellectual activity.

Of course one can also experience Western art music in this Dionysian fashion. This reminds me of an old teacher. Once in a while, after the doors of the university were closed at the end of the day, he would lock himself in a classroom and play his favorite performances of his beloved symphonies at very high volumes. So loud, it almost made the doors tremble. Even the most extreme classical music fanatics sometimes just want to listen to Wagner or Beethoven for the pure joy of being moved by sound, without ever wanting it to end, and so experience it in a Dionysian fashion, very much like the visitors of an EDM event, as will be discussed shortly.

Wagner's goals were of an Apollinian nature; the transferring of a fixed meaningful content. Deleuze adds to Nietzsche the interesting point that Wagner, in creating Apollinian music, also distorted the movement of the Dionysian: “Nietzsche’s reproach to Wagner is that he inverted and distorted movement, giving us a nautical theater in which we must paddle and swim, rather than one in which we can walk and dance.” (1968: 10) And: “…the essence of movement is not opposition, not mediation, but repetition” (1968: 11). Deleuze thus adds a form of movement to the Dionysian of which the essence is repetition. This is also the essence of Dionysian dance, which always belongs to the domain of the earthly/particular. You cannot dance to sheet music or the ideas of Beethoven. You have to feel the repetition and the rhythm in that time and space in order to forget and let go. This movement is not repetition, it is a loop: encompassing feedback, taking place under changing particular circumstances that cannot be neglected.

### 3.5 Loops: in music

The use of loops, and strict repetition does not date back to classical music (which involved repetitions of fixed entities and motifs), but to 20\(^{th}\) century avant garde. The important first step to using loops, was the invention of magnetic tape by Fritz Pfleumer in 1928. In the years to follow, magnetic tape was solely used to record audio. It took until the 1940's before it was utilized in the creating process of music as well. Pierre Schaeffer and Pierre Henry used abandoned allied communications equipment to create their music using recorded sounds exclusively. By the late 1940's the music of Henry and  

\(^{16}\) Aristotle, *Poetics*. In particular books I, V and VI, in which he describes the role of mimesis in the theater. Catharsis cannot be achieved without mimesis of the play and the audience.
Schaeffer was widely known as *musique concrète*, or concrete music. Schaeffer stated:

> When I proposed the term 'musique concrète,' I intended ... to point out an opposition with the way musical work usually goes. Instead of notating musical ideas on paper with the symbols of solfege and entrusting their realization to well-known instruments, the question was to collect concrete sounds, wherever they came from, and to abstract the musical values they were potentially containing. (Reydellet 1996,10)

And Henry:

> Musique concrète was not a study of timbre, it is focused on envelopes, forms. It must be presented by means of non-traditional characteristics, you see...one might say that the origin of this music is also found in the interest in ‘plastifying’ music, of rendering it plastic like sculpture... musique concrète, in my opinion... led to a manner of composing, indeed, a new mental framework of composing. (James 1981,79)

In these statements we can clearly see a breach with old classical values. No longer were melody, rhythm, harmony and motifs the key to a great piece of music, but concrete sounds. However, Schaeffer and Henry still persisted in creating classic compositions, with the concrete sounds as the building blocks as the structure of the composition. And like the building blocks, these sounds often still referred to objects or sounds outside the composition, carrying meaning and increasing the world that is capable of being presented within the music (Demers 2010: 22).

The invention of magnetic taped offered a new possibility to Schaeffer and Henry; it was now possible to physically loop the tape, offering the possibility to create strict repetitions through a loop. However, to their dismay, their music was frowned upon by the established field Western art music. In this field notions of originality were highly valued, and strict repetitions were seen as a sign of weakness instead of a composing tool (Beil 2012).

Schaeffer and Henry themselves felt that they were working on the frontier of Western art music, trying to bring it one step further by incorporating the magnetic tape as a new instrument that allowed for new sounds. This felt 'connectedness' by Henry and Schaeffer to the field of Western art music can be recognized in the way they named their own compositions, for example *Le Microphone bien tempéré* (Henry 1951), or *Symphonie pour un homme seul* (Schaeffer, Henry 1950); titles that explicitly refer to Beethoven and classical traditions. Karlheinz Stockhausen, a highly educated contemporary of Schaeffer and Henry who studied at the Hochschule für Musik in Cologne, even went so far as to create new symbols and solfege for magnetic tape and filters, in order to better fit in with the Western art music tradition and its theory.
But this classical approach towards the magnetic tape had consequences. Stockhausen's sheet music again forced musicians to approach the composition as existing in a Platonian world of ideas. As a fixed idea that has to be read from beginning to end, and in this context, the magnetic tape loops, utilized by Henry, Schaeffer and Stockhausen structurally functioned in a similar fashion as building blocks in a Beethoven symphony, because the loops were now again fixed in a composition, played with a fixed linear directed movement from beginning to end. The only difference being that the building blocks from Schaeffer and Henry seriously lack in variation. From this perspective we can say that the critics who valued variation had a good point.

However, musique concrète did plant the seed for a new approach to repetitions that involved loops in a different way. An approach in which the aspect of 'forgetting through repetition', as theorized by Deleuze (1968), becomes an important aspect of the musical experience.

Wim Mertens discusses the functions of repetition in minimal music in Basic Concepts of Minimal Music (1983):

The use of repetition is not new at all. What is new is only the global musical context in which it is used, and it is only this situation that allows us to distinguish between American repetition and repetition in classical music. In traditional music, repetition is used in a preeminently narrative and teleological frame, so that musical components such as rhythm, melody and harmony and so on are used in a causal prefigured way, so that a musical perspective emerges that gives the listener a non-ambivalent orientation and that attempts to inform him of meaningful musical contents. (1983)

and:

The compositions appears as a musical product characterized by an organic totality. By the underlying dynamic, dramatising construction, a directionality is created that presumes a linear memory in the listener, forcing him or her to follow the linear musical evolution. Repetition in the traditional work appears as a reference to what has gone before, so that one has to remember what was forgotten. This demands a learned, serious and concentrated memory-dominated approach to listening. (1983)
Here, Mertens agrees with the assertion in chapter two that a classical composition is a fixed entity, filled with meaningful content, working its way towards an ending or cut in a linear fashion. If there is repetition, it still functions as a building block for the musical structure as a whole, and as a tool to remember a specific part of the musical content.

Mertens opposes this classical use of repetition to the use by American minimalist composers such as Reich, Glass, Young and Riley. He states:

The music of the American composers of repetitive music can be described as non-narrative and a-teleological. Their music discards the traditional harmonic functional schemes of tension and relaxation and (currently) disapproves of classical formal schemes and the musical narrative that goes with them (formalizing a tonal and/or schematic dialectic). Instead there appears non-directed evolution in which the listener is no longer submitted to the constraint of following the musical evolution. (1983)

When the listener does not have to follow the musical evolution, he is no longer constrained to memory. The listener can indulge himself in the forgetting power of the repetition, as theorized by Deleuze (1968). Since the movement of repetition is not goal directed, there is no meaning fixed in the music for the listener to grasp. The music becomes a-rational and there is no logical causality. According to Mertens, this has interesting consequences:

...with the removal of logical causality sound becomes autonomous, so that in a process work, no structure exists before sound: it is produced at each moment. (1983)

The listener does not perceive a finished work. On the contrary, according to Mertens, the listener actively participates in its construction:

Since there is no absolute point of reference a host of interpretative perspectives are possible. So that goal-directed listening, based as it is on recollection and anticipation, its no longer suitable and must be in favour of a random, aimless listening, traditional recollection of the past being replaced by something akin to a 'recollection into the future', actualisation rather than reconstruction. (1983)

In this type of musical experience, the listener forgets. His memory is thrown overboard, and is replaced by 'actualisation'; a creation of experience of the here and now, in which particular circumstances of the here and now are dominant.

However, even though the particular circumstances are important, and even though the music is produced at each moment, we can still imagine a type of even less fixed music. Mertens writes:

American repetitive music is an objective music in that, since no physiological tension is created, there is an ambiguous relationship with the listener. The music exists for itself and has nothing to do with the subjectivity of the listener. The latter's position has become an ambiguous one: on the one hand he is freed of intentionality, but on the other hand he is reduced to passive role, merely submitting to the process. (1983)

In American minimal music, the response of the listening audience is non-important. The
audience passively submits to the actualization. This is different in many types of electronic dance music (EDM). In this kind of music the DJ adapts his repetitive music to the audience response, giving the audience the power to alter the music physically, creating a highly interactive type of music, dealing with particular circumstances and feedback loops. In the words of composer Ben Neill: “In this type of event, the artists are not the center of attention, instead it is the role of the artist to channel the energy of the crowd and create the proper backdrop for their social interaction. The audience truly becomes the performance” (Neill 2002: 4). The consequence is a highly fluid, and, to a high degree, unpredictable stream of music.

Here we see a clear distinction with American minimal music, in which the listener has to sit still. Composer/teacher Joel Chadabe puts it the following way:

Computer music is aimed at an elite group of listeners that constitute a segment of aristocratic high-art music culture. The elite group of listeners is small in number—smaller than the elite group that appreciates Wagner, for example—because the technology and the artistic concepts that have grown out of computer music are so new that a larger elite group has not yet had the time to grow. Popular electronic music, on the other hand, exists within a commercial entertainment culture. A song or a performing group is in effect designed to be immediately successful within a targeted segment of the mass market. Further, immediate success demands involvement and participation by the public. It follows that popular electronic music is consumed by its public primarily in clubs where the public participates by dancing and that it is appreciated more in physical than intellectual terms. (Chadabe 2009: 9)

Chadabe recognizes the classical and intellectual traits from chapter two in the approach to the American minimal music, and opposes this to EDM which has a more interactive nature. As discussed in the previous chapter of this paper, an intellectual approach leads to silent contemplation, neglecting many of the socially interactive aspects of this kind of music. The listener submits to a passive role (Mertens 1983). But even in some avant-garde approaches these social interactions are an important part of the musical structure, and not just for economic and entertainment purposes. This can be exemplified by a short case study of Raster Noton and German avant garde DJ Carsten Nicolai, in which the audience becomes a part of the performance as well.

3.6 Raster Noton and Carsten Nicolai
Raster Noton is a German electronic music label founded in Chemnitz, Germany, 1996 by Carsten Nicolai (a.k.a. Alva Noto), Olaf Bender (a.k.a. Byetone) and Frank Bretschneider. They create, collect and publish minimalist avant garde electronic music. Nicolai stated that Raster Noton are mainly interested in driving ideas of very experimental club music17. I will focus on Carsten Nicolai, because his philosophy on repetitive loops is most clear, since his philosophy is also expressed through visual art works he creates.

First and foremost, Nicolai (b. 1965) is a club DJ who creates his music on the spot in a club using loops exclusively. He does so by the looping oscillators and tone generators, creating an accumulative form18, with a climactic accumulation of texturally thick grooves. Besides that, he samples old communication devices such as fax machines.

18 Accumulative Form: A notion coined by Mark Spicer in (Ac)cumulative Form in Pop-Rock Music (2004). A cumulative work climaxes at the end in a full-fledged presentation of the main theme. An accumulative work on the other hand replaces the main theme with the climactic accumulation of of riffs into a texturally thick groove (2004).
and telephones, which he then loops. Since old communications theory neglects feedback loops, one could interpret the looping of these old communication devices as a criticism on old communications theory. By sampling these devices, Nicolai forces these media into an interactive communications loop₂ where these media interact with the audience, under the particular circumstances of that clubbing event. The audience in return reacts to the sounds, offering feedback to the DJ, who then in return adapts his music, offering feedback to the dancing audience. This continues in a looped process, thus creating a feedback loop. A musical event far less predictable than the fixed performance of a Beethoven symphony.

Nicolai stated that he wants to step back from recording, and focus on the live performances. To this day, Nicolai has not released any DVDs of his performances, therefore neglecting an economic opportunity to make profit. It seems as though he feels that the loops and interactions are crucial to the music, but that they do not function in a recorded nature. This is not hard to understand, since recordings offer no room for interactivity in the sense that the live set in the club can. The interactive nature of the event is crucial to Nicolai. Without the interaction, it would only be the linear directed communication of a fixed entity, from artist to the audience. If a listener at home plays a recording, the DJ cannot respond to the audience and is left out of the musical experience. The same goes for the performing space; the space where the music was created would not be the same as the space where the listener is located. Recorded music, as a consequence, has become fixed and universal, partly existing in a different space.

Nicolai's DJ sets are accompanied by repetitive visuals that respond to the loops he creates in his music, all to immerse the audience, and to make the audience stop most rational contemplation and forget. If one plays back a recorded performance, it has lost this interactive nature. The loops₂ are gone, and the loops₁ have become classical compositional building blocks, because we will know when the performance will end, since the DVD or CD can only store so much. If we watch it again, we will see the exact same performance, and we, as an audience, will know what will happen after each sound. It has become a predictable fixed structure, directed towards a fixed ending or cut, which would allow for rational contemplation. It has become a one way non-interactive communication from CD to listener, without the possibility of feedback.

Nicolai's fascination for loops and particular circumstances can also be recognized in his visual arts.
At first sight, these loops are just strips of magnetic tape, glued together in a loop. But once you move them to a different space, the shape of these magnetic tape loops will change; they are dynamic. They only take on that shape in that particular room under those particular circumstances. One can change the loops without breaking the loop: feedback. This illustrates the view that physical loops, seem to invite socially interactive loops.

3.7 Musicological analysis of EDM and loops

This notion of interactivity, evidently important in EDM events, also plays an important role in the analysis of this kind of music. Some scholars in the field of EDM even go as far as to suggest that EDM is meaningless without these interactive communication loops. Hillegonda Rietveld writes:

It is only when played to and interacted with a dancing crowd, that house music, as a medium, is complete. In addition, a dance record is also pretty meaningless when it is separated from other dance records. One should look at dance singles as words which are looking for a sentence; they need to be combined in order to create a soundscape. (1998: 7)

Rietveld asserts that EDM needs to have a social and interactive context. Only then it becomes meaningful. Disconnected from the changing and interactive particular circumstances, an EDM track *an sich*\(^{19}\) becomes meaningless. Rietveld states that dance

\(^{19}\) A Kantian notion. The 'Ding an Sich' means the being of the object in itself, disconnected from other things. Kant explored this notion in his *Kritik der reinen Vernunft* (1781). When it is stated that music has meaning *an sich*, it means that it has meaning disconnected from the way that it is presented to us, disconnected from its phenomenal presence.
singles, or EDM tracks for that matter, should be looked at as words looking for a sentence. But as Mertens asserted, in the case of highly repetitive music, the music is produced at each moment (1983). How can one know the meaning of a sentence if it is still under construction? The event itself, during the process, is meaningless and does not represent anything.

Theoretically, this leads to the assertion that EDM events, as events in progress, constitute a musical experience without a clear starting point or ending. The people, partying and dancing, actively acting upon the music, are not aware when the party has started or when it will end, because the music makes the audience forget. Michaela Pfadenhauer writes:

Rave implies a party that (at least in theory) has ‘always already’ started and ‘never’ ends. In fact, it is ‘merely’ an opportunity to dance to music that lasts so long that—potentially—every participant can get into and drop out of the event again at any point of time without missing anything essential. That is to say that such a party often lasts for twelve hours or more (sometimes even for several days). (2009)

The feedback loops between the DJ and the audience theoretically continue without ending. The musical movement, that functions as a feedback loop, does not work up towards an ending or climax and becomes a-teleological as asserted by Mertens (1983). A leaving audience member will merely cease to contribute her part to the feedback loop, and therefore cease to contribute to the continuous creating process of the music.

This notion of interactivity is the main focal point in many studies regarding EDM. Since this interactivity is a social process, it is almost exclusively approached from a sociomusicological point of view. An in depth discussion and analysis of Michaela Pfadenhauer’s symptomatic sociological contribution Lord of the Loops. Observations at the club culture DJ-desk (2009) will help to get a grasp on the epistemology of a sociological approach to the topic.

Pfadenhauer’s contribution to the field of EDM, in her own words, intends to provide a “structural description of the usual conditions under which a club culture DJ works, which he/she has to handle by acting situationally, and under which he/she in turn has to be handled - both as a typical role player and also as a principally idiosyncratic person who, depending on the situation, generates more or less problems” (2009). By ‘acting situationally’ she presumably means that the DJ is situated: the DJ has to deal with all things happening inside the club, and adapt to this situation with his music. In other words: the DJ has to interact with all the particular circumstances in the club. He has to actualize his experience, and cannot merely depend on memory, as asserted by Mertens (1983).

Pfadenhauer’s method consists of qualitative sociological research, which in her case means interviewing participants of the specific club scene and participating in the scene herself in order to grasp the ‘quality of the experience’. Pfadenhauer states: “As sociological researchers of life-worlds, we are interested in the perspective with which the people who are the object of research perceive the parts of the social world relevant for them” (2009). The object of study in this case being German speaking DJs.

Before focusing on the DJ, Pfadenhauer attempts to describe the physical

\[20\] Situated Cognition implies that knowing is inseparable from doing by arguing that all knowledge is situated in activity bound to social, cultural and physical contexts.

\[21\] Lifeworlds: a concept by Edmund Husserl, first introduced in his Crisis of European Sciences (1936). The concept was further developed by Jürgen Habermas, most importantly in The Theory of Communicative Action (1981).
experience of the music. She states that due to the high volumes, low lighting and the long time span, the hours in the club are experienced as “a continuum of resting places and flying stretches interwoven in manifold ways in the raver’s conscious” (Schütz 1966), and because of this process the location becomes “a feast to his/her eyes or ears” (2009). Pfadenhauer adds:

Besides the duration of the event, the volume of the acoustic emanations, which can by all means reach decibel levels of up to 120, seems to be essential to achieve this. Frequencies under 800 Hertz are so intensive at this sound energy level that they are not only taken in with the sense of hearing but actually with the sense of touch, too (especially through the diaphragm). Ideally one does not dance to but rather be in the club culture music, which seems to flood and to stream through the body and to make one forget the world around oneself. To bring about this effect, an acoustic irradiation seemingly ‘from all sides’ (thus the creation of a sound space in which and through which one can move equally well allover) seems indispensable. (2009)

Clearly Pfadenhauer sees the club culture experience as a predominantly physical experience, as opposed to the intellectually uplifting experience of the romantic symphony as discussed in chapter two. If there is intellectual meaning in the experience, it is not dominant to the physical experience. The physical locational space is crucial to the experience of EDM.

In the next section of her paper Pfadenhauer focuses on the DJ and interaction. She states that the skill of the DJ mainly manifests itself in picking the right records with a view to an over-all concept of his set, and that he has to be capable of reacting very flexibly to situations and moods. To be able to do this, as Pfadenhauer asserts, the DJ hardly ever puts his earphones over both of his ears so that she is open to interaction, as well as being capable of hearing both tracks she is mixing. Pfadenhauer writes:

Generally, the interaction of the people on the stage with the DJ during the set is a difficult matter. ‘Making a good party’ takes precedence over all other activities on the stage, and this usually demands a good deal of concentration. Therefore, upon the DJ’s request, which he signals verbally or by means of gestures, different people (partly friends, partly staff members) render various services (e.g., fetching and handing him drinks, lighting and handing him a cigarette, etc.). (2009)

and:

Depending on the DJ’s character and his mood, he shows himself as more extroverted or introverted, more priestly or chummy, in interaction with the dancers. Oriented towards the whole ‘party crowd’ or individual dancers, he may communicate more non-verbally (by, e.g., provoking ‘hands ups’) or verbally (for instance, by backing down the volume and loudly cheering and spurring on or berating the audience). Only rarely a microphone is installed at the DJ-desk for this purpose. Normally, however,—depending on the phase in which the whole party is (in the prelude stage, at its height, at an advanced hour, or even in its ‘final’ hour) and on what tone he wants to set (warming up, evoking ‘peak experiences’, or cooling down)—the DJ tries to influence the mood on the dance floor through his choice of music and sound mixing. (2009)

In her section on interaction, Pfadenhauer merely focuses on verbal and non-verbal communication with a linguistic nature, for example the hand signals or the microphone and speech. She also claims that the DJ at all times has a purpose: warming up, evoking
peak experiences, or cooling down. The DJ ‘wants’ to set a tone. But does the DJ always have a clear idea in advance of how she wants to influence the mood? Does it not also depend on the atmosphere and what is going on in the club? Is this a rational decision?

To present communication in Pfadenhauer’s way is describing communication as a classic *sender → message → receiver* model of communication, as criticized by Shannon. If there is a clear idea to be transferred in the music in advance, the music has to be fixed in order to transfer the idea. This model has a rational and predictable feel, since the sender has to think of his message in advance and of finding a fitting way to present this message. The model does not describe how the mood influences the DJ back, causing her to change what she is doing. And does the DJ rationally decide to continue a certain beat, or does she feel it? Is it merely because of a rational interpretation of communications? This physical and possibly emotional aspect of interactive experience seems to be neglected. Communicative interaction does not stop once a message is received, and the experience of the atmosphere seems to play a part in this as well. Here Pfadenhauer appears to neglect the notion of feedback.

Pfadenhauer seemingly seeks the essence of the DJ performance in communication, which differs from interaction if you describe communication in a classical way in a *sender → message → receiver* model. This model is a linear directed movement, and therefore has a high degree of predictability: the message is either understood and one acts upon it, or it is not understood. Pfadenhauer contradicts herself with this approach, since she stated that a rave does not have a clear start or ending, even though these communication models clearly do. The classical model of communication seems unfit if one wants to describe a process without a starting or ending point.

Besides this, Pfadenhauer states that the DJ at a rave creates a composition:

The rave differs from the traditional disco precisely in that individual “hits” are not played one after the other but rather the music to which the ravers can dance is actually created by the DJ himself/herself within in the party situation—however, not with traditional instruments but by means of record players, mixing desk, and possibly other electronic equipment. At the turntable (or, less frequently, by so-called live-acts), the DJ basically inserts sequences of familiar material (loops), at best as recognizable building blocks, into a situational sound composition. (2009)

A composition, as discussed in the previous chapter, works towards an ending and has a pre-configured shape consisting of fixed entities as building blocks. How can something that is pre-configured be unpredictable in its course, even though the DJ live set has a high degree of unpredictability and can been seen as a continuous work in progress? These assertions are incongruent, and it seems as though the notion of composition is unfit for the analysis of EDM.

The discussion of Pfadenhauer’s research exposes that when one speaks of communications and interactivity, it is hard to do so without engaging in latent modes of thinking dealing with fixed entities such as compositions or classical communication. What is more striking is that Pfadenhauer does not mention the music at all, apart from its sonic dimensions and that she described it as a composition. Is the musical structure not connected to the way in which the DJ and the audience socially and interactively engage with the music? This belief even goes so far as for some scholars such as Rietveld (1998) to assert that EDM is meaningless without the interactions.

Mark J. Butler disagrees and recognizes the importance of EDM’s musical structure
in *Unlocking the Groove* (2006). He explains the lack of focus on structural aspects of EDM due to the fact that it is hard to talk about the sound of EDM in a precise manner. Butler cites Buckland:

David Morales’ remix of ‘Goldeneye’ by Tina Turner exemplifies the cues DJs served up for the dancers. After building up layers of rhythms, which acquainted dancers with the tempo and timbre of the track, and after repetition had made it familiar, the explicit rhythm track was pulled way, leaving the unembellished key signature chords of the harmony chiming out. A key chord sustained itself under the second repeated cycle of these chords to create a dramatic tension of expectation. (Buckland 2002: 79)

This description comprises of a pure formalist approach, focusing on the structure of David Morales’ remix. It offers pure Platonian truths about the track, but still it is missing something. This method somehow seems unfit for describing EDM. Butler writes:

What exactly are ‘key signature chords’ (or ‘key chords’?) Tonic chords? ‘Primary chords’ (tonic, subdominant, dominant)? Chords belonging to a particular key? Although most of Buckland’s musical descriptions are relatively clear, this use of terminology is curious given the absence of notational symbols such as key signatures in this music. (Butler: 11)

Butler feel’s Buckland’s description is inadequate, since EDM lacks solfege. But he also feels that her attempt is noteworthy, because what matters to music is not just the social aspect, but also the sound:

The people involved in EDM culture - DJs, fans, producers - care deeply about sound. The sound is the force that drives people to dance - indeed, causes them to feel that they have to dance. The sound is what producers spend their time crafting, leading fans to collect their records obsessively. The sound motivates DJs to play this particular record at this particular moment. Furthermore, sound affects the ways in which DJs alter and combine records, as well as producers’ decisions during the compositional process. Therefore, studying the sonic dimensions of electronic dance music can help us understand the specific choices and behaviors that go into its creation and appreciation. As an essential part of the cultural complex in which EDM is embedded, sound deserves scholarly investigation. (Butler: 12)

Butler thus tries to explain why people involved with dance music make certain choices and appreciate EDM through a structural approach of the music in addition to a sociological one. By stating this, Butler acknowledges that musical structure is connected to the social response to the music. He states that studying the sonic dimensions can help us understand the specific choices that go into its creation and appreciation. This suggests that this sonic dimension is not merely a sonic dimension, but that it is interwoven with other dimensions, for example the social and cultural dimension where appreciation takes place. For instance, if this record has this specific sound, it is suitable to play in this particular social situation. The different dimensions somehow interact and are important to each other.

Butler’s main points of focus in his study of sonic dimensions are rhythm and time. According to Butler, rhythm is the driving force behind EDM, and this indeed seems to make sense, since the nature of dance seems closely connected to rhythm. Butler states that this structural approach, or studying EDM as music, is important, since it offers new knowledge about the sound of EDM, and because it has been much argued against its
importance (Butler: 13).

As mentioned, Rietveld clearly underlines the importance of social interactions within EDM, and goes as far as to suggest that EDM is music created with two specific functions: interacting and creating a dancing atmosphere (1998). Butler, on the contrary, wishes to justify an approach that focuses less on function and interactions. The music has meaning \textit{an sich}\textsuperscript{22}. Here Butler disconnects the music from its related social interactions, however he does acknowledge their importance:

\begin{quote}
I will contend that its [EMD's] groove - far from being locked in a single, restricted type - promotes multiple and flexible interactions, an unlocking of temporal experience into many possible directions. (Butler: 5)
\end{quote}

According to Luis Manuel Garcia (2005), Butler wants to focus on the musical process as a part of the inner musical structure. Through repetition and looping in the musical structure, one can prolong the pleasure by shifting the perceptual focus from one structural layer to another (Garcia 2005: 5.2), therefore offering an explanation for the importance of musical structure within EDM.

Butler seems to struggle with a derivative of the cartesian divide; a cut between \textit{res cogitans} and \textit{res extensa}. This struggle between mind and body has been apparent in philosophy ever since Plato, as discussed in chapter two. On the one hand, we have the \textit{thinking matter}. This is the world inside our minds, and can be linked to notions of the Platonian. It is through our minds that we can think rationally and create abstract theories. Our minds somehow interact with the world around us; the \textit{extended matter}. This encompasses our body and our environment. But how do they interact? This struggle is apparent in Butler’s methodology, since in science it seems that the only possibility is to study only one side of the divide. Butler tries to study both the world inside the music, a world believed to be determined by theory and thought, as well as the world outside the music, a world believed to be determined by movement and interaction.

However, in his approach the two worlds are still separated. Butler studies the world inside the music, or the musical structure, by performing rational musical analysis and transcribing EDM. An approach to the music that strives to provide objective facts about the music \textit{an sich}. On the other hand he tries to study the world outside the music, in other words: ‘what people do with the music’. He does so by performing field research in clubs and discotheques, looking at the interactions accompanied by in-depth interviews with the people involved, in a similar fashion as Pfadenhauer.

Butler runs into problems with the structural musical analysis, stating that transcribing EDM brings forth a number of complications; one of them being the fact that transcriptions transfer certain information better than others (Butler: 24). Different transcriptive methods are better at describing different elements of the world inside the music. He states that there is a disjuncture between music and theory, but that this disjuncture can highlight assumptions within current theories of music and reveal some of the distinctive aspects in question (Butler: 24). He adds that comparing classical music with pop music enriches pop music, because the theory of classical music speaks for music in a more general way (Butler: 24).

\textsuperscript{22} A Kantian notion. The ‘\textit{Ding an Sich}’ means the being of the object in itself, disconnected from other things. Kant explored this notion in his \textit{Kritik der reinen Vernunft} (1781). When it is stated that music has meaning \textit{an sich}, it means that it has meaning disconnected from the way that it is presented to us, disconnected from its phenomenal presence.
Another problem Butler encounters is that the DJ live set\(^\text{23}\) has a degree of unpredictability:

In general, the exact course of a DJ's performance is not predetermined, instead developing according to the demands of a specific situation, through interaction with a dancing audience. (Butler: 33)

How can one theorize, let alone transcribe, something that is unpredictable to a significant degree? The music is clearly shaped by the interactions during a live set. His problem again seems to be the strict divide that is apparent in western thinking between the inner world (mind and theory), and the outer world (the body and its interactions). The inner is the musical theory, the outer is social interaction.

A well known sociological approach, focusing on the world outside the music, is *Dis-Orienting Rhythms - the politics of the new Asian dance music* (1996), edited by Sharma, Hutnik and Sharma. The work focuses on the meaning of EDM, more specifically Asian EDM in the UK. In their own words, the book opens up a series of critical debates and tensions concerning the production of new Asian dance music as an object of knowledge for academic consumption, and tries to approach the topics through a new sociology that does not rehearse Orientalist scholarship. The main topic of the book is Asian pop culture in the UK, and in the introduction they explain why they focus on music. They state that Asian dance music has played a crucial role in the formation of urban cultural politics in the UK (1996: 2). This exposes an approach to music in which music is treated as a carrier of culture and meaning, dealt with from a sociological perspective. Many of the issues discussed in the book deal with notions of artists 'representing' aspects of Asian culture (if one can speak of this), racism, and the way the music is culturally perceived and received. In doing so, it does a particularly good job, with contributions from many people inside the field of Asian EDM, consequently uncovering and countering many hidden and latent forms of prejudice that Western scholars from outside the field might exhibit. But the music itself is hardly discussed apart from its cultural effects. The sound and the structure of Asian EDM is to a large degree separated from what people do with the music in this approach, which is a consequence of a sociological epistemology that focuses on the expression of culture.

*Dis-Orienting Rhythms* (1996) is a clear example of a belief that EDM can signify something beyond the music itself. Asians in the UK employ dance music as a vehicle of cultural expression, and the sampling of particular instruments and rhythms that are somehow connected to a particular culture can signify different cultures and different places. But this process of signification becomes more difficult when the sounds appear to be to short or to indistinct to signify anything. What if merely a pulse or a click is looped? Joanna Demers writes the following:

> Consider this simple fact and its ramifications. No matter the genre, listening situation (whether live or recorded), or audience, all forms of electronic music make manifest the strangeness of sounds that have only recently become imaginable and executable. All electronic music is a meditation on the act of listening to sounds both old and new, therefore a meditation on the cognitive processes that accompany listening. (2010)

\(^\text{23}\) A DJ live set is a DJ performance in a live setting in front of an audience.
The sheer freedom of electroacoustic music constitutes both its strength and its burden. With the latitude to use both conventional musical figures and random, seemingly unintentional sounds, electroacoustic composers have generated an amount of theoretical literature concerning the act of listening that is unrivaled in any other genre of music. This literature argues over the extent to which composers, materials, and listeners themselves can control the listening process. At its heart, this discourse is concerned with the signifying properties of sound: whether sound can be heard separately from any social, cultural, natural, or historical associations. (2010)

This discussion is also valid for many types of EDM. What if we do not recognize the click of a fax machine in Carsten Nicolai's music? Can it still offer a critique on old communications technology? How should we approach this? The sound itself appears to be a part of the structural inside of the music, whereas the meaning of the click as a critique on old communications technology appears to be more on the sociological outside of the music. The important issue Demers points out is: can sound be disconnected at all from its cultural and social associations? If this is not so, this would have far fetching consequences for the analysis of electronic music.

Philip Tagg elaborates on the problem of meaning in From Refrain to Rave – The Decline of Figure and the Rise of Ground (2000). Tagg writes that he wishes to attempt to relate the structures of music to the society and culture in which and for the music is produced and used. He states that during his time as a musician he noticed that if he played $a$ and not $b$, the 'old Methodist ladies' were more likely to cry, and if he played $y$ and not $z$, the dancers were more likely to boogie on down (2000). “The choice was between, on the one hand, Palestrina$^{24}$ crosswords plus Schenker and the aesthetics of musical absolutism on the one hand, and, on the other, making some sense out of music” (2000)$^{25}$. According to Tagg, this is a radical difference. He suggests that rave music differs so basically from rock 'n roll as regards its musical structuration that old models for explaining how popular music interacts with society may need radical revision (2000). He states that his presentation is polemical, rather than authoritative or scholarly, and that the main point of his essay is to raise questions instead of answering them. Tagg's questions however, will help to clarify the problems that this chapter deals with.

Tagg starts of by describing a fear for EDM, because of the high consumption of drugs during the parties. He states that the 'elders' fear the use of MDMA, because the drug is a danger to their children. The drug enhances perception of color and sound, but also causes dehydration and can lead to psychosis. A ground for real concern, because parents do not want to let their children end up as junkies. But according to Tagg, this can not be the only cause. Somebody who drinks whiskey at the weekends will not end up to be an alcoholic most of the time. Tagg grounds this fear in another 'high':

It is probably fear of another 'high' that haunts those who put an end to dance raves, the fear that their sons and daughters (and the society we all populate) are out of their control and that the young people, by organizing and participating in these raves, have in

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$^{24}$ Giovanni Pierluigi da Palestrina (1525 or 1526- 1594) was a renaissance composer of sacred music and a representative of the Roman school of composition. The 'crosswords' possibly refer to Palestrina's compositional style, in which polyphonic melodies cross each other and lead to solutions. The dissonances in the polyphony mostly resolve on the 'weak' measures of the beat in Palestrina's compositions.

$^{25}$ Schenkerian analysis is a method of analysis of which the goal is to interpret the underlying structure of a tonal work and to help reading the score according to that structure. A Schenkerian analysis shows the hierarchical relations between different musical elements between different passages. Heinrich Schenker developed his theory in the early 20th century.
fact started to take control over their own lack of control on society. (2000: 3)

Tagg states that reorganization and thatcherisation in the brazen capitalism of the last two decades promotes greed as a virtue, with buzzwords such as ‘achievement’ and ‘performance’. We have to elbow each other out of jobs. According to Tagg, this way of living led to multiple forms of bankruptcy. Not only banks, but also thousands of small companies go bust every week, property prices are plummeting and health and social welfare infrastructures are dismantled before our eyes (2000:4). Tagg also recognizes an intellectual and spiritual bankruptcy in studies of contemporary culture, quoting James Lull as an example:

Music excites the body to automatic movement, an exhilaration that defeats boredom and inspires insight… Music gives the body control over itself, granting personal freedom and revealing sexual potential. When Madonna says 'you can dance', she truly empowers her fans. (Lull 1992: 29-30)

and Lawrence Grossberg:

To find out how rock functions, it is necessary to explore effects that are not necessarily signifying, that do not necessarily involve the transmission, production, saturation, or even deconstruction of meaning. Rock and Roll is corporeal and 'invasive'. For example, without the mediation of meaning, the sheer volume and repetitive rhythms of rock and roll produce a real material pleasure for its fans (at many live concerts, the vibration might actually be compared to the use of a vibrator, often focused on the genital organs) and restructure familial relations (by producing immediate outrage and rejection from its non-fans, e.g. parents. (Grossberg 1990: 113)

Tagg states that both of these examples are symptomatic of much sociological writing on rock in its mystification of musical signification and its avoidance of music as structure and experience (2000: 6). They simplify the object of study, by reducing its meanings, similar to the way capitalism reduced society to money. Furthermore, as Tagg points out, it assumes we all have intimate knowledge of the experience of vibrators.

Tagg's main problem with the above examples is that they assume that rock music is mainly a corporeal experience: structure is not connected to meaning. It treats rock music as vibrators. According to Tagg this is a wrong approach: “If this is so, the passage just quoted is an insult to every rock or pop musician and to all the time and energy they spend rehearsing, doing sound checks, studio retakes and different studio mixes to obtain the sound that says a and not b” (2000: 5). The structure and the sound of the music has meaning, because the musicians make specific choices about this sound. This is a process that cannot be neglected.

In the pages to follow, Tagg gives a thorough structural description of rave music, offering pure Platonian knowledge, for example:

Rave compilations are qualified by terms like 'urban', 'manic', 'megadance', 'power', 'ultrasonic', 'energy', etc. Most rave runs in regular two-bar periods of 4/4 (or two bars of 2/4 if you prefer). These periods are about half the length of those found in an average rock number more akin to the modules of fast disco. Tempos generally range between 116 and 144 bpm, the most common pulse rate being around 132… (2000: 7)
Bass riffs, if they occur at all, are usually quite simple, and seem to consist of either repeated single notes sounding the root position of the overlying chord (usually a triad) or circling stepwise around it. (2000:7)

Descriptions very similar to Buckland's description of David Morales' remix of Goldeneye. Descriptions that according to Butler do not grasp the nature of EDM. Tagg shares Butler's opinion by stating that these descriptions leave us with many questions such as 'why the breakneck tempo?', 'why the steady pulse?', 'why no prominent bass line?' (2000:10).

According to Tagg, we have to look at figure/ground relationships. The meaning of the sounds is to be found in its social context, stating:

Given the historically verifiable dual relationship (a) between themes as musical figures and the foreground individual and (b) between accompaniment or backing and the environment in which the figure/ground moves and has its being, it is possible, using the basic tools of musematic analysis, to come up with quite reasonable hypotheses as to how music encodes different patterns of socialization. In this context, you need to know if the music contains any melodic figures and, if so, how many occur at the same time. You also need to identify the backcloth, if any, against which those figures are profiled. Then you have to find out how the figures interact with each other and with the background and establish any connotative meaning you might find in (a) the figure, and (b) the ground, and (c) in the relationship, if any, between figure and ground. (2000:11)

Tagg's suggested approach shares many aspects in common with semiotic approaches, as criticized by Nattiez (1990). In many cases it is hard to objectively know what the music connotates. What is quite interesting in Tagg's approach is the suggestion that the interaction between musical figures can also be read as social interaction:

Many forms of West-African polyrhythmic music consist of a multitude of short, repeated, rhythmically and timbrically varied figures, all played simultaneously. Such musical structuring can also be read as social structuring: each individual part is required to differ from, and yet interact with all the other individual parts. The successful musical event is in this context homologous with the successful and immediate interaction of individuals in society. (2000:11)

According to Tagg, the same would account for rave music.

Tagg wishes to connect the sound and feel of the music to events happening in culture. But in this approach, culture is treated as an entity that can be reflected. Therefore, culture has to be treated as a fixed entity, and the musical elements become fixed and distinguishable elements in order to be able to signify. The musical elements become part of a syntax or a structuring mechanism, because, according to Tagg, figure/ground theories allow for music to encode different patterns of socialization.

But is the structure of rave music dependent on a large fixed entity such as culture, which is full of universal encoded meanings and communications, or does it depend on more particular situations and social interactions happening at the event itself? Events that are 'too small', changing and fluid to be grasped by something as big as 'culture'? And are the musical structures even fixed enough to a degree that they allow for decoding? A question that arises if we believe that loops do not have a fixed
structure, without starting and ending. Or do we have to look at the changing circumstances that cannot be grasped in universal fixed forms of knowledge? Could it be that EDM is homologous to immediate interaction, not by individuals in society, but to individuals at the event?

If we look at the above approaches in terms of fixed/universal and changing/particular, then we can recognize a tendency to in musicology to approach music from a Platonian ontology dealing with fixed and universal entities. This tendency allows musicologists to structure the music and connect meaning to it, since only more fixed entities can bear meaning. But this approach seems reductive and unable to grasp every aspect of the EDM event. For example: imagine an EDM event to reach a climax, with a thousand people are dancing like crazy, but all of a sudden the DJ removes the beat. This act drastically increases the tension; the dancers still feel the beat and wait until the reward they get when the DJ reintroduces the beat. Can the exact moment, the exact feel of this particular break at this particular event be pinpointed in culture? And when one transcribes this break in a musical score, does it mean anything at all apart from being an empty bar in the score? The above approaches do not deal with these issues, since their epistemologies are not able to grasp the connection between the inner space and the outer space of the music on the level of small, interactive changing and particular events that the DJ has to juggle with. In musicology we can recognize a sliding scale: the more concrete and clear the meaning is that one wants to attribute to EDM, the more fixed the music and the social interactions have to be.

Furthermore, musicology deals with either the world inside the music, or with the world outside the music. Musicology in relation to the world inside the music deals with fixed and Platonian entities in regards to musical structure, and musicology in relation to the world outside the music deals with interaction and communication and attempts to structure these events, often neglecting the relation to the world inside the music, apart from the meaning that is attributed to the music. This meaning then becomes a fixed and universal type of Platonian knowledge connected to the musical structure, similar to the meanings attributed to Beethoven's fifth; the meanings become either a myth or a collection of personal accounts from which something similar to an average meaning can be deducted. If EDM in fact has an unpredictable structure (as asserted by Butler), and does not have a beginning or ending (as asserted by Pfadenhauer), then these approaches, or a combination, are not sufficient for explaining EDM, since the structured knowledge they provide cannot grasp the unpredictable. The knowledge these approaches bring does not account for particular and changing circumstances, or juggling DJs and audience members. These approaches do not seem to grasp the small interactive loops that connect the musical inner space to the outer space. Analysis of the world between the inner and outer musical space needs a different epistemology.

3.8 Perception and space
Joël Krueger describes the gap between the inner and outer musical world in his essay Enacting Musical Content (2011), in which he explores musical space by employing an enactive approach, which is an approach that goes against classic computational models of cognition, involving passive models of perception. According to an enactive point of view, perception is intrinsically active (Noë 2004). Perceptual experience acquires content via the possession and deployment of bodily skills: we use our bodies to move through the world and engage with the world (Krueger 2011, Noë 2004). We do not sit silently and rationally interpret the world in order to understand it, and what it
represents, but we act. Enactive approaches are often seen as theories of access: “they describe how the possession, the deployment, and the understanding of bodily skills, as well as sensorimotor regularities governing our engagement with the world, determine the character (the how) and the content (the what) of perceptual experience - that is, the form of our experiential access to the world” (Krueger 2011). Enactive approaches counter classic computational theories of cognition, and especially classical theories of visual experiences.

Varela, Thompson and Rosch (1991) were among the first to contend that computational and representational notions of cognition do not account for perception. They suggested an embodied approach:

By using the term 'embodied' we mean to highlight two points: first, that cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities, and second, that these individual sensorimotor capacities are themselves embedded in a more encompassing biological, psychological, and cultural context. By using the term 'action' we mean to emphasize once again that sensory and motor processes, perception and action, are fundamentally inseparable in lived cognition. (1991: 173)

Perception and action form a loop: a perception - action loop\textsuperscript{26}. The content of perception is determined by the movement and actions a being undertakes, and its actions are in part determined by its perception of the world. VTR claim that action and perception are inseparable in the sense that they determine each other. Perception leads to action, and action leads to perception. This encompasses that the type of body and movement of a being determines the knowledge it acquires. For example: imagine two creatures, similar in intelligence, but with very different bodies. One creature is thirty foot high and weighs twenty thousand pounds and walks around on two legs. The other creature is only half a foot high and walks around on six legs. Their perceptive qualities may be very different as well. The first organism may only face forward, while the second small creature has a 270 degree view of the world. The other creature is only half a foot high and walks around on six legs. Their perceptive qualities may be very different as well. The first organism may only face forward, while the second small creature has a 270 degree view of the world. The other creature is only half a foot high and walks around on six legs. Their perceptive qualities may be very different as well. The first organism may only face forward, while the second small creature has a 270 degree view of the world.

This example is of course a gross exaggeration, but it does illustrate how perception can determine our action. Alva Noë provides a more realistic example of how our bodily movement and active perception contribute to our understanding of our environment. Alva Noë on an elliptical plate:

... we understand that its elliptical look depends on our spacial relation to it, a relation that is modulated by movement. When you move with respect to a plate, its profile changes as we move, and we encounter the actual shape of the plate in thus bringing to bear our sensorimotor understanding. Our appreciation of its actual shape consists in our perception of its profile and our understanding of the way the profile, or apparent shape, depends on movement. We may say, in a case such as this, that we are able to experience the shape of the plate, to see it, because we grasp, implicitly, the

\textsuperscript{26} The VTR action-perception loop is not to be confused with either loop\textsubscript{1} or loop\textsubscript{2}. It seems related to loop\textsubscript{2}, but the notion of feedback is lacking in a concrete sense.
sensorimotor profile of the plate. Our grasp of the plate’s sensorimotor profile makes its shape available in experience. (Noë 2006: 78-79)

Our understanding of an object or environment is underpinned by a sensorimotor understanding of it. We have physical access to the object or room. We can walk across it, touch it, hear it and smell it. According to enactivists we do not look for representational frames in order to recognize an elliptical plate, because we have direct phenomenal access to it.

This approach is clearly different from a Platonian approach of knowledge, where the idea of an object is fixed and universal. Plato’s approach, as opposed to enactivist approaches, does deal with notions of representation: any bed we encounter represents the perfect bed, and it is not through action that we get to know the idea of the bed, but through a rational approach. Instead of a sensorimotor understanding, we acquire a rational understanding of the object; an understanding that takes place in the mind.

Krueger adopts an enactivist approach in order to study musical space. He makes two assertions: one is that music manifests itself as having spatial content, the second is that sensorimotor regularities constrain this content and that musical content is therefore brought to phenomenal presence by bodily exploring structural features of music. We enact musical content (Krueger 2011: 63). This is philosophically interesting since it suggests that listening to music is not a passive affair, as is often presumed. Listening to music is not a one way process or communication leading from musical piece to listener (Sloboda 2005). It is active and interactive. The listener is situated and has the possibility to dance, sing, or tap his foot. The listener can physically act upon the music, just as he can walk around Noë’s elliptical plate. The acting upon the music contributes to the listener’s understanding of the music. To this point, one could still make sense of describing this process as being a linear directed movement; from music to listener. I will get to this shortly.

According to Krueger, this acting upon the music is possible because auditory experiences are locational: “they represent both what is happening, as well as how something is happening in relation to oneself” (2011: 65). For example: we can hear children playing outside (the what), and we can hear they are playing slightly right of my house out on the street (the how). Krueger states that this locational aspect of sound has behavioural consequences. If one would walk out on the street and hear the kids kicking a ball behind them, then one would hear the whizz of the ball flying towards them, and one would know which way to duck without rationally analyzing extra-auditory information:

The ability to track and quickly respond to events in the environment rests on having immediate phenomenal access to the spatial location carried by sounds. A step-wise process depending upon the access and utilization of extra-auditory data, or necessarily mediated by an inferential ‘working out’ of a sound’s location, places an unnecessarily excessive computational burden on the perceiver – and thus would, accordingly, significantly impede their reaction times. (2011: 66)

Sounds therefore seem to bear spatial and locational features of the world, which allow us to physically act upon them in this world. This is not because sounds represent events happening, which we would have to analyze in order to act. These features are manifested directly in the world to which we have direct phenomenal access. Sounds are affordances: meaningful objects in our phenomenal world, perceived directly, which
allow for behavior (Chemero 2011: 136).

Krueger argues that the phenomenology of musical experience is determined by two forms of spatiality which we have shortly discussed before: inner and outer musical space. However, Krueger wishes to focus on the gap between the two and explore how they are related. He asserts that the two spaces fuse in a process he coins deep listening:

…in episodes of 'deep listening' - listening in a voluntary mode of sustained perceptual focus and affective sensitivity, as opposed to hearing music with 'one ear' as a piece drifts idly by in the background- listeners enact the experiential fusing of these two forms spatiality. Put otherwise, the spatiality of musical structure - and in particular, structural features like textural qualities and the temporal regularities of sonic patters (both melodic and rhythmic) - presents music as having an exploratory profile affording this sort of deep listening. (2011: 67)

According to enactivists, experience is an active encounter with hidden complexity (Noë 2009: 473). Krueger states that conscious phenomena harbour potentially attended-to aspects that invite further exploration (2011: 67). The elliptical plate in Noë's example changes according to our bodily movements along the plate. In this 'moving around the plate', we uncover previously hidden aspects of this plate, which builds expectation. This type of acting in relation to objects is a form of sensorimotor knowledge: “an understanding of how our perceptual relation to the world is mediated by contingent relations coupling bodily movement and sensory change” (Krueger 2011: 68).

The above notions obviously regard a world with clear spatial features or affordances, but as discussed before, sound has these spatial features as well. When we hear music in a concert hall, we understand that the sound is coming from the stage or from the PA system. Listening to a car stereo, we understand that the sound is coming from the speakers. This is the outer space. However this is not the only encounter with space. There is the suggestion of another musical space. Krueger quotes Merleau-Ponty:

When in the concert hall, I open my eyes and visible space seems to me cramped compared to that other space through which, a moment ago, the music was being unfolded, and even if I keep my eyes open as the piece is being played, I have the impression that the music is not really contained within this circumscribed and unimpressive space. It brings a new dimension stealing through visible space, and in this it surges forward... (2002: 257-258)

Merleau-Ponty differentiates between two kinds of space. The visible space, or outer space, and a space he experiences as a new dimension. A space not constrained to the walls of the concert hall: inner space. But they both exist at the same time.

This fusion of spaces is sometimes referred to as site, which according to Joanna Demers entails the sound in which the environment propagates, as well as the space that listeners physically and metaphorically occupy (Demers 2010: 113). Demers asserts that the terms at play in discussions of music and site are space, place and location. According to Lefebvre, space refers to large sites that are physical, mental or cultural, and either imaginary or real (2000). In this regard, space seems to act as an umbrella term for inner space, since this term refers to an imaginary and cultural world. The inner space deals with elements ‘inside’ the music: the musical structure, the harmonies, the melodies, and the unfolding of these musical aspects in time, and their interrelations. These elements, according to Krueger, seem to create an exploratory
profile. A space also open to exploration. It does not entail a clear communication from composer to a passive and receptive audience. It is an active process. Merleau-Ponty automatically detects the piece's inner spatial configuration. He explores the inner profile of the musical piece, an inner world. This is the profile that traditional structuralist musicologists focus on in order to create an understanding of a piece of music. However, Merleau-Ponty - or any other listener for that matter - also has a clear understanding of where the music is coming from, just as when we are listening to music in a car stereo. The listener is situated at a site (Demers 2010: 114).

So what happens in a state of deep listening? Krueger writes the following:

Deep listening is a voluntary form of musical experience consisting of sustained attentional focus and affective sensitivity. It is an immersive form of listening in which the subject selectively orients herself to a piece of music by actively attending to its various sound features and their interrelationships - while simultaneously maintaining a state of affective receptivity, or a readiness-to-be-moved, by what is happening sonically in the music. Deep listening is thus a transactive mode of listening involving 'processes such as exploring, selecting, modifying and focusing of attention' (Reybrouck 2005: 252). Moreover, this deep engagement can have the temporary effect of weakening or obliterating the felt senses of inner and outer.' "...The deep listener has the felt sense of inhabiting the sound field, leading to a heightened emotional and affective responsiveness to the musical situation (Vastjfall 2003)." (Krueger 2011: 71)

What Krueger is basically stating is that the musical inner space is explored while listening, but during this exploration the listener is situated. He can not be disconnected from his listening environment. An 'objective' view of the music an sich is impossible. When Butler states that he wants to study the sound of EDM, he neglects this situatedness. Krueger (and Reybrouck) claim that listeners select and explore certain parts of the inner space, while at the same time having the felt sense that they inhabit the sound field. The locational space of the listener meshes with the inner space, which enables the listener to create a sensorimotor understanding of the inner space. Bodily movement changes the perception of the sounds, thus changing our understanding of the sounds. Krueger states: "we enact an experiential fusing of these two forms of musical spatiality such that neither takes phenomenological precedence over the other. Rather, they come together and, in their fusing, open up experiential character of the piece in a new and previously unheard way" (2011: 70). This would mean that each and every musical experience is a situatedly unique experience. Every time you hear a song on the radio or at a concert your locational circumstances will be different, thus leading to a different 'understanding' of the song. But also every time you move differently to a song. The particular circumstances and bodily movements matter for the experience of the music. Now we can identify loops2 in musical experience as well. There is a constant interaction between the listener and the music, and feedback is provided by acting upon the music, which alters the musical experience. To merely study the music's inner structural space is to turn the music into universal knowledge and linear directed communication. From Beethoven to audience, from Wagner to Nietzsche. If one wants to understand musical experience, a particular experience that is different every time, then one cannot neglect the body and the locational aspect of musical experience:

The animate body plays an important role in enacting this sort of musical spatial fusing. This is because bodily movements such as gently swaying back and forth, bobbing one's head, tapping fingers and toes, and of course dancing, modulate our perception of the
spatial content of musical experience, by modulating our relation to different features of
the music, such as metre and melody. (Krueger 2011: 73)

A different dance, a different movement, a different stereo would lead to a different
understanding. This process also works the other way around: a different music, will
lead to a different movement. This would explain at least certain non-sociological
aspects of why different genres of music encourage different dancing styles.

The above descriptions only deal with the perspective of the listener. But one can
imagine the musicians being listeners of their own music, both during the creating
process, as well as during the performance. The musician experiences his own music.
From this perspective Krueger’s principles of the experience of musical space would also
apply to the musician. The musical inner world meshes with the musical outer world.

Take for example Carsten Nicolai. What Nicolai seems to express through his
music, and through his visual works of art, is that the DJ has to juggles. A juggler has to
know the balls, she has to feel their weight, she has to feel the anticipation of the
audience, and she has to feel the rhythm created by the loops₁. When giving a juggling
performance, she cannot calculate all that will happen. She has to have a bodily
knowledge and feeling of what to do. In other words a sensorimotor understanding of
what is going on. The same goes for Nicolai. He has to know his loops₁, but he also has to
feel the rhythm. He has to feel when to start the next loop₁ and how long this loop₁
should last depends on his feeling for the audience. The loops₁ in the music, since they
have no fixed starting and ending, are thus part of all other feedback loops₂, including
interactions with the DJ, the audience and the performing space. Loops₁ entail loops₂.
They form a dynamical system.
4. Loops and Affordances as a Dynamical System

A dynamical system is a system of which the parameters of the constituents change over time. The DJ live set is a system that changes over time, due to the fact that its constituents (the audience, the music itself, and the DJ’s experience) also change over time due to interactions with the other constituents. Furthermore, these constituents are all dynamical systems in itself. Attempting to describe these relations through dynamical systems theory will provide insight on how constituents of the DJ live set relate and interact.

4.1 Affordances

One of the main problems in describing the relations between the constituents of the DJ live set in a dynamical system is to find a calculable unit in math. In previous sections we have discussed how the interactions between DJ, audience, music and space depend on atmosphere and emotions, as well as linguistic communication, but there is no way in physics to calculate or measure emotions or atmosphere in specific units. One way through which we might be able to come close to measuring atmosphere and emotions is by counting the number of the before mentioned affordances\(^{27}\). In order to better understand what affordances are, we will shortly discuss Anthony Chemero’s notion of affordances in *Radical Cognitive Science* (2009).

Chemero starts off by stating that if embodied cognitive science wants to avoid notions of mental representations, it must take perception to be direct. It suggests that people can pickup information from the environment directly, without complex processing, comparable to Krueger’s example of dodging the ball on the street. Krueger stated that what we perceive are spatial features of the world, and that sounds bear in them these spatial features. Chemero elaborates on what these features could encompass by discussing Gibson’s theory of affordances.

Chemero describes affordances as meaningful objects in our phenomenal world, perceived directly, which allow for behavior (2009: 136). In inferential theories of perception the meanings of objects reside inside our heads. For example: we perceive a sound through receptors in our ears which creates a certain sensation. Our brain then performs inference on the sensation, producing meaningful perception, as asserted by Meyer (1956: 81). In theories of direct perception, as discussed in 3.8, meaning is in the environment and does not depend on inference. “The animal simply gathers meaning from a meaning-laden environment” (2009: 135). According to Chemero, our environment contains meanings because it contains affordances, and these are meaningful to animals.

Chemero recognizes one major problem with this approach: if our environment contains affordances, then our environment cannot be merely physical. Chemero quotes Gibson, one of the founding fathers of the theory of affordances: “the affordances of the environment are what it offers to the animal, what it provides or furnishes, either

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27 This counting however, can never be exact, since affordances are in no ways 'objectively' perceivable. We do not know what affordances are in a non-theoretical situation. The approach is suggestive, but I feel it does elaborate on the interactions and helps describe these interactions.
for good or for ill” (Gibson, 1979: 127). According to Chemero, this seems to imply that an affordance is a resource offered by the environment for animals that have the ability to perceive and use it, and they are meaningful to animals because they provide opportunities for particular kinds of behavior (Chemero 2009: 136).

What this means might become clear once we try to identify affordances in music. Think of a beat. For example a beat with the kick-drum on each count of a 4/4 measure. Let’s think of ourselves as novice dancers, which implies that our bodies do not have advanced sensorimotor capabilities of perceiving and physically grasping beats. Since this beat is relatively simple and very common in western music, we are capable of dancing to this beat in a really simple fashion. Each beat can be seen as an affordance. We perceive the beat and it provides us with the opportunity for a particular kind of behavior: moving to this beat on each count. Now let’s think of a complex syncopated beat in a 5/4 measure, say with the kick on the 1 and 3 count, and on top of that a complex and syncopated snare drum pattern, and a fast high hat. As novice dancers, with our sensorimotor capabilities tuned to easy 4/4 patterns, we would not be able to grasp all the things going on in the rhythm. More advanced dancers might very well be able to dance to everything going on in the rhythm, since they have a more advanced sensorimotor understanding of the beat. They might be able to feel the patterns of the syncopated snares, as opposed to merely the kick on each count. They are in a greater state of rhythmical accordance with the music, and therefore the music provides them more opportunities or affordances for dancing behavior. And these kind of affordances seem likely to be counted. This can provide a unit for our dynamical system.

4.2 Affordances offered by the beat in a dynamical system
As stated before, a dynamical system is a system in which the constituents change over time. The interacting constituents we can identify in a DJ live set are the DJ, the music involving loops, and the dancing audience. The unit we will apply is the number of affordances. And in order to provide the best example, we will theoretically describe a DJ set involving a DJ who uses loops exclusively. Furthermore, the DJ live set will not have a starting point or ending, since these starting or ending points are not of great importance, as asserted by Pfadenhauer (2009).

In order to describe the relations in a dynamical systems formula, we need to give the constituents a symbol and elaborate on the way the affordances can be understood by us in each of the constituents that play a part in the interactions. First the dancing audience: \( X(t) \). Dance can be seen as a result from the affordances provided by the beat. When dancing wildly, it is likely that a great number of affordances is perceived and acted upon. The atmosphere is good. When almost not dancing, and some people standing still, looking bored or distracted, a low number of affordances provided by the music is perceived or acted upon. The DJ feels this response and will change the number of affordances in the music in order to accord and adjust to the audience. The DJ wants all audience members to be immersed in his music and to dance to it with passion.

The DJ is the second constituent: \( D(t) \). The DJ experiences her loops, and responds to it: she likes it, or she does not, which opts for a certain kind of behavior, for example changing the beat. In the case of the DJ it is hard to see how she responds to the affordances offered by the music. However, we can perceive when he changes the beat. The changing of the beat is an act that offers different affordances.

The music itself, with its loops, is the third constituent: \( M(t) \). We can analyze the beat in a musicological fashion and might be able to distinguish elements of the beat.
that could offer affordances to dancers, comparable to the role played by kick and snare drum in the example in 4.1. These affordances seem to offer a high degree of measurability, since we can count pulses. All these constituents change over time \( t \), hence the \( (t) \).

It seems as though we would need to incorporate the three constituents in one formula, however there is one interaction which is not possible: the dancing audience cannot physically alter the beat. Only the DJ can. This decreases the number of dynamical systems to two first order dynamical systems: (1) a dynamical system involving the DJ and his loops, and (2) a dynamical system involving the DJ and his loops as a single constituent and the audience on the other hand. The formulas describe the relations in changes over time. The formulas also involve two constants. These constants are the hard to grasp and difficult to measure emotions and the atmosphere that influence how and how many affordances are acted upon. They are significant. Furthermore they are dynamic systems in themselves, but in order to describe the other interactions clearly we will reduce these processes to a constant.

1):

\[
\frac{dM}{dt} + M(t) = a \cdot D(t) + b \frac{dD}{dt}
\]

2):

\[
\frac{dD}{dt} + D(t) = a \cdot X(t) + b \frac{dX}{dt}
\]

and since constants \( a \) and \( b \) also influence the DJ:

\[
\frac{dX}{dt} + X(t) = a \cdot D(t) + b \frac{dD}{dt}
\]

4.3 Classical music as a dynamical system

These formulas can also be applied to classical music performance. \( D(t) \) stands for the affordances provided by the composer, \( M(t) \) for the affordances in the music, and \( X(t) \) for the affordances perceived by the audience. However, in this case, the composer \( D(t) \) and the music \( M(t) \) are one and the same, since the composer decided on the fixed form of the music \( M(t) \) before the performance, which leads to the assertion that \( D(t)=M(t) \).

Since the music is a fixed preconfigured entity, we can conclude that \( dM(t) = 0 \). The affordances put in the music \( M(t) \) by the composer will not change in respect to the original idea. Besides that, the audience cannot influence the music \( M(t) \). The audience is separated from the performance through the fourth wall (Schiffman 2006). The audience is only allowed to passively perceive the affordances offered by the composer in a ,and therefore is not able to interact with the performers. We can imagine that in a perfect listening situation, the audience would fully understand the symphony, meaning that the audience seized all the affordances provided by the composer and the music. All of the above notions would lead to the following formula:

\[
M(t) = X(t)
\]
Since in classical music the time \( t \) has set limits, the graph of this formula would resemble a simple function, from \( t=0 \) to \( t=\text{lim} \). This function would always move towards an ending, because when \( t>\text{lim} \) then \( M(t)=0 \). The music has stopped and there are no affordances left to perceive. If \( t<0 \) then \( M(t)=0 \) as well. This indicates that the music has not yet started.

This leads to the conclusion that classical music performance is not a dynamical system, but a simplified functional approach to the performance, due to the fact that some possible interactions, such as the audience effecting the musicians, are insignificant. In a perfect world, they would not exist. Western art music performance effectively reduces the possibilities of interactions that could harm a perfect and flawless performance of the composer's original idea. The complexities of the interactions of a performance should be brought to a bare minimum, and merely the perfect transfer and performance of the ideal symphony with its affective message would remain.

This brings us to an interesting aspect of classical music: the metronome. Most sheet music involves an indication of the tempo in which the fixed musical movements have to be played. The structuring and limiting of the time makes the graph of the classical music formula a fixed entity as well. At any given time, one will know the tempo. John Cage acknowledged the structuring capacity of time by giving Stockhausen a wrist watch without hands, supposedly stating: “So that you may check the time that is not, at no time.”

4.4 Complications for empirical research
The previous two paragraphs seems to call for empirical research. The above formulas open up a window for a form of empirical research of social interactions and music, in which the gap between the world inside the music and outside the music is partly bridged. But can we do this within reasonable norms of reductionism? In the formulas describing EDM we have reduced dancing behavior to interactions with the DJ and the music, however there are of course other reasons for why one dances a certain way. We can imagine different affordances conflicting for attention and altering the loops. For example a nice girl at the bar might cause you to stop dancing or try even harder. A few tequilas too many and it messes up your perceptive abilities. In general one might experience emotions, that are disconnected from the constituents in these systems, but that do influence the way one behaves within these systems. Describing all related aspects to the systems would be impossible. One can try to pin down these aspects in the constants, but this might seem absurd due to the complex nature of these aspects. Describing them in more complex formulas is also a choice, but how many constituents and systems are involved? Who can tell. The main benefit of the formulas in this chapter is describe how music and behavior relate and interact in a loop, inside and outside, in contrast to idealized and simplified linear communication of classical music. But there are many questions to be answered when one wants to apply these ideas in practice.

4.5 Summary
The field of EDM exhibits mainly two types of approaches: the sociomusicological and the structural. Structural approaches look at the music in ways that resemble classical structural approaches. They attempt to theorize the musical structure of EDM.
Sociomusicology attempts to structure the the way people deal with EDM events, often employing classic sender → message → receiver models of communication, instead of communication as a loop. These approaches seem problematic: EDM does not have a clear point of starting and ending, and is highly unpredictable in its course. Structural and classic approaches seem invalid for the analysis of EDM (Butler 2006). EDM is not a fixed Platonian entity, similar to classical music, which complicates the application of structural classical approaches on EDM. EDM, in contrast to classical music, is highly interactive and flowing in nature, and involves feedback loops, instead of one way communication. EDM involves looped communication, which is altered by the audience, the DJ, and the music itself. A Platonian epistemology, dealing with fixed idealized forms, cuts, and one way communication is invalid, since the performance is an ever changing entity. EDM needs a different epistemology. Notions of situated and embodied cognition deal with changing particular situations. Krueger (2011) applies these theories to music, finding that the inner world of music cannot be separated from the outer world. The perception of musical structure is linked to social and space related events, and meshes in an experience called deep listening (Krueger 2011). The interactions between the inner and the outer musical world can be theoretically described in a dynamical system, with the DJ, the audience and the music as its constituents. This can be done by taking Chemero's (and Gibson's) notion of affordances as a perceivable and calculable unit. The consequential formulas describe the interactive and dynamic relations. When applied to classical music, they show that classical music is a linear one way directed movement, instead of a dynamical system.
5. Conclusion

5.1 Conclusion
As I have tried to show here, the analysis of classical music resides in a Platonian-like ontology. The perfect Beethoven symphony is approached as a theoretical idea, exists within a Platonian realm as a type of perfect and true knowledge, far away from interference from earthly and temporal matters. All we can do here on earth, is to strive for this idea, like Plato's carpenter attempting to build the perfect bed. Musicians have to perform the symphony as well as possible, in accordance with Beethoven's original idea. Musicologists try to pinpoint what Beethoven tried to bring across with his musical idea. The musical score, as the only objective link to Beethoven and his idea, functions as a Platonian law from which no one is allowed to deviate. It is always played from beginning to end, allowing the music to convey a never changing meaningful content. Because the music is treated in this fashion, it becomes a fixed entity. As a consequence of this approach, the symphony communicates in a classical sender → message → receiver model, from Beethoven's primordial idea to orchestra and audience in a linear directed movement. The audience passively sits still and consciously tries to grasp the symphony's meaning. The musical message is evoked or transferred through smaller fixed entities such as motifs, harmonies and melodies, that form the musical building blocks. These small fixed entities have a clear point of starting and ending, and are always played from beginning to end. They can be identified as cuts.

EDM is approached in a different manner. It does not lend itself for a Platonian realm, instead it is an interactive flowing process dealing with constantly changing particular events at a dance event, causing EDM to be a much more of a changing entity. In the most interactive forms of EDM, one could argue that the music cannot be considered a closed entity at all. EDM events do not have a clear point of starting or ending, therefore EDM does not deal with cuts. EDM uses loops, which theoretically never stop. The interactions occurring at EDM events encompass loop movements involving feedback by the DJ, the audience and the music itself. They form a dynamical system, in which each of the constituents shape each other. The musical structure depends on the audience response and the space, which in return determined by the musical form. The most interactive forms of EDM do not deal with fixed entities, which problematizes structural and Platonian approaches. The DJ has to juggle her loops, in order to deal with the changing and flowing circumstances during the EDM event. She needs an understanding and craftsmanship, part bodily and non-rational, of these changing circumstances.

Problems occur when one tries to apply methods of analysis deriving from a Platonian ontology of music to EDM. Many scientific types of knowledge derive from a Platonian ontology to some degree. These methods focus on universal elements, which causes scholars such as Butler (2006), Tagg (2000) and Demers (2010) to encounter a discrepancy between the musical form of EDM and the methods of analysis. Structural approaches and solfege seem to carry less descriptive meaning, and musical signification becomes problematic and vague to a much higher degree than it already was in classical music. Sociological approaches deal with the meaning of music, but in these approaches the meaning is often disconnected from the musical structure. Culture, to a high degree, is treated as a fixed universal entity that can be reflected through music. All these approaches derive from a slightly different ontology of music, but all have a Platonian
structure. When combined, as attempted by Butler, the approaches are always in addition to each other, instead of forming a new approach. The combination of the approaches does not grasp the nature of EDM due to fact that the Platonian epistemologies do not allow to grasp the flowing and changing particular circumstances that the DJ has to deal with.

EDM is primarily a bodily experience in which one wants to be immersed for pure joy. It is an a-rational music, because the repetitive nature of things makes people forget, as suggested by Mertens (1983) and Deleuze (1968). The DJ has to juggle her loops in order to create this interactive event taking place in the here and now. She is situated and has to deal with a dancing audience, the atmosphere and her own loops. She responds to an audience, that in return responses to the changes in the music. The inner musical space merges with the outer musical space. This is a dynamic process, in which a fluid and ever changing system takes shape, encompassing both the music and the social. If one wants to fully understand EDM, then the social dimension cannot be separated from the musical dimension, and the mind cannot be separated from the body. This calls for new approaches towards EDM, which deal with the situatedness of the DJ and the audience, and the effects hereof on the music itself.

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image on the front page: *Tape Loops* by Carsten Nicolai, [www.arrestedmotion.com](http://www.arrestedmotion.com)

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