Loop Aesthetics

Repetition in the Work of Bernhard Lang

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Thesis submitted to City, University of London
in partial fulfilment of the requirements for the degree of
Doctor of Philosophy

September 2019

City, University of London
School of Arts and Social Sciences
Department of Music

Writing has nothing to do with signifying.
It has to do with surveying, mapping, even realms that are yet to come.
– Gilles Deleuze and Félix Guattari, *Mille Plateaux* (1987/2014: 4-5)

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ACKNOWLEDGEMENTS

To my husband, Sebastian Mortelmans. You have been there for me every step of the way and encouraged me to chase even my wildest dreams. Thank you for your boundless optimism, love, and support. With you, everything is possible.

To my mother, Marie-Christine Minten, and my father, Jacques Dysers. You taught me not to fear the paths less travelled. Thank you for inspiring me to pursue a career in music, and to always reach for the stars.

To my supervisor, Newton Armstrong. You selflessly guided me along this incredible journey and believed in me even at times when I did not. Thank you for helping me find my voice, both within academia and beyond.

And finally, to the artist who inspired this work, Bernhard Lang. Thank you for welcoming me into your studio in Vienna during the cold winter months of 2017, and for replying to my emails with never-ending enthusiasm. Most of all, thank you for creating a musical world so intricate and rhizomatic that it would continue to fascinate me up to this very day.

ABSTRACT

This dissertation considers the different types and effects of musical repetition in the oeuvre of Austrian composer Bernhard Lang (b. 1957). The study aims to develop an understanding of Lang's 'loop aesthetics' in both analytical and philosophical terms. In that respect, the study seeks to contribute to the ongoing debates on the practices, aesthetics, analysis and philosophies of repetition in contemporary music, and, as such, to contribute to the emerging field of repetition studies. Drawing on recent scholarship from the fields of music theory, cognition, and psychology, as well as on post-structuralist philosophy, archival research, and interviews with the composer, the study addresses current debates about the experiences of musical repetition and develops new approaches to repetition as a concept in music-analytical discourse.

Repetition is traditionally thought of in terms of sameness, similarity, and stability. In most musical discourse, the phenomenon is commonly considered to indicate the mere re-iteration of a previously explored idea. To speak and think of musical repetition in such reductive terms, however, stands in conflict with the more permeable and fluid ways in which repeated objects appear to the listener in experience. This study takes a different view and argues that musical repetition is not a singular, but an inherently multifaceted phenomenon, which can embody many different shapes and forms, and engender a multitude of experiences. Concentrating primarily on the various types of displacement that can be effectuated by musical repetition in experience, the study argues repetition to be a space in which radical instabilities can occur.

Using Lang's *Monadologie IX: The Anatomy of Disaster* (2010) as an analytical case-study, the thesis establishes that repetition can give rise to radical instability and displacement, and that it can do so in different ways and on different hierarchical planes. Finally, the study asserts Lang as a Deleuzian artist-philosopher, whose musical oeuvre and idiosyncratic loop aesthetics give rise to philosophical notions of non-identity and non-essentialism, multiplicity, and becoming.

CHAPTER ONE
INTRODUCTION

Everyone repeats.
Some do it knowingly, others do it unknowingly.
I repeat deliberately.[2]
– Bernhard Lang (2014)

1.1 Bernhard Lang: loop composer

The music of Austrian composer Bernhard Lang (b. 1957) is difficult to fit into any one musical category. His work references a wide range of styles and sound worlds, sharing links with not just contemporary composition and free jazz, but also referencing turntablism, hip-hop, and DJ-culture. When asked about his inspirations, the composer self-situates his work between that of experimental filmmakers, such as Martin Arnold and Raphael Montañez Ortiz; writers and playwrights, such as Samuel Beckett and William S. Burroughs; mathematicians and computer scientists, such as John Conway and Stephen Wolfram; as well as philosophers, such as Gilles Deleuze and Gottfried-Wilhelm Leibniz.

The structural idea at the core of Lang's oeuvre is, however, a simple one: it is that of the loop. In a 2014 interview, the composer even describes himself as a 'repeat offender'; a 'loop composer' in the broadest sense of the term.[3] And indeed, an extensive engagement with repetition is a salient feature in Lang's aesthetic; one influenced in particular by the composer's interest in Deleuzian philosophy.

[2] Bernhard Lang (2014), in: Doris Weberberger, '"Ich wiederhole bewusst" – Bernhard Lang im Mica-Porträt'. Available at http://www.musicaustria.at/ich-wiederhole-bewusst-bernhard-lang-im-mica-portraet/ (accessed on 21 August 2018): 'Es wiederholen sowieso alle, nur die einen machen es bewusst, die anderen unbewusst – und ich wiederhole bewusst'. Throughout the dissertation, quotations from sources originally in German or French are presented in my own translations, except for when English translations were readily available.
[3] Bernhard Lang (2014), in: Daniel Ender, 'Das Verschwinden des Komponisten. Bernhard Lang und seine Arbeit am Steinbruch der Musikgeschichte', in: *Neue Zeitschrift für Musik* 4, p. 16.

The explicitly repetitive nature of Lang's oeuvre manifests itself in various forms and operates on different levels. In fact, repetition is a central feature both *within* and *between* Lang's musical works.

Within the confinements of an individual piece, Lang's obsessive repetition primarily functions as a syntactic device. It is repetition that generates the formal structure of these works, which typically consists of randomly juxtaposed units of repeating musical ideas, fragments or 'cells'. In terms of formal structure, Lang's works are straightforward, as any given musical cell is simply repeated a number of times until it is brusquely abandoned in favour of a completely different one (Figure 1.1). Formally, these works present themselves as a discontinuous series of parts – much like a Burroughsian cut-up. As such, Lang's pervasively repeating cells disrupt and abandon the more traditional, linear and teleological constructs of musical syntax, instead favouring endlessly looping, cyclical structures, which seem to lead to nothing but their own end.

However, Lang's fascination with repetition ventures far beyond its use as a syntactic device. In his works for the operatic stage, for instance, repetition is the primary narrative trope. In terms of storyline, these works centre around topics which are closely related to that of repetition, such as habit and addiction; memory and the loss thereof; recurrence, the double, and the doppelgänger. Repetition also regularly finds its way into the scenic actions of these works, as actors, musicians, and at times even dancers are asked to perform mechanically repetitive gestures from a choreographed score.

Lang's world is one of borrowing and appropriation, too. Although allusions and citations are prevalent throughout his entire oeuvre, the works contained in Lang's *Monadologie* series (2007-) are characterised by an ample and explicit use of musical borrowing. In fact, these works are best described as meta-compositions, in which pre-existing materials are explicitly re-worked and, as such, re-produced and re-presented.

Finally, Lang's concern with repetition is also echoed in his tendency to group his musical output into compositional cycles or series. No less than six ongoing series are currently featured on his work list. Each of them embodies an exploration of the same idea: that of repetition.[4] Thus, Lang's oeuvre exhibits a certain self-constraining movement, in which sameness always inhabits that which presents itself as novelty.

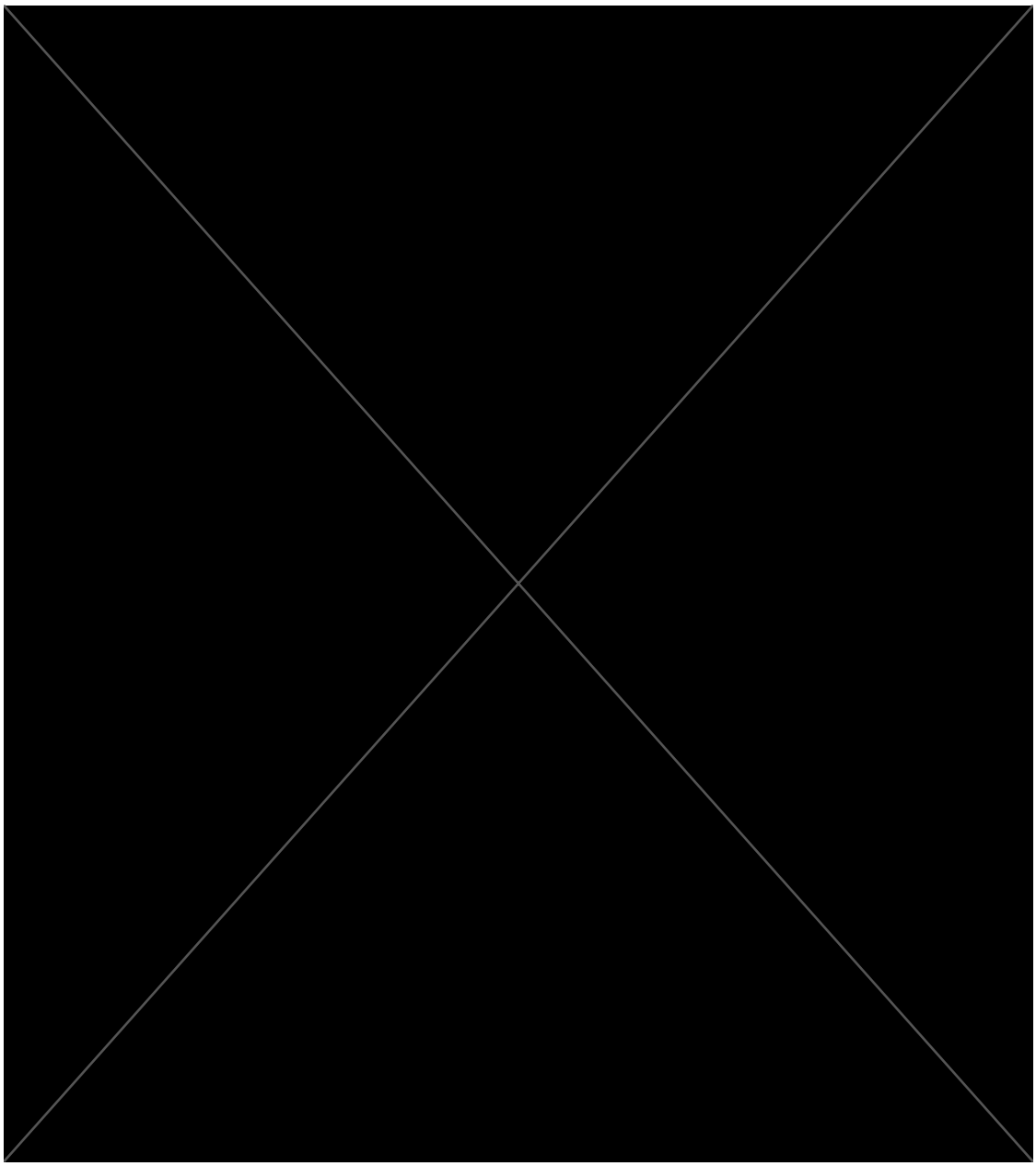

Figure 1.1: Repetition as a structural device in *Differenz/Wiederholung 12: Cellular Automata* (2003), bars 111-116

[4] In chronological order, these series are: (1) *Schrift* (1996-), (2) *Differenz/Wiederholung* (1998-), (3) *Das Theater der Wiederholungen* (2002-), (4) *Monadologie* (2007-), (5) *Hermetica* (2008-), and (6) *Game* (2016-).

In other words, repetition forms the very core of Lang's aesthetic. Indeed, repetition is nested in every possible corner of Lang's thoughts and works; inhabiting the oeuvre in many different shapes and forms, operating across its various structural levels, and effectuating a multitude of percepts and experiences. Existing entirely through and out of repetition, his artistic world is best described as one of 'loop aesthetics'.

1.2 The fine art of repetition

Lang is, of course, neither the first, nor the only composer to engage with repetition. In fact, repetition is one of music's most fundamental, cross-cultural and definitive features. As Victor Zuckerkandl observes, repetitiveness is *integral* to music:

> Music can never have enough of saying over again what has already been said, not once or twice, but dozens of times; hardly does a section, which consists largely of repetition, come to an end, before the whole story is happily told all over again.[5]

With examples of musical repetition ranging from the reciting tone in Gregorian chant to the principles of formal symmetry in Western classicism, the cyclical quasi-repetitions in African drumming and the layering of loops in Electronic Dance Music (EDM), the phenomenon penetrates virtually all areas and domains of music-making.

Moreover, repetition operates not only *within* musical works but also *between* them. Consider, for example, a musician incessantly repeating a difficult passage during a rehearsal, or the ways in which we, as listeners, happily put our favourite recordings on repeat, again and again. In fields such as music production, industry, education, and performance, notions of repetition and repeatability have proven to be vital too. Trying to explain the very concept of 'music', Peter Kivy even goes as far as to state that 'the fine art of repetition' was 'perhaps the closest to a "definition" of music [he] would

[5] Victor Zuckerkandl (1956), *Sound and Symbol: Music and the External World* (New York: Princeton University Press), p. 213.

ever come'.[6] Similarly, biologist William Tecumseh Fitch argues that repetition is one of the 'design features' of music – that is, one of music's most essential and constitutive characteristics.[7] Put differently, repetition is and always has been an integral component of music. As early as 1882, Ferdinand Praeger noted that no other art form is as inherently repetitive as music: '[w]ould ever a poet think of repeating half of his poem; a dramatist a whole act; a novelist a whole chapter?'.[8]

Nonetheless, the twentieth century saw composers pushing at its boundaries, either in explicitly placing repetition at the foreground of their musical creativity (e.g. in the cases of minimal, post-minimal and several strains of popular music), or in deliberately seeking to avoid it altogether (e.g. in the cases of integral serialism or aleatory music). John McGrath writes that:

> Although the repetition of notes, motives or modal areas has always been a formative structural device in music, it began to assume a considerable creative influence that is traceable during the twentieth century from rock to minimalism, and from rave to ambient music. Repetition in music moved beyond the pejorative towards apotheosis, as it became heralded as an end in itself, rather than being a maligned necessity.[9]

Moving into the 21st century, Elizabeth Margulis argues that music has become 'the canonical domain of repetition'.[10] In an era where digital recording technologies 'unquestionably make possible a degree and pervasiveness of repetition that was previously unheard of', Margulis claims that it has become virtually 'impossible to remain neutral or unreflective about repetitiveness'.[11]

Yet, although several composers have given repetition an explicit role in their work – consider, for instance, that of various minimalist and post-minimalist composers, EDM and hip-hop artists, turntablists and DJ's – Lang is the first composer to place the phenomenon so distinctly at the heart of his oeuvre, his thinking, and his general aesthetic. For Lang, repetition is not merely one of many,

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[6] Peter Kivy (1993), *The Fine Art of Repetition: Essays in the Philosophy of Music* (Cambridge: Cambridge University Press), p. 7.
[7] William Tecumseh Fitch (2006), 'The Biology and Evolution of Music: A Comparative Perspective', in: *Cognition* 100, pp. 173-215.
[8] Ferdinand Praeger (1882), 'On the Fallacy of the Repetition of Parts in the Classical Form', in: *Proceedings of the Royal Musical Association* 9/1, pp. 2-4.
[9] John McGrath (2017), *Samuel Beckett, Repetition and Modern Music* (New York: Routledge), p. 2.
[10] Elizabeth Hellmuth Margulis (2014), *On Repeat: How Music Plays the Mind* (New York: Oxford University Press), p. 4
[11] Ibid., p. 77.

but the single and primary focus of his artistic concern. Tangled up in a complex web of interconnections and functioning on multiple musical as well as extra-musical levels, repetition is the central trope that makes up Lang's idiosyncratic language.

1.3 Repetition studies

The heightened artistic interest in and emphasis upon repetition that has developed since the middle of the twentieth century has by no means been confined to strictly musical spheres. A similar trajectory can, for example, be found within the domain of literature, where writers and playwrights such as James Joyce, Alain Robbe-Grillet and Samuel Beckett offered repetition a privileged space in their artistic outputs. Similarly, in the domain of visual arts, artists such as Andy Warhol, Mark Rothko, and Bridget Riley gave repetition a new centrality in their works, to name but a few. In the world of dance, too, repetition became a central feature in the work of choreographers such as Pina Bausch and Anne Teresa De Keersmaeker. The list goes on. As John McGrath remarks, '[r]epetition's ubiquity in many artforms makes it a transmedial device, one that is shared amongst them, rather than belonging to one in particular'.[12] Similarly emphasising the heightened interest in repetition that seems to flourish within the contemporary arts scene and, by extension, in modern-day society, Ralf Beil writes that:

> In today's world, the loop seems to be virtually ubiquitous – whether in music, on the Internet [sic], in video art, or in hotel lobbies and living rooms, where monitors present the endless crackling of an open fire or fish swimming around in aquariums. At the same time, the self-contained circuit, the endless loop, has been an essential topos of cultural history and philosophy since antiquity.[13]

In recent years, repetition has also become an important theme within academia; and especially within the humanities, where it has emerged as a central area of inquiry in disciplines as varied as

[12] John McGrath (2017), *Samuel Beckett, Repetition and Modern Music* (New York: Routledge), p. 2.
[13] Ralf Beil (2017), 'A Loop Seldom Comes Alone', in: Ralf Beil (ed.), *Never-Ending Stories: The Loop in Art, Film, Architecture, Music, Literature, and Cultural History* (Berlin: Hatje Cantz Verlag), p. 14.

sociology, political science, linguistics and philosophy. Despite the apparent transmediality and ubiquity of repetition, however, it does not raise the same questions and contexts in each discipline. 'On the contrary', writes Sarah Gendron, 'contemporary understandings of repetition serve to highlight divergence'.[14] Consider, for instance, repetition in the field of philosophy. In the work of Sigmund Freud, the tendency to repeat is described as an essential component of the human psyche, materialising in the shape of habits, memories, and ultimately, in the self-destructive force of the 'death drive'. For Friedrich Nietzsche, then, who writes about repetition only parenthetically, the idea of the 'eternal return' is one of the cornerstones of philosophical nihilism. For Ferdinand de Saussure, repetition is a prerequisite in the formation of the linguistic sign. In the works of post-structuralist thinkers Jacques Derrida and Gilles Deleuze, then, repetition is a means of destabilising philosophical notions of identity and being. A similar divergence of questions and contexts surrounding repetition can be found across the several domains of music studies, in which repetition as an area of inquiry has been on the rise since the early 1990s.

As an area of academic inquiry, repetition has particularly been embraced by the fields of music cognition and psychology. Bob Snyder, in his research on music and memory, for instance, identifies repetition and rehearsal to be primary mnemonic devices.[15] David Huron also mentions repetition *ad passim* in his research on music and the psychology of expectation, as he draws links between musical repetition and the two opposing cognitive responses of reduced as well as increased pleasure.[16] In 2014, Elizabeth Margulis was the first to publish an in-depth inquiry into the cognitive significance of repetition in music, thereby focusing more specifically on how repetition influences our musical understanding and appreciation.[17]

Repetition has also become an important issue within the field of popular music studies and, by extension, the field of musicological inquiry that focuses on minimalist music. In these domains, the emphasis has largely been on repetition as a structural device, and on the ways in which repetition

[14] Sarah Gendron (2008), *Repetition, Difference, and Knowledge in the Work of Samuel Beckett, Jacques Derrida and Gilles Deleuze* (New York: Peter Lang Publishing), p. 3.
[15] Bob Snyder (2000), *Music and Memory: An Introduction* (Cambridge, MA: The MIT Press).
[16] David Huron (2006), *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge, Massachusetts: The MIT Press).
[17] Elizabeth Hellmuth Margulis (2014), *On Repeat: How Music Plays the Mind* (Oxford: Oxford University Press).

affects perception and experience.[18] Repetition also features as a central argument in Robert Fink's critical comparison between American minimal music and capitalist marketing strategies.[19]

In music theory and analysis, repetition has also recently made its entrance as a distinct area of inquiry. The first step in this direction was taken by Adam Ockelford in his claim that imitation – and thus, by extension, repetition – is the underlying principle of all musical structure.[20] Ockelford's so-called 'zygonic' theory of musical repetition focuses on the ways in which imitative structures are perceived. The main emphasis of Ockelford's argument is on the role of repetition in highlighting the salience of particular elements within the musical fabric. More recently, Dora Hanninen has found that 'if the importance of repetition for perception in general and music analysis in particular is widely understood, it has yet to play a central role in a theory of music analysis'.[21] With her theory of recontextualisation, which focuses on the differing perception of repeated musical elements as they appear within different musical contexts, Hanninen has currently put herself at the forefront of theoretical inquiry into musical repetition. Crucially, Hanninen's work on repetition highlights the idea that the phenomenon can engender a multitude of effects in both perception and cognition.

Although repetition has clearly gained increased popularity as an area of inquiry over the past few decades, the emergent field of repetition studies is still in its infancy. For example, the aesthetical and philosophical potentials of repetition as a phenomenon within the field of music have yet to spark academic interest. Up to this day, the discourse that surrounds musical repetition as both a concept and a phenomenon within the field of music studies, remains diverse, heterogeneous, and above all, limited.

[18] See, for instance: Richard Middleton (1983), '"Play It Again Sam": Some Notes on the Productivity of Repetition in Popular Music', in: *Popular Music. Volume 3: Producers and Markets* (Cambridge: Cambridge University Press), pp. 235-270; Olivier Julien and Christophe Levaux (eds.) (2018), *Over and Over: Exploring Repetition in Popular Music* (New York & London: Bloomsbury Academic).
[19] Robert Fink (2005), *Repeating Ourselves: American Minimal Music as Cultural Practice* (Berkeley & Los Angeles: University of California Press).
[20] Adam Ockelford (2005), *Repetition in Music: Theoretical and Metatheoretical Perspectives* (London: Ashgate).
[21] Dora A. Hanninen (2012), *A Theory of Music Analysis: On Segmentation and Associative Organisation* (Rochester: University of Rochester Press), p. 33.

1.4 Aims, objectives, and methods

This study aims to develop an understanding of Lang's 'loop aesthetics' in both analytical and philosophical terms. In that respect, the study seeks to contribute to the ongoing debates on the practices, aesthetics, analysis and philosophies of repetition in contemporary music, and, as such, to contribute to the emerging field of repetition studies.

Dora Hanninen argues that '[t]o use repetition strategically, [one] must be able to recognize repetition in various forms, ranging from equivalence to similarity (equivalence plus transformation) in one and multiple dimensions'.[22] As such, one of the main objectives of this study is to identify and assess the different types of repetition that are activated in Lang's oeuvre, as well as the different effects they engender in terms of listening experience. Chapter 2 looks at the various ways in which repetition is activated in Lang's oeuvre; from exact acoustic repetition in the *Differenz/Wiederholung* series, to the composer's practice of grouping his works together in large-scale series. Although repetition is understood here in its broadest sense, the study does not concern issues that involve the *repeatability* of musical works, such as repeated listening, technological reproduction, nor issues of performance or programming. Instead, the focus will be on the concept and phenomenon of repetition as it operates *within* Lang's oeuvre – that is, as it works through his artistic thinking, his work, and his general aesthetic.

Consequently, this dissertation also evaluates the impact of Deleuzian philosophy on Lang as a composer. In doing so, a particular focus is placed on the Deleuzian notion of 'repetition' and the ways in which it echoes in, and works through Lang's music and thinking. More specifically, Chapter 2 will present Lang's oeuvre to be a complex, fluid and 'rhizomatic' network of interrelationships; of short-circuits created between seemingly disparate elements – as such, revealing the oeuvre as a Deleuzian project in itself. In that respect, the study connects with and builds upon a vast body of recent scholarship dedicated to building interconnections between Deleuzian philosophy and the broader domain of music – a trend described by Sally Macarthur, Judy Lochhead and Jennifer Shaw

[22] Ibid., p. 33.

as a 'Deleuzian turn' in music studies.[23] The purpose of this component of the study is, however, not to prove that Lang's oeuvre *is,* or *is not,* in fact, Deleuzian. Rather, its purpose is to assess either claim.

The second central concern throughout this study is to develop and illustrate different ways of thinking about musical repetition. More specifically, the thesis argues that repetition is not necessarily the synonym to sameness, similarity, and stability it is so often automatically presumed to be. Instead, the study makes the case for repetition as a space in which radical instabilities and displacements can occur. Brian Hulse remarks that '[r]ethinking musical repetition is a challenge because [it] is almost universally excised by established concepts in contemporary music theory'.[24] He explains:

> [T]he primary problem with traditional concepts of difference is that they relate all difference to identity, both in the sense of difference being the *opposite* of identity as well as to the assumption of an identity *of* all difference itself. From the first proposition flows a corresponding demotion or collapse of all repetition into identity, the repetition of the same. Not only do repetitions become unified case by case, but there is also a general identity to all repetition in the world. We lose not only the particularity of repetition in various domains (repetition in one domain is equated with repetition in another), but also the particularity of each individual repetition in a series. In music this loss, which is usually cited as establishing unity or an identity, results in masking or forgetting all the dynamic play of differences that occur in musical repetition. Repeating textures, we are told, denote a lack of information. Nothing happens.[25]

Chapter 3 aims to challenge those preconceived notions by arguing that musical repetition is not a singular, but an inherently multifaceted phenomenon. After assessing the terminologies currently available for speaking of, and thinking about repetition in music, the chapter distinguishes between the effects and implications of repetition understood as sameness on the one hand (i.e. 'exact' or

[23] Sally Macarthur, Judy Lochhead and Jennifer Shaw (eds.) (2016), *Music's Immanent Future: The Deleuzian Turn in Music Studies* (New York: Routledge). See also, amongst others: Ronald Bogue (2003), *Deleuze on Music, Painting, and the Arts* (London & New York: Routledge); Michael Gallope (2008), 'Is There a Deleuzian Musical Work?', in: *Perspectives of New Music* 46/2, pp. 93-129; Ian Buchanan and Marcel Swiboda (eds.) (2010), *Deleuze and Music* (Edinburgh: Edinburgh University Press); Brian Hulse and Nick Nesbitt (eds.) (2010), *Sounding the Virtual: Gilles Deleuze and the Theory and Philosophy of Music* (Surrey: Ashgate); Edward Campbell (2013), *Music After Deleuze* (London & New York: Bloomsbury Academic); Joe Panzner (2015), *The Process That Is the World: Cage/Deleuze/Events/Performances* (London & New York: Bloomsbury Academic); Pirkko Moisala et. al. (eds.) (2017), *Musical Encounters with Deleuze and Guattari* (New York & London: Bloomsbury Academic, 2017).
[24] Brian Hulse (2010), 'Thinking Musical Difference: Music Theory as Minor Science', in: Brian Hulse and Nick Nesbitt (eds.), *Sounding the Virtual: Gilles Deleuze and the Theory and Philosophy of Music* (Surrey: Ashgate), p. 32.
[25] Ibid., p. 49.

'literal' repetition), and of repetition understood as similarity on the other (i.e. 'near-literal' or 'varied' repetition). As a means of accounting for and distinguishing between the different types and effects of musical repetition at work within Lang's oeuvre, the chapter introduces two new concepts: 'microvariation' and 'drifting repetition'.

Thirdly, the study sets out to evaluate, assess, and rethink the role of repetition in music analysis. In that respect, this dissertation follows the line of reasoning posited by Dora Hanninen, who writes that '[w]hereas in much music analysis the identification of repetition serves as a goal and an endpoint, here repetition becomes a starting point [for analytical inquiry]'.[26] Concentrating on the various types of displacement that can be effected by repetition in experience, the thesis focuses primarily on repetition in Lang's ongoing *Monadologie* series (2007 –). In these works, pervasive near-literal repetition gives rise to the cognitive experiences of drift, disorientation and getting lost. Chapter 4 is conceived as an analytical case-study and focuses on the opening movement of Lang's third string quartet, *Monadologie IX: The Anatomy of Disaster* (2010). Taking the experience of getting lost in the act of listening as a starting point for analysis, the chapter investigates how, where, and to what means musical repetition works as a mechanism of drift and disorientation in this work. Ultimately, Chapter 4 reveals how repetition is capable of effectuating radical instabilities as it unfolds across the several different hierarchical planes of the musical work.

Finally, Chapter 5 draws a number of conclusions in relating the use of repetition in Lang's oeuvre back to a broader socio-cultural shift towards fluidity and non-essentialism. The main argument here is that Lang's oeuvre gives rise to notions of instability, difference and multiplicity (as opposed to notions more routinely associated with repetition, i.e., stability, unity and identity). To put it in the words of Edward Campbell, the oeuvre is shown to pose 'musical questions that are not [reducible] to identitarian modes of thought'.[27]

This dissertation is the first extended study of Lang's work. Although the German-speaking world showed some early signs of academic interest in his work, the emphasis there has largely been on

[26] Dora A. Hanninen (2004), 'Feldman, Analysis, Experience', in: *Twentieth-Century Music* 1/2, p. 229.
[27] Edward Campbell (2013), *Music After Deleuze* (London & New York: Bloomsbury Academic), p. 33.

the works contained in the *Differenz/Wiederholung* series.[28] The opposite is true for the more recent and more limited academic interest in Lang's oeuvre stemming from the English-speaking world, which, thus far, has exclusively focused on his work for the operatic stage.[29] No previous studies have assessed Lang's *Monadologie* series, even though the project has been ongoing since 2007 and currently contains just under forty large-scale compositions.[30] More importantly, this study is the first to explicitly recognise the absolute centrality of repetition in Lang's work.

In fact, the current discourse on Lang's music is largely limited to the numerous writings, commentaries, interviews and lectures the composer himself offers about his music. Bundled and made widely available through his personal website, these reflections on his work are rather theoretical in nature and, as such, betray somewhat of an academic intention.[31] Nonetheless, Lang's writing is best understood as part of the oeuvre in itself. Not unlike Gilles Deleuze's idiosyncratic style of writing, Lang assumes a lot of prior knowledge from his readers. Continuously reiterating a variable set of philosophical, socio-political and aesthetic concepts, the composer associates himself with an extensive and ever-changing set of philosophers and artists. As such, Lang's rhetoric is also similar to that of John Cage, in that his ideas are themselves subject to an ongoing process of difference and repetition. To put it in the words of Joe Panzner: 'a handful of complex themes are presented and returned to again and again, subtly reworked or decontextualized, tested for variations, extensions, and sometimes mutations'.[32] Although Lang's assorted writings are a valuable

[28] Particularly noteworthy in this respect is the 2010 issue of *MusikTexte: Zeitschrift für Neue Music*, which featured Lang as one of two central composers (the second being Annea Lockwood). The issue comprised of four original articles about Lang's music, written by four different authors: (1) Reinhard Kager (2010), 'Geschichte als Wiederkehr des Ähnlichen', in: *Musiktexte: Zeitschrift für Neue Musik* 126, pp. 76-80; (2) Björn Gottstein (2010), 'Wiederholung als dialektisches Moment: Musikalisches Kreisen und generierte Loops in der Musik von Bernhard Lang', pp. 69-70; (3) Lothar Knessl (2010), 'Granulierte Klanggebilde: Wie Berhard Lang mit Zelle und Computer umgeht', pp. 61-63; and (4) Sabine Sanio (2010), 'Improvisieren, Komponieren, Schreiben. Über die Musik von Bernhard Lang', pp. 63-68. The only exception here is my own 2014 article, which focuses on Lang's operatic work *I Hate Mozart*: Christine Dysers (2014), 'Mozart als Gegenstand postmoderner Kritik. Das Wiederholungskonzept in Bernhard Langs I hate Mozart (2006)', in: *Musik und Ästhetik* 18/72, pp. 5-25.

[29] See: Lauren Redhead (2014), 'Quotation, Psychogeography, and the 'Journey Form' in the Music Theatre of Bernhard Lang and Chico Mello', in: *Contemporary Music Review* 33/2, pp. 148-166; and Laura Tunbridge (2016), 'Loving Mozart: Bernhard Lang, "Ach, ich fühl's" (Grace Moor), I Hate Mozart, Act I', in: *Cambridge Opera Journal* 28/2, pp. 271–275. Again, the only exception here is my own 2015 article which focuses on Lang's *Monadologie* series: Christine Dysers (2015), 'Re-Writing History: Bernhard Lang's Monadologie Series (2007-present)', in: *Tempo* 69/271, pp. 36-47.

[30] See Appendix I for a list of works currently contained in the *Monadologie* series.

[31] See: http://members.chello.at/bernhard.lang/publikationen.htm

[32] Joe Panzner (2015), *The Process That Is the World: Cage/Deleuze/Events/Performances* (London & New York: Bloomsbury Academic), p. 30.

source in providing both a way into the oeuvre and an insight into his compositional practice, they demand a certain wariness and critical distance from their readers.

As the first composer to put repetition so explicitly at the forefront of their artistic oeuvre, their thinking, and their music, Lang's 'loop aesthetics' reflect a broader socio-cultural tendency, or even urge, towards repetition. Ralf Beil writes that:

> Today, the endless loop oscillates between the experience of massive uniformity, the ecstatic cancellation of time, and ambivalent permanent excitation. Whether assembly-line work or marketing, techno music or chatting on the Internet [sic]; in all areas of media and life, endless loops are reality. [...] [T]his, however, has far-reaching consequences even for politics and the stability of the global economy and social system.[33]

Similarly, Robert Fink argues that 'as a cultural practice, [an] excess of repetition is inseparable from the colourful repetitive excess of post-industrial, mass-mediated consumer society'.[34] Lang profiles himself as a composer who at the same time celebrates and critiques this. As such, this study provides a timely inquiry into repetition as a current and multifaceted topic both within Lang's artistic world and beyond it.

Finally, it must be acknowledged from the outset that this study does not claim to be exhaustive. For example, the nature and scope of this dissertation do not allow sufficient space to analyse any of Lang's works in their totality. The political implications of Lang's practice of musical borrowing do not form a central focus here either. Although touched upon briefly over the course of this dissertation, Lang's approach to sampling and appropriation could certainly provide the basis for further research and debate.

[33] Ralf Beil (2017), 'Squared Infinity: A Brief History of the Loop in Art, Film, Architecture, Music, Literature, and Cultural History', in: Ralf Beil (ed.), *Never-Ending Stories: The Loop in Art, Film, Architecture, Music, Literature, and Cultural History* (Berlin: Hatje Cantz Verlag), p. 39.
[34] Robert Fink (2005), *Repeating Ourselves: American Minimal Music as Cultural Practice* (Berkeley & Los Angeles: University of California Press), p. x.

CHAPTER 2
THE RHIZOMATIC OEUVRE

> We're tired of trees. We should stop believing in trees, roots, and radicles.
> They've made us suffer too much. All of arborescent culture is founded on them, from biology to linguistics.
> Nothing is beautiful or loving or political aside from underground stems and aerial root,
> adventitious growths and rhizomes.[35]
> – Gilles Deleuze and Félix Guattari (1987)

2.1 Deleuze as an awakening

Since the late 1990s, Lang's aesthetic has been explicitly driven by philosophical reflection. While claiming to be 'a philosophically-influenced composer' who derives 'many of [his] inspirations from philosophical thinking', the composer has a strong tendency to self-situate his work between that of philosophers such as Gottfried Wilhelm Leibniz, Henri Bergson, Friedrich Nietzsche and Søren Kierkegaard.[36] The work of French post-structuralist philosopher Gilles Deleuze is an especially frequent touchstone. In fact, Lang's engagement with repetition has been particularly influenced by his interest in Deleuze's philosophical project.

For Lang — who holds an MA degree in philosophy from the University of Graz and who even briefly embarked on a PhD project on Wittgenstein before giving it up in favour of his studies in composition — a general interest in philosophy was not by any means novel. In 1995, however,

[35] Gilles Deleuze and Félix Guattari (2014), *A Thousand Plateaus: Capitalism and Schizophrenia*, translated by Brian Massumi (London: Bloomsbury Academic), p. 15. Originally published in 1987 *as Mille Plateaux: Capitalisme et Schizophrenie II* (Paris: Les Éditions de Minuit), pp. 23-24: 'Nous sommes fatigués de l'arbre. Nous ne devons plus croire aux arbres, aux racines ni aux radicelles. Nous en avons trop souffert. Toute la culture arborescente est fondée sur eux, de la biologie à la linguistique. Au contraire, rien n'est beau, rien n'est amoureux, rien n'est politique, sauf les tiges souterraines et les racines aériennes, l'adventice et le rhizome'.
[36] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).

Lang's initial encounter with Deleuzian thought marked a major turning point in his artistic development. Lang comments:

> [H]aving studied mostly the Austrian school of Neo-positivism, Deleuze came as a shock for me, leading to revolutionize my musical thinking and restarting the conflict with the Stuttgart/Darmstadt school.[37]

The so-called 'shock-effect' Lang claims Deleuze's book to have induced can for a large part be explained by the composer's schooling in the German-Viennese tradition of neopositivism or logical empiricism. This philosophical movement took a radically anti-metaphysical stance and shared a common interest in scientific methodologies, such as logic and mathematics. Neopositivism had flourished in both Europe and the United States between the early 1920s and late 1950s, making it one of the dominant schools of Western thought until at least the late 1960s.

Deleuze's philosophical project, on the other hand, was of a very different kind. In an attempt to overturn the essentialist reign of 'identity', Deleuze's philosophy of difference was one of fluidity, openness, and interconnectedness. With the philosopher at one point even describing himself as 'a pure metaphysician', Deleuze's way of thinking was a radical shift away from the much more rigid and analytical models of thought that had previously been advanced by the German-Viennese neopositivist traditions in which Lang had been schooled.[38] Lang explains:

> The key issue [for me] was, in fact, more the method than the content. The Deleuzian method is a very, very un-German approach to the process of thought, and Deleuzian thinking is a tentative thinking, a circular thinking, that does not move towards a goal in a linearly tractable, dialectical sense. Rather, it is a circling around, a putting in perspective, a leaving of, and a returning to the topic. And that really interested me as a method: that the result of the thinking process is less interesting than the process itself, and that new light is shed on the topic during this erratic wandering around, that constitutes the method of research and exploration. Deleuze does this in a very, very playful way, in a very poetic way, which prompted me to reassess the traditional interpretation of the concept and the context that is 'repetition'.[39]

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[37] Bernhard Lang (2015), 'The Difference Engines: Singing Deleuze'. Available at https://www.researchcatalogue.net/view/236855/236856 (accessed on 6 March 2019).
[38] Gilles Deleuze (1999), in: Arnaud Villani, *La guêpe et l'orchidée: Essai sur Gilles Deleuze* (Paris: Éditions Belin), p. 130: 'Je me sens pur métaphysicien'.
[39] Bernhard Lang, cited in: Reinhard Kager (2010), 'Geschichte als Wiederkehr des Ähnlichen', in: *Musiktexte: Zeitschrift für Neue Musik* 126, p. 76: 'Der Angelpunkt war de facto mehr die Methode als der Inhalt. Die Deleuzesche Methode ist

This chapter sets out to trace the impact of Deleuze's philosophical project on Lang's oeuvre. In doing so, a particular focus is placed on the Deleuzian concept of 'repetition' and the ways in which it echoes in and works through this oeuvre.

After providing the reader with a brief outline of the Deleuzian project and its three key concepts of 'identity', 'difference', and 'repetition', the chapter will explore the ways in which Deleuze's philosophical work, and, more specifically, the different notions of repetition it activates, reveals itself throughout Lang's musical output. In particular, three of Lang's large-scale and ongoing compositional series will be under scrutiny here: (1) the *Differenz/Wiederholung* series; (2) the *Theater der Wiederholungen* series; and (3) the *Monadologie* series.[40] Ultimately, the chapter will present Lang's oeuvre to be a complex, fluid and 'rhizomatic' network of unexpected interrelationships; of short-circuits between seemingly disparate elements. As such, the chapter will reveal Lang's oeuvre to be a Deleuzian project in itself.

2.2 Differential ontology: theoretical framework and key concepts

Between 1953 and 1993, the French post-structuralist thinker Gilles Deleuze developed a body of work that would cause 'a revolution in philosophy'.[41] In an attempt to overturn the essentialist tradition of essence and identity, Deleuze postulated a philosophy of difference 'in which the concept of multiplicity replaces that of substance'.[42] Freeing the concept of 'difference' from the

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eben eine sehr, sehr undeutsche Herangehensweise an einen Denkvorgang, und das Deleuzesche Denken ist ein tastendes Denken, ein kreisendes Denken, das nicht in einem linear verfolgbaren dialektischen Schrittsystem sich auf ein Ziel hinbewegt, sondern es ist ein Umkreisen, Relativieren, Abspringen, Wieder-zum-Thema-Zurückkommen. Und das hat mich eigentlich als Methode interessiert: dass einen eigentlich das Ergebnis des Denkprozesses nicht so sehr interessiert, sondern mehr der Prozess an sich, und dass man in diesem erratischen Herumirren in Form eines Forschens und Erforschens den Begriff neu durchleuchtet. Das geschieht bei Deleuze in einer sehr, sehr spielerischen Weise, in einer sehr poetischen Weise, die mich dazu veranlasst hat, diese herkömmlichen Besetzungen des Begriffs "Wiederholung" und den Kontext "Wiederholung" neu zu besetzen'.

[40] The other three series that comprise Lang's oeuvre up to date (the *Schrift* series; the *Hermetica* series, and the *Game* series) will not be considered here and fall beyond the scope of this study.

[41] James Williams (2013), *Gilles Deleuze's Difference and Repetition: A Critical Introduction and Guide* (2nd edition), (Edinburgh: Edinburgh University Press), p. 1.

[42] Daniel Smith and John Protevi (2015), 'Gilles Deleuze', in: Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Winter Edition). Available at https://plato.stanford.edu/archives/win2015/entries/deleuze/ (accessed on 22 March 2017).

reign of 'identity' and 'representation', Deleuze generated a philosophy of flux and fluidity in which he encouraged the reader to venture beyond the traditional notions of unity and coherence, and instead, to think chaotic complexity, divergence and decentring.

Chronologically as well as methodologically, it is the 1968 publication *Différence et répétition* that forms the cornerstone of Deleuze's philosophical project.[43] The book marked a significant turning point in Deleuze's writing. His earlier publications mainly consisted of critical readings of other philosophers, such as, for example, of Hume (*Empirisme et subjectivité*, 1953), Nietzsche (*Nietzsche et la philosophie*, 1962), Kant (*La philosophie critique de Kant*, 1963), and Bergson (*Le Bergsonisme*, 1966). In *Différence et répétition*, however, Deleuze postulates his very own model of thought and cultivates his 'philosophy of difference'. The theory outlined here also laid the foundation from which Deleuze would later develop a number of more practical and interdisciplinary works, such as, for example, his two books on cinema (*Cinema 1: L'image-mouvement*, 1983; and *Cinéma 2: L'image-temps*, 1985), his works on Foucault (*Foucault*, 1986) and Leibniz (*Le Pli: Leibniz et le Baroque*, 1988), and the four books he co-authored with Félix Guattari: *L'Anti-Œdipe* (1972), *Mille Plateaux* (1980), *Kafka: pour une littérature mineure* (1986) and finally, *Qu'est-ce que la philosophie?* (1991).[44]

Overall, Deleuze's main philosophical endeavour can best be understood as a metaphysical inquiry into the nature of identity. In that inquiry, the concept of 'repetition' takes a central stage. Arguing that 'difference inhabits repetition', Deleuze suggests that the exact repetition of the same is impossible.[45] For how can something be the same in a different point of time and in a different context? Liberating the concept of 'repetition' from its identitarian notions of sameness and

[43] James Williams (2013), *Gilles Deleuze's Difference and Repetition: A Critical Introduction and Guide* (2nd edition), (Edinburgh: Edinburgh University Press), p. 33.
[44] The four volumes Deleuze co-authored with Félix Guattari create a peculiar problem for anyone dealing with either of their oeuvres. Written in a style that is distinctly different from their individual projects, it is impossible to filter out Deleuze's from Guattari's ideas in these collaborative ventures. Confusing the matter even further is the fact that both authors freely expanded and commented on ideas from these four volumes in their later individual publications, with each of them treating the co-authored works as their own. As there is no straightforward solution to the issue, I have opted to treat Deleuze's individual publications and the four volumes he co-authored with Guattari as constituting of one single body of work.
[45] Gilles Deleuze (2011), *Difference and Repetition,* translated by Paul Patton (London: Continuum), p. 97.

similarity, Deleuze develops an ontology of difference, change and becoming, in which identity exists not as a stable entity, but as a seething and chaotic flux.[46]

Deleuze's body of work encompasses a dense patchwork of concepts, comprising specialist terms borrowed from other philosophers as well as conceptual neologies. In their 1991 essay *Qu'est-ce que la philosophie?*, Deleuze and Guattari reflect on the difference between philosophy and science, claiming that science deals with functions and propositions, whereas they conceive of philosophy as the engagement with concepts:

> The Greeks might seem to have confirmed the death of the sage and to have replaced him with philosophers – the friends of wisdom, those who seek wisdom but do not formally possess it. But the difference between the sage and the philosopher would not be merely one of degree, as on a scale: the old oriental sage thinks, perhaps, in Figures, whereas the philosopher invents and thinks the Concept. [...] The philosopher is expert in concepts and in the lack of them. He knows which of them are not viable, which are arbitrary or inconsistent, which ones do not hold up for an instant. On the other hand, he also knows which are well formed and attest to a creation, however disturbing or dangerous it may be. [...] The philosopher is the concept's friend; he is potentiality of the concept. That is, philosophy is not a simple art of forming, inventing, or fabricating concepts, because concepts are not necessarily forms, discoveries, or products. More rigorously, philosophy is the discipline that involves concepts.[47]

Although most of these concepts are essentially developing variations on the same core idea of 'difference in itself', they are often deliberately left open to reflection, interpretation and appropriation. In other words, Deleuzian terminology does not consist of simple and easily definable key terms. Instead, mirroring his philosophical conviction that life exists as a continuous flux, Deleuze's writing is similarly mobile and fluid, full of unexpected connections and hidden pathways. The philosopher explains:

> I make, remake and unmake my concepts along a moving horizon, from an always decentered centre, from an always displaced periphery which repeats and differentiates them.[48]

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[46] Eugene W. Holland (1997), 'Marx and Poststructuralist Philosophies of Difference', in: *The South Atlantic Quarterly* 96/3, p. 532.
[47] Gilles Deleuze and Félix Guattari (1994), *What Is Philosophy?*, translated by Hugh Tomlinson and Graham Burchell (New York: Columbia University Press), pp. 3-5.
[48] Gilles Deleuze (2011), *Difference and Repetition,* translated by Paul Patton (London: Continuum), p. xix.

According to Claire Colebrook, this renders an 'almost circular quality' to Deleuze's writing: 'once you understand one term you can understand them all; but you also seem to need to understand all the terms to even begin to understand one'.[49] The following sections, therefore, shed light on the three concepts that form the central pillars of Deleuze's philosophical project: those of 'identity', 'difference', and 'repetition'. These three concepts will later prove to be of vital importance to Lang's musical oeuvre.

2.2.1 Identity

Intuitively, we often speak of identity in empirical terms, such as the identical, the same, the not-different. A similar philosophical model, of thinking identity in terms of essence and unity can be rooted back to the work of the pre-Socratic Greek philosopher Parmenides. In claiming that being is timeless, indivisible and unchangeable, he was the first to situate identity as an eternal and static entity, at the very basis of philosophical thought.[50]

Later models of thought, such as, amongst others, Plato's idealism and Aristotle's epistemology, followed in Parmenides' footsteps and similarly held notions of identity and representation at their very core. The shared understanding of identity as a unified whole and a coherent totality gave rise to the development of a long-standing tradition of philosophical essentialism, with many philosophers actively locating the notion of identity in self-contained sets of properties or characteristics, and attributing a notion of underlying and unchanging 'essence' to the world and the ways in which we perceive it.[51] According to Deleuze, such a practice of identity-thinking has dominated Western philosophy for centuries:

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[49] Claire Colebrook (2002), *Understanding Deleuze* (Crows Nest: Allen & Unwin), p. xviii.
[50] Vernon W. Cisney (n.d.), 'Differential Ontology', in: *Internet Encyclopedia of Philosophy: A Peer-Reviewed Academic Resource*. Available at http://www.iep.utm.edu/diff-ont/ (accessed on 17 July 2016).
[51] In its broadest sense, 'essentialism' is the doctrine of identity: the belief that every individual substance has an underlying, fixed, and unchanging essence. This idea proceeded from the intuition that being is simple and univocal – an idea put forward in both Plato's idealism (the world as reducible to timeless and absolute 'ideas') and Aristotle's epistemology (the world as reducible to essential forms or 'categories' of being). For centuries, essentialism has dominated Western thought, with numerous philosophers acknowledging the primacy of an irreducible essence (e.g. Descartes' notion of knowledge as the essence of being; Spinoza's idea of God as an absolute and infinite being; Leibniz'

> There has only ever been one ontological proposition: Being is univocal. [...] From Parmenides to Heidegger it is the same voice which is taken up, in an echo which itself forms the whole deployment of the univocal. A single voice raises the clamour of being. We have no difficulty in understanding that Being, even if it is absolutely common, is nevertheless not a genus. It is enough to replace the model of judgement with that of the proposition. In the proposition understood as a complex entity we distinguish: the sense, or what is expressed in the proposition; the designated (what expresses itself in the proposition); the expressors or designators, which are numerical modes – that is to say, differential factors characterising the elements endowed with sense and designation. [...] What is important is that we can conceive of several formally distinct senses which none the less refer to being as if to a single designated entity, ontologically one.[52]

Indeed, a similar concept of essence has been central to the thought of many other Western philosophers. For instance, German philosopher Georg Wilhelm Friedrich Hegel, who is primarily known for his system of dialectics, states that the concept of identity can only exist in relation and absolute contrast to difference:

> Or when this is said, that identity is identity essentially as separation from difference or in the separation from difference, then right there we have the expressed truth about it, namely that identity consists in being separation as such, or in being essentially in the separation, that is, it is nothing for itself but is rather the moment of separation.[53]

What is remarkable here, however, is that Hegel draws the concept of *difference* into his definition of identity. By doing so, he critiques Aristotle's so-called 'law of identity'. Aristotle's axiom of identity is most commonly represented as 'A = A', whereas Hegel rather implies that 'A is different from not-A'. Hence, this essentialist system of thought implies that, whatever differences may exist *outside of* the concept, essence or identity, they simply cannot be thought without referring back to that

world as made up out of simple and indivisible 'monads'; or Locke's idea of essence as obscure and relative, to be known only through sensory experiences). In that respect, essentialism remained largely unchallenged until the beginning of the 20th century, when philosophers such as Alfred Whitehead and Henri Bergson – both influenced by Darwin's theory of evolution and the rapid succession of socio-cultural changes induced by the technological revolution – started to emphasise ideas of change, process, and motion in their work; and, in doing so, rekindled the Heracliteian idea of identity as fluid and ever-changing ('panta rhei'). Although often widely contested, various essentialist notions continue to linger in current-day society (e.g. gender essentialism, or the idea that gender is binary).

[52] Gilles Deleuze (2011), *Difference and Repetition*, translated by Paul Patton (London: Continuum), p. 44.

[53] Georg Wilhelm Friedrich Hegel (2010), *The Science of Logic*, translated by George di Giovanni (Cambridge: Cambridge University Press), p. 358.

primary concept, essence or identity. In this perspective, difference renders itself as a necessary precondition for identity.

In other words, the notion of identity has traditionally been thought in the sense of the identical, the not-different, which 'entails a primordial, undifferentiated, closed, normally transcendent, totality from where difference emanates'.[54] Conversely, difference has traditionally been understood as a by-product of identity, as to state that A is different from B would logically imply that both A and B are well-defined, stable and coherent unities or identities.

2.2.2 Difference

Throughout his philosophical project, Deleuze consciously seeks to overturn these essentialist ideas of identity and representation, in order to free our thinking from rigid and highly systematic models of thought, which he claims to be nothing but a 'transcendental illusion'.[55] In an active search for a new model to structure our thinking, he proposes an ontology of difference, in which the concept of difference is formulated as 'foundational and constitutive'.[56] Instead of thinking difference as subordinate to identity, and speaking of it in terms of resemblance, opposition and analogy, Deleuze argues instead to venture beyond the primacy of identity and representation, and to start thinking *difference in itself*:

> It is not difference which presupposes opposition but opposition which presupposes difference, and far from resolving difference by tracing it back to a foundation, opposition betrays and distorts it. Our claim is not only that difference in itself is not "already" a contradiction, but that it cannot be reduced or traced back to a contradiction, since the latter is not more but less profound than difference.[57]

[54] Gavin Rae (2014), 'Traces of Identity in Deleuze's Differential Ontology', in: *International Journal of Philosophical Studies* 22/1, p. 86.
[55] Gilles Deleuze (2011), *Difference and Repetition,* translated by Paul Patton (London: Continuum), p. 334.
[56] Vernon W. Cisney (n.d.), 'Differential Ontology', in: *Internet Encyclopedia of Philosophy: A Peer-Reviewed Academic Resource*. Available at http://www.iep.utm.edu/diff-ont/ (accessed on 17 July 2016).
[57] Gilles Deleuze (2011), *Difference and Repetition,* translated by Paul Patton (London: Continuum), pp. 62-63.

Hence, whereas the essentialist tradition was to understand difference in terms of a fixed identity (as a negation of identity: 'X is not Y', or as a disparity between two identities: 'X differs from Y'), Deleuze instead argues to understand it as a type of *becoming*, as an ongoing variation of relations, of multiplicity, of potentiality, of virtuality, of non-identity. In this respect, Deleuzian difference is not only non-conceptual but also empirical, as it forces us to venture beyond representation and instead to focus on the world as we perceive it. As Cliff Stagoll puts it:

> To think in terms of difference-in-itself means to set the concept aside and focus instead on the singular, and the unique circumstances of its production. Awareness of such specific circumstances means that the notion of some 'thing in general' can be set aside in favour of one's experience of *this* thing, here and now.[58]

Freed from notions of sameness, similarity and identity, the Deleuzian notion of difference is no longer grounded in anything but itself. It is an ideal of virtual potential; a continuous variation of relations.[59] By placing difference at its very core, identity then becomes a temporal illusion; a 'becoming' that is in a constant state of flux.

It is, nevertheless, a common misunderstanding that Deleuze's differential ontology would entirely reject all notions of identity. Authors such as Lutz Ellrich, for example, criticise Deleuze's logic, claiming to recognise moments of shared identity, such as language or ethics, at times when the concept of identity enters the domain of the empirical.[60] However, this argument does not succeed in undermining Deleuze's attempt to affirm difference as such. Deleuze never claims that there is no such thing as identity. Rather, he argues that all empirical identity is nothing more than a temporary manifestation of identity. Identity, in its Deleuzian understanding, is hence not *prior to*, but *emergent*

[58] Cliff Stagoll (2010), 'Difference', in: Adrian Parr (ed.), *The Deleuze Dictionary: Revised Edition* (Edinburgh: Edinburgh University Press), p. 76.
[59] Daniel W. Smith and Henry Somers-Hall (eds.) (2012), *The Cambridge Companion to Deleuze* (Cambridge: Cambridge University Press), p. 37.
[60] Lutz Ellrich (1996), 'Negativity and Difference: On Gilles Deleuze's Criticism of Dialectics', in: *MNL: Modern Language Notes* 111/3, pp. 463-487.

from difference. Instead of a 'being', identity is a 'becoming' that is always founded upon 'a prior, transcendental difference':[61]

> This is what the philosophy of difference refuses: *omnis determination negatio*. … We refuse the general alternative proposed by infinite representation: the indeterminate, the indifferent, the undifferentiated or a difference already determined as negation, implying and enveloping the negative (by the same token, we also refuse the particular alternative: negative of limitation or negative of opposition). In its essence, difference is the object of affirmation itself. In its essence, affirmation is itself difference.[62]

2.2.3 Repetition

Inextricably linked to the Deleuzian concept of difference is that of repetition. For it is precisely the notion of repetition that allows us to think *difference in itself*, as freed from the reign of identity. Arguing that 'difference inhabits repetition', Deleuze suggests that there can never be such a thing as an exact repetition of the same.[63] For, in order to be detectable as such, a repetition must, in however small a degree, be different from its original. For example, the passage of time or an alteration in space may provoke such a subtle element of differentiation. As John McGrath puts it, 'the very notion of "again" negates "sameness". How can something be the same at a different point in time and context?'.[64]

By structuring our thinking through the concept of 'difference', and thus no longer defining 'being' as a fixed identity, but rather as a process of becoming, Deleuze eliminates the notion of a stable identity. Repetition can then no longer be founded on identity or sameness, as there is no longer an original which it can reproduce. Rather than thinking repetition in terms of identity and sameness (X, X, X,…), it is, therefore, necessary to start thinking *repetition for itself*, as a variation along differences (X, X', X'',…). James Williams draws a comparison to the variation along a series of

[61] Gavin Rae (2014), 'Traces of Identity in Deleuze's Differential Ontology', in: *International Journal of Philosophical Studies* 22/1, p. 101.
[62] Gilles Deleuze (2011), *Difference and Repetition,* translated by Paul Patton (London: Continuum), pp. 63-64.
[63] Ibid., p. 97.
[64] John McGrath (2017), *Samuel Beckett, Repetition and Modern Music* (New York: Routledge), p. 33.

different shades in colour: 'for Deleuze there is repetition when there is difference in the shades resisting definition according to a fixed identity'.[65] Otherwise stated, although different shades of blue are all essentially blue, they still differ amongst each other.

In thinking of repetition not as synonymous to identity, but instead as its very negation; as a mechanism productive of difference, Deleuze introduces a certain aleatory moment in the development of thought. As multiplicity, contingency and flux here become prerequisites for thinking, logical conditions such as identity and opposition start to waver, and thinking is pushed beyond any dialectical system.[66]

2.3 The *Differenz/Wiederholung* series (1998 –)

> I began reading Gilles Deleuze's book *Difference and Repetition*.
> The book impressed me so much that I wrote a whole series of pieces based on it.[67]

Crucially, Deleuze's philosophical project offers not one, but multiple registers of repetition. In that respect, Deleuze's way of thinking marks 'a significant shift from the way in which repetition has been seen to work within modernism, indeed to be generative in the very formation of new aesthetic strategies'.[68] Similarly, Lang's oeuvre also explores and activates multiple types of repetition. From the smallest possible scale of a repeated beat or rhythm, over slightly larger components such as melodies and phrases, to recurring ideas and themes, repetition is not one of many, but the single

[65] James Williams (2012), 'Difference and Repetition', in: Daniel W. Smith and Henry Somers-Hall (eds.), *The Cambridge Companion to Deleuze* (Cambridge & New York: Cambridge University Press), p. 38.
[66] Gary Aylesworth (2015), 'Postmodernism', in: Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy (Spring Edition)*. Available at http://plato.stanford.edu/archives/spr2015/entries/postmodernism (accessed on 26 March 2019).
[67] Bernhard Lang (2009), in: Renáta Spisarová (ed.), *Ostrava Days 2009: Report* (Ostrava & New York: Ostrava Center for New Music), p. 127.
[68] Briony Fer (2004), *The Infinite Line: Re-Making Art After Modernism* (New Haven & London: Yale University Press), p. 3.

main focus of Lang's oeuvre. In musical terms too, this in itself marks a radical shift away from modernist aesthetics. Lang comments:

> Being a student of the Schoenberg-school of sorts, repetition had been a banned thing for me for a long time, me aiming to achieve a continuous variety within my music, never saying things twice. The big change [...] came about through my reading of Deleuze's book "Difference and Repetition" [...]. It was mainly Deleuze's book who [sic] woke me from my dogmatic slumber.[69]

Up until his first encounter with Deleuze's *Différence et répétition* in 1995, Lang had explicitly shied away from using exact repetition in his compositions. In his early works, such as *Zeitmasken* (1986), *Kleine Welten* (1991), and *Küstenlinien* (1992), Lang audibly situates himself within the post-Webernian tradition. The musical language used in these works bears a strong resemblance to that of Morton Feldman's early work, in that it is pointillistic, and consists mainly of sparsely placed and generally hushed, free-floating rhythms and sonorities.

In fact, the composers and thinkers associated with the Second Viennese School are a frequent touchstone for Lang when commenting on his early work. In a sense rebelling against his musical training within this tradition, Lang speaks particularly of Schönberg as some kind of bogeyman. For, in his eyes, as well as in those of several scholars, the works of Schönberg and his pupils represent the absolute antithesis of repetition.[70] Resonating with Adorno's idea of repetition as being regressive[71], the composers of the Second Viennese School are often said to have deliberately avoided repetition as the formative principle in their works, and instead to have favoured principles

[69] Bernhard Lang (2002), 'Loop Aestetics: Improvisation und Komposition mit Loops', Paper presented at the 41th Internationale Ferienkurse für Neue Musik (Darmstadt). Available at http://members.chello.at/bernhard.lang/publikationen/loop_aestet.pdf (accessed on 15 March 2016). It is somewhat remarkable for Lang – a composer who is so heavily inspired by poststructuralist thought – to use the expression of 'awaking' from a 'dogmatic slumber' here. A similar phrasing was also used by Immanuel Kant in his *Prolegomena* (1783), to describe his critical turn after his reading of David Hume.

[70] See, for instance: Susan McClary (2014), 'Rap, Minimalism and the Structure of Time in Late Twentieth Century Culture', in: Christoph Cox and Daniel Warner (eds.), *Audio Culture: Readings in Modern Music* (London: Bloomsbury), pp. 292-295; Tilman Baumgärtel (2015), *Schleifen: Zur Geschichte und Ästhetik des Loops* (Berlin: Kulturverlag Kadmos), p. 80; Edward Campbell (2013), *Music After Deleuze* (London & New York: Bloomsbury Academic), pp. 11-15

[71] Although such commentary is scattered throughout his oeuvre, Adorno equates repetition in popular music with capitalist standardisation, the loss of individuality, and a regressive way of thinking. See, for instance: Theodor Wiesengrund Adorno, 'On Jazz (1936)', 'On Popular Music (1941)', and 'Difficulties (1964, 1966)', in: Richard D. Leppert (ed.) (2002), *Essays on Music: Theodor W. Adorno*, translated by Susan H. Gillespie (Berkeley: University of California Press), pp. 370-496; 437-369; and 644-680.

of variation and non-repetition.[72] Boulez, for instance, applauded the works of Schönberg, Berg, and Webern for their 'non-repetition of objects', emphasising that their music encompassed 'no literal return of ideas' and 'no literal reprise of formal elements'.[73]

Lang describes the shift away from this Schönbergian lineage of sparsity and variety, and on towards a more individual aesthetic, in which the concept of repetition would become not just one of many, but the single and primary concern, as 'a sort of revolution'; an act which 'they would crucify [him] for'.[74] This change in compositional thinking was marked in 1998 by the completion of *Differenz/Wiederholung 1*, a work for flute, cello, and piano, which had been inspired by Lang's reading of Deleuze. Only four bars into the work, a series of relentless exact repetitions kicks in as Lang asks the performers to repeat bar 5 – not once or twice, but five times in a row (Figure 2.1). He comments:

> I remember having a moral crisis when I used this repetition bracket. My teachers all came from the Viennese school, from the Schoenberg school, and I became some kind of obscene criminal by doing this. You wouldn't believe it but that's the simple truth. My super-ego was watching this and I really started to sweat. What do I do now? I'm not allowed to do that! In the end, I did. I had discovered a new way of approaching things. […] This was in 1997 at the beginning of the whole story.[75]

From 1998 onwards, Lang's oeuvre has been predominantly concerned with the productive application of Deleuzian concepts and frameworks as a compositional methodology, and, in particular, with his concept of repetition as a transformative power. *Differenz/Wiederholung 1* would soon become the first in an ongoing series of works that carry the same title and explicitly reference Deleuze's eponymous 1968 monograph.

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[72] See, for instance: Theodor Wiesengrund Adorno (1949), *Philosophie der neuen Musik* (Frankfurt am Main: Suhrkamp Verlag); Arnold Schönberg (1967), *Fundamentals of Musical Composition*, edited by Gerald Strang and Leonard Stein (London: Faber & Faber), p. 20; Andreas Jacob (2000), 'Arnold Schönbergs Theoretische Schriften Über Funktion und Techniken der Wiederholung', in: Kathrin Eberl and Wolfgang Ruf (eds.), *Musikkonzepte – Konzepte der Musikwissenschaft: Bericht Über Den Internationalen Kongress Der Gesellschaft Für Musikforschung Halle (Saale) 1998. Band 2: Freie Referate* (Kassel & New York: Bärenreiter), pp. 572-579.

[73] Pierre Boulez (2005), *Leçons de musique: Points de repère III*, edited by Jean-Jacques Nattiez (Paris: Éditions Christian Bourgois), pp. 356-357. Cited in, and translated by: Edward Campbell (2013), *Music After Deleuze* (London & New York: Bloomsbury Academic), p. 12.

[74] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).

[75] Bernhard Lang (2009), in: Renáta Spisarová (ed.), *Ostrava Days 2009: Report* (Ostrava & New York: Ostrava Center for New Music), p. 129.

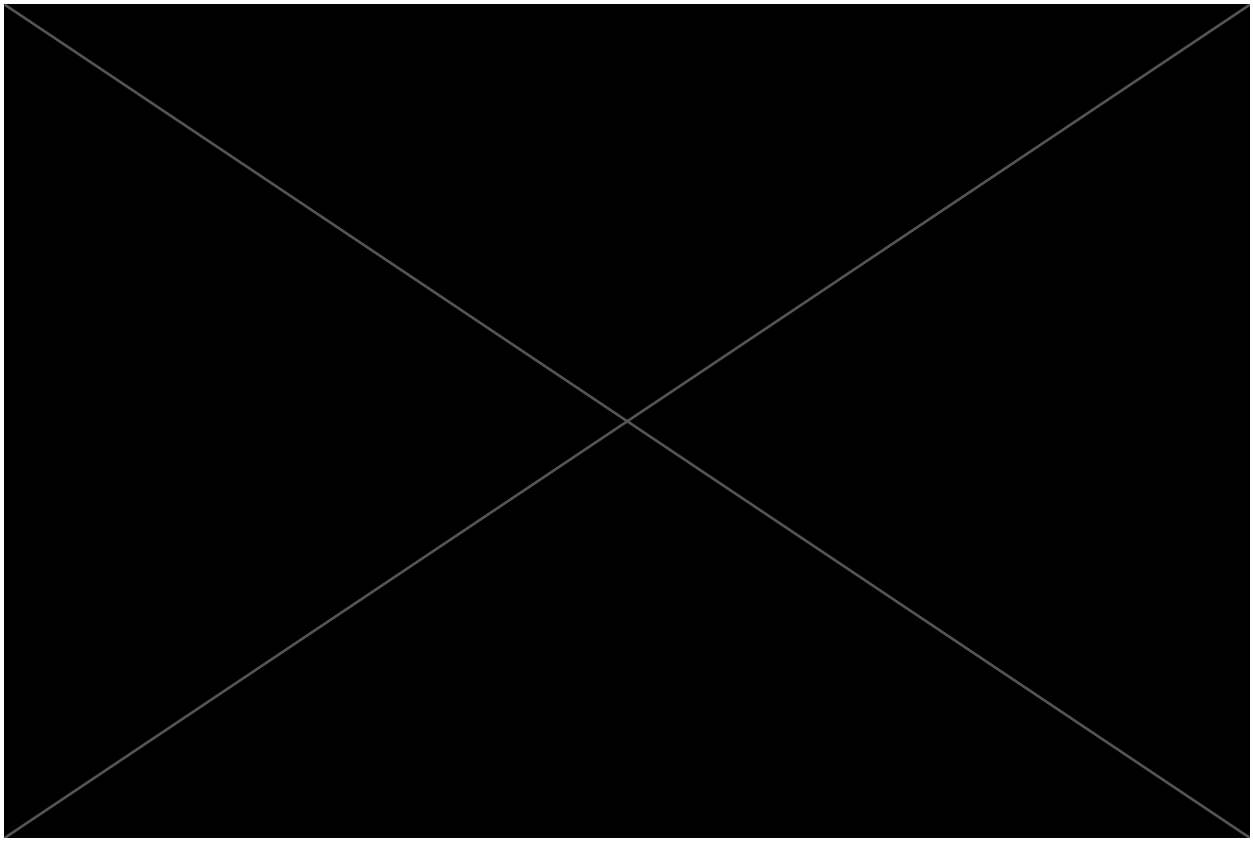

Figure 2.1: Opening page to *Differenz/Wiederholung 1* (1998)

2.3.1 Repetition for itself

The works contained in the *Differenz/Wiederholung* series are characterised by their obsessive engagement with exact repetition. Throughout these works, exact repetition works on several different structural levels, ranging from literal repetitions of distinct musical segments on a microscopic level to repetitions of entire formal sections on a macroscopic level. Here, repetition is thought 'for itself'. Here, repetition is repetition in its own right, as an end-in-itself. An obvious example is *Differenz/Wiederholung 2* (1999), a work for three voices, electronically amplified ensemble, and video. Figure 2.2 shows a prolonged passage of exact repetition in the opening movement for *Differenz/Wiederholung 2* (bars 92a-j), where one bar of music is repeated ten times in a row – a common procedure throughout the work.

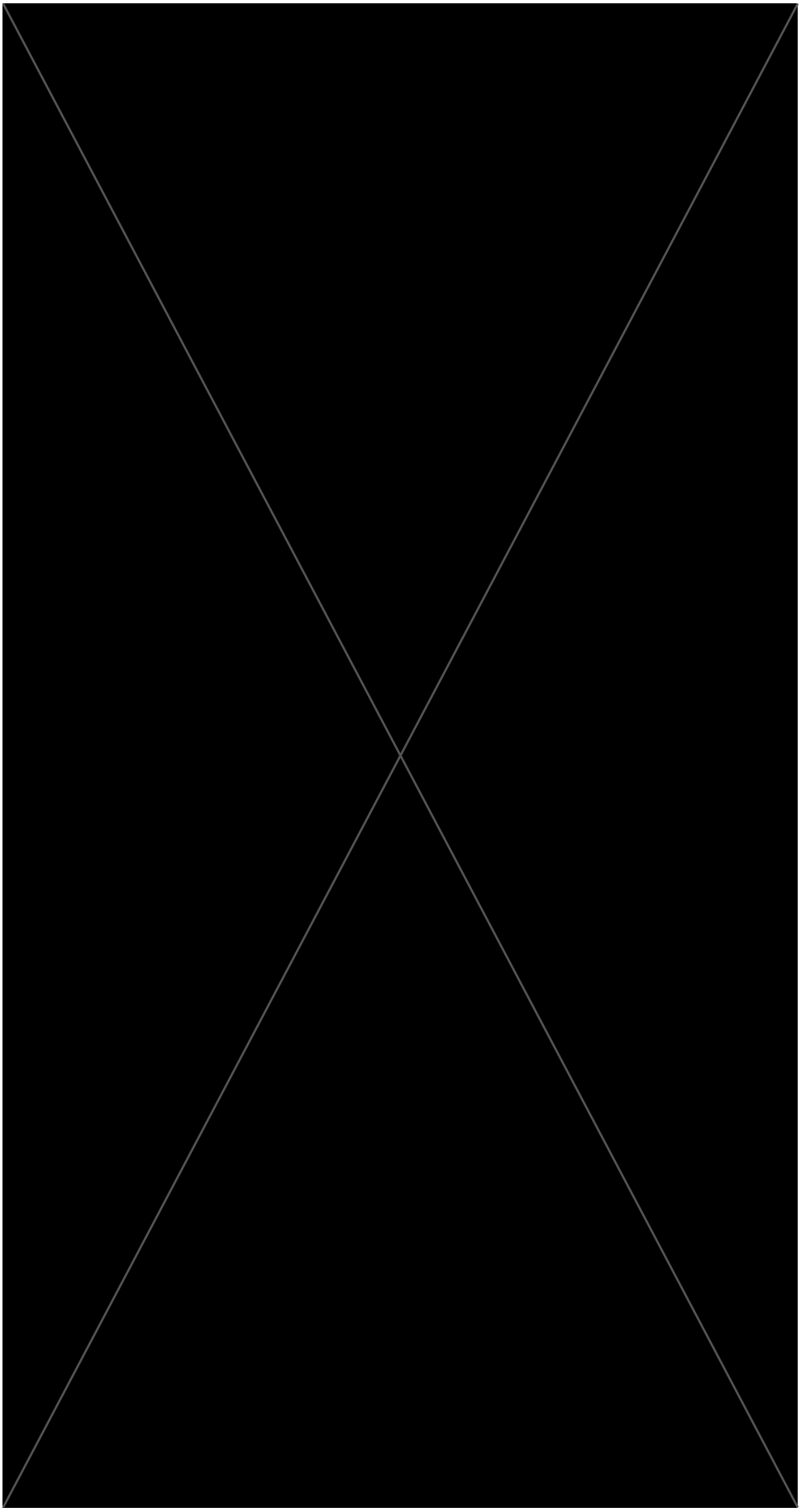

Figure 2.2: Literal repetition in *Differenz/Wiederholung 2* (1999) - *I: Dead Repetition*, bars 92a-j

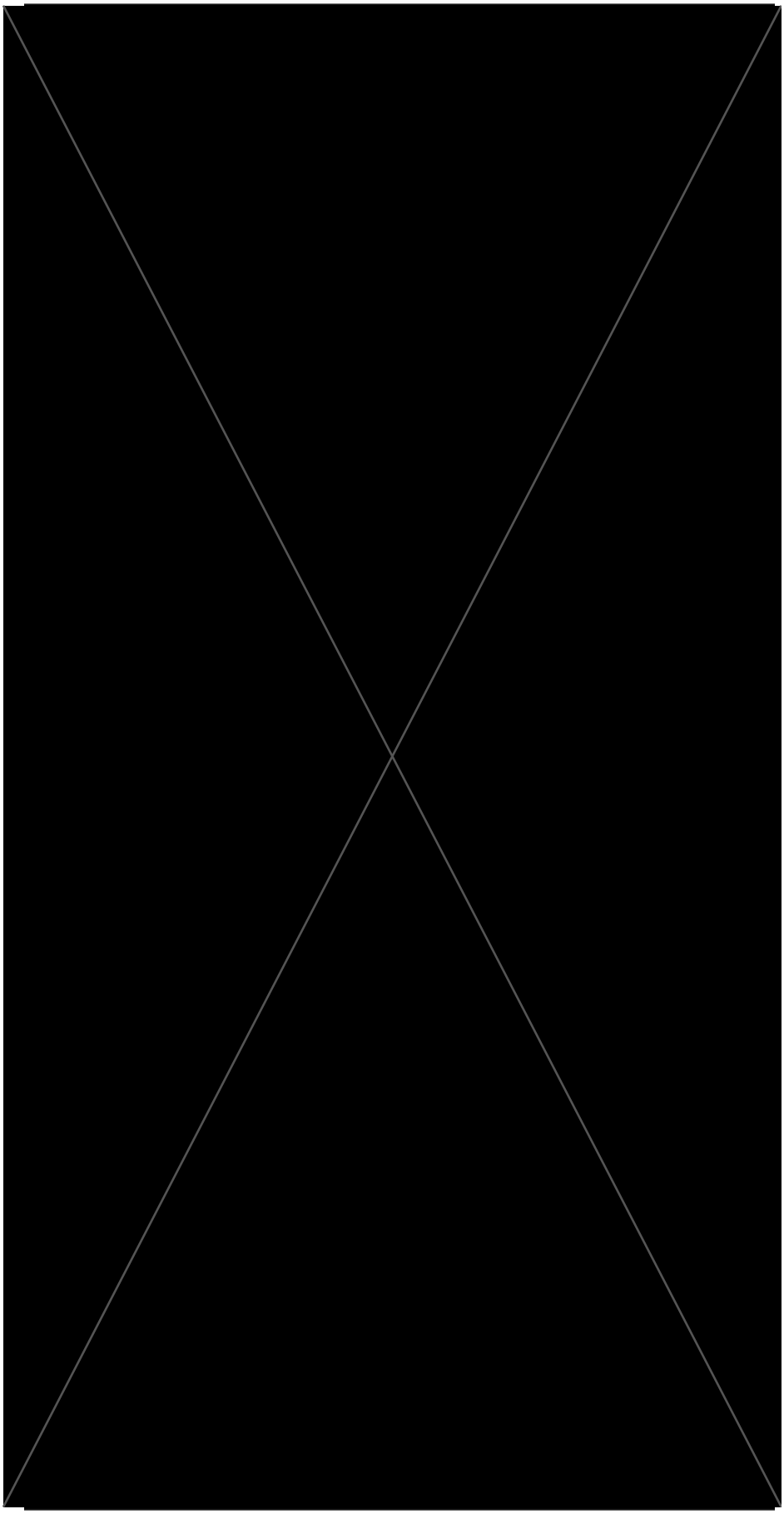

Figure 2.2 Continued

In the accompanying notes to the score, Lang moreover stresses that 'the repeat sign refers to *all* parameters of a repeated bar. These repetitions are extremely mechanical in nature and are to be performed with the *least possible degree of variation*'.[76] This explicit demand for an 'extremely mechanical' approach to musical repetition indicates a specific attitude in terms of style and performance. As the performers are asked to play machine-like repetitions, they are left with little to no room for personal interpretation and emotional expression. In that respect, Lang's work draws in an association with that of György Ligeti, as it makes similarly high technical demands from its performers in asking them to play in a quasi-mechanical manner.[77] Commenting on his experiences of working with performers, Lang comments that:

> They are so committed to reproducing the score, they don't understand one note. [They are] all cogwheels of sorts. They are just parts of the machinery, which is completely against the definition of the romantic musician's him- or herself. She [...] or he wants to feature something, to [...] interpret something. Like Nietzsche said: 'poetry is dancing in jazz'. This is playing; this is dancing with jazz. The fascinating thing is: the longer they work, the more possibility they have to *listen*. It's a kind of enlightenment.[78]

Besides focusing on the idea of exact repetition on a bar-to-bar level, *Differenz/Wiederholung 2* also holds repetitive qualities on a larger structural level. In fact, the work is hyper-symmetrical in structure. It consists of seven movements, each characterised by their own instrumental configuration. The fourth and central movement, *Image/Idea*, functions as the central axis over which the instrumental constellations of the six other movements are mirrored – albeit with some minor variations – hence forming a triptych-like structure (Figure 2.3).

[76] Accompanying notes to Bernhard Lang (1999), *Differenz/Wiederholung 2* [score] (Berlin: Ricordi), SY 4522, p. IV: 'Wiederholungszeichen bezieht sich auf *alle* Parameter eines wiederholten Taktes. Diese Wiederholungen sind sehr mechanisch und mit der *kleinstmöglichen Varianz* auszuführen'.
[77] Ligeti's so-called 'meccanico' style is characterised by the coexistence of several musical layers in which small groups of pitches are rapidly and mechanically repeated. Examples of this technique can be found in Ligeti's *Second String Quartet* (1968), the first movement of his *Chamber Concerto* I (1969–70), and several of his piano études. See, for instance: Jane Piper Clendinning (1993), 'The Pattern-Meccanico Compositions of György Ligeti', in: *Perspectives of New Music* 31/1, pp. 192-234.
[78] Bernhard Lang, in an interview with Christine Dysers (Vienna, 27 November 2017).

Vocal/Instrumental part	Movement						
	I	II	III	IV	V	VI	VII
Arabic singer			x			x	
Soprano	x	x	x	x	x	x	x
Rapper		x	x		x	x	x
Clarinet in Bb		x	x		x	x	x
Oboe		x			x	x	
Tenor saxophone in Bb	x	x	x		x	x	x
Electronic violin	x				x	x	x
Electronic guitar		x			x	x	
Cello 1+2	x	x	x		x	x	x
Double bass 1+2	x	x	x		x	x	x
Keyboard 1+2	x	x	x	x	x	x	x
Percussion	x	x	x		x	x	x

Figure 2.3: Instrument constellation for the seven movements of *Differenz/Wiederholung 2* (1999)

The seven movements in themselves consist of seven sections, which are equally characterised by changes in instrument constellation. Here, again, the fourth and middle sections function as a central axis over which the timbral qualities of the other six are mirrored. The overall result is one of formal hyper-symmetry; of a nested structure which leans towards self-similarity (Figure 2.4).

The hyper-architectural approach to form and structure in *Differenz/Wiederholung 2*, and, correspondingly, in most of the works contained in the *Differenz/Wiederholung* series, stands in stark contrast to its quasi-improvisational musical qualities. Commenting on this, Lang states that he 'cut the freely composed passages like a film, fitting them into a very strict formal matrix'.[79]

[79] Bernhard Lang (2006), 'Spiegelungen – Doubles. Kommentare zu einem Gespräch mit Bernhard Lang', in: Berno Odo Polzer and Thomas Schäfer (eds.), *Katalog Wien Modern* (Saarbrücken: Pfau Verlag), p. 20: 'Die frei komponierten Passagen des Stücks habe ich dann wie einen Film geschnitten und in diese strenge formale Matrix eingepasst'.

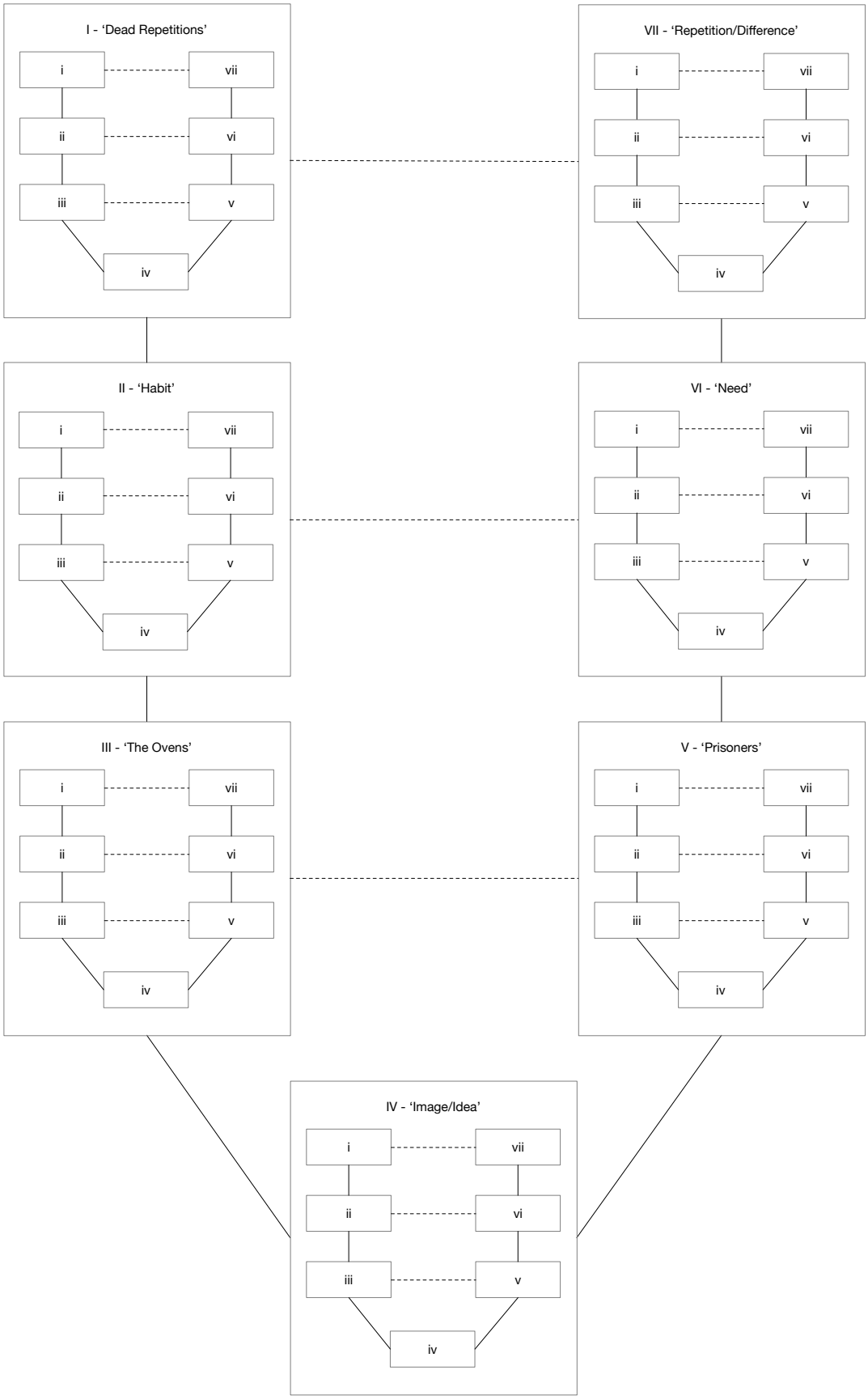

Figure 2.4: Hyper-symmetry in *Differenz/Wiederholung 2* (1999)

2.3.2 Automatic writing

Mirroring Deleuze's 'tentative' and 'circular' way of thinking, Lang claims that most of the works contained in the *Differenz/Wiederholung* series were written through the use of automatic writing techniques, which he describes as the process of 'transcribing [his] internal dream-music'.[80] Used by numerous Dadaist and surrealist artists in the early twentieth century, automatic writing is a form of creating without conscious thought, allowing the artist to tap into the subconscious mind. Lang's interest in improvising and adlibbing can easily be traced back to his involvement in several free jazz ensembles in the 1980s, such as the Erich Zann Septet, Vienna Loop Orchestra, Laleeloo, and Picknick mit Weismann. Lang comments:

> There, [I] realised [...] that [...] improvisation ran in patterns. There were repeated patterns. We introduced [...] more and more loops in [our] improvisation[s].[81]

Just like Deleuze's thinking, automatic writing inherently prioritises the process over the final result. Shutting down the conscious mind, moreover, allows for a certain aleatory moment to emerge, in which creativity is freed from rational control. In the *Differenz/Wiederholung* series, this typically results in what seem to be randomly juxtaposed units of repeating musical ideas (see Figure 1.1 on page 12). Formally, the result is a discontinuous series of parts, much like a Burroughsian cut-up.

Commenting on *Monadologie XXXII: The Cold Trip* (2014-2015), a work which is not contained in the *Differenz/Wiederholung* series, but which was written through the use of the same techniques, Lang comments: 'I do not think while writing; [...] I just go for it'.[82] He describes the compositional process as 'gut writing', as 'just the music which is coming in my head'.[83] At the same time, the process of automatic writing in itself is also closely related to notions of repetition, as it usually results in a

[80] Bernhard Lang (2003), 'Cycling/Re-Cycling'. Available at http://members.chello.at/bernhard.lang/publikationen/cycling_recycl.htm (accessed on 10 August 2017).
[81] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).
[82] Ibid.
[83] Ibid.

continuous rumination of the same or similar thoughts; of tracing and eventually circling the same idea (or ideas) over and over again.

Of course, the above is but an idealised rendition of the automatic writing process which Lang claims is at the foundation of the *Differenz/Wiederholung* series. In reality, Lang's compositional approach always involves at least some minor degree of conscious thought and deliberate intervention. Admitting that the process is actually a two-fold procedure of conscious predetermination followed by a less rational phase of free association, Lang acknowledges: 'I do my thinking *before*. I do a lot of reflection'.[84]

2.4 The *Theater der Wiederholungen* series (2002 –)

Shortly after premiering *Differenz/Wiederholung 2* in 1999, the work's multimedial setup inspired Lang to project his newly developed repetition-paradigm onto the operatic stage:

> I quickly noticed, especially in the semi-scenic work *DW2*, that the production of loops by the performers led to a defined, choreographed dramaturgy. This autogenerative dramaturgy led to the conception of *Das Theater der Wiederholungen*.[85]

The completion of Lang's three-act opera *Das Theater der Wiederholungen* in 2002 marked the beginning of a second ongoing series, this time comprising of large-scale works for the operatic stage. These works each have distinct individual titles and thereby differ from Lang's other series, in which new works are simply marked by a reference number. Nevertheless, Lang tends to speak of these

[84] Ibid.
[85] Bernhard Lang (2009), 'Das Theater der Wiederholungen: Revisited'. Available at http://members.chello.at/bernhard.lang/publikationen/DasTheaterderWiederholungenRevisited_Bernhard%20Lang.pdf (accessed on 7 January 2019): 'Ich bemerkte sehr bald, vor allem im semi-szenischen Stück DW2, dass die Produktion von Loops bei den Ausführenden zu einer definierten Bewegungsdramaturgie führten. Diese Autogenerative Dramaturgie bestimmte die Konzeption des Theater der Wiederholungen'.

works as 'episodes' in 'the ongoing theatre project which is the *Theater der Wiederholungen*'.[86] Lang confirms that the operatic works are, in fact, all part of 'one project, one piece. It's just different versions of one piece.'[87] For these reasons, the study will henceforth use 'the *Theater der Wiederholungen* series' as the common denominator for Lang's operatic project in its entirety.

2.4.1 Deleuze's 'théâtre de la répétition'

Again, Lang here explicitly refers to the philosophical work of Deleuze, who in his introduction to *Différence et répétition* advances the idea of a 'théâtre de la répétition' (Eng: 'theatre of repetition'; Ger: 'Theater der Wiederholung'). Deleuze here primarily refers to the innovative means of expression used by Kierkegaard and Nietzsche, whose thinking and writing he claims to be theatrical in the sense that 'they want to put metaphysics in motion, in action. They want to make it act, and make it carry out immediate acts'.[88] For Kierkegaard and Nietzsche, Deleuze claims, 'it is a question of producing within the [philosophical] work a movement capable of unsettling the spirit outside of all representation; [...] of making movement itself a work, without interposition; [...] of inventing vibrations, rotations, whirlings, gravitations, dances or leaps which directly touch the mind'.[89]

In their Deleuzian conception, the works of Nietzsche and Kierkegaard are, in other words, not mere exchanges of representations, but instead, events – they are transmissions of movement, or of a setting into movement; they are 'non-representational signs' that 'trigger sensual and emotive movements like shock, puzzlement, attraction, seduction, repulsion, confusion and dizziness'.[90] Their works are to be actively engaged with; like scripts for the reader to re-enact. Reading their

[86] See, for example, Lang's notes on the 2012 music theatre work *Der Reigen*, which he introduces as 'eine weitere Episode im Theaterprojekt *Das Theater der Wiederholungen*'. Available at http://members.chello.at/bernhard.lang/werkbeschreib/ueber_reigen.htm (accessed on 15 April 2019).
[87] Bernhard Lang, in an interview with Christine Dysers (Vienna, 27 November 2017).
[88] Gilles Deleuze (2011), *Difference and Repetition,* translated by Paul Patton (London: Continuum), p. 9.
[89] Ibid.
[90] James Williams (2013), *Gilles Deleuze's Difference and Repetition: A Critical Introduction and Guide* (2nd edition), (Edinburgh: Edinburgh University Press), p. 47.

work, then, is not merely an intellectual exercise. Rather, it is a direct and unmediated experience that 'operates through sensations and affects which force [the body] into movement and change'.[91]

Deleuze's conception of a 'theatre of repetition', then, is probably best understood as a dynamic 'philosophy' or 'metaphysics' of repetition, which is communicated onto the reader directly and without mediation:

> The theatre of repetition is opposed to the theatre of representation, just as movement is opposed to the concept and to representation which refers it back to the concept. In the theatre of repetition, we experience pure forces, dynamic lines in space which act without intermediary upon the spirit, and link it directly with nature and history, with a language which speaks before words, with gestures which develop before organized bodies, with masks before faces, with spectres and phantoms before characters – the whole apparatus of repetition as a "terrible power".[92]

Deleuze's 'theatre of repetition' is, in other words, supposed to work upon the reader as a productive force, requiring the reader not merely to understand the philosophical project, but to be set in motion by it; to 'act' it; to embody it.

2.4.2 A creative misunderstanding

Whereas Deleuze's 'theatre of repetition' is essentially a metaphor for a theatrical – or, in other words, a direct and unmediated – transmission of non-essentialist ideas onto an audience, Lang's interpretation of the phrase is much more literal, in the sense that his *Theater der Wiederholungen* is just that: a series of works for the operatic stage, in which the notion of repetition takes on a central role. The operatic works contained in the *Theater der Wiederholungen* series are, in fact, literally made up out of repetition, in that they are spawned from repetition on both a micro- and a macroscopic level. In these works, repetition of various sorts not only serves as a focal point in the scores, but also features prominently in the libretti, the scenic actions, and the staging.

[91] Ibid., p. 48.
[92] Gilles Deleuze (2011), *Difference and Repetition*, translated by Paul Patton (London: Continuum), pp. 11-12.

With a gentle nod to Nietzsche's 'eternal return', the three acts of *Das Theater der Wiederholungen* (2002), for example, each tell a story of historical atrocities: from Marquis de Sade's lust for torture and pain in the first act, to the cynicism of the American dream and the harsh realities of the Nuremberg trials in the second and the third. In other works contained in this series, the notion of repetition is more of a narrative trope. The provocatively titled *I HATE MOZART / ODIO MOZART* (2006), for example, shows the members of an opera company preparing for their next Mozart production. While on the one hand rehearsing (and, therefore, repeating) their parts, the protagonists are also shown to be struggling in their attempts to correctly reproduce Mozart's musical intentions (which can be read as a critique on both historical performance practice and the canon-centred cultural climate in the West). In *Der Golem* (2016), the idea of the doppelgänger forms the central thread in the narrative.

In most of Lang's operatic works, repetition also forms a central focus in terms of scenic actions. In *Das Theater der Wiederholungen* (2002), for example, the musicians' natural movements are magnified and repeated. In doing so, their idiomatic gestures turn into performative actions. While such actions may highlight the performers' relationships to both their instruments and their colleagues, they also hold the power to alienate those relationships. Besides having the musicians play from a detailed choreographed score, Lang also integrates several dancers into the ensemble, whose sole purpose is to 'double' the actions of the musicians (Figure 2.5). As the line between musicians and dancers is blurred, and with performers continuously entering and exiting the stage, Lang here establishes links with both Bertolt Brecht's epic theatre and Mauricio Kagel's instrumental theatre. At the same time, the performers' precise and almost mechanical repetitive gestures also establish links with the work of choreographers such as Anne Teresa De Keersmaeker and Pina Bausch (video example 1).

Lang's operatic works also tend to explore the notion of repetition in terms of staging. In *Das Theater der Wiederholungen* (2002), for example, the composer demands that the entire ensemble, as well as the six singers and the director, wear the same clothes (a plain suit and tie) and the same blonde

wig.[93] The result is at the same time both humorous and unsettling. As the individual identity of the protagonists is lost in favour of anonymity, the full cast starts to resemble a group of René Magritte's anonymous bourgeois businessmen (video example 1).

Figure 2.5: Doubling of the director in *Das Theater der Wiederholungen* (2000-2002)
Photo taken at the 2003 Graz première by Edi Steirer

Ultimately, Lang's works for the operatic stage are 'theatres of repetition' in the utmost literal sense of the term, in that they open up various registers of repetition simultaneously. From the musical repetition of cells and sections, over the exploration of repetition as a narrative theme, to the incorporation of explicitly repetitive gestures or staging decisions, repetition in these works becomes a multimodal phenomenon which unfolds across various modes of activity and timescale. Although it could be argued that these different types of repetition reach and affect the audience at different times and in different ways, Lang's conception of his operatic work as a 'theatre of repetition' still

[93] The 2003 staging for *Das Theater der Wiederholung* was created in close collaboration with French director and choreographer Xavier Le Roy (b. 1963).

differs quite radically from the original Deleuzian meaning of the phrase, as the unmediated and direct communication of a philosophical idea onto an audience. Commenting on the idea that Deleuze's philosophical work tends to invite multiple interpretations and just as many misinterpretations, Lang states that 'in art, everything is possible and even a misunderstanding can be a creative misunderstanding'.[94]

2.5 The *Monadologie* series (2007 –)

In 2007, Lang began to work on a third series of works: the *Monadologie* series. Three features set these works apart from those contained in the *Differenz/Wiederholung* and the *Theater der Wiederholungen* series. The first is the philosophical starting point, which is here shifted away from Deleuze's *Différence et répétition*, and onto the philosopher's 1988 reading of Gottfried-Wilhelm Leibniz's rationalist philosophy in *Le Pli: Leibniz et le Baroque*. The title of this series of works explicitly references Leibniz' 1714 philosophical treatise, *La Monadologie*. The second is an ample and explicit use of musical borrowing. In these works, repetition is understood in its most literal sense: that of re-production or re-presentation. As such, the works contained in the *Monadologie* series are meta-compositions, which not only draw upon pre-existing material, but also offer it a new reading. The third is that these works are, for the most part, computer-generated. In fact, a substantial number of works in this series were generated from the same compositional software environment: Computer-Aided Design for Musical Applications (CadMus). The following sections unpack these three characteristics one by one, focusing in particular on how these elements can be seen to articulate or explore the three key Deleuzian ideas of identity, difference, and repetition.

[94] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).

2.5.1 Leibniz, Deleuze, and the limits of identity

The Fold became such an important book for the *Monadologies*
– it gave me the *idea* for the *Monadologies*.[95]

In his 1714 philosophical treatise *La Monadologie*, German rationalist philosopher Gottfried Wilhelm Leibniz (1646-1716) describes the metaphysical world as containing only two elements: God, and simple, immaterial substances, which he calls 'monads'. These are indivisible, simple and, most importantly, single units of substance. They are the very fundamentals out of which the universe exists; the 'atoms of Nature – the elements out of which everything is made'.[96]

According to Leibniz, the universe as we perceive and experience it, is made up out of compounds: composites of different monads working together in a harmonious system. Douglas Burnham gives the example of a coffee cup, which he explains is made of an infinite number of monads acting together as one.[97] Therefore, each monad must contain within itself not only all the properties the compound concept of the coffee cup might potentially exhibit in the future (e.g. broken into shards), but also the trace of those that it has exhibited in the past (e.g. its pre-cup state as a heap of formless clay). As such, the monad is at the same time always pregnant with the future and brimming with the past. In other words: past, present, and future properties of the concept are folded up into the monad.[98]

It is on this very idea, of the monad encapsulating endless realms of potential within itself, that Deleuze focuses in his 1988 monograph *Le Pli: Leibniz et le Baroque* (1988).[99] Pushing beyond the boundaries of Leibniz' definition of identity by its infinite limits (identity as a compound of singular and indivisible monads), Deleuze is able to think of identity as pure difference (identity as a

[95] Bernhard Lang, in an interview with Christine Dysers (Vienna, 27 November 2017). Emphasis added.
[96] Gottfried Wilhelm Leibniz (1714), *La Monadologie*, §3: 'Et ces Monades sont les véritables Atomes de la Nature et en un mot les élements des choses'. English translation by Jonathan Bennett (2017) available at https://www.earlymoderntexts.com/assets/pdfs/leibniz1714b.pdf (accessed on 30 March 2019).
[97] Douglas Burnham (n.d.), 'Gottfried Leibniz: Metaphysics', in: *Internet Encyclopedia of Philosophy: A Peer-Reviewed Academic Resource*. Available at https://www.iep.utm.edu/leib-met/ (accessed on 30 March 2019).
[98] Gottfried Wilhelm Leibniz (1714), *La Monadologie*, §22, §61. English translation by Jonathan Bennett (2017) available at https://www.earlymoderntexts.com/assets/pdfs/leibniz1714b.pdf (accessed on 30 March 2019).
[99] Although this is Deleuze's first full monograph on Leibniz' work, his engagement with it had started a lot earlier, e.g. in earlier works such as *Différence et répétition* (1968) and *Logique du sens* (1969).

continuous process of unfolding; as a process of actively *becoming* rather than one of steadily *being*). In Deleuze's reading, Leibniz' 'monadic' concept of identity, becomes a 'nomadic' one:

> Instead of a certain number of predicates being excluded from a thing in virtue of the identity of its concept, each "thing" opens itself up to the infinity of predicates through which it passes, as it loses its center, that is, its identity as concept or as self.[100]

Ultimately, to think of identity as passing through an infinite number of states; of identity as a continuous process of folding and unfolding, offers the possibility of displacement: of rendering out of focus and of seeing in a different way.[101]

In his *Monadologie* series, then, Lang takes a rather literal approach towards Deleuze's reading of Leibniz. In these works, vast passages – and, in some cases, even entire works – are spawned from one single, well-defined unit of musical material, such as a motif or a phrase. Characteristically, such a unit of starting material — the musical monad, or, to put it in Lang's words, the musical 'cell' — is put through an extensive looping process, during which a compound set of computer algorithms gradually introduce a number of seemingly random, very minimal changes with each new repetition. Lang clarifies:

> The real difference with the *Differenz/Wiederholung* series is, that the repetitions are constantly mutating. Each repetition is subjected to an iterated process of mutation compared to the previous one. In other words, everything is continually branching out; virtually no repetition is identical. This is also reflected in the notation of the score: the traditional repeat sign that states 'repeat three times' is gone. Instead, the process of repetition is now written out, with an incredible number of shifts, as well as sonic differences. In the *Differenz/Wiederholung* series, I let the [repeated] cell be just that. I can transpose that cell up and down, but I cannot change its content. Here [i.e. in the *Monadologie* series], the machines distort the material. They can really warp the content of the cell; mutate it, metamorphose it.[102]

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[100] Gilles Deleuze (1990), *The Logic of Sense*, translated by Mark Lester (London: The Athlone Press), p. 174.
[101] Peter Eisenman (1992), 'Unfolding Events', in: Jonathan Crary and Sanford Kwinter (eds.), *Zone 6: Incorporations* (New York: Zone Books), pp. 423-427.
[102] Bernhard Lang, in: Bernhard Günther (2010), 'Die Frage nach dem Original: Die Monadologie IX und Die sieben letzten Worte', in: Matthias Naske (eds.), *Back to the Future: Rainy Days 2010* (Luxemburg: Philharmonie Luxembourg), p. 90. Available at http://www.philharmonie.lu/media/content/download/documents/Publications/rainy_days-Kataloge/rainy_days_2010-back_to_the_future-Leseprobe.pdf (accessed on 19 July 2019): 'Aber der wesentliche Unterschied zur *Differenz/Wiederholung*-Serie ist, dass die Einzelwiederholungen alle mutierend fortschreiten, und es ist jede Wiederholung gegenüber der vorhergehenden einem iterierten Mutationsprozess unterzogen, d.h es verästelt sich alles ununterbrochen, es ist praktisch keine Wiederholung irgendwie identisch. Das äußert sich schon in der Notation, dass das Wiederholungszeichen mit "Wiederholung drei Mal" nicht mehr existent ist, sondern dass das ein

The result is a sequence of obsessive near-repetitions. As each new repetition is slightly different from its predecessor, the material gradually drifts off; revealing its inherent potential and eventually shedding its original identity during the process (Figure 2.6). This notion of drift — of gradually moving further and further away from the original until it is completely lost — is reinforced by the nature of the starting material, which typically consist of pre-existing music.[103] The repetitions in Lang's *Monadologie* series are, therefore, perhaps best described as 'drifting' repetitions, which are chaotically and aimlessly meandering further and further away from their original identities.[104]

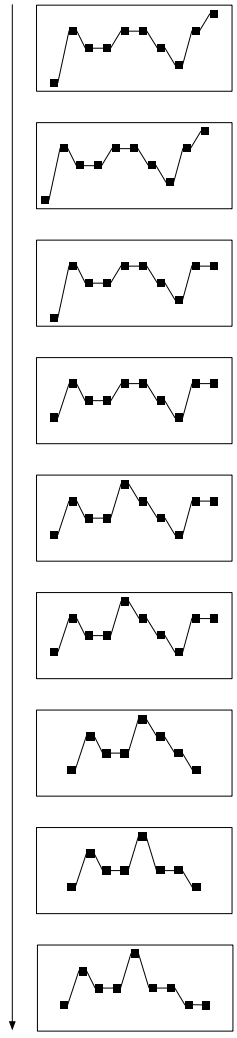

Figure 2.6: Stylised representation of the process of drift at work in the *Monadologie* series

ausgeschriebener Wiederholungsprozess ist, der mit unglaublich vielen Verschiebungen und auch tonalen Differenzierungen arbeitet. Bei der *Differenz/Wiederholung*-Serie habe ich ein Sample als Sample genommen, und in einem Sample kann man wieder rauf- und runtertransponieren, aber ich kann den Inhalt des Samples nicht verändern. Jetzt verändern die Maschinen wirklich [...] verzerrend, sie können quasi den Inhalt wirklich verzerren, mutieren, Metamorphosen durchlaufen lassen'.

[103] Issues of drift, disorientation, and getting lost, will be discussed more fully in the following chapters and will take on a particularly central role in Chapter 4.

[104] The concept of 'drifting repetition' will be further explored in Chapter 3, and more particularly in Chapter 3.4.2.

2.5.2 Sampling: repetition as re-presentation and re-production

Besides explicitly referencing the philosophical work of Leibniz, the works contained in Lang's *Monadologie* series are also characterised by their ample and explicit use of musical borrowing. In fact, each of these works is generated entirely from short fragments of pre-existing material; a practice the composer refers to as 'sampling'.[105] Lang's practice of sampling archival materials makes a gentle nod to Deleuze's idiosyncratic way of writing, which is in itself characterised by ample and explicit references to the works of other philosophers. In describing Deleuze's philosophical technique as a process of 'writing texts on existing texts' and of 'creating a new kind of meta-philosophy', Lang claims that 'all the *Monadologies* [...] were inspired by the resulting concept of Meta-Composition'.[106] The *Monadologie* series is, in other words, a collection of meta-compositions – i.e. a collection of compositions *about* compositions – which have instances of pre-existing music as their main subject. Here, repetition is understood in its most literal sense: that of the re-presentation or the re-production of historical and cultural artefacts.

The procedure by which Lang selects the source materials for the works contained in the *Monadologie* series, involves two steps. First, the composer decides which musical work (or, in some rarer cases, works) will be at the basis for a new *Monadologie*. Lang claims that the musical artefacts used to generate a new *Monadologie* may stem from 'everything that has ever been recorded on any medium and is still available'[107] and that he, in that respect, treats the whole of music history as 'a

[105] Exceptions are *Monadologie I* (2007), *Monadologie XXV: 10 Paintings* (2013), and *Monadologie XXIX: London in the Rain* (2014), which have been generated from original, newly composed material. Maintaining the use of the term 'sampling' in this context is, moreover, slightly problematic. While the term usually refers to the practice of transposing a recorded sound from one digital medium to another, Lang's musical borrowings are not at all digital. Instead, they are entirely score-based transcriptions of pre-existing music, which tend to stay relatively close to their original instrumentation and tempo, almost as if the composer cut out a fragment of the original score and pasted it into his own work. Nonetheless, the notion of sampling does remain valuable in the specific context of Lang's oeuvre, as it draws in the realms of DJ-culture and turntablism to which this oeuvre so frequently refers. Adding to the terminological confusion is the fact that both the *Differenz/Wiederholung* and the *Theater der Wiederholungen* series do, in fact, contain examples of digital sampling. In these instances, found materials (often concrete sounds or fragments taken from movie soundtracks) are either programmed into a keyboard or a sampler, or played off of a vinyl record by a turntablist. Radically different from the integral role of sampled materials in the *Monadologie* series, these digital samples never serve as the starting point for the entire work. In the case of the *Differenz/Wiederholung* series, for example, short audio samples are sporadically used by Lang to add an extra hint of colour; to add a certain fullness to the sound. In the *Theater der Wiederholungen* series, on the other hand, Lang's audio samples are usually embedded into the narrative – e.g. the use of distorted Mozart-samples in *I HATE MOZART / ODIO MOZART* (2006).

[106] Bernhard Lang (2015), 'The Difference Engines: Singing Deleuze'. Available at https://www.researchcatalogue.net/view/236855/236856 (accessed on 6 March 2019).

[107] Bernhard Lang (2006), 'Cuts'n Beats: a Lensmans View. Notes on the Movies of Martin Arnold', p. 5. Available at http://members.chello.at/bernhard.lang/publikationen/CutsAndBeatsNotesonMartinArnold.pdf (accessed on 1 September 2014).

musical supermarket, where styles can be bought, assembled, simulated'.[108] In reality, however, the works contained in the *Monadologie* series predominantly reference sources that are Western, classical, and canonical.[109] The initial decision, of what archival materials to use, is often intuitive, as Lang states that 'the choice is the same as when we go to lunch and pick a meal'.[110] In some cases, however, this decision is rather pragmatic and commission-based:

> For example, for *Monadologie II*, I was commissioned to write an orchestral piece. I knew that they would play a Strauss after that; the *Don Quixote*. So, I thought to myself: if the original is in the program, I will choose it [as my source material]. This made sense for me.[111]

Nonetheless, Lang does not use these source materials in their entirety. As has been indicated previously, the works contained in the *Monadologie* series are generated from smaller fragments or 'samples' taken from these source materials.[112] Selecting that sample – the second and final step in Lang's decision-making process – is much more intuitive:

> This is a delicate process. From my experience, I know that certain things will work well in a dynamical development, and some things won't. I choose my cells with the knowledge that they will be able to grow. These are mostly complex structures; they will evolve in a more interesting way than simple patterns. Often, this is not the main theme. Mostly it's a transition passage. Sometimes the main theme can be interesting too, for example the opening passage of the three bassoons in the Monadologie on the *Sacre* [*du printemps*]. The actual choice is then very intuitive.[113]

Lang refers to these samples as 'micro-images', which 'feature the image of a recognisable visual gesture or musical phrase, a recognisable entity, a signifier of sorts'.[114] Put differently, the samples used by Lang to generate the works contained in the *Monadologie* series consist of readily perceptible

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[108] Bernhard Lang (2009), 'Style vs. Stylez: The political economy of aesthetics', p. 4. Available at http://members.chello.at/bernhard.lang/publikationen/Bernhard_Lang_Style_and_idea_IV.pdf (accessed on 22 December 2018).
[109] See Appendix I for a list of works currently contained in the *Monadologie* series.
[110] Bernhard Lang (2011), in: Renáta Spisarová (ed.), *Ostrava Days 2011: Report* (Ostrava & New York: Ostrava Center for New Music), p. 81.
[111] Bernhard Lang, in an interview with Christine Dysers (Leuven, 26 October 2013).
[112] The works contained in the *Monadologie* series are generated algorithmically from a musical input cell in CadMus – Lang's compositional software environment. The inner workings of this software environment and the ways in which it is used to generate the works in the *Monadologie* series, is assessed in more depth in Chapter 2.5.3.
[113] Bernhard Lang, in an interview with Christine Dysers (Leuven, 26 October 2013).
[114] Bernhard Lang (2006), 'Cuts'n Beats: a Lensmans View. Notes on the Movies of Martin Arnold', p. 9. Available at http://members.chello.at/bernhard.lang/publikationen/CutsAndBeatsNotesonMartinArnold.pdf (accessed on 1 September 2014).

musical units; they are fully-fledged musical figures or motifs which typically span a duration of anywhere between 50 and 7000 milliseconds.[115] As such, they sit right in-between the total durational capacity of the short term auditory memory, which, according to David Huron, is generally able to store sound sequences with a durational span of anywhere between a minimum of three to five seconds and a maximum of ten to twelve seconds.[116] In terms of duration, the samples are, in other words, guaranteed to be retained in the listener's short-term memory.

Once a sample has been selected, it is converted into MIDI-data and fed into CadMus – a software environment for algorithmic composition, the workings of which will be addressed in more depth in Chapter 2.5.3. It is, however, important to note at this point, that this algorithmic processing involves an elaborate cutting and looping process, which results in an obsessive, yet erratic looping of the sampled material in the final score. As such, the works contained in the *Monadologie* series are characterised by a kind of 'meta-repetition', in which a cultural and historical artefact is repeated not only in the sense of it being re-presented or re-produced, but also in that of it being put on loop.

According to Linda Hutcheon, to re-produce and adapt a cultural and historical artefact is not only to interpret it, but, in doing so, also 'to take a position on it'.[117] In fact, the very idea of re-producing a pre-existing artefact articulates 'the very act of critique: to think twice and more deeply (or at least differently) about an experience'.[118] Deleuze, too, argues that:

> Repetition belongs to humour and irony; it is by nature transgression or exception, always revealing a singularity opposed to the particulars subsumed under laws, a universal opposed to the generalities which give rise to laws.[119]

In several interviews, Lang confirms that a political intention sits behind his explicit use of pre-existing materials. Commenting on the *Monadologie* series, the composer explains that he sees

[115] Ibid.
[116] David Huron (2006), *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge, Massachusetts: The MIT Press), p. 228.
[117] Linda Hutcheon and Siobhan O'Flynn (2013), *A Theory of Adaptation* (New York: Routledge), p. 92.
[118] Laurel Westrup and David Laderman (2014), 'Sampling across the Curriculum', in: David Laderman and Laurel Westrup (eds.), *Sampling Media* (Oxford: Oxford University Press), p. 247.
[119] Gilles Deleuze (2011), *Difference and Repetition,* translated by Paul Patton (London: Continuum), p. 6.

musical borrowing as a means of holding up a mirror to the cultural industries, which, in terms of funding and programming, tend to favour historical and canonical music over new productions.[120]

> [T]he whole *Monadologie* concept in itself is a hidden criticism, starting from the point that each of us is just repeating stuff. We are just in a repetition culture, like a little mouse in a wheel. The market is just focusing on repetition, and it takes all our efforts of creating something new. Economically we are being pushed off the scene now, all over the world. As authors and creators of the new, we are being pushed off by this big repetition wheel, machinery. Bruckner's *First Symphony* will be played a thousand times more than any of your pieces.[121]

In Lang's hands, the loop becomes an instrument of humour, irony, and critique, in that it mirrors the cultural industries' tendency to lock historical artefacts into a system of endless repetition. Lang explains:

> What I do, is I say: 'Look! We are stuck in a loop. We are running in circles'. I believe that seeing the hamster wheel is the first step in breaking out of it. If the hamster wheel is not focused on, and not brought into the room, one has no chance of breaking out of it. In that case, we keep on running inside of it, while believing we are moving on a straight line.[122]

Whether or not a listener is able to decipher Lang's critical message, is, however, entirely dependent on whether or not they pick up on the fact that the composer is, in fact, drawing upon archival materials. A realm of different issues come into play here. These range from the recognisability of the pre-existing material (that is, the degree to which the original has, or has not been altered or transformed), to the listener's acquaintance with music history in general. Furthermore, the context in which the work is being heard may also be of significance. For instance, the situation is quite different when both the referenced and the referring work are programmed during the same

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[120] See also: Barbara Barthelmes (2008), 'Die Vermittlung Neuer Musik fängt beim Komponieren an: Ein Gespräch mit dem Komponisten Bernhard Lang', in: *2'33": Zeitung des Netwerk Neue Musik* (October); Daniel Ender (2009), 'Mann muss eine Fräge oft stellen, um neues zu finden: Bernhard Lang im Gespräch mit Daniel Ender', in: *Österreichische Musikzeitschrift* 64/8-9, pp. 55-57; Susanna Niedermayr (2007), 'Eine eigene Ästhetik des Unregelmässigen: Susanna Niedermayr im Gespräch mit Bernhard Lang', in: *Dissonanz/Dissonance* 99, pp. 16-18.

[121] Bernhard Lang (2011), in: Renáta Spisarová (ed.), *Ostrava Days 2011: Report* (Ostrava & New York: Ostrava Center for New Music), p. 82.

[122] Bernhard Lang (2007), in Susanna Niedermayr, 'Eine eigene Ästhetik des Unregelmässigen', in: *Dissonanz/Dissonance* 99, p. 18: 'Was ich tue, ist zu sagen: Schaut mal hin! Wir sind in einer Schleife. Wir drehen uns im Kreis. Und ich glaube, wenn man das Laufrad erst einmal sieht, dann ist das der erste Schritt zum Ausbruch. Bevor das Laufrad nicht thematisiert ist und in den Raum gestellt ist, hat man keine Chance daraus auszubrechen. Dann läuft man darin immer weiter und glaubt, man bewegt sich auf einer Geraden.'

concert, as was the case with Lang's *Monadologie II* and Strauss' *Don Quixote*. In that respect, Linda Hutcheon rightfully remarks that '[d]ifferently knowing audiences bring different information to their interpretations'.[123] It is hence very possible that a listener might not be able to pick up on the fact that a cultural artefact is being referenced. In such an event, Lang's critical message is, of course, lost. Commenting on this issue, Lang confirms:

> I realised, while writing the forty-something *Monadologies*, that Bordieu [sic] is absolutely right in his thesis that the very cultural knowledge which is claimed by the middle-class is not identical with its actual, truly reproducible knowledge. Most people don't know *Parsifal* at all. This is one of the failed concepts in the *Monadologie* series.[124]

Whereas Lang's opinion on the issue is thus overtly negative, Linda Hutcheon has a more positive idea of what happens when an audience is not familiar with the original that is being referenced, or when they do not pick up on the fact that a pre-existing work is being referenced. She argues that:

> In these instances, we simply experience the work without the palimpsestic doubleness that comes with knowing. From one perspective, this is a loss. From another, it is simply experiencing the work for itself, and all agree that even adaptations must stand on their own.[125]

The degree to which listeners are, or are not, familiar with the works that are being referenced in the *Monadologie* series, cannot be measured. Consequently, the effect of this type of repetition on the listener's experience is volatile and unknown. This reveals a fascinating limitation to the operability of repetition as it is understood here, in terms of the re-presentation and the re-production of archival materials. Whether or not Lang succeeds in getting his critical intent across, therefore necessarily falls beyond the scope of this study.

[123] Linda Hutcheon and Siobhan O'Flynn (2013), *A Theory of Adaptation* (New York: Routledge), p. 125.
[124] Bernhard Lang, in personal communication with Christine Dysers, 29 June 2019.
[125] Linda Hutcheon and Siobhan O'Flynn (2013), *A Theory of Adaptation* (New York: Routledge), p. 127.

2.5.3 CadMus as generative DNA

It has been indicated previously that the majority of works contained in the *Monadologie* series have been generated from the same compositional software environment: CadMus (Computer-Aided Design for Musical Applications). For several reasons, CadMus in itself can also be seen to engage with several strands of Deleuzian thought.

CadMus is a computer-assisted composition environment, programmed in C++ by the composer and written for his specific compositional purposes. Lang started to develop CadMus in 1993, initially only using the software to facilitate certain compositional procedures, such as the generation of microtonal all-interval series, the generation of harmonic series from a fundamental, and the looping of musical materials. It was not until 2007, when Lang considerably reworked and expanded the software's codebase in order to generate the score for *Monadologie I*, that CadMus became one of Lang's main compositional tools.[126] Since then, Lang continued to use CadMus to generate other *Monadologie* scores until finally abandoning the use of the software with *Monadologie XXIX: London in the Rain* (2014). As a result, later works in the *Monadologie* series embody a much looser interpretation of computer processing. Commenting on this, Lang clarifies that in these later works, he 'just remembered the results of these processings [sic], using manual looping and cutting for generating the actual texts'.[127]

Although the use of CadMus as a computer-assisted environment for algorithmic composition was hence abandoned in the later *Monadologie* pieces, the idea of algorithmic processing has remained a key feature throughout the further development of the series. The works contained in the *Monadologie* series are, therefore, best understood as a set of differing instantiations of a general underlying model. Lang subscribes to this line of reasoning too, in claiming that 'actually, the *Monadologies* are all versions of a single composition'.[128] It seems reasonable, in that respect, to assume that these works share a similar essence; that they are singular instances derived from a

[126] Bernhard Lang, in personal communication with Christine Dysers, 17 July 2019.
[127] Bernhard Lang (2017), in: *The Cold Trip* [CD liner notes] (Vienna: *Paladino Media GmbH*).
[128] Bernhard Lang, in personal communication with Christine Dysers, 9 July 2014.

shared model. Although outwardly differing from one another, the works contained in the *Monadologie* series are inwardly connected by a certain degree of structural homogeneity on account of the specific ways in which the model generates its distinct instances.

As such, these works are a series of actualisations which are not necessarily linked to a specific or fixed model, but which are instead interconnected by the ways in which they differ *among* themselves in terms of code. In other words, the works contained in the *Monadologie* series are expressions of the same field of potential, which guides their formation. According to Joe Panzner, '[s]uch a structure of difference would not be a model, a transcendent yardstick against which diverse productions were gauged, but a generative structure of continuous variation guiding the emergence of new forms without prefiguring them'.[129] Panzner goes on to compare the idea to the biological phenomenon of variation that occurs between wild mushrooms that share the same genetics:

> A mushroom's genes do not constitute a blueprint for the construction of a mushroom; they are not a prefiguration of a form, but a coding of potentials that co-function with an environment containing its own potentials. In the presence of certain environmental factors, such as soil moisture or nutrient availability, certain potentials will be expressed in a mushroom's features. Under other conditions, the same genetic code could yield a dramatically different set of features unlike those of its genetically-identical peer. Between the two mushrooms, the coded potentials in its DNA remain the same – a multiplicity of future expressions and traces of past expressions, a unity of differences, a distinct bundle of potentials enmeshed in and modulated by a broader field of potentials, a bounded set of tendencies from which an infinite variety of mushrooms can emerge and into which they recede.[130]

Gilles Deleuze also describes such a relationship of linkage without resemblance in genetic terms, as he states that:

> [G]enes express differential elements which also characterise an organism in a global manner, and play the role of distinctive points in a double process of reciprocal and complete determination; the double aspect of genes involves commanding several characteristics at once, and acting only in relation to other genes; the whole constitutes a virtuality, a potentiality; and this structure is

[129] Joe Panzner (2015), *The Process That Is the World: Cage/Deleuze/Events/Performances* (London & New York: Bloomsbury Academic), pp. 36-37.
[130] Ibid.

> incarnated in actual organisms, as much from the point of view of the determination of their species as from that of the differentiation of their parts, according to rhythms that are precisely called "differential", according to comparative speeds or slownesses which measure the movement of actualisation.[131]

In a most literal sense, then, CadMus constitutes a distinct 'coding of potentials', in that it carves out a space of possibility in which a new *Monadologie* can grow. The use of CadMus opens up a field of possibilities for Lang, which is 'broader than a mere collection of foreseeable, traceable possibilities, but not so broad as to constitute an undifferentiated field from which anything can emerge'.[132] This idea similarly resonates in the work of digital artist Manfred Mohr, who claims that the use of computer algorithms allows him to 'build something bigger than what [he] can imagine'.[133]

However, CadMus not only aids the composer in opening up new and uncharted topologies of imagination and creativity; it also assists in translating these realms of possibility into sonic outputs, whose individual geographies seem to be specifically designed for getting lost. CadMus makes up the generative DNA for the *Monadologie* series, in that it provides a compositional model for what Rebecca Solnit describes as 'calculating the unforeseen':

> It seems to be an art of recognizing the role of the unforeseen, of keeping your balance amid surprises, of collaborating with chance, of recognizing that there are some essential mysteries in the world and thereby a limit to calculation, to plan, to control.[134]

In several interviews, Lang makes his use of CadMus as a compositional tool seem particularly straightforward, as he claims that he can simply 'put in a score and another one comes out of it'.[135] In reality, however, the inner workings of CadMus are much more complex. In fact, to describe the software's inner workings, is not at all an easy task. First of all, the code that makes up CadMus has been edited incessantly over time. In stressing that 'the program itself has mutated' and that he 'had

[131] Gilles Deleuze (2011), *Difference and Repetition*, translated by Paul Patton (London: Continuum) p. 234.
[132] Joe Panzner (2015), *The Process That Is the World: Cage/Deleuze/Events/Performances* (London & New York: Bloomsbury Academic), p. 44.
[133] Manfred Mohr (2016), in an interview for the Carroll/Fletcher Gallery, London. Available at http://vimeo.com/157167520 (accessed on 9 January 2018).
[134] Rebecca Solnit (2005), *A Field Guide to Getting Lost* (Edinburgh: Canongate), pp. 6-7.
[135] Bernhard Lang (2011), in 'hcmf// 2011: Bernhard Lang: Over and Over', *Huddersfield Contemporary Music Festival*. Available at www.hcmf.co.uk/Bernhard-Lang-Over-and-Over (accessed on 1 September 2014).

the editor open and [...] rewrote the program all the time', Lang seems to have conceived of CadMus as an open-ended work-in-progress.[136]

Secondly, CadMus is inherently modular in nature. The software comprises a large number of neatly encapsulated, discrete functions. These include functions which are designed for reading and writing MIDI data; for converting clock time to metrical quantisation (and vice versa); for dealing with pitch rows and their transformations; and for various basic musical conversions, such as generating harmonic series from a fundamental, or converting frequency to MIDI pitch (and vice versa). Two types of functions have been of major importance in the generation of the *Monadologie* series. The first is a set of functions for cutting up and looping musical material, which the composer has labelled as 'granulators'.[137] The second is a list of thirty-five discrete functions described as 'life rules' (with titles ranging from 'life0' to 'life34'). These 'life rules' contain different cellular automata implementations.[138] The specific workings of these two types of functions will be covered in more depth in the following chapters of this dissertation. What is important at this point, is to note the fact that many of these functions can be combined with one another in sequential chains, in parallel constructions, and in recursive networks. As such, CadMus is best understood as a modular environment for creating functional assemblages. Figure 2.7 shows a stylised rendering of what such an assemblage of functions might look like. As the exact order and combination of functions differ with every new work, these are represented as black boxes in the diagram.

[136] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).
[137] 'Granulation' or 'granular analysis' is the term Lang uses to describe his looping technique. The technique is discussed in more depth in Chapter 4.4.1.
[138] Cellular automata (CA) are discrete, abstract and dynamical computational systems, used to model complex (and often natural) phenomena. The concept and its importance to the works contained in Lang's *Monadologie* series will be further assessed in Chapter 3.4.3.

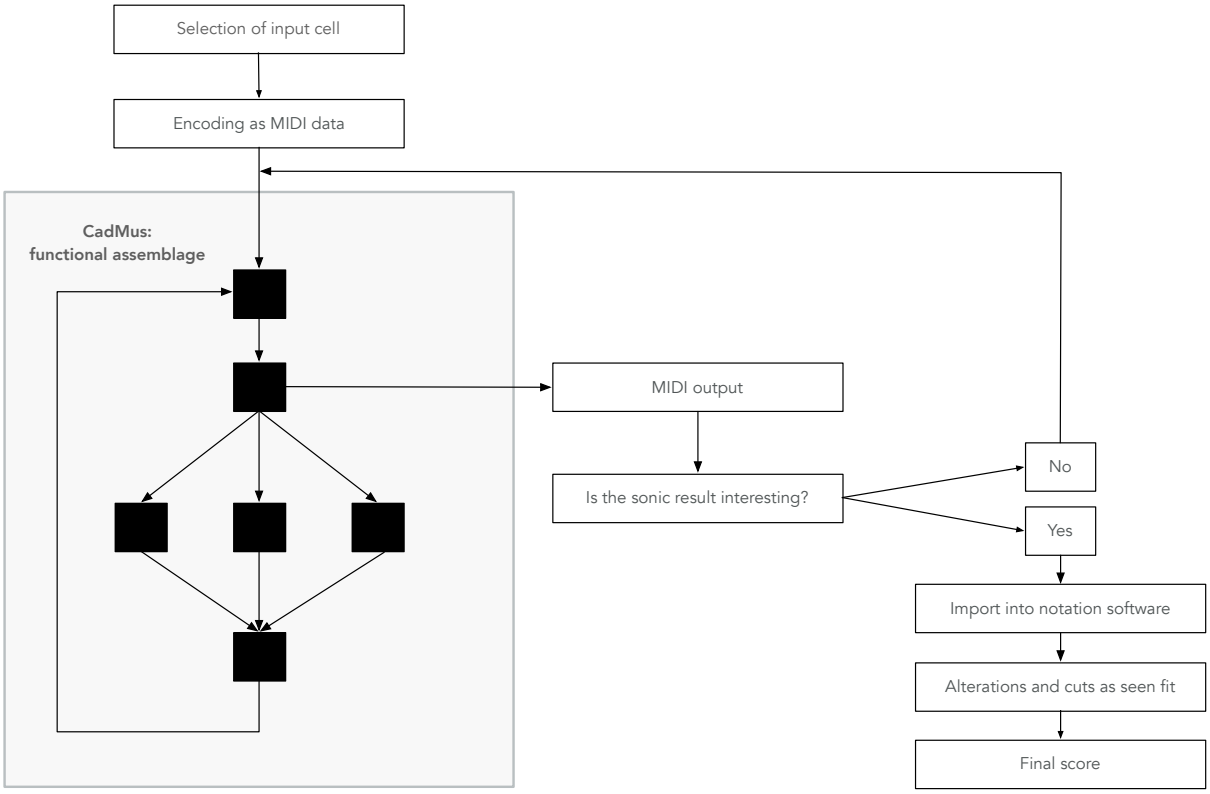

Figure 2.7: Stylised representation of the compositional process behind the *Monadologie* series

What is particularly interesting is that the composer creates these assemblages during a heuristic process of experimentation. As is shown in Figure 2.7, the underlying principle of Lang's compositional approach to the *Monadologie* series is one of an extensive feedback system, in which the composer continuously goes back to tweak the functions' parameters. At times, Lang even rewrites the software code during the compositional process. He explains: 'I go back, you see. Trying, setting the parameters, the rules, the codes, … Write and write…'.[139] Considering that CadMus offers an almost infinite number of possible functional assemblages, which are created ad hoc for each new composition and altered along the way, it is impossible to make any definitive claims as to exactly which functions or settings were used to generate a particular score – let alone in what order or assemblage.

[139] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).

Only when the composer eventually decides that the results generated from CadMus are sufficiently interesting, does he move on to the final phase in the composition process: orchestrating the score, and making cuts and alterations as seen fit. Even though the exact sonic outcome generated by CadMus can never be anticipated entirely, the composer is still responsible for writing the software code, handpicking the input materials, configuring the functional assemblage that will run on the selected input material, manipulating the command parameters in the software's terminal, and finally, editing the output that is generated. The compositional procedure that underpins the *Monadologie* series is, therefore, best described as one of determined indeterminacy. Lang explains: 'I'm just like a gardener in this game. I care for the trees growing and the flowers growing, but they do the growing themselves'.[140]

The explicitly heuristic method that Lang subscribes to in creating the *Monadologie* series hence clearly mirrors Deleuze's circular way of thinking, which the composer described at the outset of this chapter as an 'erratic wandering around, that constitutes the method of research and exploration'.[141] Deleuzian methods of thinking and making have, in other words, filtered into the very design of Lang's *Monadologie* series. The following chapters, and in particular Chapter 4, will further assess whether these methods have also found their way into the sounding result of these works.

2.6 Seriality, interconnections, and the rhizomatic oeuvre

Seriality, or the practice of working in series, is one of the defining characteristics of Lang's oeuvre. In commenting on the reasons behind this, Lang implicitly links the principle of seriality to the idea of exhausting all possibilities; of trying out all possible configurations of a constellation of rules – an

[140] Bernhard Lang, in an interview with Christine Dysers (Leuven, 26 October 2013).
[141] Bernhard Lang, in: Reinhard Kager (2010), 'Geschichte als Wiederkehr des Ähnlichen', in: *Musiktexte: Zeitschrift für Neue Musik* 126, p. 76.

idea postulated by Deleuze in his short essay *L'épuisé* (1992), in which the philosopher argues that true creativity can only sprout from exhaustion of all possibilities.[142] Lang explains:

> I continued the Deleuzian discourse and the recherche [sic] in the music! [...] Everybody asks me: why do you continue to write these pieces? And I say: I'm not finished. I haven't reached a point where I could say, now, this is it. And as long as I'm uncertain, it goes on! [143]

Of course, working in series is in itself a form of repetition. It is a practice of continuously repeating a same or similar set of ideas; of rethinking the same scenario over and over again. In that respect, Lang's approach bears a strong resemblance to that of Samuel Beckett, whose late works are characterised by a recurring set of character types, who always find themselves in the same kinds of places and engage in the same sort of actions, yet always act from completely different vantage points. Within Lang's oeuvre, however, seriality is understood not just in its most conventional meaning of 'working in series'. Instead, seriality is understood as rhizomatic; as a complex network of interconnections and short-circuits.

The previous sections have set out a number of key distinguishing features that aid in differentiating Lang's three main series from one another. Up to a certain extent, Lang's series do have their own distinct characteristics and identities. The works therein are connected by a set of common strands that link them together. For instance, the works contained in the *Monadologie* series are interconnected by a set of three shared features. First, there is the mere fact that the works are ranked numerically, rather than given an individual title, and, as such, are bound to a skeletal chronology. Secondly, the works are linked through their compositional techniques: those of sampling and algorithmic processing. Finally, the prevalence of near-literal or 'drifting' repetition in these works also provides an explicit connection between them. Thus, although they may vary wildly in instrumentation and sound, the works within the series remain interconnected through these three characteristics.

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[142] See: Gilles Deleuze (1998), 'The Exhausted', in: *Essays: Critical and Clinical*, translated by Daniel W. Smith and Michael A. Greco (London & New York: Verso), pp. 152-174.
[143] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).

Nonetheless, Lang's series are not hermeneutically closed. On the contrary even: they are interconnected and mutually interwoven. Their borders are porous in the sense that some of their defining elements — such as the use of musical borrowing and algorithmic processing which ties together the works contained in the *Monadologie* series; or the extra-musical repetitions contained in the choreographed scores that so typically characterise the works contained in the *Theater der Wiederholungen* series — have become interchangeable between the series over time. The use of exact musical repetition, for example, is not necessarily limited to the *Differenz/Wiederholung* series; just as much as the use of 'drifting' repetition is not exclusive to the *Monadologie* series.

Other interconnections are even more unexpected. Consider, for example, *Monadologie XXXIII: ParZeFool* (2015-2016), which is a reworking of Wagner's *Parsifal* (1882). While this is a work for the operatic stage, Lang does not consider it to be a part of the *Theater der Wiederholungen* project. The same goes for *Differenz/Wiederholung 26: The Exhausted* (2014), which, although it entails a detailed choreographed score as well as scenic directions, is officially listed as a part of the *Differenz/Wiederholung* series. The score for *Differenz/Wiederholung 20* (2008), then, shows the words 'Hermetica I' as its subheading, implying that the piece, in its entirety and without any alterations, is the first iteration in the *Hermetica* series.

In other words, the series contained in Lang's oeuvre work synchronously, in that they run through each other chronologically. They are developed simultaneously, at times interfering and mingling with each other; at others diverging from one another. They are not series in the sense that they follow a prescribed internal order, in which one work should be heard 'before' the other to create a particular narrative or arch. Neither are the works contained in these series intended to be heard together, as though missing one piece would lead to an unsolved puzzle. Instead, the works are fully autonomous and self-contained.

In fact, Lang's series are ongoing works-in-progress. They do not conform to any clear linear development, nor do they have any end or conclusion in sight. In a sense, they are infinite; endlessly

repeating. Here, as Briony Fer argues, '[e]ndlessness plays its own sort of endgame: the exhaustion of something going on interminably, the tedium of repetition'.[144]

This idea of unexpected connections, blurred boundaries and vague identities further emphasises Lang's Deleuzian mind-set. Joe Panzner explains that such an approach 'stands in stark contrast to most attempts at constructing an ontology of the musical work, ontologies that attempt to define the identity conditions of a musical work or the links that would bind together a unitary work and its disparate incarnations under a common concept'.[145] He continues:

> Such a concept would link the work and its manifestations by an order of resemblance, by determining what they held in common: a collection of features, a common form of expression, a capacity for reproduction, resemblance, reference. The composer's "intention" becomes fixed as a thing, a solidity, a model; a particular notable performance becomes the object of reproduction by future generations. Variations from this model are dismissed as *external differences* – products of error, happenstance, the gap between pure and transcendent concept and muddled reality – rather that productions from some sort of *internal difference* in the work itself. The dissimilarities between concept and reality appear at worst as faults or mere contingencies, at best as the additions of a particularly virtuous artist whose tolerated indiscretions are permitted because she retains some order of resemblance to the model. It is this vision of production, with its constant reference to a higher term that would discipline variance into similarity, to which [...] Deleuze so rigorously objects.[146]

In other words, Lang's oeuvre defies the conventional idea of the musical work – and, by extension, that of the series – as a closed-off, well-defined, and fixed entity. Instead, Lang's world is one of continuous rumination; one of a never-ending re-thinking, re-focusing, re-interpreting, and sometimes even of the coalescence of same and similar ideas. In doing so, the composer continuously draws in new links, new associations, and new connections. As such, he creates a widely diverse, but also a widely dispersed network of associations and interrelationships. This, in itself, is a very Deleuzian way of thinking and making. The oeuvre, therefore, presents itself as rhizomatic; as an unpredictable process of 'networked, relational and transversal' thought.[147] The organic image of the

[144] Briony Fer (2004), *The Infinite Line: Re-Making Art After Modernism* (New Haven & London: Yale University Press), p. 37.
[145] Joe Panzner (2015), *The Process That Is the World: Cage/Deleuze/Events/Performances* (London & New York: Bloomsbury Academic), p. 39.
[146] Ibid., pp. 39-40.
[147] Felicity J. Colman (2010), 'Rhizome', in: Adrian Parr (ed.), *The Deleuze Dictionary: Revised Edition* (Edinburgh: Edinburgh University Press), pp. 232-235.

rhizome is scattered throughout Deleuze's body of work as a critique of hierarchical or 'arborescent' thought. Stifling the creative potential of dynamism, interconnectivity, and unexpected or non-hierarchical relationships, Deleuze argues that an arborescent scheme of thought is rather limited. As such, the rhizome is a means of reimagining thought as 'a creative and dynamic enterprise'.[148] To think in terms of the rhizome is, then, to think in terms of the multiple:

> In contrast to centered (even polycentric) systems with hierarchical modes of communication and preestablished paths, the rhizome is an acentered, nonhierarchical, nonsignifying system without a General and without an organizing memory or central automaton, defined solely by a circulation of states.[149]

[148] Cliff Stagoll (2010), 'Arborescent Schema', in: Adrian Parr (ed.), *The Deleuze Dictionary: Revised Edition* (Edinburgh: Edinburgh University Press), p. 14.
[149] Gilles Deleuze and Félix Guattari (2014), *A Thousand Plateaus: Capitalism and Schizophrenia*, translated by Brian Massumi (London: Bloomsbury Academic), p. 22.

CHAPTER 3
DIFFERENT REPETITIONS

> If repetition is possible, it is due to miracle rather than to law. [...] If repetition exists, it expresses at once a singularity opposed to the general, a universality opposed to the particular, a distinctive opposed to the ordinary, an instantaneity opposed to variation and an eternity opposed to permanence. In every respect, repetition is a transgression. It puts laws into question, it denounces its nominal or general character in favour of a more profound artistic reality.[150]
>
> – Gilles Deleuze (1968)

3.1 What is repetition?

Musical repetition is a remarkably slippery concept. Although it is one of the most fundamental and cross-cultural features of music, the precise meaning of the term is surprisingly ill-defined. For example, neither the *New Grove Dictionary of Music and Musicians* nor the *Oxford Dictionary of Music* – two principal sources when it comes to describing musical terms and techniques – hold an entry on 'repetition'. On a strictly terminological level, it almost seems as though the phenomenon is so inherently fundamental to music that its meaning has become self-evident. For what is repetition, if not the recurrence of a previous action, statement, or idea? And when a previously explored idea is simply re-iterated, what else is left to be said?

With various synonyms and related terms in use — such as 'recurrence', 'reprise', 'ostinato', and 'loop', to name but a few — it proves difficult to conceive of repetition as a single and overarching concept. In fact, the phenomenon of musical repetition materialises across a wide variety of musical styles and genres, in which it takes on various shapes and forms, unfolds across different timescales,

[150] Gilles Deleuze (2011), *Difference and Repetition,* translated by Paul Patton (London: Continuum), p. 3. Originally published in 1968 as *Différence et répétition* (Paris: Les Éditions de Minuit), p. 9: 'Si la répétition est possible, elle est du miracle plutôt que de la loi. [...] Si la répétition existe, elle exprime à la fois une singularité contre le général, une universalité contre le particulier, un remarquable contre l'ordinaire, une instantanéité contre la variation, une éternité contre la permanence. A tous égards, la répétition, c'est la transgression. Elle met en question la loi, elle en dénonce le caractère nominal ou général, au profit d'une réalité plus profonde et plus artiste'.

operates on different structural levels, and engenders a multitude of listening experiences. Repetition is, in other words, not a singular, but an inherently multifaceted phenomenon. As Tilman Baumgärtel describes it:

> [Repetition] can lull you to sleep, like counting sheep. But it can also make you lose your mind, as if though it were an artistic version of Chinese water torture. It can knock you down and overwhelm you – a feeling most people get when they step into a club for the very first time. [...] But it can also go on and on, making you pray for *something* to finally happen.[151]

The previous chapter has shown that repetition is a central concern in Lang's oeuvre. Throughout Lang's work, the phenomenon manifests itself in various shapes and forms; extending from the most mechanically exact repetitions to those which are subjected to different degrees of variation. Moreover, repetition runs on multiple hierarchical planes within Lang's oeuvre; ranging from musical repetition in its most traditional sense, as the reiteration of distinct musical cells; to the much broader interpretation of repetition as the exploration of same or similar ideas across a series of works. As repetition can hence propagate a multitude of meanings and experiences, this chapter sets out to develop an oeuvre-specific terminology that ventures beyond the usual discourse of repetition as an element of sameness and similarity. Instead, this chapter argues that repetition is a strange and multifaceted phenomenon, which is not necessarily tantamount to the notion of sameness to which it is so often intuitively reduced. Defining 'repetition' as a phenomenon which is fuzzy, rich, and multifaceted from the very outset, this chapter sets out to identify the several types of musical repetition that are at work in Lang's oeuvre, and to differentiate between the different effects these may engender in experience. Whereas the previous chapter has largely focussed on repetition as a central and broadly defined concept operating within Lang's oeuvre, this chapters will assess musical repetition in a much narrower sense – that is, as the reiteration of musical cells, motifs, phrases, and sections, as occurring within the confinements of the individual musical work.

[151] Tilman Baumgärtel (2015), *Schleifen. Zur Geschichte und Ästhetik des Loops* (Berlin: Kulturverlag Kadmos), p. 49: 'Sie können einlullen, wie das Schäfen-Zählen vor dem Einschlafen. Aber sie können einen auch als eine künstlerische Version der chinesischen Wasserfolter den Verstand rauben. Sie können niederknüppeln und planieren, ein Gefüfl, das vielen bei ihrem ersten Besuch einer Techno-Party überkommt. [...] Sie können dem schönen Moment Dauer verleihen. Aber sie können aich so lange wiederholes, bis etwas gefällt'.

After evaluating the different terminological frameworks currently available for speaking of, and thinking about musical repetition, the chapter will distinguish between the effects and implications of repetition understood as sameness on the one hand (i.e. 'exact' or 'literal' repetition), and of repetition understood as similarity on the other (i.e. 'near-literal' or 'varied' repetition). As a means of accounting for and distinguishing between the different types and effects of musical repetition at work within Lang's oeuvre, the chapter will introduce the concepts of 'microvariation', and 'drifting repetition'. Finally, musical repetition will be presented as a productive and transformative force; a 'power of the new', which 'calls forth a terra incognita filled with a sense of novelty and unfamiliarity'.[152]

3.2 Typologies of repetition

Repetition has been on the rise as an area of inquiry across the several domains of music studies since the early 1990s. Alongside the increase in scholarly attention also grew the urge to define, or at least, to delineate, the phenomenon of musical repetition. As a result, the past few decades have seen several attempts in creating typologies of repetition.

In what is perhaps one of the earliest attempts to create a typology of repetition, Victor Zuckerkandl distinguishes between 'patent, more or less literal repetitions of themes, motifs, melodies, whole complexes, comparatively large sections of a composition' on the one hand, and 'more secretive [repetitions], that represent various degrees of [...] transformation or development', on the other.[153] Although Zuckerkandl here implicitly acknowledges that there are several 'degrees' of repetition, a significant amount of terminological fuzziness remains. In fact, Zuckerkandl's typology possibly raises more questions than it answers.

[152] Adrian Parr (2010), 'Repetition', in: Adrian Parr (ed.), *The Deleuze Dictionary: Revised Edition* (Edinburgh: Edinburgh University Press), pp. 225-226.
[153] Victor Zuckerkandl (1956), *Sound and Symbol: Music and the External World* (New York: Princeton University Press), p. 212.

To begin with, it is unclear where one might situate the boundaries between verbatim repetitions on the one hand, and Zuckerkandl's 'more or less literal' repetitions on the other. The distinctions between the two categories Zuckerkandl sets up are also fuzzy. At what point, for instance, does a 'more or less literal' repetition become a 'more secretive', or, for that matter, a 'more patent' one? Zuckerkandl's typology opens up a Pandora's box, reminding us that 'repetition' is a slippery concept. It is remarkably challenging to draw crisp boundaries between seemingly distinct concepts, such as, for example, 'repetition' and 'variation'. For, at what point exactly does 'repetition' stop being 'repetition'? At what point does 'repetition' spill over into the sphere of 'variation', and vice-versa? Whereas the use of adjectives, such as 'literal', 'near-literal', or 'varied' repetition may create some degree of terminological nuance, the conceptual boundaries between these are equally blurry and continue to neglect the rich diversity that ranges from exact, literal repetition on the one hand, to variation on the other (Figure 3.1).

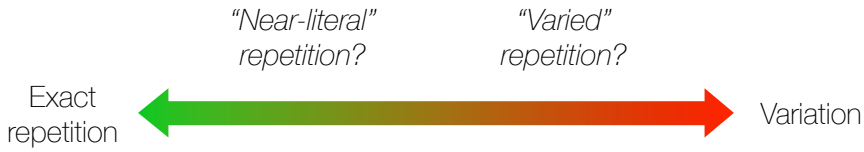

Figure 3.1: Repetition as a slippery concept

Concentrating primarily on issues of musical form and syntax, Richard Middleton distinguishes between 'musematic' or short, motivic repetitions on the one hand, and 'discursive' or more substantial, architectonic repetitions of entire phrases or sections on the other.[154] Middleton argues that musematic repetitions, such as repeated notes and riffs, are of a more visceral and groove-inducing nature. As such, they are 'far more likely to be prolonged and unvaried' than discursive

[154] Richard Middleton (1983), '"Play It Again Sam": Some Notes on the Productivity of Repetition in Popular Music', in: *Popular Music. Volume 3: Producers and Markets* (Cambridge: Cambridge University Press), p. 238.

repetitions, which contribute to the creation of higher-level musical structures and narratives.[155] In other words, while musematic repetition operates on a syntactic level; discursive repetition works on a surface level, creating musical form and structure.

As Middleton's terminology focuses solely on the length of the repeated material, it overlooks the importance which changes in musical context (e.g. changes in harmonic environment) might have on the ways in which repetition works, or is experienced. Although musematic and discursive repetition are useful terms in discourses on musical syntax, they do not necessarily say much about the nature, mechanisms, and effects of musical repetition.

Building on Middleton's typology, Rebecca Leydon argues that 'the internal structure of an ostinato itself, as well as its interaction with other lines or other ostinati, can suggest a subject with particular kinds of volitional attributes'.[156] Leydon goes on to develop a typology of six 'minimalist tropes' or, put differently, six different expressive ends and experiential effects to which obstinate repetition can serve. These tropes are identified as (1) 'maternal' repetition, which 'evokes a regression to an unimagined state of prelinguistic origins'; (2) 'mantric' repetition, which 'portrays a state of mystical transcendence'; (3) 'kinetic' repetition, which 'depicts or incites a collectivity of dancing bodies'; (4) 'totalitarian' repetition, which 'evokes an involuntary state of unfreedom'; (5) 'motoric' repetition, which 'evokes an indifferent mechanized process'; and (6) 'aphasic' repetition, which conveys notions of cognitive impairment, madness, or logical absurdity'.[157] Each of these tropes is tied to a type of 'musical subject', which Leydon describes as that 'what listeners *become* while they are engaged with a piece of music'.[158] While Leydon's typology is one of the first to explicitly acknowledge repetition's 'great variety of expressive purposes', and successfully identifies six of those, it lacks in providing any concrete answers as to *how* exactly those purposes are achieved.[159]

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[155] Richard Middleton (1990), *Studying Popular Music* (Philadelphia, PA: Open University Press), p. 269.
[156] Rebecca Leydon (2002), 'Towards a Typology of Minimalist Tropes', in: *Music Theory Online* 8/4, §9. Available at http://www.mtosmt.org/issues/mto.02.8.4/mto.02.8.4.leydon.html (accessed on 23 July 2019).
[157] Ibid.
[158] Ibid., §2.
[159] Leydon does, however, acknowledge that her article is but a 'preliminary study' and suggests for future research to 'pay attention to the relative duration and complexity of repeated segments, the relationships among strata, the range of differentiation among musematic and discursive parsing within a piece, and the expressive nature of the vacuum that absent syntactical processes leave behind'. See: Rebecca Leydon (2002), 'Towards a Typology of Minimalist Tropes', in:

A completely different approach is taken by David Lidov, whose typology focuses on the correlation between the number of times a musical unit is repeated, and the effects of that on human attention. The first type of repetition he distinguishes is 'formative' repetition, which he describes as the immediate succession of two identical units of musical material. Lidov's formative repetition is primarily syntactic in function, as it 'defines the units of a musical work and establishes their position in a hierarchy of longer and shorter segments'.[160] A formative repetition can be 'varied' when the second iteration of the repeated unit is not identical, yet merely similar to the first. In that case, Lidov argues that the mere presence of variation will establish 'equivalences and oppositions between different features of the material'.[161] In other words, Lidov claims that the listener's attentional focus will be drawn to those elements that have changed, rather than to those which have stayed the same. What really defines formative repetition, then, is that 'the material but not the repetition, per se, attracts attention'.[162]

Whenever a musical unit is repeated more than twice, Lidov speaks of 'focal repetition' – a type of repetition which he explains with the example of a classical sequence. Lidov argues that focal repetition gives the impression of being strongly goal-oriented, and that the mere fact of something being repeated more than twice will draw the listener's attention.[163]

The third and final type of repetition which Lidov describes is 'textural repetition', in which the musical unit is repeated so many times that it 'cancels out its own claim and our attention and, thereby, refers our focus elsewhere (to another voice or to a changing aspect)'.[164] Lidov argues that such a transfer of focus might already happen after four or five repeats, claiming that 'the figure maintains, nevertheless, a transcendental influence on our musical consciousness'.[165]

Music Theory Online 8/4, §25. Available at http://www.mtosmt.org/issues/mto.02.8.4/mto.02.8.4.leydon.html (accessed on 23 July 2019).
[160] David Lidov (2005), *Is Language a Music? Writings on Musical Form and Signification* (Bloomington & Indianapolis: Indiana University Press), p. 30.
[161] Ibid.
[162] Ibid.
[163] Ibid., pp. 33-35.
[164] Ibid., p. 35.
[165] Ibid.

In other words, Lidov does make several interesting claims about the correlation between the number of times a musical unit is repeated and how that alters our focus of attention. However, just like Middleton, Lidov's typology severely downplays the impact of musical context (e.g. the salience of musical parameters) and cognitive factors (e.g. short term memory) on the ways in which repetition works and is experienced. As Anne Danielsen argues:

> The effects of repetition and difference [...] are highly dependent on context and emerge in combination with other musical aspects. For example, it is neither variation *per se* that produces the goal-directedness of classical tonal music nor repetition *per se* that causes the different states of being commonly associated with repetitive music. Repetition is not automatically equal to nonhierarchical or nonlinear forms, or to different trancelike, meditative, or regressive conditions (depending upon one's perspective); variation is not automatically equal to linear, discursive, or teleological forms. Instead, it is particular combinations of repetition and variation, and their interaction with other musical parameters, which produce such effects.[166]

In Lang's *Monadologie* series, obsessive repetition produces an experience of disorientation; of gradually drifting off and eventually getting lost in a strange musical landscape. Take, for instance, Lang's *Monadologie XXIII: ...for Stanley K.* (2013) for large orchestra (audio example 1). The work opens with an explicit and quasi-literal quotation of the opening bars to Richard Strauss' symphonic poem *Also sprach Zarathustra!* (1896). It is safe to assume that Strauss' opening fanfare lingers in the mind of many Western listeners, for, in addition to being a staple in the symphonic repertoire, the work has also made numerous appearances in popular film and television culture. In fact, the work is perhaps most known for its appearance in Stanley Kubrick's 1968 film *2001: A Space Odyssey*, in which it was prominently featured.

[166] Anne Danielsen (2018), 'Time and Time Again: Repetition and Difference in Repetitive Music', in: Olivier Julien and Christophe Levaux (eds.), *Over and Over: Exploring Repetition in Popular Music* (New York & London: Bloomsbury Academic), p. 40.

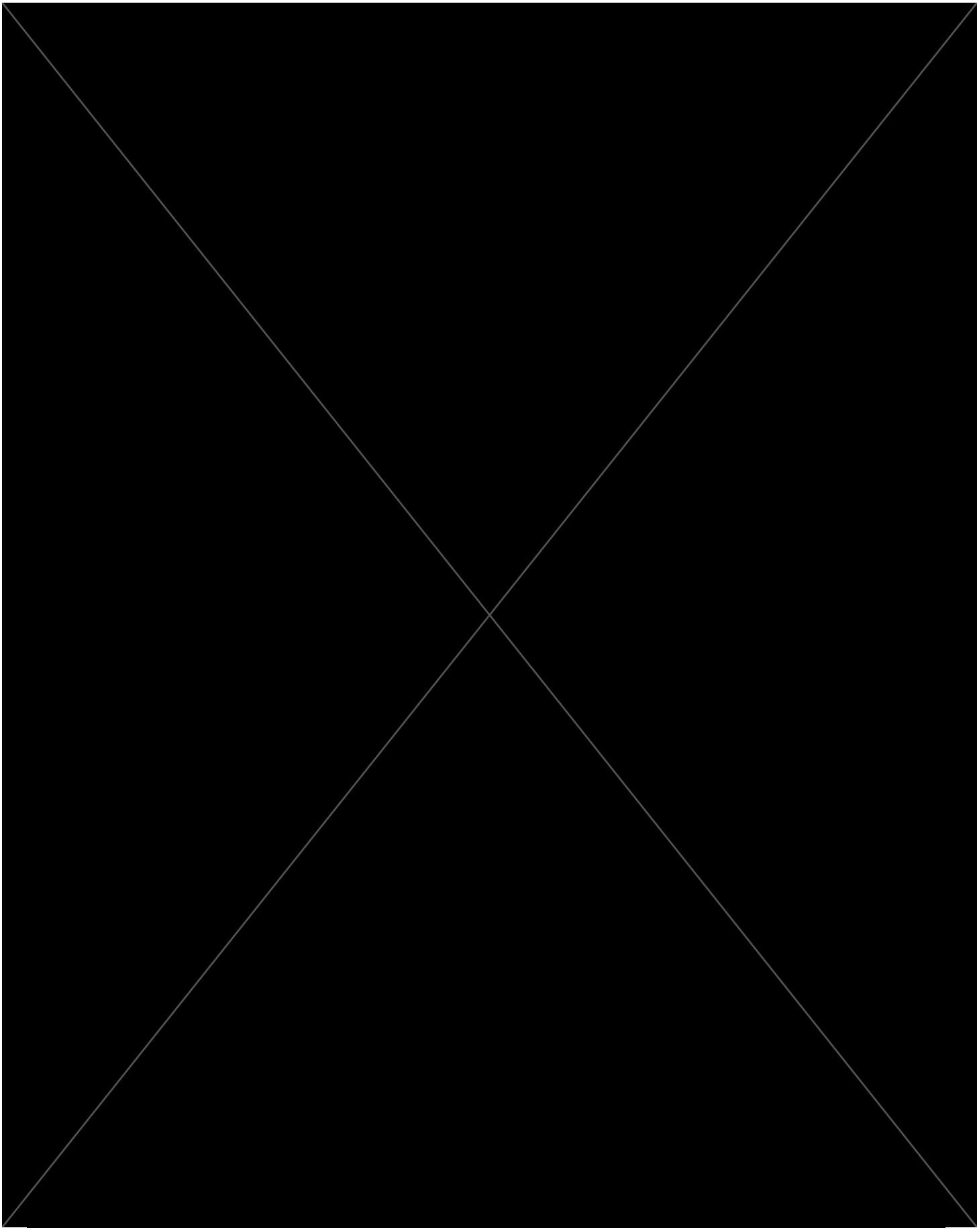

Figure 3.2: Opening to *Monadologie XXIII: ...for Stanley K.* (2013)

Linda Hutcheon argues that, 'if an adapted work is a canonical one, we may not actually have direct experience of it, but may rely on a generally circulated cultural memory'.[167] If the listener is even vaguely familiar with Strauss' opening fanfare – be it either through actual familiarity with the work or through the generally circulated cultural memory thereof –, it is safe to assume that, in listening to Lang's *Monadologie XXIII*, they will experience a sense of pleasure in identifying the original material – a subconscious reflex which Robert Zajonc identified as the 'mere exposure effect'.[168] In that case, the listener will automatically and instantaneously form a mental expectation of how this music is supposed to proceed.[169] However, after the first presentation of Strauss' opening statement, its iconic opening *fortepiano* seems to get stuck in an endless repetition (Figure 3.2). This is, of course, far from the outcome we, as listeners, had anticipated. All of a sudden, it seems as though we are listening to an old vinyl record of *Also sprach Zarathustra!*, which is being played on a broken record player. The needle seems to be stuck in a single, yet irregular groove; erratically skipping backwards and forwards across the record's surface. Something seems off with the speakers connected to the record player too, as the volume blasting through them aimlessly shifts from one dynamic range to another.

As the looped material locks into a hiccupping and distorted repetition, in which a new iteration always sounds *more or less*, but never *really* the same, the familiar quickly dissolves into the unfamiliar. Only a few seconds into the piece, the borrowed material seems to be drifting and deteriorating. What started as a confident familiarity with Strauss' opening motif, has quickly shifted into the realisation of being lost in Lang's strange musical landscape. The listener finds themselves in an unfamiliar place of confusion, disorientation and bewilderment, without any recollection of where they are or how they got there.

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[167] Linda Hutcheon and Siobhan O'Flynn (2013), *A Theory of Adaptation* (New York: Routledge), p. 122.
[168] The 'mere exposure' or 'familiarity' effect, as identified by Robert Zajonc in the 1960s, is the psychological phenomenon by which people are more inclined to develop a preference for stimuli with which they are already familiar. Interestingly, several follow-up studies revealed that the mere exposure effect was independent of conscious stimulus recognition. In fact, data analysis showed that conscious thought tended to weaken the effect, suggesting the phenomenon to be more of a subconscious reflex. See: David Huron (2006), *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge, Massachusetts: The MIT Press), pp. 132-134; 141.
[169] Lang purposefully tries to intensify this subconscious reflex by predominantly selecting canonical works as a starting point for his *Monadologie* series (see Appendix I for an overview).

In the CD liner notes for Lang's *Differenz/Wiederholung 2* (1999), a multimedial work for amplified ensemble, three vocal soloists, and video, Jan Jagodzinski describes a similar experience:

> Bernhard Lang's DW2 presents the listening eye and the (eye)ing ear with a challenge: the usual securities of comfortable viewing, understanding and listening that form the ground of representation are swept away. The viewer/listener is thrown into the 'midst of things' struggling immediately to find mooring onto anything that will give the completion of a predicated sentence of the sung voice, an articulated visual letter on the screen, or the welcomed relief of following a melodious passage to its completion. But, no such resting periods are given. None can be found.[170]

But how can repetition – a phenomenon which is so intimately linked to ideas of sameness, similarity, identity, and stability – function as a mechanism of drift and disorientation? What exactly is it about these obsessive repetitions that triggers the cognitive experience of wandering off into a strange and unsteady musical landscape?

The first step towards developing an understanding of how Lang's pervasive repetitions can trigger the experiences of drift and disorientation is to differentiate between the different types of musical repetition at work in his oeuvre. In the next two sections, a distinction is therefore made between the implications and effects of repetition understood as sameness (that is, what we intuitively understand when we speak of 'exact' or 'literal' repetition – the type of repetition that is prevalent in the *Differenz/Wiederholung* as well as the *Theater der Wiederholungen* series), and of repetition understood as similarity (that is, what we intuitively understand when we speak of 'near-literal' or 'varied' repetition – the type of repetition that characterises the *Monadologie* series).

[170] Jan Jagodzinski (2000), 'The oral/*e* Eye', in: Bernhard Lang, *Differenz/Wiederholung 2* [CD liner notes] (Vienna: KAIROS).

3.3 Repetition as sameness

When we think of repetition, we tend to intuitively think of it in terms of sameness: as the simple act of saying things twice; of reiterating a previous action, idea, or statement. The inclination to equate repetition with sameness harks back to a long-standing tradition in Western thought: that of thinking about and interacting with the world in terms of well-defined identities. For a large part, Western thinking upholds the narrative that everything has some kind of essence or substance, an 'identity' which is stable and fixed – an integrated whole.

3.3.1 Identity-thinking in music

A similar tendency towards identity-thinking is embedded in the ways we intuitively engage with music, too. Edward Campbell rightfully points out that 'there are many ways in which we can conceive of music in terms of sameness or identity'.[171] For, indeed, the ways in which we speak and think about music are deeply rooted in notions of identity and representation. Many listeners will, for example, have a favourite version, interpretation or recording of any given piece of music. As a result, their preferred version will often be deemed to be the piece's primary identity, serving as a benchmark model against which all other versions are compared.

Furthermore, the very notion of the musical work is often intuitively equated with, or even reduced to seemingly fixed identities, such as 'the score', and 'the composer'. Several music-analytical methods, for example, set out from the notational model that is the score as a definitive and absolute representation of the work. Commenting on this situation, Judy Lochhead remarks that:

> Analytical investigation tends to address musical works, or parts of them, as identifiable pieces of music. [...] Works are often linked to a notated score, a tangible document that provides performance guidelines, and analytical investigation has often focused on these scores as an "objective" indication of the work and its structure.[172]

[171] Edward Campbell (2013), *Music After Deleuze* (London & New York: Bloomsbury Academic), p. 3.
[172] Judy Lochhead (2016), *Reconceiving Structure in Contemporary Music: New Tools in Music Theory and Analysis* (New York & London: Routledge), pp. 69-70.

The idea of repetition as an exact restatement of a previous musical element – be that a note, a rhythm, a motif, or even an entire section – is also supported visually in the score. In traditional notation, musical repetition is often signposted visually by a repeat sign, which suggests that the repeated material remains fixed and invariable during the entire process.

The previous chapter already indicated that the traditional measure repeat symbol (') is prevalent in Lang's earlier, handwritten scores. In the accompanying notes to his score for *Differenz/Wiederholung 2* (1999), for example, Lang stresses the fact that 'the repeat sign refers to *all* parameters of a repeated bar. These repetitions are extremely mechanical in nature and are to be performed with the *least possible degree of variation*' (Figure 3.3).

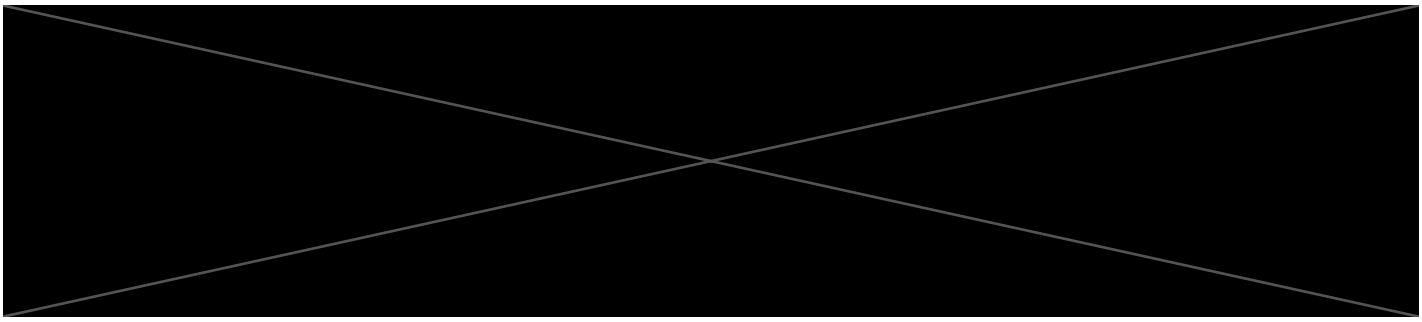

Figure 3.3: Excerpt from the accompanying notes to *Differenz/Wiederholung 2* (1999)

It is, however, important to acknowledge that it is virtually impossible for a human performer to attain such exact 'mechanical' repetitions. John Cage alludes to this very issue in a letter to his friend, the Dutch writer J. Bernlef, in which he describes his experience of sitting through a marathon performance of Erik Satie's *Vexations* (ca. 1883-1884). This short piano piece, which has been described as 'the first minimal piece', consists of a self-repeating chain of chords over a thirteen-note bassline.[173] According to Satie's inscription at the top of the score, *Vexations* is to be played no fewer

[173] Robert Orledge (2001), 'Satie, Erik Alfred Leslie', in: *Grove Music Online*. Available at https://0-doi-org.wam.city.ac.uk/10.1093/gmo/9781561592630.article.40105 (accessed on 17 May 2019).

than 840 times in a row.[174] Reflecting on his experience of the concert, which allegedly lasted for over eighteen hours[175], Cage writes:

> In September, 1963, we had ten pianists to play one of Satie's Vexations in relays [...]. The effect of this going on and on was quite extraordinary. Ordinarily, one would assume there was no need to have such an experience, since if you hear something said ten times, why should you hear it any more? But the funny thing was that it was never the same twice. The musicians were always slightly different with their versions, their strengths fluctuated.[176]

In other words: the exact same musical material might sound completely different when played by different performers. An empirical experiment by Alf Gabrielsson further illustrates the impossibility of exact repetition in performance. Figure 3.4 shows the difference in expressive timing between two pianists playing the opening bars of Wolfgang-Amadeus Mozart's *Piano Sonata in A Major* (K. 331). Gabrielsson's experiment primarily proves (1) that timing in performance tends to deviate from the notated durations prescribed in the score, and (2) that different performers will make different expressive choices with regards to timing.

More importantly, however, the experiment also reveals a difference in expressive timing between two statements of the same material, as it is played by one and the same performer. This is indicated visually in Figure 3.4 through the use of solid and dotted lines. Whereas the solid line in each of the two graphs shows the pianist's timing on their initial statement of Mozart's opening phrase, the dotted line shows the same pianist's timing on its subsequent reiteration. The two graphs shown in

[174] The inscription at the top left corner of Satie's undated score for *Vexations* reads: 'In order to play the theme 840 times in succession, it would be advisable to prepare oneself beforehand, and in the deepest silence, by serious immobilities' ('Pour se jouer huit cent quarante fois de suite ce motif, il sera bon de se préparer au préalable, et dans le plus grand silence, par des immobilités sérieuses'). As the work was neither published nor performed during the composer's lifetime, there is no musicological evidence to support the idea that Satie actually intended the work to be performed 840 times in a row. Nonetheless, the idea to do so has gained popularity after the work's première on 9 September 1961, during a marathon performance organised by John Cage.
[175] Harold C. Schönberg et al. (1963), 'Music: A Long, Long, Long Night (and Day) at the Piano', in: *The New York Times* (11 September), p. 45.
[176] John Cage in a letter to J. Bernlef, pseudonym of Hendrik Jan Marsman, dated 4 December 1965, in: Laura Kuhn (ed.) (2016), *The Selected Letters of John Cage* (Middletown, Connecticut: Wesleyan University Press), p. 333.

Figure 3.4 thus indicate a significant change in the performer's expressive timing between the theme's initial statement and its later repetition.[177]

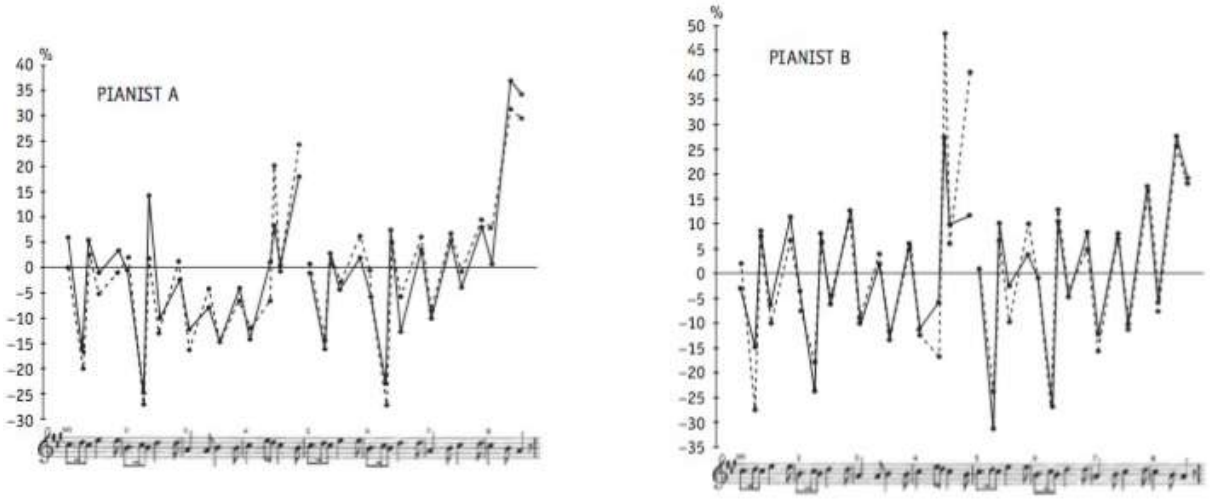

Figure 3.4: Difference in expressive timing in the performance of the opening theme from Mozart's Piano Sonata in A major (K. 331) on its first statement and its later repetition (indicated by solid and dotted lines) by two different pianists: pianist A and pianist B (Gabrielsson, 1987)

In other words, Gabrielsson's experiment demonstrates the impossibility of exact acoustic repetition in performance, showing that even though a performer might set out to play the exact same material twice, microscopic shifts in expressive timing are likely to occur. Although exact acoustic repetition can, in other words, never be achieved in human performance, it *can*, of course, be obtained through the use of various technological devices, such as tape recorders, turntables, digital samplers, drum machines; or programmed on digital audio workstations.

[177] Alf Gabrielsson (1987), 'Once again: The theme from Mozart's piano sonata in A major (K. 331). A comparison of five performances' in: Alf Gabrielsson (ed.), *Action and Perception in Rhythm and Music: Papers Given at a Symposium in the Third International Conference on Event Perception and Action* (Stockholm: Royal Swedish Academy of Music), pp. 81-103.

3.3.2 Repetition as (the illusion of) difference

Even in those cases in which we are confronted with exact acoustic repetition (e.g. a digitally looped sample), we might not necessarily experience it as such. In fact, a prolonged passage of exact musical repetition may not primarily *sound* as repetition – as the continuous reiteration of the exact same thing, being reaffirmed over and over again. DJ Kool Akiem describes his personal experience of ongoing exact repetition as follows:

> Sometimes I'll put a loop on and let it play for, like, two or three days… When you do something like that, you get to hear all the different parts and pieces and elements of it that you never really heard before… It probably sounds strange to a lotta [sic] people, but you get to hear stuff that the musician didn't try to put in there. You know what I mean? It's just in there.[178]

In Kool Akiem's experience, repetition is not perceived as an ongoing reiteration of the same. Instead, the artist describes his experience of listening to the same musical material over and over again as one of hearing things that were not initially there; almost as though the material is opening itself up to him, revealing new qualities with each new listen.

The experience of perceptual change described by Kool Akiem is a side-effect of habituation: an attentional process in which the brain decreases in responsiveness when it is confronted with a repeating stimulus. As habituation kicks in, the mind grows bored and insensitive towards the repeated stimulus – a process which David Huron describes as 'the brain's version of been there, done that'.[179]

When confronted with the persistent repetition of the same, the habituated mind tends to wander off quickly. Eagerly on the lookout for new information onto which it can direct its attention, the mind starts scanning through the layers of the repeated musical material, shifting focus across different aspects of it with each new iteration. Put differently, listening to a prolonged passage of

[178] DJ Kool Akiem (1999), cited from: Joseph G. Schloss (2004), *Making Beats: The Art of Sample-Based Hip-Hop* (Middletown, Connecticut: Wesleyan University Press), p. 137.
[179] David Huron (2013), 'A Psychological Approach to Musical Form: The Habituation-Fluency Theory of Repetition', in: *Current Musicology* 96, p.9.

exact repetition induces a transfer of attentional focus (Lidov's 'textural repetition'). As the brain gets tired of the whole, it starts to zoom in on the particular; focussing instead on the differing timbres and articulations with each reiteration. While every re-statement of the same finally presents itself as a unique set of sonic qualities, every sense of sameness or repeated identity that was initially experienced, withdraws. The result is an illusion of perceptual transformation, described by Judy Lochhead as 'a musical flow of perpetual alteration, a flow of differing'.[180]

A well-known example of this phenomenon is the so-called 'speech-to-song illusion'; an auditory illusion which was discovered by cognitive psychologist Diana Deutsch (audio example 2). In this experiment, a sentence of ordinary speech is presented, after which a single clause from the utterance is put on loop and repeated ten times in a row. For the vast majority of listeners, a radical change in perception occurs after a few repeats, as they gradually start to infer a melodic contour, as well as elements of pitch and rhythm. As the listeners are finally presented with the full original sentence again, the repeated utterance appears to be sung, rather than spoken.[181]

Deutsch's speech-to-song illusion vividly illustrates the transformational effect repetition can have on our perception of a repeated object. The effect is perhaps best explained in terms of attention: bored by the incessantly repeated same, the listener's attention eagerly shifts to any other available domain. In the case of the speech-to-song illusion, for example, the listener's attention shifts from the semantic meaning of the spoken utterance to the phrase's musical qualities. A similar attentional phenomenon, described earlier by Leon Jacobovitz in 1962, is semantic satiation: a psychological effect in which persistent repetition of a word or utterance causes it to temporarily lose all semantic meaning for the listener, who then perceives it as a meaningless sound object.[182]

[180] Judy Lochhead (2016), *Reconceiving Structure in Contemporary Music: New Tools in Music Theory and Analysis* (New York & London: Routledge), p. 123.
[181] Diana Deutsch and Trent Henthorn (2011), 'Illusory Transformation from Speech to Song', in: *Journal of the Acoustical Society of America* 129, pp. 2245-2252. Available at http://deutsch.ucsd.edu/psychology/pages.php?i=212 (accessed on 29 August 2018).
[182] Leon Jakobovits (1962), *Effects of Repeated Stimulation on Cognitive Aspects of Behavior. Some Experiments on the Phenomenon of Sematic Satiation* (Ph.D. Thesis: McGill University). Available at http://www.soc.hawaii.edu/leonj/499s2000/banaag/semantic-satiation.htm (accessed on 6 June 2016).

More recently, research by Rhimmon Simchy-Gross and Elizabeth Hellmuth Margulis has proven that repetition can also musicalise non-speech sounds, such as, for example, musical pitches or environmental sounds. As opposed to Deutsch's speech-to-song illusion, the experiments conducted by Simchy-Gross and Margulis showed that the illusion of perceptual transformation was maintained regardless of whether the repetitions were exact or not.[183] In an interview about their findings, Margulis argues that:

> No matter the constituent material, whether it's strings of syllables or strings of pitches, it seems that the brute force of repetition can work to musicalize sequences of sounds, triggering a profound shift in the way we hear them. [...] [T]he simple act of repetition makes a new way of listening possible.[184]

Prior to these discoveries in the domains of semantics and music cognition, composers such as Steve Reich had already been exploring the transformational power of repetition in their compositional practice. In two of Reich's early tape experiments, *It's Gonna Rain* (1965) and *Come Out* (1966), a short spoken utterance is put on loop and repeated several times before being subjected to a gradual phasing process. As the phrase is stubbornly repeated, the listener's attention is rapidly drawn away from its semantic contents and redirected onto its musical features. In other words: in these two examples, repetition erodes the semantic content of a spoken phrase, rather than reinforcing it.

This is what Gilles Deleuze calls the 'paradox' of repetition; that it is at the same time both defined by sameness and by difference. While our theoretical understanding of musical repetition is usually one of sameness – an idea that is supported visually in the score –, its phenomenal experience is one of ongoing difference:

> Repetition changes nothing in the object repeated, but does change something in the mind which contemplates it. [...] Does not the paradox of repetition lie in the fact that one can speak of repetition only by virtue of the change or difference that it introduces into the mind which contemplates it? By virtue of a difference that the mind draws from repetition?[185]

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[183] Elizabeth Hellmuth Margulis and Rhimmon Simchy-Gross (2018), 'The sound-to-music illusion: Repetition can musicalize nonspeech sounds', in: *Music & Science* 1, pp. 1-6.
[184] Elizabeth Hellmuth Margulis (2014), 'One More Time: Why Repetition Can Turn Almost Anything into Music', in: Ed Lake (ed.), *Aeon Magazine Online*. Available at https://aeon.co/essays/why-repetition-can-turn-almost-anything-into-music (accessed on 29 August 2018).
[185] Gilles Deleuze (2011), *Difference and Repetition*, translated by Paul Patton (London: Continuum), p. 90.

The experience of this illusion of transformation – of repetition as difference – is necessarily subjective and is largely dependent on a complex interplay between various cognitive and musical factors, such as the listener's attention span, the focus of their attention and the capacity of their short-term memory, as well as the length and the complexity of the repeated material.

Take, for instance, Bryn Harrison's 2014 composition *Surface Forms (Repeating)*, in which a musical unit of forty-three seconds in duration is continuously repeated in either literal or near-literal fashion (audio example 3). Although these repeating sections can clearly be distinguished from the score, they are almost indiscernible in listening. In fact, the composer even admits that he 'had not anticipated [...] just how difficult it would be to actually discern the literal repetitions, that is, the 'joins' between the end of the cycle and the start of a new one'.[186] As the repeating unit is too long and too dense to be retained by our short-term memory, we are unable to consciously register this music as repeating. Instead, the effect is one of 'a continually unfolding textural field, without beginning or end, not dissimilar to the perception of a Shepard tone'.[187]

In some cases, such as Tom Johnson's interactive piano piece *Same or Different? No. 7* (2004), the listener's preconceptions about the piece will also inform what is, and what is not, perceived as repetition (audio example 4). In this work, a short musical cell is repeated twice in a row, after which the audience is asked whether the two musical cells they just heard were the same, or whether they differed from one another. Just like in a coin toss situation, or in a multiple-choice test, the listener does not statistically expect the outcome to be identical with every query – a preconception which will automatically influence the listener's focus of attention and, with that, contribute to the ways in which repetition is experienced.

In other words, although repetition does not alter the actual object of our perception, it does, by default, alter the way in which the repeated object is perceived. There is, in other words, a large

[186] Bryn Harrison (2012), 'Scanning the Temporal Surface: Aspects of Time, Memory and Repetition in My Recent Music', in: *CeReNeM Journal* 3, p. 64.
[187] Ibid., p. 65.

discrepancy between (1) repetition as a theoretical concept, which is intuitively understood in terms of sameness and the reinforcement of a previous identity; and (2) repetition as it is experienced, as a perpetual flux of difference, generating the illusion of never-ending novelty. In an attempt to distinguish between the two, Deleuze differentiates between 'bare repetition', which he defines as a conceptual construct of sameness and identity; and 'covered repetition', which he argues is inhabited by difference:

> The first repetition is repetition of the Same, explained by identity and the concept of representation; the second includes difference, and includes itself in the alterity of the Idea, in the heterogeneity of an "a-presentation". One is negative, occurring by default in the concept; the other affirmative, occurring by excess in the Idea. One is conjectural, the other categorical. One is static, the other dynamic. One is repetition in the effect, the other in the cause. One is extensive, the other intensive. One is ordinary, the other distinctive and singular. One is horizontal, the other vertical. One is developed and explicated, the other enveloped and in need of interpretation. One is revolving, the other evolving. One involves equality, commensurability and symmetry; the other is grounded in inequality, incommensurability and dissymmetry. One is material, the other spiritual, even in nature and in the earth. One is inanimate, the other carries the secret of our deaths and our lives, of our enchainments and our liberations, the demonic and the divine. One is a "bare" repetition, the other a covered repetition, which forms itself in covering itself, in masking and disguising itself. One concerns accuracy, the other has authenticity as its criterion.[188]

3.3.3 The paradox of repetition

Deleuze's paradox of repetition holds two radical implications for the position of repetition as a concept used in current music-analytical discourse. First of all, the discrepancy between musical repetition as a theoretical concept of sameness on the one hand, and as an experience of difference on the other, warrants a certain degree of vigilance in analysis. For, in search of classification and generalisation, most analytical methods tend to portray repetition as an element of stability and sameness (A = A). This idea, which corresponds to Deleuze's concept of 'bare repetition', is supported visually by the score. As has been indicated previously, this is, however, in conflict with

[188] Gilles Deleuze (2011), *Difference and Repetition*, translated by Paul Patton (London: Continuum), p. 27.

the more permeable and fluid ways in which repetition appears to our perception; as Deleuze's 'covered repetition' or an experience of ongoing difference (A ≠ A). Sally Macarthur and Judy Lochhead emphasise the fact that:

> [T]he processes of becoming tend to be repressed in most music research, and [...] this research is dominated by representational modes of thought. Even while recognizing, that not everything can be represented, representational modes of thinking tend to *assume* that it is enough to focus only on those aspects of identity that can be represented.[189]

In his book on *Computation and Human Experience*, Philip Agre suggests that '[t]echnology at present is covert philosophy; the point is to make it overtly philosophical'.[190] Very much the same thing could be said about the music-analytical tools currently at hand, as the ways in which we analytically engage with music are deeply rooted in notions of identity and representation. Hidden just beneath the surface of our analytical interactions with music, sits the deeply essentialist assumption that essence and identity are embedded in the visual representation that is the notated score.

Dora Hanninen draws attention to this issue in her analysis of Morton Feldman's 1987 composition *Piano, Violin, Viola, Cello*.[191] The opening of this piece consists of nine one-bar segments (Figure 3.5). While the first seven segments of this passage contain distinct musical material (bars 1-7), the final two segments (bars 8-9) are exact repetitions of, respectively, segments number two and four (bars 2 and 4). In other words, bars 2 and 8; and bars 4 and 9, have the exact same notational image. When it comes to analysing post-tonal music such as Feldman's, pitch-class set analysis is one of the go-to methods. In terms of pitch-class set and interval vector bars 2 and 8; and bars 4 and 9, are, indeed, identical (Figure 3.5).

[189] Sally Macarthur, Judy Lochhead and Jennifer Shaw (eds.) (2016), *Music's Immanent Future: The Deleuzian Turn in Music Studies* (New York: Routledge), p. 6.
[190] Philip E. Agre (1997), *Computation and Human Experience* (New York: Cambridge University Press), p. 240.
[191] Dora A. Hanninen (2004), 'Feldman, Analysis, Experience', in: *Twentieth-Century Music* 1/2, pp. 238-240.

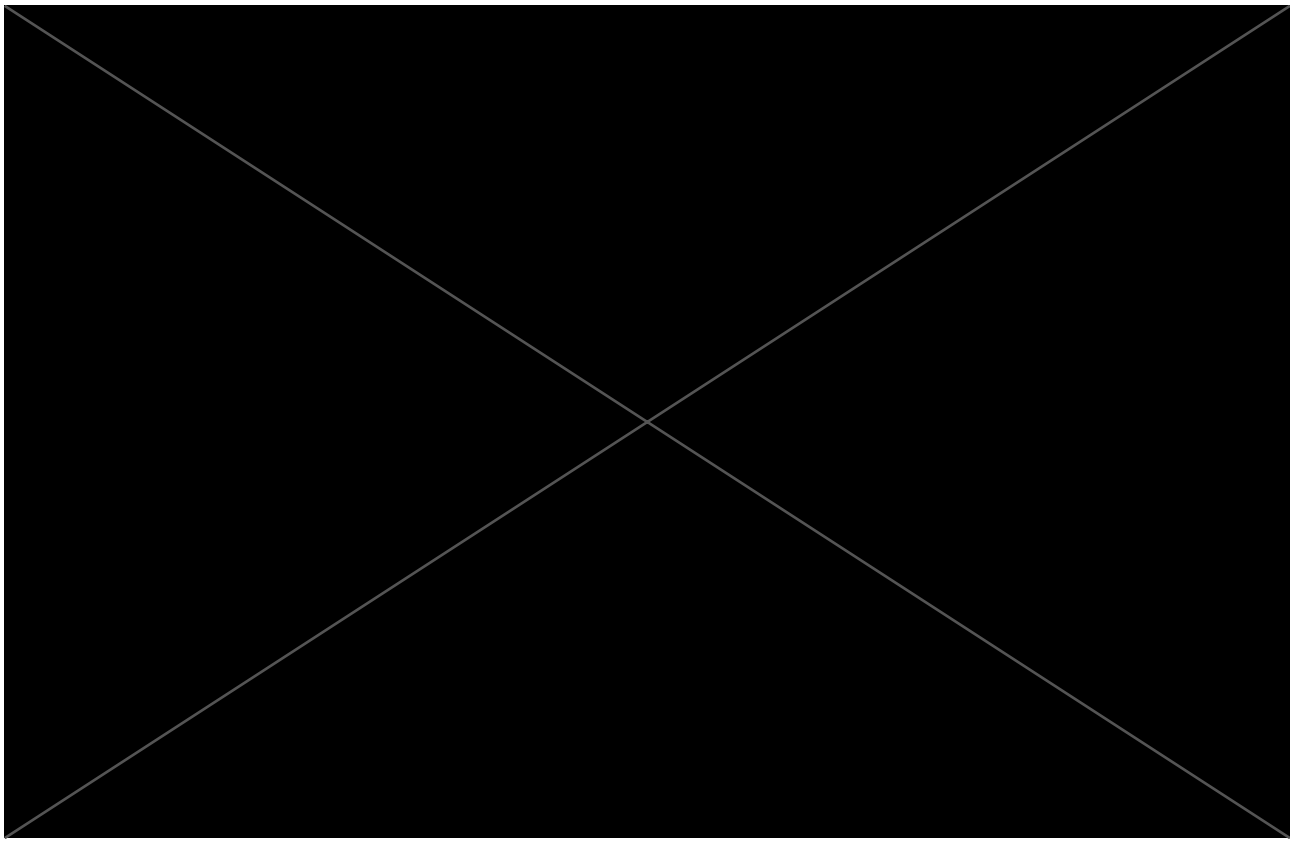

Figure 3.5: Dora Hanninen's analysis of Morton Feldman's *Piano, Violin, Viola, Cello* (1987)

Hanninen, however, maintains that '[a]nalysts tend to work as if musical segments were fixed things, as if repetition conferred identity. [...] But in *Piano, Violin, Viola, Cello*, segments have slippery identities'.[192] Although bars 2 and 8; and bars 4 and 9, are identical in terms of notational image, pitch-class set, and interval vector, Hanninen claims that bar 2 sounds slightly different from bar 8, and that bar 4 sounds slightly different from bar 9. She argues that this is a 'phenomenal transformation of repetition [...] induced by a change in musical context... an *estranged* repetition, in which repetition does not sound (primarily) like a repetition'.[193] In other words, Hanninen claims that the intervening material in bars 3 to 7 and the cell's distinct locations in the score have altered our perception, causing the experience of *difference* instead of *similarity* between bars 2 and 8, and between bars 4 and 9 (audio example 5).

[192] Ibid., p. 249.
[193] Dora A. Hanninen (2003), 'A Theory of Recontextualisation in Music: Analyzing Phenomenal Transformations of Repetition', in: *Music Theory Spectrum* 25, p. 61.

So, even though they are identical in both notational image and analytical interpretation, bars 2 and 8, and bars 4 and 9 do not necessarily *sound* the same. Indeed, whereas the common tools of post-tonal analysis imply a strong sense of identity, there is actually a perceptual non-identity. This suggests that a certain degree of vigilance is required so as to avoid the trap of making category errors; that is, of confusing the map with the territory.

Secondly, the paradox of repetition also suggests the need for new methods in music analysis. More specifically, it invites the analyst to move away from the use of quantitative and structural descriptions of musical repetition, and instead, to direct the analytical focus onto the ways in which musical repetition is experienced in both cognition and perception. To put it in the words of Judy Lochhead: when dealing with musical repetition, 'analysis must seek evidence beyond that of the score'.[194] Dora Hanninen takes up a similar position, as she argues that:

> If one thinks of music analysis as being not so much about pieces as about experiences of pieces, a reasonable place to start is at the centre of that experience. [...] [W]e must be willing to analyse not only the music but also ourselves – our habits of thinking, hearing, and doing music analysis; and our understanding and expectations of what music analysis is or can be. [...] [W]hen *notes* are repeated, the *sound* may change. [...] As repetitions of individual segments – traditionally a building block in music analysis – dissolve into multiple perceptions, the analyst must make a choice: to retreat from the disjunction between notes and sounds, or to engage with it.[195]

The tools currently at hand for dealing with musical repetition as it is perceived and cognitively experienced are, however, limited. A crucial step in this direction has, nonetheless, been taken by Dora Hanninen in her theoretical work on musical recontextualisation. Her research provides a conceptual framework for 'analysing phenomenal transformations of repetition according to the (perhaps combined) means that produce them – changing relations among ideas and instances, instances and segments, and segments and their structural interpretations'.[196] In other words, Hanninen's theory of recontextualisation allows the analyst to explore the changing relationships

[194] Judy Lochhead (2016), *Reconceiving Structure in Contemporary Music: New Tools in Music Theory and Analysis* (New York & London: Routledge), pp. 69-70.
[195] Dora Hanninen (2004), 'Feldman, Analysis, Experience', in: *Twentieth-Century Music* 1/2, p. 228; 239.
[196] Dora A. Hanninen (2003), 'A Theory of Recontextualisation in Music: Analyzing Phenomenal Transformations of Repetition', in: *Music Theory Spectrum* 25, p. 94.

between repeated musical objects and their musical contexts. In that respect, Hanninen's theory focuses predominantly on those instances in which the same musical material appears in different contexts throughout a specific work.

Nonetheless, the analytical tools developed by Hanninen are hard to transfer onto to those musical works, such as Lang's, which encompass prolonged passages of exact repetition. In these cases, strings of literal repetition are presented without any change of context between them, other than the inevitable passing of time. Take, for instance, bars 241-245 from Lang's *Differenz/Wiederholung 1.2* (2002), a work for flute, tenor saxophone and piano (Figure 3.6; audio example 6). Here, three distinct musical cells or building blocks are presented (respectively A, B, and C). After the A-material is presented a total of six times in a row, the B-material is repeated three times, after which the C-material is, finally, stated not once, but twice.

As we zoom in on the A-material, there is little else to be said analytically apart from the mere fact that it is repeated six times in a row. Other than the linear progression of time, there is no change of context between the individual repeats whatsoever – that is, no changes in pitch constellation, rhythm, or register; no intervening material to influence the listener's perception; no temporal dispositions, etcetera. Aside perhaps from the microscopic, inevitable, and moreover, unintended nuances in expressive timing and dynamics caused by the human performer, there is nothing here but an extended period of exact acoustic repetition.

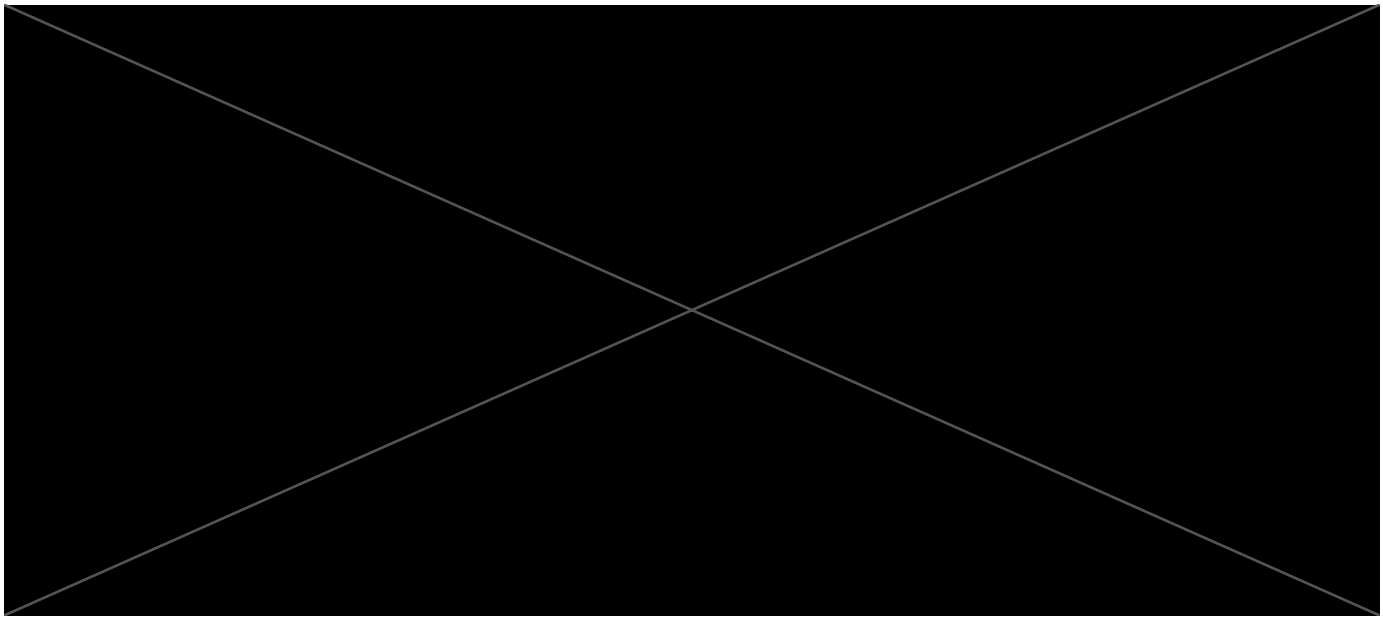

Figure 3.6: Repetition of three distinct musical cells in *Differenz/Wiederholung 1.2* (2002), bars 241-245

Yet, while the score suggests a high degree of sameness (A = A), the experience of listening to this passage is one of a digression into difference (A ≠ A). In other words, the experience of listening to these repeating cells is comparable to that of looking through a kaleidoscope: although the object of perception remains stable and invariable, it is perceived as though it were fluid and ever-changing. There are, however, no established analytical methods that account for this experience. Confronted with the discrepancy between repetition as a concept of sameness on the one hand, and as a musical experience of difference on the other, the analyst is left with surprisingly little to say.

In that respect, the paradox of repetition invites and welcomes further research. Music theory can, for example, find a way forward in a move towards more qualitative approaches, that give special attention to musical cognition and perception. In that respect, one possibility is to investigate the ways in which exact acoustic repetition is experienced over different timespans. To address the various effects of exact musical repetition in terms of perception, cognition, and experience, would necessarily involve a complex weighting of numerous variables, such as memory, cognitive capacity, attentional focus, and patterns of expectation. In addition to gaining feedback from several types of audiences (i.e. listeners in different age ranges, with different cognitive capacities, different musical preferences, different degrees of musical schooling, etcetera), such an investigation would also need

to take several musical aspects into consideration (e.g. the length and the complexity of the repeated segment, the number of times it is repeated, the relative salience of its different musical parameters, etcetera). To create an analytical toolkit that takes into account the effects of exact acoustic repetition as it is experienced over prolonged passages of time, would, therefore, most likely need to be an interdisciplinary project in which music theorists join forces with psychologists, cognitive scientists, and possibly even mathematicians. This, however, falls beyond the scope of this study.

A second way of moving forward, and also the route taken in this dissertation, is to initiate a change in the analytical discourse that surrounds musical repetition. In their research, Sally Macarthur and Judy Lochhead urge the analyst to challenge unity as an analytical premise, to surpass representational and identity-based modes of analytical thought, and instead, to embrace 'the processes of becoming' that are activated in most music: 'to talk about those unknowable aspects of identity in ways that acknowledge its complexity and that it is always emergent and multiple'.[197] In this respect, a useful terminological toolkit for thinking about repetition is offered by Deleuze's differential ontology, which provides a fresh and not in the least dynamic perspective on musical repetition. For, in its Deleuzian sense, repetition is the very antithesis of unity, fixity, or identity. Instead, it is understood as a productive force that gives rise to variation in and through each repetition. Deleuzian repetition, in other words, is inhabited by difference. As Adrian Parr writes:

> [R]epetition is best understood in terms of discovery and experimentation; it allows new experiences, affects and expressions to emerge. To repeat is to begin again; to affirm the power of the new and the unforeseeable. In so far as life itself is described as a dynamic and active force of repetition producing difference, the force of which Deleuze encourages us to think of in terms of 'becoming', forces incorporate difference as they repeat giving rise to mutation.[198]

To think of musical repetition in its Deleuzian sense, is to acknowledge it as a place where radical instabilities can arise. Freed from its identitarian purpose, musical repetition becomes a means of musical fluidity, of uncertainty, and even destabilisation. The object of repetition then, is no longer

[197] Sally Macarthur, Judy Lochhead and Jennifer Shaw (eds.) (2016), *Music's Immanent Future: The Deleuzian Turn in Music Studies* (New York: Routledge), pp. 7-8.
[198] Adrian Parr (2010), 'Repetition', in: Adrian Parr (ed.), *The Deleuze Dictionary: Revised Edition* (Edinburgh: Edinburgh University Press), p. 225.

a fixed identity, but a 'process of difference and differentiation that mutates the context through which repetition occurs'.[199] As a result, the task of the analyst shifts from the identification of repeating objects, to the evaluation of musical fluidity.

A similar argument is put forward by Dora Hanninen, who argues that analysis should primarily be an investigation of human experience. Instead of focusing on 'the reduction of sounds and ideas, from individuals to classes, or complex theoretical terms to terms taken to be more fundamental', music analysis should focus on 'interpretation as the *ramification* of sounds and ideas, interpretation as criticism in the literary sense'.[200]

> Some analysts will find the burgeoning possibilities exciting. Others may find them unsettling, and for good reason. Analysis that focuses on the multiplicity of sounds issuing from a single set of notes can rub up against deeply held (or hidden) ideas about music analysis – what music analysis is, and why one does it. [...] Analysis is an inquiry into musical experience; the inspiration for analysis is curiosity.[201]

Chapter 4 of this dissertation takes Hanninen's proposition as a starting point, in assessing and accounting for the experiences of drift, disorientation, and ultimately, of getting lost, which pervasive repetition gives rise to in Lang's 2010 string quartet, *The Anatomy of Disaster*. Leading up to that analytical case-study, the following section focuses on a second type of repetition found in Lang's work: that of near-literal repetition. Here, repetition is understood not as sameness, but as similarity.

[199] Ibid., p. 226.
[200] Dora A. Hanninen (2004), 'Feldman, Analysis, Experience', in: *Twentieth Century Music* 1/2, p. 248.
[201] Ibid., p. 248; 250.

3.4 Repetition as similarity

Besides being intuitively thought of in terms of sameness, repetition is also fundamentally related to the concept of variation. Stronger even – repetition is a prerequisite for variation. For, to classify an object X' as a variation on a primary and referential object X, is, essentially, to acknowledge that X' is at the same time both *similar to*, as well as *different from* X. In other words, variation encompasses a degree of difference that is significant enough to be acknowledged as such (X' is not X), yet that is also subtle enough not to be understood as a complete departure from its referential object (X' is not Y). From this point of view, repetition is not primarily understood in terms of *sameness*, but as *similarity*; as a type of reiteration in which some, but not all characteristics of the repeated object remain the same.

According to Elisabeth Margulis, musical variation exposes the ways in which the mind tends to wander when it is faced with exact acoustic repetition. She argues that musical variation 'mimics' the subjective process of phenomenal transformation, in that '[i]t takes the shifting qualities that a listener normally imposes on the music and repositions them within the music itself'.[202] Deleuze, too, speaks of variation as 'the spirit of every repetition'; as 'the essence of that in which every repetition consists':

> When we are confronted by a repetition which proceeds masked, or comprises displacements, quickenings, slowdowns, variants or differences which are ultimately capable of leading us far away from the point of departure, we tend to see a mixed state in which repetition seems to be employed symbolically, by analogy or metaphor. [...] However, we wished to show the coexistence of these instances in every repetitive structure, to show how repetition displays identical elements which necessarily refer back to a latent subject which repeats itself through these elements, forming an "other" repetition at the heart of the first. We therefore suggest that this other repetition is in no way approximative or metaphorical. It is, on the contrary, the spirit of every repetition. It is the very letter of every repetition, its watermark or constitutive cipher. It forms the essence of that in which every repetition consists: difference without a concept, non-mediated difference. It is both the literal and spiritual primary sense of repetition. The material sense results from this other, as if secreted by it like a shell.[203]

[202] Elizabeth Hellmuth Margulis (2014), *On Repeat: How Music Plays the Mind* (New York: Oxford University Press), pp. 176-177.
[203] Gilles Deleuze (2011), *Difference and Repetition*, translated by Paul Patton (London: Continuum), pp. 27-28.

In other words, variation can in itself be seen as a specific type of repetition – that is, as one in which the phenomenon is primarily conceived of in terms of similarity, rather than sameness.

3.4.1 The same, but different

Variation – a type of repetition understood here as 'the same, but different' – is operative in several of Lang's scores. Instances of 'varied' or 'varying' repetition are predominantly, yet not exclusively, found in the works contained in his *Monadologie* series. Nonetheless, the degree to which Lang tends to introduce elements of variation from one repetition to the next, is remarkably, if not microscopically small. In Lang's varied or varying repetitions, the sense of sameness generally seems to outweigh that of difference.

Consider, for example, Figure 3.7, which shows a particular instance of varied or varying repetition in Lang's *Differenz/Wiederholung 2* (1999). Here, a musical cell comprising a single bar (68a) is repeated seven times (68a-g). This is made explicitly visible in the score, the visual image of which is dominated by the traditional measure repeat symbol (𝄎). Over the course of these seven repetitions, however, a number of minor alterations take place within the repeated object. More particularly, subtle changes are situated in the double bass, the percussion, and the keyboard parts.

In the double bass part, relatively minor changes in pitch content, rhythmic structure and articulation occur. More specifically, in bar 68d, the disappearance of the pitches A_2 and B_3, as well as the A_4 pizzicato, result in a slight change of rhythmic structure. As the *marcato* accent on the middle B_3" has disappeared as well, bar 68d also contains a minor change in articulation. As soon as bar 68e, however, the rhythmic structure of bars 68a-c is restored, as the B_3n at the end of the cell is reintroduced. The concluding pizzicato is restored as well, albeit no longer *marcato* and pitched on B_4 instead of A_4. An A_2 now accompanies the B_3" in the middle of the cell.

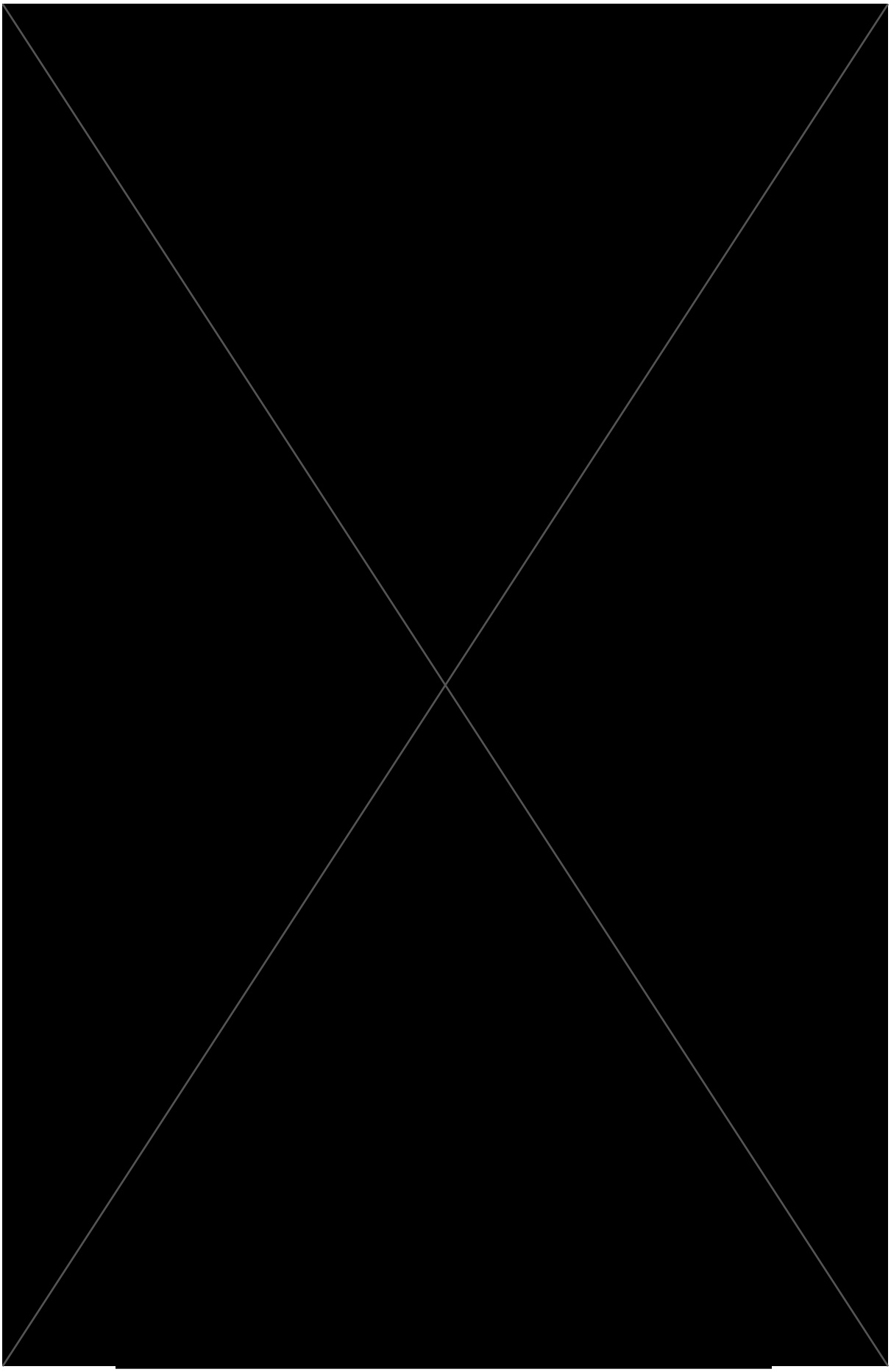

Figure 3.7: Repetition as similarity in *Differenz/Wiederholung 2 - I: Dead Repetition* (1999), bars 68a-g

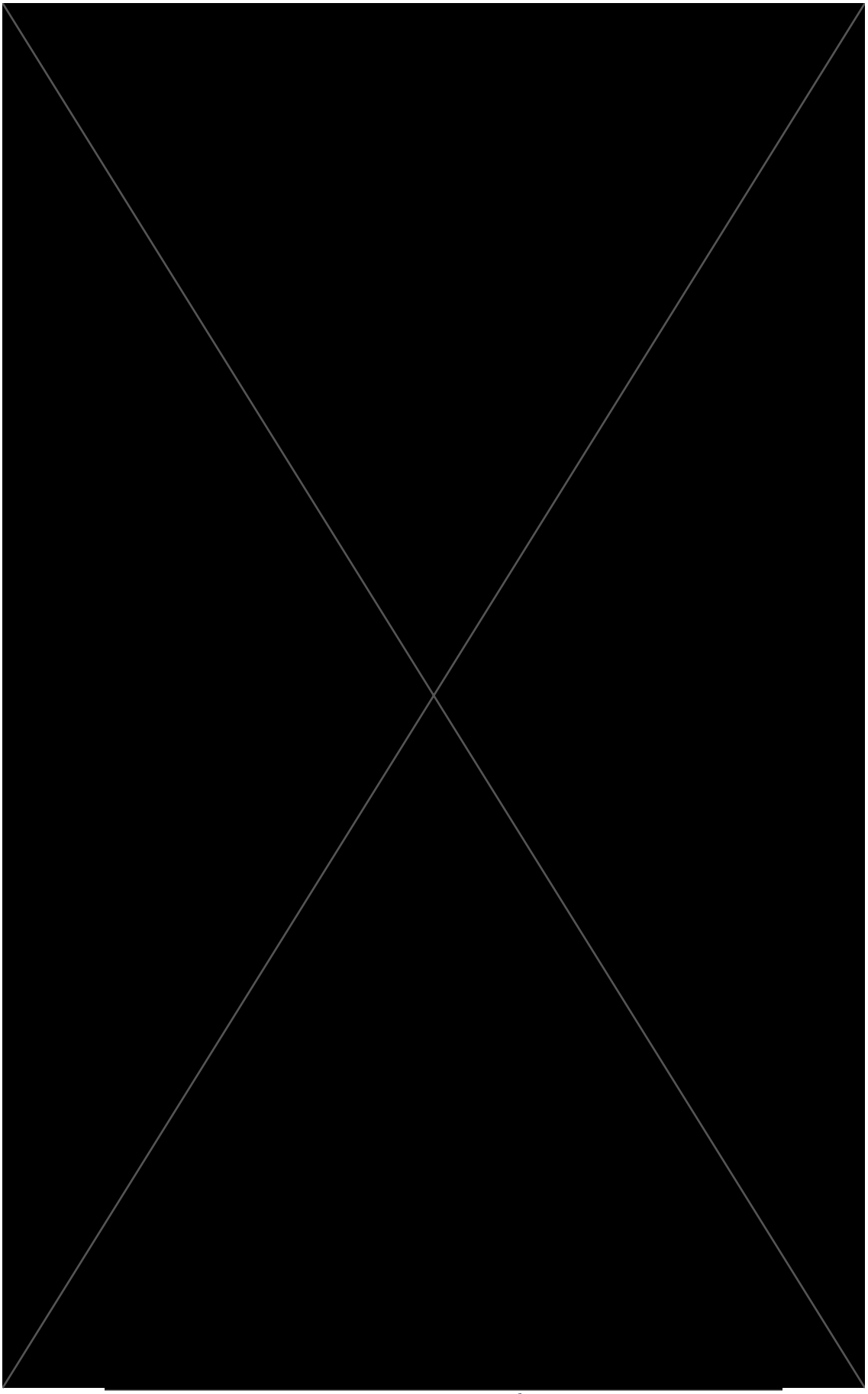

Figure 3.7 Continued

The changes that occur in the two percussion parts are strictly rhythmic in nature. In the first percussion part, a *marcato* semiquaver is added onto the last beat of bar 68d, the whole of which is then repeated another three times over the course of bars 68e-g. In the second percussion part, bar 68e differs slightly in rhythmic structure from its previous iterations, as the metric division of the cell is converted from nonuplets into sextuplets. As soon as bars 68f-g, however, the previous rhythmic structure (that of bar 68a) is reinstated.

Finally, in the two keyboard parts, a minor change in tone quality or timbre occurs. Over the course of bars 68a-f, keyboard player 1 is asked to gradually turn their modulation wheel all the way up. Meanwhile, keyboard player 2 is asked to perform a reverse trajectory over the course of bars 68a-e, starting with the modulation wheel turned all the way up and slowly turning it all the way back down. As Lang's score does not specify any particular settings for the keyboards' modulation wheels, it is safe to assume that these are programmed to perform their most common function, which is to add in vibrato. Although the digital sample that is being played on both keyboards remains the same throughout the entire passage, the act of simultaneously opening up and closing down the modulation wheel will create a spatialised timbral crossfade.

When pointed out from the score one by one, the amount of change occurring over the course of bars 68a-g seems to be quite significant. In listening to this passage, however, it is extremely difficult to pick up on any of these changes (audio example 7). Several factors are at play here. For starters, the passage is but a brief and fleeting moment within a larger movement, and takes up mere seconds in duration. Secondly, elements of change are exclusively situated in the double bass, the percussion, and the keyboard parts, while the surrounding material – that is, the material contained in the tenor saxophone and the two cello parts – remains unvaried throughout.

Range of variation

A more objective way of indicating the amount of diversity (or, alternatively, the amount of sameness) in this passage, is to look at it in terms of its 'range of variation'. This metric, developed by Dora Hanninen, specifies just how much variation or uniformity a set of related musical objects contains, by weighting and comparing their global properties (such as pitch content and rhythm).[204] Figure 3.8 looks at the range of variation in bars 68a-g by breaking the passage up into seven distinct layers of repeating material. These layers largely correspond to each of the instrumental parts; the only exception being the two keyboard parts, which both play the exact same material and which, as such, form one coherent instrumental layer. In each of the seven instrumental layers, the repeated cell is confined to the first bar of the passage (bar 68a), which is reiterated a total of seven times (bars 68a-g). Hypothetically, since we are investigating the richness or diversity of variation within each of these seven instrumental layers, each reiterated cell could take on a total of seven distinct shapes, forms, or identities.

Looking at the seven reiterated cells of musical material (bars 68a-g) in each of the instrumental layers and comparing them in terms pitch content, rhythm, timbre, and articulation, shows that the passage is actually relatively uniform, in that it contains only a minor degree of variation.[205] More specifically, Figure 3.8 suggests that the passage gravitates towards a range of variation that equals 1, meaning that in most instances, the repeated cell only takes on one single form or identity over the course of seven iterations, and that there is, in other words, no variation. In the tenor saxophone and the two cello parts, the repeated cell does not shift identities over the course of the passage, as no transformation occurs. Although variation does occur in four of the seven instrumental layers, the repeated cells never shed all of their distinctive qualities (that is, change is never situated in all four musical parameters simultaneously).

[204] See: Dora A. Hanninen (2012), *A Theory of Music Analysis: On Segmentation and Associative Organisation* (Rochester: University of Rochester Press), pp. 102-114.
[205] The seven reiterated cells contained in each of the two percussion parts are not evaluated in terms of pitch content, as the two percussion parts are strictly non-pitched.

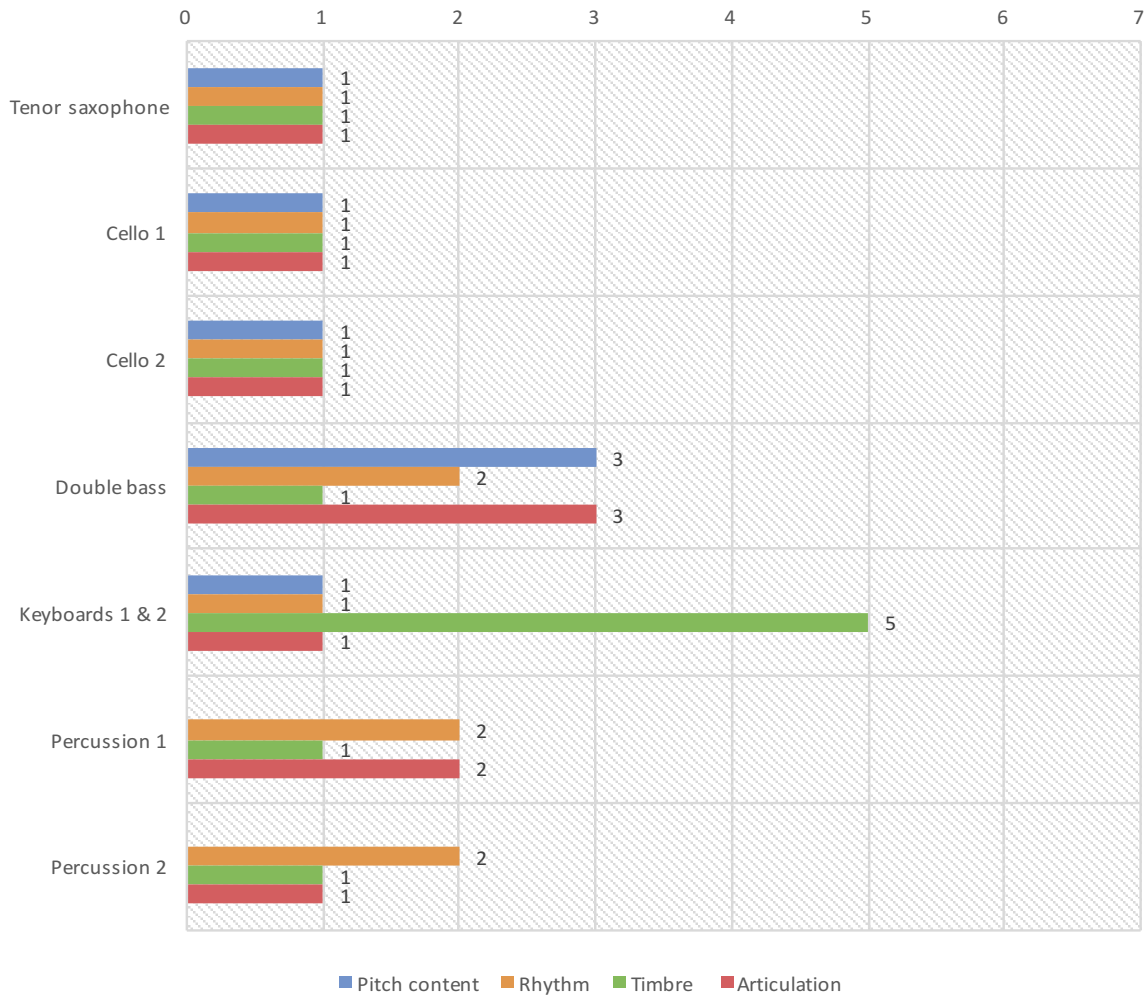

Figure 3.8: Range of variation in *Differenz/Wiederholung 2 - I: Dead Repetition* (1999), bars 68a-g

In the double bass and the two percussion parts, variation is limited too. In the double bass part, the repeated cell takes on three distinct identities in terms of pitch, three in terms of articulation, and two in terms of rhythm. In terms of timbre, however, the repeated cell remains constant and unvaried. The same goes for the two percussion parts, which also remain fixed in terms of timbre. In both percussion parts, the repeated cell takes on two distinct rhythmic identities. In terms of articulation, the repeated cell remains unvaried in the second percussion part, while taking on two distinct identities in the first. The cell's range of variation is at its largest in the two keyboard parts. Although the repeated cell here remains stable and unvaried in terms of pitch, rhythm, and articulation, it takes on no less than five distinct timbral identities over the course of a mere seven repetitions.

It is important to note, however, that Hanninen's range of variation does not provide any information about the perceptual salience of these shifting identities. While Figure 3.8 clearly shows just how many (or, in this case, just how few) different identities the repeated cells take on, the data visualised here is entirely score-based. As such, it fails to map to the perceptual experience of this passage in the act of listening. For, even though Hanninen's metric indicates that there is a certain amount of variation embedded in this passage, these transformations are extremely subtle in terms of perceptual salience. The keyboard's timbral crossfade, for instance, is hardly noticeable, especially when listening to a recorded version of the work. While the listener's attention is drawn to the lively and highly rhythmic material in the string parts, the spatialized effect created by the two keyboards fades into the background. Other elements of change seem to disappear into a perceptual environment of sameness too. There is, however, no straightforward way to capture these hierarchies of salience, apart from creating an intuitive weighting. Once again, we are faced with the analytical limitations that surround musical repetition as it is experienced.

Distribution of variation

A second metric developed by Hanninen, which she calls the 'distribution of variation', aids in explaining why the aforementioned transformations slip under the radar in the act of listening. Hanninen defines a passage's distribution of variation in relation to its range of variation. While a passage's range of variation shows the analyst how many different shapes or identities a repeated cell takes on, its distribution indicates the frequency by which each of those identities occurs.

Figure 3.9 shows bars 68a-g in terms of their distribution of variation, which is represented numerically over a number of seven reiterations. While a flat distribution suggests that no variation occurs over the course of seven reiterations, a distribution of, for instance, 2/34 indicates that the repeated cell takes on two distinct identities; the first of which is repeated three times in a row, and the second of which is repeated four times in a row.

What Figure 3.9 reveals, is that elements of variation never occur simultaneously in each of the seven instrumental layers. Elements of change or transformation are, in other words, always embedded in surrounding layers of sameness, or exact acoustic repetition.

More importantly, however, Figure 3.9 also demonstrates that in most cases, elements of change are transient and fleeting. In both the double bass and the second percussion part, for example, rhythmic change does not occur until the last of seven repeats. In the double bass part, the second of three articulation- and pitch-based identities is only heard once; sandwiched between a group of three repeats. These new identities are, in other words, never reinforced nor emphasised.

It comes as no surprise that the two keyboard parts show a broad distribution in terms of timbre. Here, the repeated cell swiftly moves through five interrelated timbral identities, before final locking into two repetitions. Here, in particular, the timbral differences between repeated cells are not only extremely subtle, but also transient, fleeting, and unpredictable.

	ARTICULATION	PITCH CONTENT	RHYTHM	TIMBRE
TENOR SAXOPHONE	1 / flat	1 / flat	1 / flat	1 / flat
CELLO 1	1 / flat	1 / flat	1 / flat	1 / flat
CELLO 2	1 / flat	1 / flat	1 / flat	1 / flat
DOUBLE BASS	3 / 313	3 / 313	2 / 61	1 / flat
KEYBOARDS	1 / flat	1 / flat	1 / flat	5 / 111112
PERCUSSION 1	2 / 34	not pitched	2 / 34	1 / flat
PERCUSSION 2	1 / flat	not pitched	2 / 61	1 / flat

Figure 3.9: Range of variation compared to distribution (range/distribution) in *Differenz/Wiederholung 2 - I: Dead Repetition* (1999), bars 68a-g

In summary, while elements of change do occur in bars 68a-g, they are extremely subtle, unsynchronised, and fleeting. Lang's varied repetitions are, in other words, both conceptually and experientially much closer to 'repetition' than they are to 'variation'. The phenomenon is thus best described as a 'microvariation': a minute, hidden or semi-hidden variation within a repeated musical cell or identity, which lingers just below the threshold of perception.

3.4.2 Microvariation and drifting repetition

In this dissertation, the term 'microvariation' will be used to indicate a type of repetition in which a repeated musical cell or identity is subjected to a minimal and almost imperceptible degree of variation. The changes occurring within the repeating cell or identity can differ in nature: they can either involve temporal, harmonic, intervallic, dynamic, and timbral elements; or combinations of these. Moreover, these changes appear to occur in a haphazard and chaotic manner, without any clear-cut processes underlying them. The idea is similar to that unfolding in the opening of Peter Ablinger's *Anfangen (: Aufhören)* (1991). Here, the exact same violin attack is repeated a total of twenty times, with the only element of change being the extremely irregular and unpredictable temporal spacing of the repeated element (Figure 3.10; audio example 8).

Conceptually, the microvariation is also close to what Dora Hanninen describes as '*semblances* of repetition – numerous, often uncoordinated, adjustments in duration, timbre, and pitch'.[206] What truly sets the microvariation apart, however, is its tacit, concealed nature. As the changes occurring within the repeated material are so minute, the element of change does not, or barely, enter the realm of the consciously perceivable. This, again, illustrates the perceptual malleability of repetition: in this case, varied repetition is not necessarily perceived as such.

[206] Dora A. Hanninen (2004), 'Feldman, Analysis, Experience', in: *Twentieth-Century Music* 1/2, p. 227.

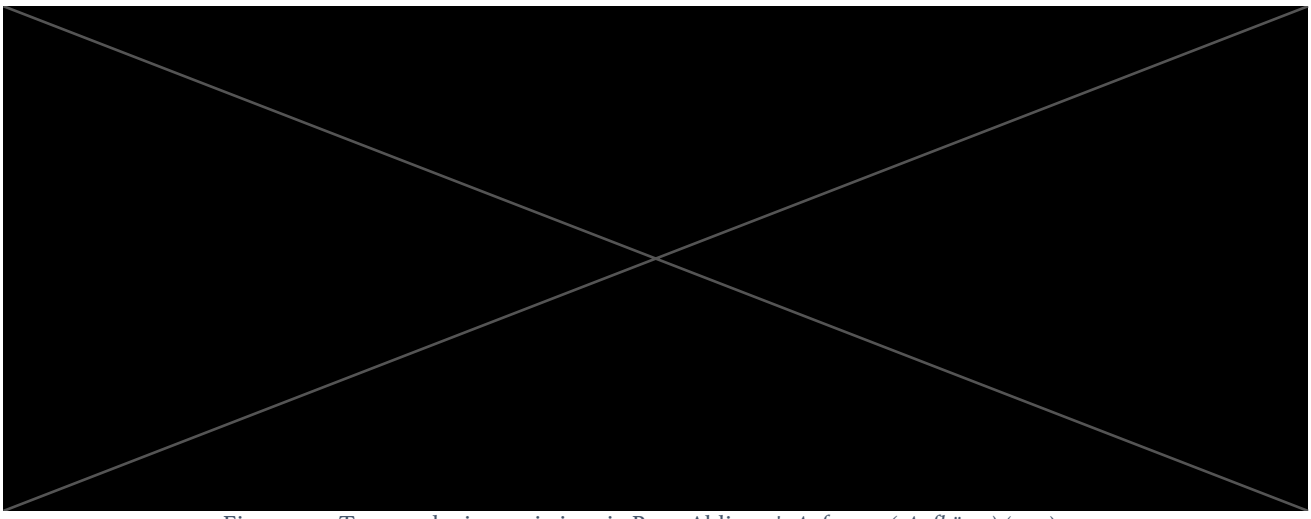

Figure 3.10: Temporal microvariations in Peter Ablinger's *Anfangen (: Aufhören)* (1991)

Ultimately, microvariations are nuances in musical syntax, defined here as minor variations in musical events occurring at the level of the repeated pattern. As such, microvariation could be identified as what Bob Snyder calls a 'low-information strategy' for 'memory sabotage'. For, by keeping change to a bare minimum, the microvariation 'attempts to sabotage recognition and expectation by frustrating recollection and anticipation, thereby intensifying the local order of the present'.[207] Snyder explains:

> Usually, low-information strategies at the melodic/rhythmic level involve gestures that are very similar, but not necessarily identical. Because they tend to interfere with each other, such gestures [...] are *difficult* to separately identify and remember. Being within-category distinctions, they are perceptible but not well remembered. Such nuances often give us the sense that the present is somehow "varying" in relation to the past, but we cannot remember exactly how.[208]

Although elements of change or variation might hardly be perceptible on a loop-to-loop level, the microvariation does have a remarkable perceptual effect when considered over a larger timescale. For, although a precise moment of change is unlikely to stand out, a series of transformations is still unfolding, however delicately, over time. Even though the slight deviations from one repetition to the next might not be the most readily salient, they work on the listener subliminally, over time

[207] Bob Snyder (2000), *Music and Memory: An Introduction* (Cambridge, MA: The MIT Press), p. 234; 236-237.
[208] Ibid., p. 236.

taking on a life of their own as the sequence of differing events gradually accumulates to finally become larger than the sum of its parts.

In the act of listening, the percipient is kept restlessly lingering in the in-between, only gradually becoming aware that the repeated material is no longer the same as it was at the start. Experientially, the effect is one of spinning out and away, of losing one's way and eventually getting lost in a strange and complex landscape. Lang's subtly varying repetitions, in other words, seem to be drifting, as they aimlessly wander about without any particular goal or destination in mind. In his own work, Morton Feldman refers to this phenomenon as 'a disorientation of memory', whereby 'there is a suggestion that what we hear is functional and directional, but we soon realise that this is an illusion; a bit like walking the streets of Berlin - where all the buildings look alike, even if they're not'.[209]

3.4.3 Calculating the unforeseen

In Lang's *Monadologie* series, microvariations are generated through the use of cellular automata algorithms, which are an integral part of the compositional software environment CadMus. Cellular automata (CA) are discrete and abstract computational systems, widely used to model dynamic systems. The basic idea is 'disarmingly simple', according to N. Katherine Hayles, and is often described as a dynamic system in which a finite set of values evolve in space and time.[210]

The idea is most commonly explained through the use of a stylised, visual example, such as the one shown in Figure 3.11. Imagine, for instance, a one-dimensional row of squares, in which each square represents a cell that can be either 'on' or 'off' – two states which are represented visually by either colouring the squares black in case they are 'on', or leaving them blank in case they are 'off'. For each

[209] Morton Feldman (1981), 'Crippled Symmetry', in: B. H. Friedman (ed.) (2000), *Give My Regards to Eighth Street: Collected Writings of Morton Feldman* (Cambridge, MA: Exact Change), p. 138.
[210] N. Katherine Hayles (2005), *My Mother Was a Computer: Digital Subjects and Literary Texts* (Chicago, Illinois: The University of Chicago Press), p. 18.

cell, an arbitrary initial state ('on' or 'off') is defined. Subsequently, a set of transition rules is also defined, which will stipulate the ways in which the cells are to interact with their immediate neighbours; i.e. the two cells that are directly adjacent to them. Transition rules are applied simultaneously to all the cells in the array, and determine the step-by-step evolution of the system, or, put differently, the behaviour of the cells in the grid from one discrete iteration to the next. With each discrete step, the cellular automaton thus produces a new row of cells, the states of which are based on the states of their neighbouring cells in the previous row. This ultimately results in a self-generating pattern of continually changing states, the behaviour of which may be fully deterministic, seem entirely random, or balance somewhere in-between.

In his book *A New Kind of Science*, Stephen Wolfram defines a total of 256 different transition rules, all of which trigger different behaviours. Wolfram's rule 254, for example, dictates that on every successive iteration of the automaton, a cell is to be turned 'on' in case either its previous self, or any of its two previously horizontal neighbouring cells, were also 'on' (Figure 3.11).

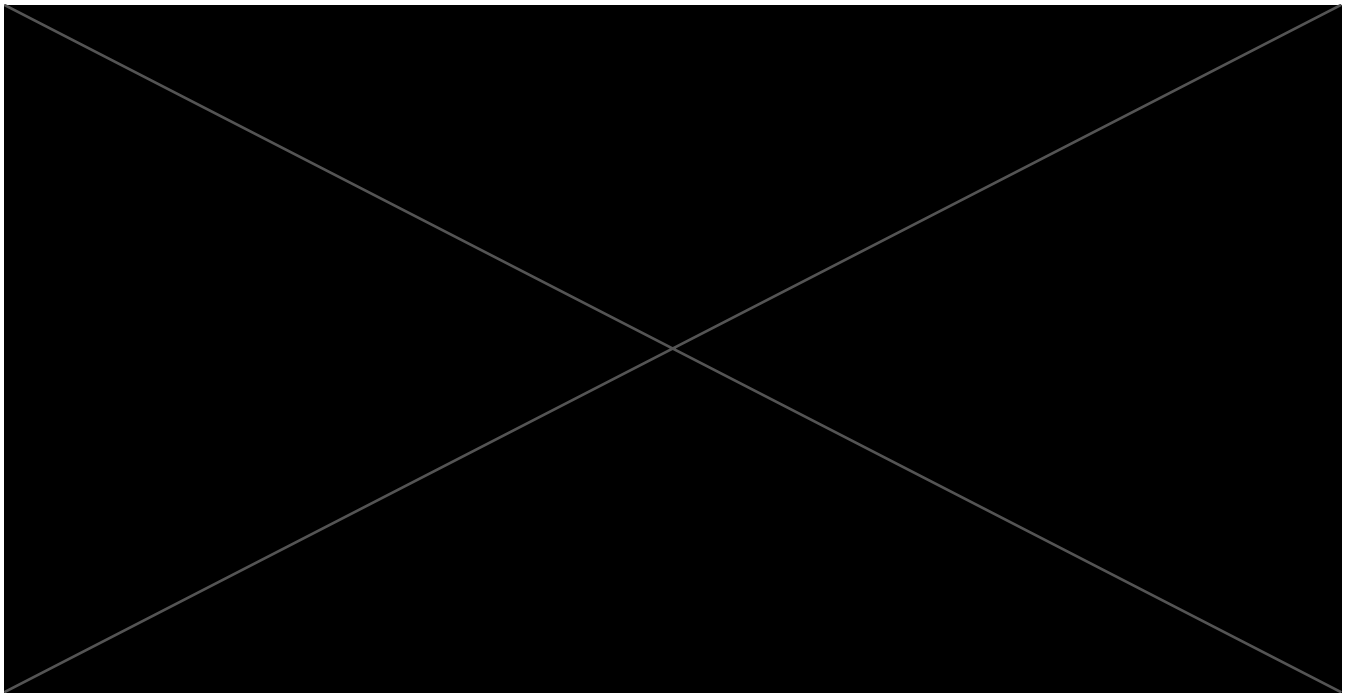

Figure 3.11: Visual representation of a one-dimensional cellular automaton abiding to Wolfram's rule 254
Image taken from Stephen Wolfram (2002), *A New Kind of Science* (Champaign, Illinois: Wolfram Media), p. 24.

Overall, a fairly simple system emerges from Wolfram's rule 254, as a consistently growing black pattern develops out of a single black cell. Other, and equally simple rules, however, give rise to astonishingly complex patterns. Take, for example, Wolfram's rule 30 (Figure 3.12). Here, a highly complex pattern emerges from a single black cell, the behaviour of which seems to balance on the threshold between irregularity and self-similarity. This example illustrates that, while cellular automata are usually based on simple initial conditions on which a simple transformation rule is applied over and over again, these conceptually simple systems are capable of incredibly complex emergent behaviours. Although the automaton performs but logical and deterministic processes, its outcome appears perceptually indeterminate and chaotic.

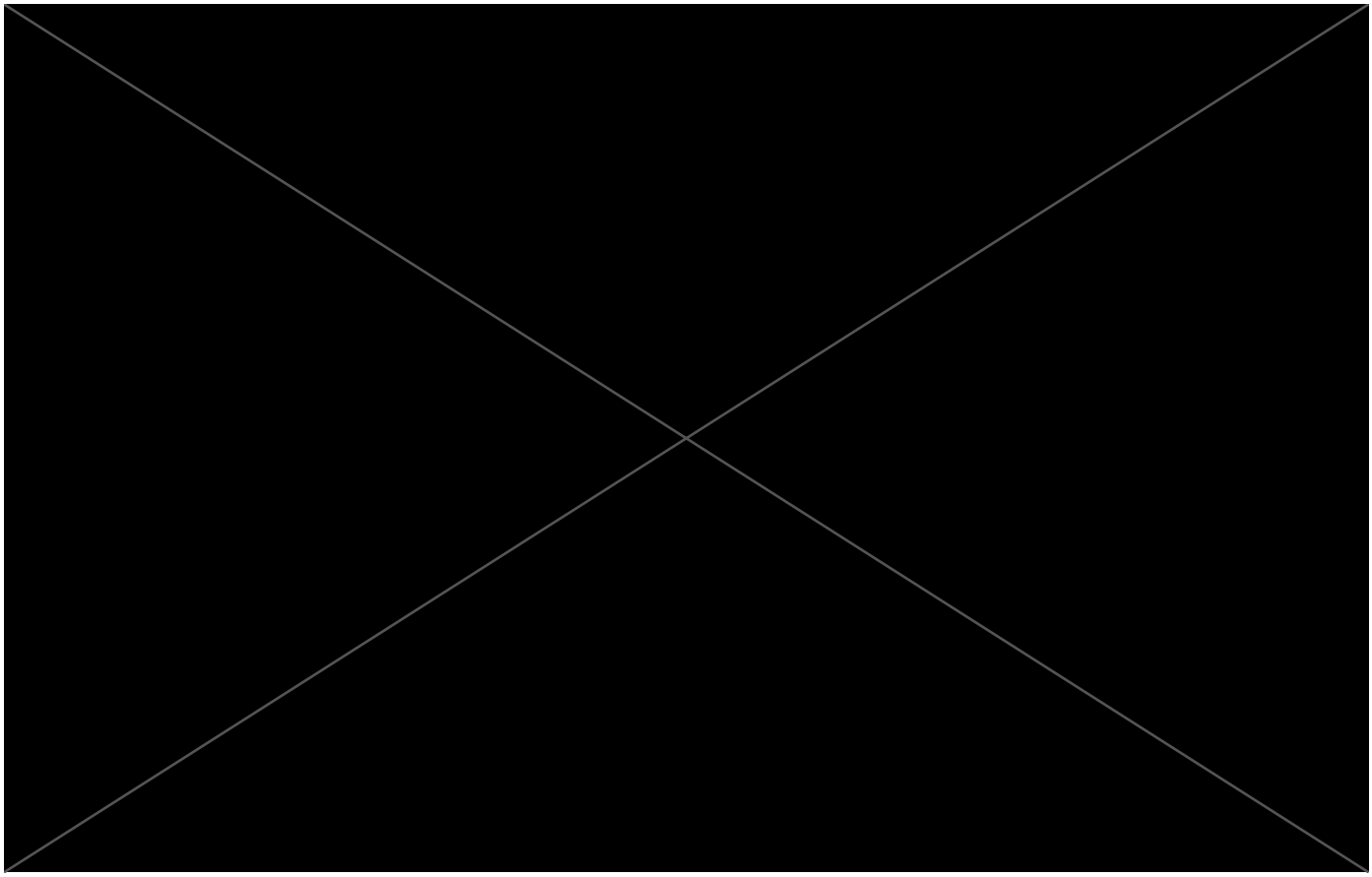

Figure 3.12: Visual representation of a one-dimensional cellular automaton abiding to Wolfram's rule 30
Image taken from Stephen Wolfram (2002), *A New Kind of Science* (Champaign, Illinois: Wolfram Media), pp. 52-53.

Cellular automata have been applied as modelling systems in numerous disciplines, ranging from computer science to biology. More importantly in the light of this study, however, is that they can also model music, which is 'fundamentally time-based and [...] can be thought of as a system in which a finite set of discrete values (e.g. musical notes, rhythms, etc.) evolve in space and time'.[211] Iannis Xenakis was one of the first composers to see the creative potential of cellular automata. In the mid-1980s, Xenakis used cellular automata to model short sequences of chords in his large-scale orchestral work *Horos* (1986). The procedure is perhaps most evident in bar 10, where a sequence of chords grows out of a single, central pitch. With each new chord, the orchestration is recombined as well, creating a kaleidoscopic and ever-changing pattern that evolves in a way that is similar to a cellular automaton (Figure 3.13).[212]

Lang, too, saw creative potential in the use of cellular automata, loosely and manually implementing them for the first time in *Differenz/Wiederholung 12: Cellular Automata* (2003). While in this work, simple cellular automata processes are written out by hand, gradually transforming a musical cell in terms of both pitch and rhythm, computer-generated cellular automata would become a significant compositional tool in Lang's *Monadologie* series. The composer explicitly refers to Wolfram's book as having been of major importance for the inception of this series, insisting that:

> A significant source of inspiration for the *Monadologie* series [...] was Stephen Wolfram's *A New Kind of Science*, which I understand as a new theory of composition.[213]

[211] Eduardo Reck Miranda (2007), 'Cellular Automata Music: From Sound Synthesis to Musical Forms', in: Eduardo Reck Miranda and John Al Biles (eds.), *Evolutionary Computer Music* (London: Springer), p. 170.
[212] James Harley (2004), *Xenakis: His Life in Music* (New York & London: Routledge), pp. 176-180.
[213] Bernhard Lang (2010), 'Monadologie IX: The Anatomy of Disaster'. Available at http://members.chello.at/bernhard.lang/werkbeschreib/ueber_monadologie9.htm (accessed on 1 September 2014): 'Wesentliche Inspirationsquelle für die *Monadologien* [...] war Stephen Wolframs *A New Kind of Science*, welches ich als neue Kompositionslehre verstehe'.

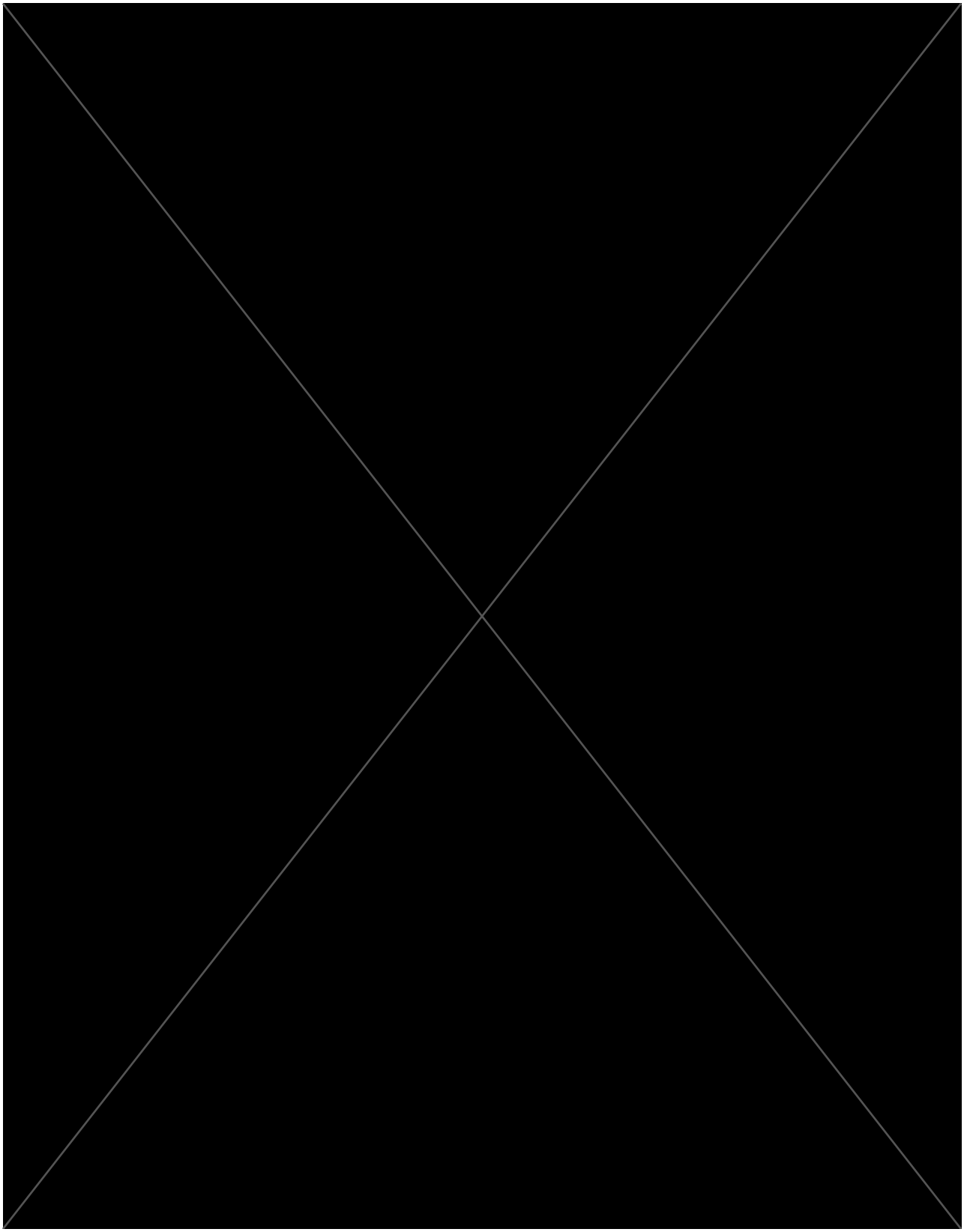

Figure 3.13: Pitch and orchestration chart for Iannis Xenakis - *Horos*, bar 10.
Image taken from James Harley (2004), *Xenakis: His Life in Music* (New York & London: Routledge), p. 178.

Programmed into the core functionality of CadMus, cellular automata algorithms are used by Lang to create chaotic and irregular patterns of change within a predetermined musical cell – that is, within the musical material that is being looped. Lang himself describes the effect as a process of folding and unfolding. He states that 'it's an unfolding. Yes, this is the crucial word. [...] To unfold the intricacies and complexities of change within each iteration'.[214]

In the first step of the process, the cell which is being fed into CadMus – the 'generative' cell – is mapped onto a MIDI grid. More specifically, the generative cell is described in terms of its pitch constellation and its rhythmic structure – the same two parameters that will eventually be subject to computer-generated change. Lang comments that he 'read the x-axis as pitch [and] the y-axis as time in a 128/256 per number of time-gridpoints [sic] of a midi-grid'.[215]

Once the generative cell has been mapped onto the MIDI grid and a transition rule has been selected, the cell will be iteratively processed. In other words, with every new iteration of the cellular automaton, a new musical loop is created. As opposed to the one-dimensional cellular automata discussed before, Lang's are two-dimensional. Each point in the MIDI grid is situated within in a two-dimensional array which defines it terms of both pitch constellation and rhythmic construct, while its iterant behaviour is determined by its four immediate neighbours (Figure 3.14).[216] In other words, each point in the grid maps to a specific pitch and a specific rhythmic value. With each new iteration, the cell is thus prone to exhibit subtle, yet seemingly random changes in terms of pitch constellation and rhythmic build. Lang explains:

> This was my *achievement*! That I was thinking in a two-dimensional grid! [...] Pitches and rhythms were created *simultaneously*! Not overlaying a pitch structure on a rhythmic structure![217]

[214] Bernhard Lang, in an interview with Christine Dysers (Vienna, 27 November 2017).
[215] Bernhard Lang, in personal communication with Christine Dysers, 9 July 2014.
[216] See: Norman H. Packard and Stephen Wolfram (1985), 'Two-Dimensional Cellular Automata', in: *Journal of Statistical Physics* 38/5-6, pp. 901-946.
[217] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).

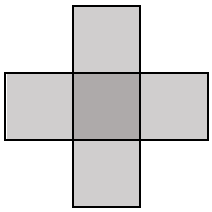

Figure 3.14: Stephen Wolfram's 'five-neighbour square', in which the value of the middle cell is updated according to its own previous state, as well as that of its four surrounding neighbours.

Figure 3.15 shows the entire procedure in simplified form, using an illustrative generative cell and mapping it onto a MIDI grid that is much smaller than Lang's.[218] The second step, of iteratively processing the generative cell, is illustrated here by means of the so-called 'game of life'; a well-known two-dimensional cellular automaton developed by mathematician John Conway. Its transition rules are very straightforward: only cells with exactly two or three active neighbours 'survive', whereas cells with less than two or more than three active neighbours are turned 'off'. A new cell can only be 'born' or activated when exactly three of its neighbours are also 'on'. Figure 3.15 only shows the first iteration of the cellular automaton, which, in this example, leads to a rather drastic transformation of the generative cell. Within Lang's compositional practice, however, the cellular automaton is iterated several times more, as such creating a succession of loops, and usually leads to subtle, microscopic changes on a loop-to-loop basis – i.e. microvariations.

[218] The illustrative MIDI grid used in Figure 3.15 allows for the bar to be divided into a maximum of sixteen semiquavers. In other words, the semiquaver is the smallest possible note value in this grid. The MIDI grid used by Lang in CadMus is, however, much finer. As such, it allows for much shorter note values and more complex rhythms. Lang states that 'this is the finest grid possible, so one quarter note is being divided in 1024 steps. So, I can do quintets, triplets, anything you want.' See: Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).

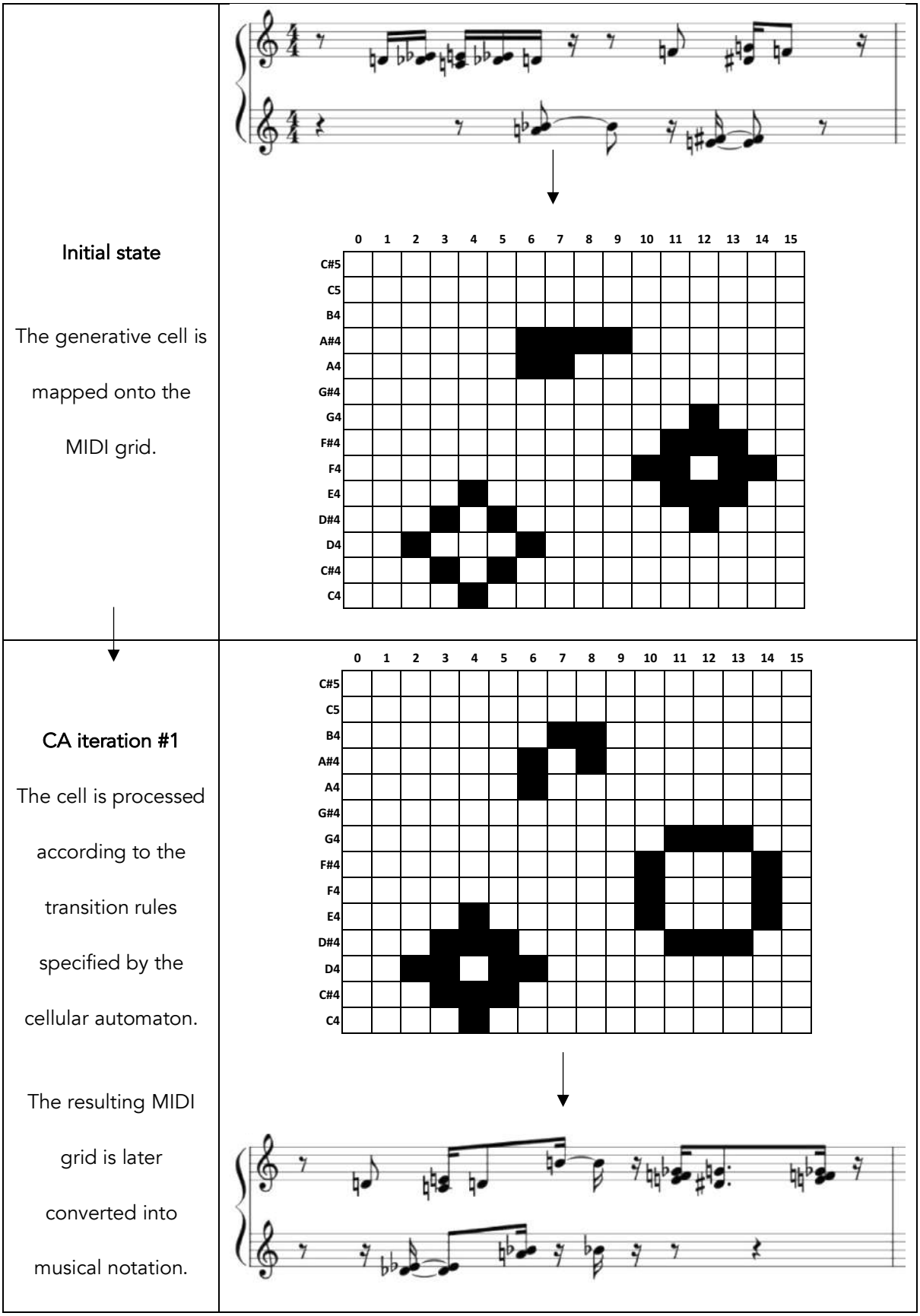

Figure 3.15: John Conway's 'game of life' as a compositional tool: initial state and first iteration

In terms of transition rules, no less than thirty-five distinct processing algorithms are coded into CadMus – one of them being Conway's 'game of life'.[219] Although each of these algorithms implements a specific transition rule as defined by Stephen Wolfram, Lang admits that the exact mappings have been lost in the heuristic process of writing the software.[220] However, from looking at the musical results, it is safe to assume that the transition rules encoded into CadMus are among the more complex in Wolfram's theory, in that they all generate seemingly random, chaotic and unpredictable patterns of change. To be precise, Lang's transition rules are most likely based on Wolfram's so-called 'class-3 cellular automata', which 'exhibit chaotic behaviour, and yield aperiodic patterns'.[221] In these transition rules, 'small changes in initial states usually lead to linearly increasing regions of change'.[222] Corresponding to this assumption, Lang hints at the notion of emergent complexity as being a crucial factor in the *Monadologie* series, claiming that:

> This is about the theory of emergence, of the non-reducibility of a chaotic event to its causal roots. And I play with this. [...] It's one musical seed, and an incredibly complex thing jumping out of this. [...] This is the *idea* of cellular automata! That out of one simple rule, emerges – emergence, the notion of emergence is crucial – emerges something incredibly complex.[223]

The effect of letting a complex cellular automaton run on a simple and well-defined musical cell is perhaps made most explicit in *Monadologie IV: Robotica 1* (2008), a work for unpitched percussion (Figure 3.16). Here, one of the thirty-five cellular automaton algorithms available in CadMus is applied to a musical cell that is two bars in length. Evidently, as the material being processed here is unpitched, the cellular automaton does not operate on the level of pitch in this example. Instead, Lang lets his cellular automaton run on the levels of rhythm and dynamics. From the second loop iteration onwards (bars 3-4), subtle and unpredictable changes in rhythm occur – microvariations, which are hardly perceptible in the act of listening. From the fourth iteration onwards, seemingly random shifts in dynamics start to occur as well (bar 8). The result is a single musical cell that is

[219] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017). Lang mentions that in CadMus, 'rule number 3 [...] is the classical Conway life-rule'.
[220] See Appendix III: Interview with Bernhard Lang (Vienna, 24 November 2017).
[221] Norman H. Packard and Stephen Wolfram (1985), 'Two-Dimensional Cellular Automata', in: *Journal of Statistical Physics* 38/5-6, p. 904.
[222] Ibid.
[223] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).

constantly repeated, though at the same time continuously shifting in a chaotic manner. Lang comments:

> This happens in cellular automata; it's an iterative machine. You feed in something, take the output, and then feed it in again. There is a feedback from input to output. It deviates progressively from the original but the original is always there, that's the interesting thing.[224]

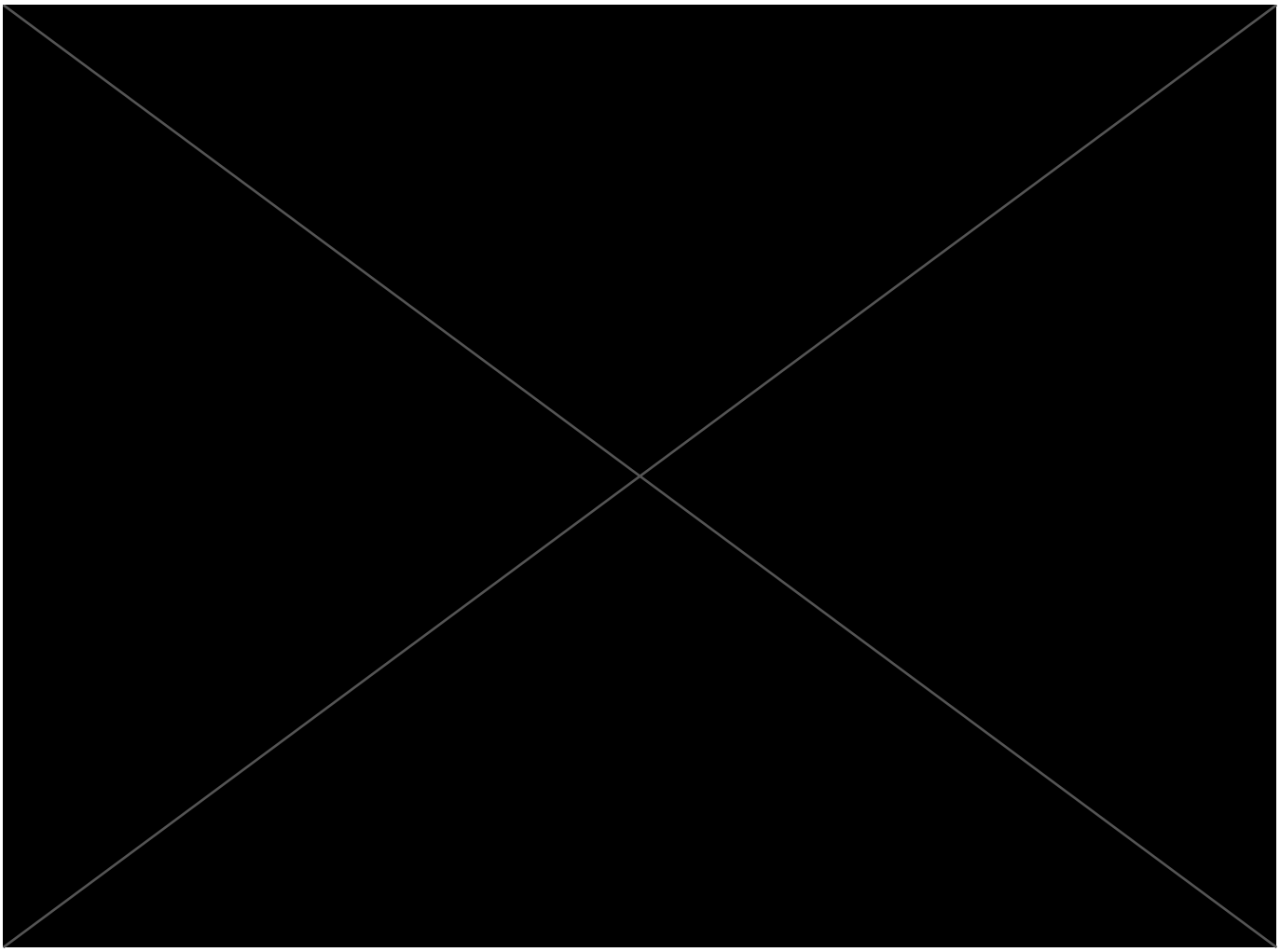

Figure 3.16: *Monadologie IV: Robotica 1* (2008), bars 1-8.

[224] Bernhard Lang (2009), in: Renáta Spisarová (ed.), *Ostrava Days 2009: Report* (Ostrava & New York: Ostrava Center for New Music), p. 133.

In their co-authored book *A Thousand Plateaus*, Gilles Deleuze and Félix Guattari speak highly of cellular automata. They present cellular automata as 'acentered systems', and, as such, as the very antithesis of the centralised systems their joint philosophy so deeply condemns.[225] According to Deleuze and Guattari, cellular automata are defined as:

> [F]inite networks of automata in which communication runs from any neighbor to any other, the stems or channels [of which] do not pre-exist, and all individuals [of which] are interchangeable, defined only by their *state* at a given moment—such that the local operations are coordinated and the final, global result synchronized without a central agency.[226]

This definition is, however, somewhat flawed. As has been indicated previously, the state of the cells operating within a cellular automaton is solely and exclusively determined by that of their immediate neighbours. Deleuze and Guattari's definition, then, inaccurately implies that cellular automata are far less rule-bound than they actually are, and that any type of interconnection or configuration between cells is, thus, possible – an idea pushed to the extreme in their concept of the rhizome. As such, the notion of cellular automata is made to fit the purpose of enacting the Deleuzoguattarian ideal of a rhizomatic, or, in other words, an acentred, non-hierarchical, and chaotically structured mode of thought.[227]

What is, in a sense, rhizomatic, is not so much the cellular automaton in itself, as a coherent set of predetermined states and rules, but the cell's emergent and often unpredictable behaviour. Take, for instance, the musical cell in *Monadologie IV: Robotica 1* (Figure 3.16). Although the cell's movement is guided by a predetermined set of rules, it outwardly seems to be developing freely and in its own time, displaying intricate patterns that 'appear to evolve, grow, invade new territories, or decay and die out'.[228] Its route is unexpected, chaotic, and complex, as if it were wandering around without any specific itinerary or destination in mind. To paraphrase Paul Klee, the cell behaves as though it went

[225] Gilles Deleuze and Félix Guattari (2014), *A Thousand Plateaus*, translated by Brian Massumi (London: Bloomsbury Academic), p. 17.
[226] Ibid.
[227] N. Katherine Hayles (2005), *My Mother Was a Computer: Digital Subjects and Literary Texts* (Chicago, Illinois: The University of Chicago Press), p. 173.
[228] Ibid.

out for a walk, 'aimlessly for the sake of the walk'.[229] Or, to put it in the words of Deleuze and Guattari, it behaves like 'a schizophrenic out for a walk', as it is continuously shedding and shifting identities, continuously triggered by random impulses from the outside, so that eventually 'the self and the non-self, outside and inside, no longer have any meaning whatsoever'.[230] In other words, in Lang's *Monadologie* series, cellular automata provide a mathematical framework for what Rebecca Solnit describes as 'calculating the unforeseen':

> How do you calculate upon the unforeseen? It seems to be an art of recognizing the role of the unforeseen, of keeping your balance amid surprises, of collaborating with chance, of recognizing that there are some essential mysteries in the world and thereby a limit to calculation, to plan, to control.[231]

3.5 Repetition as a productive force

This chapter has shown that repetition is not necessarily the synonym to sameness or stability we so often automatically presume it to be. After assessing the terminological frameworks currently at hand for speaking of, and thinking about musical repetition, the focus shifted onto two distinct types of musical repetition at work in Lang's oeuvre: repetition understood as sameness (exact acoustic repetition) and repetition understood as similarity (near-literal or varied repetition, which was later defined as microvariation). Rather than a subordinate to identity, unity, or stability, repetition was shown to be a highly complex and multifaceted phenomenon, which can embody many different shapes and forms, and engender a multitude of experiences. Most importantly, the chapter revealed repetition to be a place where radical instabilities can occur.

[229] Paul Klee (1961), *Notebooks Volume 1: The Thinking Eye*, translated by Ralph Manheim (London: Lund Humphries), p. 105.
[230] Gilles Deleuze and Félix Guattari (2013), *Anti-Oedipus*, translated by Robert Hurley, Mark Seem, and Helen R. Lane (London: Bloomsbury Academic), p. 11.
[231] Rebecca Solnit (2005), *A Field Guide to Getting Lost* (Edinburgh: Canongate), pp. 6-7.

First and foremost, the chapter showed that musical repetition might not primarily *sound* as repetition – that is, as the continuous reiteration of the exact same thing, being reaffirmed over and over again. Instead, it was argued that prolonged passages of exact acoustic repetition might, and are likely to activate the illusion of phenomenal transformation; a perceptual flow of differing.

Secondly, the chapter examined the idea of repetition as similarity, and introduced the concept of 'microvariation' as a means of describing one of the two main types of musical repetition found within Lang's works. Here, the perceptual and experiential malleability of musical repetition was found to be a key issue too, as these subtly varied near-repetitions were shown to produce the cognitive experience of disorientation; of drifting off and eventually getting lost in unfamiliar musical landscapes.

Put differently, musical repetition was demonstrated to be a productive force of transformation; an inherently multifaceted phenomenon that effectuates perceptual and experiential difference both in and through itself. The differential effect of repetition is described metaphorically by Lang as 'a kind of third dimension emerging out of the two-dimensionality of a rotating disk'.[232] Deleuze describes a situation as being 'productive' when it allows for 'a different type of image' to appear, which 'brings out the thing in itself, literally, in its excess of horror or beauty, in its radical or unjustifiable character'.[233] Adrian Parr writes that:

> Deleuze encourages us to repeat because he sees in it the possibility of reinvention, that is to say, repetition dissolves identities as it changes them, giving rise to something unrecognisable and productive. It is for this reason that he maintains that repetition is a positive power (*puissance*) of transformation. [...] Thus, in a very real sense, repetition is a creative activity of transformation. [...] As a power of the new, repetition calls forth a *terra incognita* filled with a sense of novelty and unfamiliarity.[234]

[232] Bernhard Lang (2002), 'Loop Aestetics: Improvisation und Komposition mit Loops'. Paper presented at the 41th Internationale Ferienkurse für Neue Musik (Darmstadt). Available at http://members.chello.at/bernhard.lang/publikationen/loop_aestet.pdf (accessed on 15 March 2016).
[233] Gilles Deleuze (2013), *Cinema 2: The Time-Image*, translated by Hugh Tomlinson and Robert Galeta (London & New York: Bloomsbury Press), p. 20.
[234] Adrian Parr (2010), 'Repetition', in: Adrian Parr (ed.), *The Deleuze Dictionary: Revised Edition* (Edinburgh: Edinburgh University Press), p. 226.

Lang's idiosyncratic use of musical repetition is hence best understood in the Deleuzian sense – that is, of repetition as a productive force of transformation; a means of discovery and experiment; a way of rendering out of focus, re-thinking, re-focusing, and eventually seeing differently. The work of visual artist Bridget Riley offers an interesting analogy here, as she states that: 'repetition acts as a sort of amplifier for visual events which, seen singly, would hardly be visible'.[235]

[235] Bridget Riley (1979), in David Thompson (dir.), *Bridget Riley* [film documentary] (Arts Council of Great Britain: Roland Collection of Films and Videos on Art). Available at https://youtu.be/_G9eGzxQq2U (accessed on 29 August 2018).

CHAPTER 4
GEOGRAPHIES OF DRIFT

> To lose yourself: a voluptuous surrender, lost in your arms, lost to the world, utterly immersed in what is present so that its surroundings fade away. [...] [T]o be lost is to be fully present, and to be fully present is to be capable of being in uncertainty and mystery. And one does not get lost but loses oneself, with the implication that it is a conscious choice, a chosen surrender, a psychic state achievable through geography.
>
> - Rebecca Solnit (2005: 6)

4.1 The Anatomy of Disaster

Lang's 2010 string quartet, *Monadologie IX: The Anatomy of Disaster*, sits on a strange plane between the familiar and the unknown. On the one hand, the work is generated entirely out of samples taken from Joseph Haydn's 1787 string quartet, *Die Sieben letzten Worte unseres Erlösers am Kreuze* (Hob. XX/1B).[236] Lang's work closely mirrors the formal structure of Haydn's original and, as such, consists of an introduction, seven meditative 'sonatas' and an epilogue – Haydn's famous 'earthquake'. More significantly, each of Lang's nine movements starts off with a slightly distorted, yet still highly recognisable quotation from Haydn's original, which is subsequently locked into endless repetition.[237]

[236] Haydn's *Sieben letzten Worte unseres Erlösers am Kreuze* was originally written as an orchestral work in 1786, and was subsequently arranged for string quartet one year later, in 1787. Nonetheless, documents found in Lang's personal archives, as well as the fact that the work was commissioned by Arditti Quartet, suggest that Lang took Haydn's version for string quartet as his primary inspiration for *The Anatomy of Disaster*, rather than the work's original, orchestral version.

[237] Of course, listeners with little or no knowledge of Haydn's *Sieben letzten Worte* will have a different experience of Lang's work than those listeners who are familiar with the referenced original. In personal communication with the author (29 June 2019), Lang refers to this issue as 'one of the failed concepts in the *Monadologie* series'. The key issues surrounding the (un)recognisability of sampled materials have previously been discussed in Chapter 2.5.2. A more detailed discussion on Lang's use of Haydn's original in this specific work, as well as its presumed recognisability, will follow in Chapter 4.3.

On the other hand, the pervasive looping of Haydn's historical material gives *The Anatomy of Disaster* an almost unfathomable quality. Philip Clark, for instance, describes the work as 'a journey to the centre of Haydn's world, taking a digressive walk around, and inside, his material'.[238] Referencing the cover art for the work's cd release on the Winter & Winter label – a photograph of *Fred the Frog Rings the Bell* (1990), an artwork by Martin Kippenberger portraying a crucified frog (Figure 4.1) – Clark continues: '[t]his most paradigmatic of Christian symbols is, like a frog on a scientist's worktable, probed and dissected'.[239]

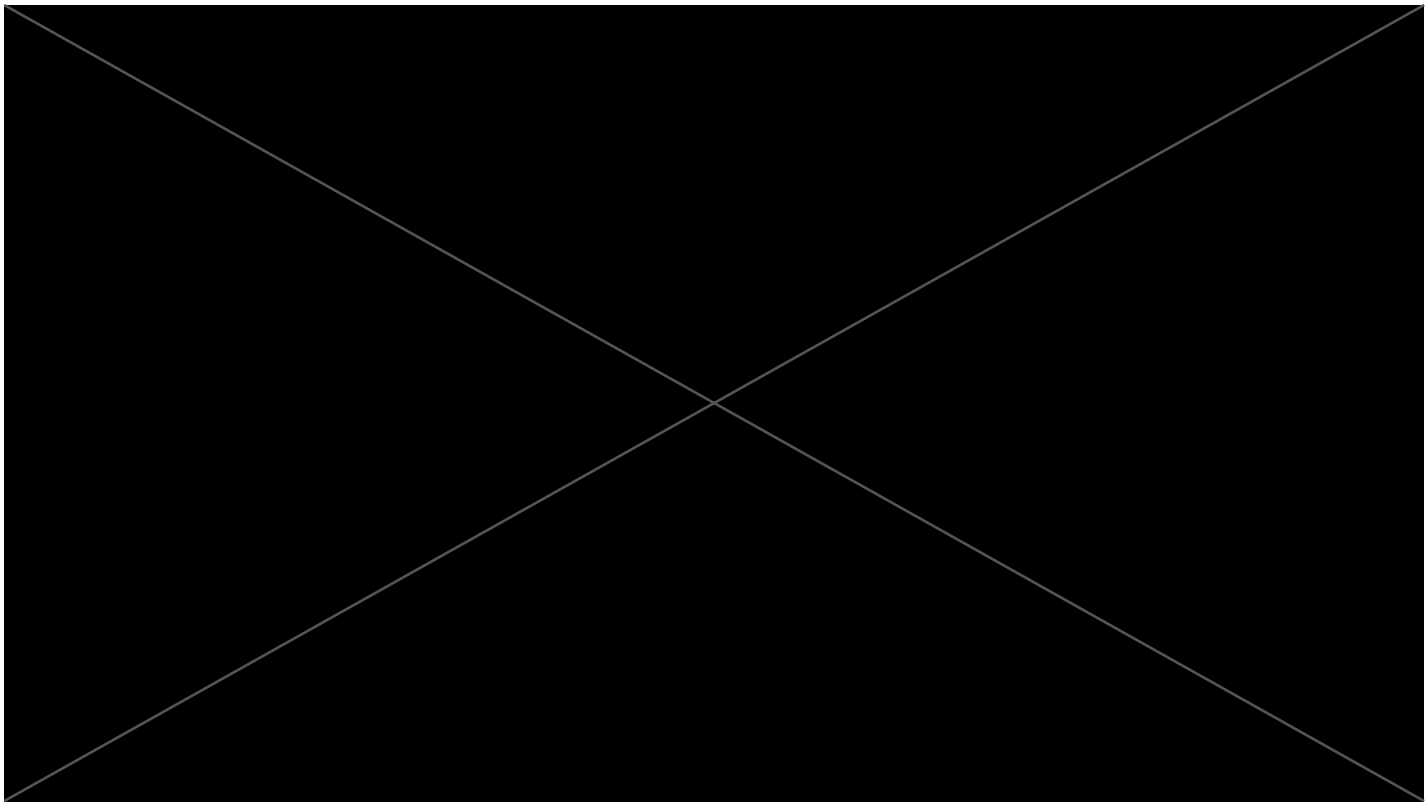

Figure 4.1: Photograph of Martin Kippenberger's *Fred the Frog Rings the Bell* (1990).
This image was used as cover art for the 2014 cd release of Lang's *Anatomy of Disaster* on the Winter & Winter label

As Haydn's historical material locks into hiccupping and distorted repetitions, the familiar quickly dissolves into the unknown (audio example 9). After a few repetitions, the sampled material seems to be drifting off, deteriorating and venturing into new and unfamiliar directions. To listen through

[238] Philip Clark (2014), 'LANG: The Anatomy of Disaster (Monadologie IX)', in: *Gramophone: The World's Best Classical Music Reviews*. Available at http://www.gramophone.co.uk/review/lang-the-anatomy-of-disaster-monadologie-ix (accessed on 26 April 2018).
[239] Ibid.

Lang's *Anatomy of Disaster* is, in other words, to experience a chaotic interplay between the old and the new; the original and its copy. It is to balance between that which is familiar, and that which is not; to be kept lingering between that which is the same, and that which seems different. As memory slips in and out of focus, the work invokes a curious experience of drift and disorientation; of wandering off from a stable territory, only to eventually find oneself being lost in a strange, complex and unfamiliar musical landscape. Describing a similar experience in listening to this work, Tim Rutherford-Johnson writes that:

> [It] begins like a broken machine. Not one of György Ligeti's delicately collapsing clockworks or the softly glitching CDs of German electronica group Oval, but a fast, heavy, gunning engine, flailing wildly and dangerously. But not fatally, because the music quickly takes on a chaotic shape of its own. Fragments turn into components. A hiccupping, short–long rhythm metamorphoses into a motif. The thick texture turns out to be comprised of thinner, overlapping layers. And amongst all the dissonances there are sudden glimpses, baffling at first, of the harmonies of a much older language. […] Somehow the music balances layers of looping and quasi-looping materials in unpredictable but still coherent relation.[240]

The experiences of drifting off, of losing direction and of eventually getting lost which occur during the act of listening, are, however, not unique to *The Anatomy of Disaster*. In fact, these experiences are a central feature to most, if not all of the works contained in Lang's *Monadologie* series. Describing *Die Sterne des Hungers* (2007) – an extra-cyclic work which Lang confirms to have been written in the direct lead-up to his *Monadologie* series[241] –, for example, Paul Griffiths writes of 'a labyrinth with no sure forces or directions'.[242] Commenting on *Monadologie VII: …for Arnold* (2009), Sabine Sanio similarly mentions that '[f]or the listener […], this music—which constantly alternates between familiarity and alienation—opens up largely unknown musical terrain'.[243]

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[240] Tim Rutherford-Johnson (2015), 'Bernhard Lang's The Anatomy of Disaster (Monadologie IX)', in: *Music and Literature* (3 February). Available at http://www.musicandliterature.org/reviews/2015/2/2/bernhard-langs-brithe-anatomy-of-disaster-monadologie-ixi (accessed on 8 June 2018).
[241] Bernhard Lang, in personal communication with Christine Dysers, 10 August 2019.
[242] Paul Griffiths (n.d.), 'Record Reviews. Bernhard LANG: Die Sterne des Hungers'. Available at http://www.disgwylfa.com/record-reviews.html (accessed on 29 July 2019).
[243] Sabine Sanio (2010), 'Bernhard Lang's Machines of Musical Difference', in: Bernhard Lang, *Die Sterne des Hungers* [CD liner notes] (Vienna: KAIROS).

For the CD release of *Monadologie XXXII: The Cold Trip* (2014-2015), Austrian record label Kairos even references the experience of getting lost in their promotional text, describing the work as '[a] new *Winterreise*: to re-walk an ancient pathway, overwriting it with new trails: a hommage to Schubert, an exploration, a time-trip into the unknown'.[244] In her review of that same work, Barbara Eckle draws a similar link to the experience of wandering. She writes that '[i]n fact, one has the feeling of being inside the wanderer's mind; of slowly losing grip of a stable reality. Suddenly, everything has become more extreme and less controllable'.[245]

Nonetheless, *The Anatomy of Disaster* stands out within the *Monadologie* series. For one, it is arguably one of the most extreme examples in foregrounding the meandering loops previously identified as 'drifting' repetitions, which are so characteristic to the series as a whole. Furthermore, *The Anatomy of Disaster* also stands out in its very explicit and literal way of mirroring its source material, i.e. Haydn's *Sieben letzten Worte*. For, besides maintaining the original's instrumentation, its nine-movement structure, as well as the titles of each of those nine movements, Lang's *Anatomy of Disaster* also copies its durational scope and general proportions. Finally, each of Lang's nine movements is generated from samples taken from the corresponding movement in Haydn's original.

The composer, too, speaks of the work as representing 'the peak of Monadological [sic] working'.[246] In this respect, Lang is particularly alluding to the fact that the work was generated entirely through strict computer-generated processing in CadMus – a process which was still in its infancy with earlier works in the cycle, and which was later abandoned completely. Lang comments:

> [I]n the latter pieces of the series I suddenly started to do all this "by hand", cutting and pasting directly in Finale, more or less "simulating" the simulation.[247]

[244] Frankie Perry (2018), 'Bernhard Lang: The Cold Trip', in: *TEMPO* 72/285, p. 102.
[245] Barbara Eckle (2018), 'Neue Version von Schuberts Winterreise: Bernhard Lang – "The Cold Trip"' (10 June). Available at https://www.deutschlandfunk.de/neue-version-von-schuberts-winterreise-bernhard-lang-the.727.de.html?dram%3Aarticle_id=419657 (accessed on 19 July 2019): 'Man hat tatsächlich das Gefühl, man befinde sich im Kopf des Wanderers, der langsam den Boden der Realität unter den Füßen verliert. Alles ist extremer und unkontrollierbarer geworden'.
[246] Bernhard Lang, in personal communication with Christine Dysers, 9 November 2017.
[247] Bernhard Lang, in personal communication with Christine Dysers, 24 May 2016.

As such, *The Anatomy of Disaster* makes for a useful tool in studying the anatomy of the works contained in Lang's *Monadologie* series, the musical landscapes of which seem to be specifically designed for getting lost.

This chapter sets out to investigate the different ways in which musical repetition can engender the cognitive experience of getting lost during the act of listening. The chapter is conceived as an analytical case-study and focuses on the opening movement of Lang's *Anatomy of Disaster,* which is titled *I: Introduzione*. The focal point in the analysis will be this movement's opening section. This passage, spanning thirty-five bars in length and clocking in at some ninety seconds in duration, is characterised by the incessant repetition of a single musical cell: the very first bar of Haydn's *Sieben letzten Worte*.[248]

4.2 Waltzing with chaos

Commenting on the opening movement of his *Anatomy of Disaster*, Lang claims that 'to analyse it, is nearly an impossibility':

> The goal was complexity. The main achievement is to create the complex from the simple. [...] I was sometimes thinking – I didn't know you yet – I was thinking about the first person that would try to analyse this thing. I was thinking, who would ever analyse this? My god. Poor you. [...] [I]t's waltzing with chaos.[249]

[248] See Appendix V for a full score of bars 1-35.
[249] Bernhard Lang in interviews with Christine Dysers (Vienna, 24 and 27 November 2017).

A similar sentiment is expressed by Tim Rutherford-Johnson in his review of the 2014 studio recording of the work, as he claims that 'its mechanisms cannot easily be unravelled'.[250] But exactly what is it about this music, that obfuscates its analysis?

It has previously been indicated that prolonged musical repetition poses a number of serious challenges in terms of analysis.[251] Chapter 3 showed that the analytical tools currently available for addressing musical repetition as it is perceived and experienced, are scarce and limited. While Dora Hanninen's theory of recontextualisation offers an excellent framework for analysing the flexible interrelationships and the phenomenal transformations transpiring between repeated materials, it focuses predominantly on those instances in which the same musical material appears in different contexts throughout a specific work.[252] Although the tools and vocabularies developed by Hanninen are extremely valuable in an inquiry into the experiential effects of musical repetition, this methodological framework proves difficult to transfer onto those musical works, such as Lang's, in which prolonged passages of musical repetition are presented to the listener without any intervening materials.

In terms of formal structure, the opening movement of Lang's *Anatomy of Disaster* abides by a simple ABA'-form. Both the A- and the A'-sections are characterised by pervasive repetition, and are generated algorithmically from the same source material: the very first bar of Haydn's *Sieben letzten Worte*. Although the contrasting B-section is also characterised by incessant repeats, its musical material was spawned from a different passage in Haydn's original (i.e. bar 7). In a discussion on repetition in Lang's opening movement, Hanninen's theory of recontextualisation is likely to provide some interesting analytical insights about the perceptual changes that transpire between the first and the second, slightly varied, A-section. Such a discussion would necessarily take the movement's contrasting B-section into account, as it is precisely this intervening B-material which

[250] Tim Rutherford-Johnson (2015), 'Bernhard Lang's *The Anatomy of Disaster (Monadologie IX)*', in: *Music and Literature* (3 February). Available at http://www.musicandliterature.org/reviews/2015/2/2/bernhard-langs-brithe-anatomy-of-disaster-monadologie-ixi (accessed on 8 June 2018).
[251] See: Chapter 3.3.3.
[252] See: Dora A. Hanninen (2003), 'A Theory of Recontextualisation in Music: Analyzing Phenomenal Transformations of Repetition', in: *Music Theory Spectrum* 25, pp. 59-97; Dora A. Hanninen (2004), 'Feldman, Analysis, Experience', in: *Twentieth-Century Music* 1/2, pp. 225-251; and Dora A. Hanninen (2012), *A Theory of Music Analysis: On Segmentation and Associative Organisation* (Rochester: University of Rochester Press).

makes for a change in context – and, as such, for a recontextualisation – between the first and the second rendition of the A-section. When it comes to investigating the sensation of getting lost, which is induced by pervasive repetition in each of the individual A-sections, however, Hanninen's method bumps into its own limits. There simply is no intervening material here – there is only repetition (Figure 4.2).

Besides demonstrating the limitations that surround the scarce analytical tools currently available for addressing musical repetition as it is perceived and experienced, Chapter 3 also indicated that most analytical discourse is inclined to reduce repetition to notions of sameness and similarity. It is, of course, tempting to describe the opening of Lang's *Anatomy of Disaster* in such reductive terms, particularly as its score clearly reads like a string of microvariations (A, A', A'',...) (Figure 4.2). However, such a description stands in conflict with the more permeable and fluid ways in which these near-literal repetitions appear to the listener in perception and experience – that is, as the sensation of gradually drifting off, losing one's way, and eventually getting lost in a strange musical landscape. Lang's obsessive near-repetitions hence pose a distinct cognitive challenge to both the analyst and the listener. For, how can the structurally simple idea of repetition – a notion which is so deeply rooted in ideas of sameness, similarity, and stability – induce the cognitive experiences of disorientation, of drift, and ultimately, of being lost in a strange musical landscape? And, more importantly, how might we account for these experiences analytically?

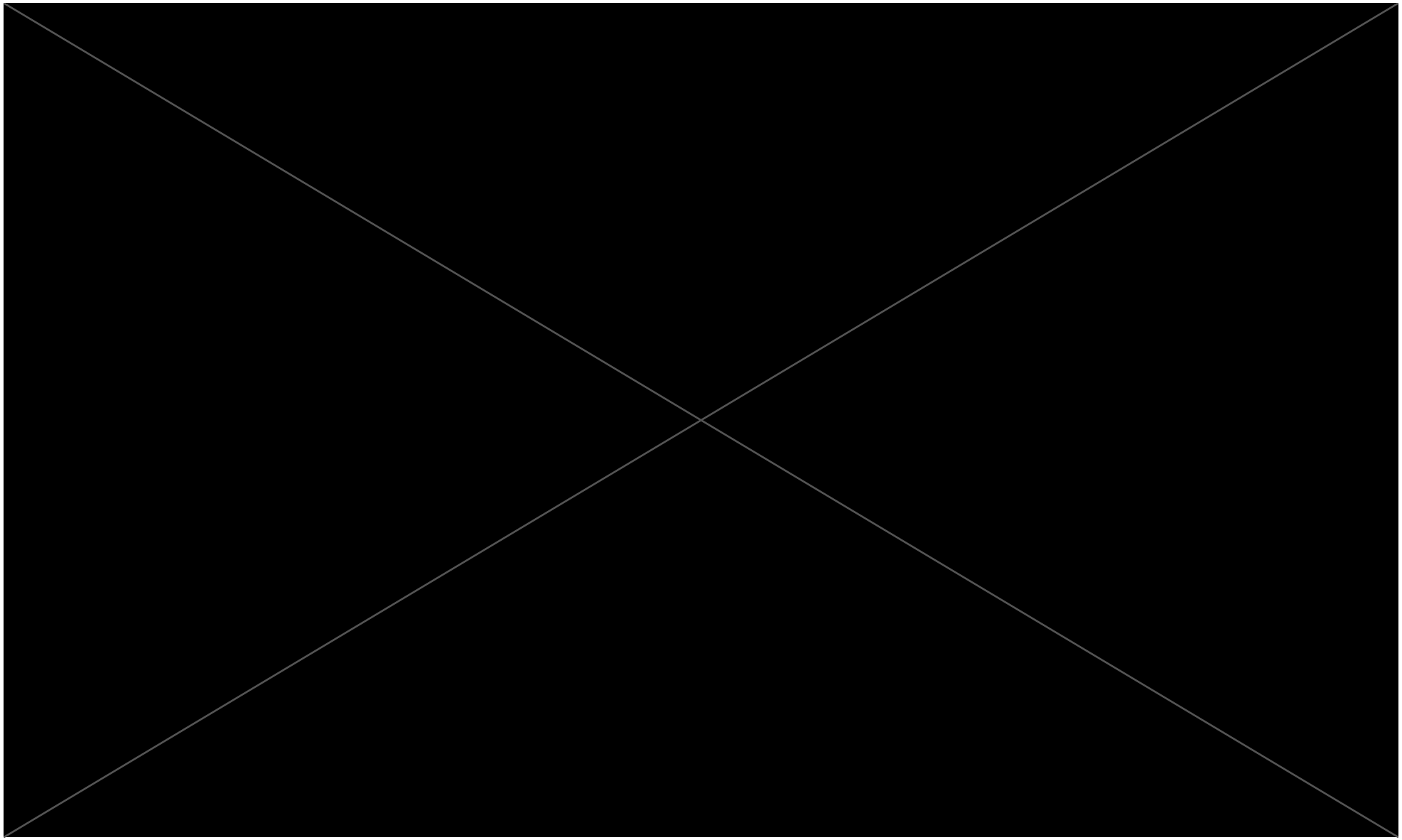

Figure 4.2: *Monadologie IX: The Anatomy of Disaster* (2010) - *I: Introduzione*, bars 1-12

4.2.1 Getting lost as a framework for analysis

In the opening of Lang's *Anatomy of Disaster*, pervasive repetition seems to resist analysis. This chapter, however, argues that this passage of prolonged microvariation does not necessarily bring analysis to a full stop. According to Dora Hanninen, music analysis should be 'an inquiry into musical experience'.[253] In my own experience of listening to Lang's *Anatomy of Disaster*, the work gives rise to the sensations of drifting off and getting lost in a complex musical landscape – an experience shared by Philip Clarke and Tim Rutherford-Johnson.[254] As such, this chapter takes the inter-subjective experience of getting lost in the act of listening as a starting point for analytical enquiry.

The experience of being lost is often negatively valenced and intuitively thought of as a problematic situation; one that is highly unpleasant and potentially dangerous. In most of her literary work, although perhaps most explicitly in *Wanderlust* (2000) and *A Field Guide to Getting Lost* (2005), Rebecca Solnit argues for being lost as a positive and wondrous experience; an adventure, which opens the mind up to possibility.[255] She claims that:

> [T]here's [an] art of being at home in the unknown, so that being in its midst isn't cause for panic or suffering, of being at home with being lost. That ability may not be so far astray from Keats's capability "of being in uncertainties, mysteries, doubts".[256]

According to Solnit, one of the major perks to being lost is the mere fact of being surrounded by the unknown – that is, the state of not knowing what you will find along the way, or when and where you will stumble across it. In this sense, getting lost entices a certain sense of mystery, of wonder, of

[253] Dora A. Hanninen (2004), 'Feldman, Analysis, Experience', in: *Twentieth-Century Music* 1/2, p. 250.
[254] Cfr. supra
[255] Rebecca Solnit's oeuvre mirrors that of Lang in several other ways, too. For instance, most of her books reiterate the same themes, such as wandering, place, and environments. What is also typical to Solnit's writing, is that she approaches any given topic from several different angles, at times writing from an essayist's perspective, at others arguing from an ecologist's, an academic's, or even an activist's point of view, and oftentimes shifting voice over the course of but a few paragraphs.
[256] Rebecca Solnit (2005), *A Field Guide to Getting Lost* (Edinburgh: Canongate), p. 39.

curiosity even. After an initial phase of disorientation and confusion, a sense of freedom emerges, which offers up a space for reflection as well as experiment – a space in which nothing is impossible:

> Never to get lost is not to live, not to know how to get lost brings you to destruction, and somewhere in the terra incognita in between lies a life of discovery.[257]

As such, Solnit's understanding of being lost strongly resonates with Deleuzian ideas of non-identity, fluidity and non-essentialism. For, just like Deleuze's understanding of repetition, Solnit's interpretation of getting lost equally gives rise to the experience of difference-in-itself. In its Solnitian sense, getting lost is a space that is perpetually changing; an unknown in which radical instabilities can occur; a productive force of transformation. Solnit states that:

> Lost really has two disparate meanings. Losing things is about the familiar falling away, getting lost is about the unfamiliar appearing. There are objects and people that disappear from your sight or knowledge or possession; you lose a bracelet, a friend, the key. You still know where you are. Everything is familiar except that there is one item less, one missing element. Or you get lost, in which case the world has become larger than your knowledge of it. Either way, there is a loss of control. Imagine yourself streaming through time shedding gloves, umbrellas, wrenches, books, friends, homes, names. This is what the view looks like if you take a rear-facing seat on the train. Looking forward you constantly acquire moments of arrival, moments of realization, moments of discovery. The wind blows your hair back and you are greeted by what you have never seen before. The material falls away in onrushing experience. It peels off like skin from a molting snake. Of course to forget the past is to lose the sense of loss that is also memory of an absent richness and a set of clues to navigate the present by; the art is not one of forgetting but letting go. And when everything else is gone, you can be rich in loss.[258]

The experience of getting lost, in its Solnitian sense of a transformational power – an unstable territory that leads to new discoveries; a Deleuzian process of *becoming* – thus guides the analysis of the opening to Lang's *Anatomy of Disaster*. More specifically, the following case-study will assess the multifaceted ways in which repetition here evokes the experience of getting lost. For, to paraphrase Hanninen: if one can hear or experience it, surely, one can find a way to 'think' it.[259]

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[257] Ibid., p. 10.
[258] Ibid., pp. 22-23.
[259] Dora A. Hanninen (2004), 'Feldman, Analysis, Experience', in: *Twentieth Century Music* 1/2, p. 250.

In evaluating how, where, and to what means musical repetition functions as a mechanism of drift and disorientation in this passage, the chapter takes a total of three distinct analytical vantage points.

First, the chapter will assess the nature of the repeated material. More specifically, the chapter will investigate the relationship between the opening of Lang's *Anatomy of Disaster* and the historical artefact it references, adapts, and subverts – that is, the introduction to Haydn's *Sieben letzten Worte*. Are any particular tensions created by repeating this pre-existing material, in the sense of both re-producing it and putting it on loop? The analytical narrative in this section is largely descriptive-comparative in nature. The first locus of disorientation is situated in Lang's distortion, re-contextualisation, and looping of Haydn's original.

Secondly, the chapter zooms in on the musical surface of the thirty-five bars that make up the opening of Lang's *Anatomy of Disaster*. Does this passage, which is characterised by pervasive microvariation, resist formal analysis, or can any musically and analytically meaningful objects be identified? If so, on what basis can this be done, and how do these objects interrelate? Can any formal structure be found in this passage, and, if so, what pathway does it guide the listener along? Drawing heavily on Dora Hanninen's theory of segmentation and associative organisation, several musical pathways for getting lost are identified.[260]

Finally, the analytical focus is shifted onto the events occurring on a loop-to-loop basis. Where are elements of repetition and variation situated, and what musical and cognitive mechanisms do they activate? How does the process of microvariation unfold here, and does it affirm or contradict the formal claims made previously? What kind of dynamic transpires between memory, recollection, and anticipation? A total of two drifting landscapes is identified: one of pitch constellation and one of metre.

[260] Dora A. Hanninen (2012), *A Theory of Music Analysis: On Segmentation and Associative Organization* (New York: The University of Rochester Press).

The insights gained during these three distinct strains of analytical inquiry will eventually be brought together in establishing an understanding of the multifaceted ways in which repetition here evokes the experience of getting lost.

4.3 Haydn, but different

The opening section to Lang's *Anatomy of Disaster* – a passage spanning thirty-five bars in length and clocking in at some ninety seconds in duration – was generated entirely from the very first bar of Haydn's *Sieben letzten Worte*. The following analysis investigates the interrelationships between this passage and the historical artefact it references. After taking a closer look at the characteristic features of Haydn's original, the comparison with Lang's looped material is made. Are any particular tensions created by repeating this pre-existing material, in the sense of both re-producing it and putting it on loop? If so, do these tensions in any sense lead to the cognitive experiences of drift, of disorientation, and of getting lost?

4.3.1 Haydn's opening motif

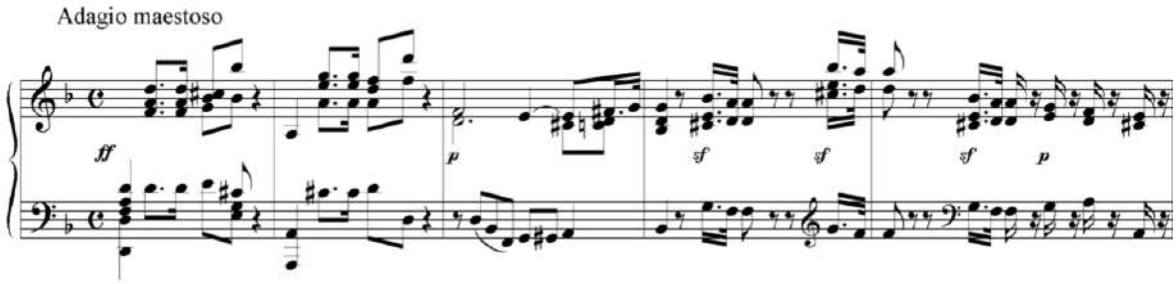

Figure 4.3: Piano reduction of Joseph Haydn's *Sieben letzten Worte – I: Introduzione* (1787), bars 1-5

Haydn's opening motif (bar 1 in Figure 4.3) is primarily characterised by its melodic contour: the succession of a rising octave, a falling minor second and a rising diminished seventh. Although the opening to Haydn's *Sieben letzten Worte* might not officially be funeral music, its musical characteristics and its extra-musical religious references to the death of Christ do suggest, as well as justify a link with the genre. The opening motif alone contains five distinct musical elements, which Maja Trochimczyk identifies as being specifically associated with ideas of death and suffering.[261] Two of these are elements of pitch and melodic contour. Consider, for example, the two large melodic leaps in Haydn's opening motif: a rising octave (d-d) and a rising diminished seventh (c#-b♭). Trochimczyk identifies such a large melodic leap as a 'saltus duriusculus': a rhetoric musical figure from the Baroque era, which was primarily used to musically express an exclamation. Similarly, the descending minor second (d-c#) between those two melodic leaps can be thought of as a 'sighing motif' (Ger: 'Seufzermotiv'), which was commonly used to musically depict a sigh, or to portray the acts of moaning or weeping. Finally, the slow tempo in which the piece is written, the steady pulse of the duple metre, as well as the strong harmonic dissonance contained in the dramatic I – ♭VII7 progression all explicitly connect the opening motif to ideas of death and suffering.[262]

Clive McClelland explicitly associates Haydn's slow introduction with the eighteenth-century tradition of 'ombra music': an umbrella term that encompasses an elaborate set of musical features which were commonly 'used to depict mortal and funereal scenes, or more generally involve death, burial, the afterlife, the supernatural, ghosts, spirits, furies, and so forth'.[263] Emphasising the movement's d minor key, its slow tempo, its prominently dotted rhythms, and the 'wide leaps in the two opening bars', McClelland points out that '*ombra* references are readily discernible' in Haydn's slow introduction'.[264] Similar idioms of burial, death and suffering can, for example, also be found in the opening movement to Beethoven's *Moonlight Sonata* (1801), and in the *Marche funèbre* from Chopin's second piano sonata in B♭ minor (1839). In both of these works, musical features such as a

[261] Maja Trochimczyk (2001), 'Dans la nuit: The Themes of Death and Night in Lutoslawski's Oeuvre', in: Zbigniew Skowron (ed.), *Lutoslawski Studies* (Oxford: Oxford University Press), p. 102.
[262] Ibid.
[263] Vasili Byros (2014), 'Topics and Harmonic Schemata: A Case from Beethoven', in: Danuta Mirka (ed.), *The Oxford Handbook of Topic Theory* (Oxford & New York: Oxford University Press), p. 393.
[264] Clive McClelland (2012), *Ombra: Supernatural Music in the Eighteenth Century* (Plymouth: Lexington Books), p. 204.

slow tempo, a minor key, a duple metre, and the use of dotted rhythms in the melodic line contribute in the creation of an overall solemn, yet gloomy atmosphere, and a procession-like character.

4.3.2 A union of opposites

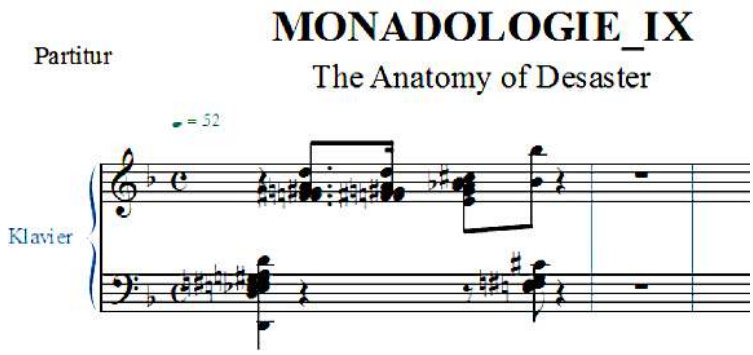

Figure 4.4: Generative cell for *Monadologie IX: The Anatomy of Disaster – I: Introduzione*, bars 1-35
Image taken from the composer's personal archive.

The musical cell Lang used to generate the opening to *The Anatomy of Disaster* (Figure 4.4), is not a literal quotation of the motif in Haydn's bar 1. Instead, Lang's generative cell is a distorted version of Haydn's original; a re-reading which Linda Hutcheon describes as 'repetition with variation, [...] the comfort of the ritual combined with the piquancy of surprise'.[265] Although both cells share more or less the same tempo, and are identical in terms of orchestration, metre, key signature, rhythmic structure, register, and melodic contour, Lang's generative cell differs from Haydn's original in terms of harmonic configuration. More specifically, Haydn's chords are filled up chromatically as well as microtonally, creating heavily conflated chords that orbit around the tonic triad. As a result, Haydn's dramatic I – ♭VII7 progression is ungrounded from its original tonal framework and transferred into a post-tonal context. Yet, due to the lingering presence of the tonic triad, Lang's dense tone

[265] Linda Hutcheon and Siobhan O'Flynn (2013), *A Theory of Adaptation* (New York: Routledge), p. 4.

clusters still maintain a distinctly tonal idiom. Although Haydn's half cadence has thus lost its original tonal function, Lang's cluster chord progression does maintain a similar open-ended, 'hanging' quality. Commenting on the alterations made to the original, Lang states that he has 'filled it out with clusters', only to maintain 'the gesture'.[266]

By increasing the motif's harmonic dissonance, Lang intensifies the associations of death and suffering embedded in Haydn's original. According to the composer, this was intended as an explicit critique towards Haydn, whose *Sieben letzten Worte* is rather solemn and meditative in character. Lang comments:

> I used to blame [Haydn], as I did not understand him. [...] How can one paint human suffering and an execution with such ease, with such surtitles, without losing face? Of course, that was a misunderstanding – I understand that much better now.[267]

In other words, at the time of composing *The Anatomy of Disaster*, the composer did not deem Haydn's solemn opening gesture fit to depict ideas of death and suffering. Yet Lang's contemporary musical language of harsh dissonance and cluster chords, was, of course, not available to Haydn at the time. As has been indicated previously, the tools used by Haydn – that is, the dotted rhythms, the minor key, the slow tempo of the duple metre, and the use of rhetoric figures – *did*, in fact, serve their historical functions of depicting notions of death and human suffering. Lang's triple forte dynamics, the aggressive bowing techniques and the allegretto to allegro tempo indication (q = 106) give the motif a much more aggressive and tormented connotation than Haydn's slow and stately adagio. In a sense, Lang's generative cell is hence a modern-day adaptation of the original. The composer comments: '[w]e live in a catastrophic age, an age of collapse, this is what I try to refer to here, too'.[268]

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[266] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).
[267] Bernhard Lang, in: Bernhard Günther (2010), 'Die Frage nach dem Original: Die Monadologie IX und Die sieben letzten Worte', in: Matthias Naske (eds.), *Back to the Future: Rainy Days 2010* (Luxemburg: Philharmonie Luxembourg), p. 92. Available at http://www.philharmonie.lu/media/content/download/documents/Publications/rainy_days-Kataloge/rainy_days_2010-back_to_the_future-Leseprobe.pdf (accessed on 19 July 2019): 'Ich habe eher ihm immer vorgeworfen, dass ich ihn nicht verstehe [...]. Wie man menschliches Leiden und eine Hinrichtung mit dieser Leichtigkeit, solchen Übertitelungen, solch leichten Farben zeichnen kann, und dabei das Gesicht bewahrt. Das war natürlich ein Missverständnis, ich verstehe das jetzt viel besser'.
[268] Bernhard Lang in personal communication with Christine Dysers, 10 August 2019.

Nonetheless, Lang's *Anatomy of Disaster* is more than just that. For, Haydn's original is not only distorted by Lang – it is also de- and re-contextualised. The very fact that this historical material is being sampled – that is, being lifted from its original context and inserted into a new one –, opens it up to entirely new readings. Martin Zeilinger writes that:

> Sampling, by its very nature, establishes sites for variance and divergence of meaning. [...] [S]ampling always seems to break the integrity of an original "whole" that is posited as a totality of meaning and creative vision. The sample thereby introduces a threat of difference – a different author, a different market, a different meaning, a different value – that is understood to alienate the original creator from his or her expression.[269]

According to Laurel Westrup, '[s]ampling practices put the sample into conversation with its new context, creating a synthesis that exceeds the sum of its parts'.[270] Lang's reading of Haydn's original thus forms a union of opposites – a paradoxical situation in which the material is at the same time both past and present; both original and copy, both Haydn's and Lang's, yet at the same time, neither the one nor the other. This is what Hutcheon calls 'the adaptive faculty' – i.e. 'the ability to repeat without copying, to embed difference in similarity, to be at once both self and Other [sic]'.[271] Deleuze, commenting on his own habit of reading and appropriating the ideas of other philosophers, describes a similar situation, in which seemingly fixed ideas such as 'the original' and 'the author' have become fluid:

> But I suppose the main way I coped with it at the time was to see the history of philosophy as a sort of buggery or (it comes to the same thing) immaculate conception. I saw myself as taking an author from behind and giving him a child that would be his own offspring, yet monstrous. It was really important for it to be his own child, because the author had to actually say all I had him saying. But the child was bound to be monstrous too, because it resulted from all sorts of shifting, slipping, dislocations, and hidden emissions that I really enjoyed.[272]

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[269] Martin J. Zeilinger (2014), 'Sampling as Analysis, Sampling as Symptom: Found Footage and Repetition in Martin Arnold's *Alone. Life Wastes Andy Hardy*', in: David Laderman and Laurel Westrup (eds.), *Sampling Media* (Oxford: Oxford University Press), pp. 157-158.
[270] Laurel Westrup (2014), 'Thinking through Sampling, Literally', in: David Laderman and Laurel Westrup (eds.), *Sampling Media* (Oxford: Oxford University Press), p. 236.
[271] Linda Hutcheon and Siobhan O'Flynn (2013), *A Theory of Adaptation* (New York: Routledge), p. 174.
[272] Gilles Deleuze (1995), 'Letter to A Harsh Critic', in: *Negotiations: 1972-1990*, translated by Martin Joughin (New York: Columbia University Press), p. 6. Originally published as Gilles Deleuze (1990), 'Lettre à un critique sévère', in: *Pourparlers: 1972-1990* (Paris: Les Éditions de Minuit), p. 14: 'Mais, surtout, ma manïere de m'en tirer à cette époque, c"etait, je crois bien, de concevoir l'histoire de la philosophie comme une sorte d'enculage ou, ce qui revient au mème, d'immaculée conception. Je m'imaginais arriver dans le dos d'un auteur, et lui faire un enfant, qui serait le sien et qui

Remarkably, Lang describes his reading of Haydn's original in terms that are similar to those used by Deleuze, as he states that '[i]n some ways, I felt like I was *talking* to Haydn by overwriting his text. A number of subtexts slipped in too, which came to the surface'.[273] More than a mere *reading* or an *interpretation* of Haydn's original, Lang's generative cell is thus more of a creative appropriation, which consists of a paradoxical union between sameness and difference. As such, the repetition of Haydn's historical material is not merely a re-representation of its original identity (that is, a re-discovery of the same; of its original cultural and historical meaning), but also a re-production (that is, the creation and exhibition) of the difference that lies at its very core.

Furthermore, the act of reading Haydn's historical artefact through the lenses of post-minimalism, DJ-culture, algorithmic composition, as well as non-essentialist philosophy, creates what Slavoj Žižek refers to as 'short circuits': critical readings which lead to 'the inherent decentering of the interpreted text, which brings to light its "unthought", its disavowed presuppositions and consequences'.[274] According to Žižek, 'such a procedure can lead to insights which completely shatter and undermine our common perceptions'.[275] In its ability to deconstruct seemingly fixed notions of 'the author' and 'the original', repetition, understood here as the re-production and the re-presentation of archival materials, thus allows for new layers of meaning to be added to those already existing; for new associations to be made; for new interpretations to arise. Repetition, in this respect, becomes a portal of discovery. Lang confirms: 'it is not a destruction of the original, but a new reading'.[276]

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serait pourtant monstrueux. Que ce soit bien le sien, c'est très important, parce qu'il fallait que l'auteur dise effectivement tout ce que je lui faisais dire. Mais que l'enfant soit monstrueux, c'était nécessaire aussi, parce qu'il fallait passer par toutes sortes de décentrements, glissements, cassements, émissions secrètes qui m'ont fait bien plaisir'.

[273] Bernhard Lang, in: Bernhard Günther (2010), 'Die Frage nach dem Original: Die Monadologie IX und Die sieben letzten Worte', in: Matthias Naske (eds.), *Back to the Future: Rainy Days 2010* (Luxemburg: Philharmonie Luxembourg), p. 90. Available at http://www.philharmonie.lu/media/content/download/documents/Publications/rainy_days-Kataloge/rainy_days_2010-back_to_the_future-Leseprobe.pdf (accessed on 19 July 2019): 'Ich hatte das Gefühl, ich *spreche* mit Haydn in gewisser Hinsicht, indem ichseinen Text überschreibe, und da rutschen auch Subtexte herein, die dann an die Oberfläche kommen'.

[274] Slavoj Žižek (2006), *The Parallax View* (Cambridge, MA: The MIT Press), p. ix.

[275] Ibid, p. ix.

[276] Bernhard Lang (2017), in: Ruth Ranacher, '"Die Loopmaschine ersetzt die Narration": Bernhard Lang im MICA-Interview' (8 May). Available at https://www.musicaustria.at/die-loopmaschine-ersetzt-die-narration-bernhard-lang-im-mica-interview/ (accessed on 31 March 2019): 'Es handelt sich ja nicht um eine Zerstörung des Originals, sondern um eine neue Lesart'.

By subsequently placing the sampled historical material on loop, Lang decentres its original identity even further. Although Lang's repetitions are, in fact, microvariations, and the generative cell is also being cut into smaller grains instead of being repeated as a whole, the perceptual process unfolding here is similar to that in Diana Deutsch's speech-to-song illusion.[277] As Haydn's distorted opening gesture locks into a hiccupping and distorted repetition, its original meaning gradually starts to erode. The familiar quickly dissolves into the unfamiliar as the extra-musical layers of meaning once associated with Haydn's historical material begin to blur, and eventually deteriorate as the repeated motif becomes just that: a repeated unit of sound. After a few repetitions, the listener's initial sense of familiarity with or recognition of the Haydn-sample thus fades, as their attentional focus shifts onto the repeated material's gesture, its rhythmic build, its timbral features, etcetera. Any initial sense of recognition thus turns out to be brief and fleeting, as what started out as a confident familiarity with Haydn's solemn opening gesture, quickly shifts into the realisation of being lost in Lang's strange musical landscape.

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By consecutively distorting, re-contextualising, and looping Haydn's historical artefact, Lang's *Anatomy of Disaster* welcomes the listener into an unstable terrain from its very outset. Repetition here works on two separate levels. First, Haydn's historical material is repeated, in the sense that it is sampled – that is, re-produced and re-presented. In this regard, repetition reinforces the sample's original identity, while at the same time also opening it up to contemporary re-readings and interpretations. As such, repetition here disrupts seemingly strict binaries, such as 'the old' and 'the new'; 'the original' and 'the copy'; and blurs seemingly fixed concepts, such as 'the work' and 'the author'. Secondly, this same material is put on loop, which causes the listener to continuously re-interpret what they just heard. Regardless of whether or not the listener is familiar with Haydn's

[277] The processes of transformation unfolding from one loop to the next, as well as Lang's procedures for cutting the material up into smaller fragments, will be addressed in more depth in Chapters 4.4 and 4.5.

historical material, persistent repetition of the near-same here invites the listener's focus of attention to wander off; to continuously shift across different aspects with each new iteration. As such, repetition here opens the material up to a flow of differing, in which the sampled material gradually but certainly escapes its original identity.

Of course, and as has been signposted both here and in earlier chapters, such intertextual usage of repetition is only effective up to a certain extent. A lot depends on whether or not the listener is familiar with the historical material that is being repeated. Acknowledging this limitation, Lang comments:

> I believe one can hear the *Monadologie IX* [...] very clearly, even without knowledge of the Haydn-piece – and that one can also guess what this is about. However, this is not a reinterpretation of Haydn; no attempt to bring Haydn into the present time. At the same time, this is definitely a weakness of sorts: presuming, on the one hand, that a system of references is in place, but knowing, on the other hand, that this system is seldom available in reception.[278]

The degree to which listeners are or are not familiar with Haydn's *Sieben letzten Worte* cannot be measured. It is, therefore, impossible to determine how effective these two types of repetition are in terms of inducing the cognitive experiences of drift, disorientation, and getting lost. The following sections, therefore, mark a shift in analytical focus. Rather than focusing on the nature and content of meanings associated with the repeated material, the next sections focus on the opening of *The Anatomy of Disaster* in terms of its sounding material.

[278] Bernhard Lang, in: Bernhard Günther (2010), 'Die Frage nach dem Original: Die Monadologie IX und Die sieben letzten Worte', in: Matthias Naske (eds.), *Back to the Future: Rainy Days 2010* (Luxemburg: Philharmonie Luxembourg), p. 93. Available at http://www.philharmonie.lu/media/content/download/documents/Publications/rainy_days-Kataloge/rainy_days_2010-back_to_the_future-Leseprobe.pdf (accessed on 19 July 2019): '[I]ch glaube, dass man die *Monadologie IX* [...] auch ohne Kenntnis des Haydn-Stücks sehr wohl hören kann – und dass man auch erahnen kann, um was es hier geht. Aber es ist keine Neudeutung von Haydn, kein Versuch, Haydn in die Jetztzeit zu bringen. Das ist sicherlich auch gleichzeitig ein bisschen der Schwachpunkt: dass man das Referenzsystem einerseits voraussetzt, aber dass man andererseits genau weiß, dass es ganz selten in der Rezeption vorhanden ist'.

4.4 Parsing the musical surface

In the opening to Lang's *Anatomy of Disaster*, a single repeated cell is subjected to a continuous process of microvariation. With every new iteration, a microscopic, uncoordinated, and seemingly random alteration takes place within it.[279] As such, the passage is perhaps best described as what Dora Hanninen defines as a 'fluid sonic surface' – that is, 'something like a single line, tenuously held together by the semblance of repetition'.[280] However, this continuously transforming musical landscape poses 'a distinct cognitive challenge' for both the listener and the analyst. Commenting on a similar issue in the late works of Morton Feldman, Hanninen explains that:

> [T]he real problem is not quantitative but qualitative: not duration or number of notes, but the identification of salient features that support memory and conceptualisation. [...] [T]he proliferation of near repetitions frustrates attempts to prioritize events by distinctive features, and thereby to categorize, or even remember, individual instances. The result is a superabundance of nuance that eludes conceptualisation, leaves listeners with little to report, analysts with little to say.[281]

While it is tempting to reduce this passage to a sequence of near-literal repetitions (A, A', A'',...), such an approach does not say anything about how this music plays the mind. To speak of this passage solely in terms of sameness and similarity, moreover, stands in stark conflict with the more permeable and fluid ways in which these near-literal repetitions appear to the listener in experience – that is, as the experience of getting lost in a complex musical landscape (audio example 9).

Dora Hanninen argues that '[s]egments and segmentation are essential to virtually all music analysis'.[282] Indeed, the formation and the recognition of 'segments', which Hanninen defines as 'musically – and analytically – significant units' is perhaps one of the most basic premises of music analysis.[283] The following analysis, therefore, assesses whether this passage genuinely resists formal analysis, or whether it abides by any type of underlying structure. In other words: can the musical

[279] These alterations are located in the repeated cell's pitch constellation, as well as in its rhythmic structure. The nature and effects of these alterations are discussed in more depth in Chapter 4.5.
[280] Dora A. Hanninen (2004), 'Feldman, Analysis, Experience', in: *Twentieth-Century Music* 1/2, p. 227.
[281] Ibid.
[282] Dora A. Hanninen, *A Theory of Music Analysis*: *On Segmentation and Associative Organization* (New York: The University of Rochester Press, 2012), p. 63.
[283] Ibid., p. 11. See also: Dora A. Hanninen, 'Feldman, Analysis, Experience', *Twentieth-Century Mus*ic 1/2 (2004), p. 226.

surface be parsed into any musically and analytically meaningful objects? If so, on what basis can this be done, and how do these objects interrelate? Does this passage abide by any type of formal structure, and, if so, what pathway(s) does that guide the listener along?

In addition to building on Dora Hanninen's theory of segmentation and associative organisation, the following analysis draws on data that relates to the compositional process behind *The Anatomy of Disaster*. In other words: can the compositional data or procedures reveal anything in terms of the work's structure?

4.4.1 The compositional data

Lang's *Anatomy of Disaster* was entirely generated in CadMus – the compositional software environment that was previously identified as the generative DNA for the *Monadologie* series.[284] Just like the other works in the series, *The Anatomy of Disaster* is hence but 'one among the many possible realizations of a particular compositional model'.[285] Damián Keller and Brian Ferneyhough argue that 'to understand the mechanisms of the model is a prerequisite' to develop an understanding of a process-based and computer-generated composition.[286] On that basis, this section sets out to investigate the ways in which CadMus has been put to use in *The Anatomy of Disaster*. The main focus of inquiry will be the compositional data generated from CadMus, and whether or not it can reveal anything in terms of the work's structural build.

Although *The Anatomy of Disaster* does not necessarily conform to the definition of process-based music in its traditional sense, the work does have numerous algorithmic processes underlying it. Just like the majority of works contained in the *Monadologie* series, the passage under analytical scrutiny

[284] See: Chapter 2.5.3
[285] Damián Keller and Brian Ferneyhough (2004), 'Analysis by Modeling: Xenakis's ST/10-1 080262', in: *Journal of New Music Research* 33/2, p. 161.
[286] Ibid.

in this chapter was generated entirely from a single cell of musical material. Commenting on the early *Monadologie* pieces, Lang comments that:

> The whole systems [sic] of composing can be called a machine. [...] I basically took one chunk of the original score, transformed it into MIDI data, fed it into the program, chose a rule for the cellular machine, and processed it. That's the piece.[287]

As such, an understanding of the construction of the work – that is, an understanding of the algorithmic processes that CadMus ran on the musical input cell – is likely to prompt an insight into its formal structure, and, by extension, into its experience in listening. While Keller and Ferneyhough consider it a basic premise for the analyst to have access to a detailed and systematic description of the specific compositional procedures underlying the musical work under analytical scrutiny, such access is limited and obscured in the case of Lang's *Anatomy of Disaster*.[288] Consequently, some caveats must first be drawn before diving into the analysis of any compositional data.

Caveats and limitations

Chapter 2 described CadMus as a modular environment for creating functional assemblages, which are created by the composer during a heuristic process of experimentation. Furthermore, the software itself was presented as a continuous work-in-progress, with Lang at times even rewriting its code as part of the heuristic process. As such, CadMus offers an almost infinite number of possible functional assemblages, which are created ad hoc for each new composition and altered along the way. For that reason alone, it is impossible to make any definitive claims as to exactly which functions or settings were used to generate a particular score – let alone in what order or assemblage.

[287] Bernhard Lang (2009), in: Renáta Spisarová (ed.), *Ostrava Days 2009: Report* (Ostrava & New York: Ostrava Center for New Music), p. 132.
[288] Damián Keller and Brian Ferneyhough (2004), 'Analysis by Modeling: Xenakis's ST/10-1 080262', in: *Journal of New Music Research* 33/2, p. 161.

Commenting on the compositional procedure behind *The Anatomy of Disaster*, Lang states that he 'suppose[s he] had some fifty tries, always listening again, changing, listening, changing, and sometimes even changing the program code in the meanwhile'.[289]

Adding to the sense of opaqueness that surrounds the underlying compositional process of *Monadologie IX* is the disorderly state the composer's digital archive is kept in. Although CadMus produces an output file for each of Lang's 'experiments', and many of these output files have been preserved in the composer's digital archive, the archive itself is extremely disorganised. Upon visiting the composer in his studio in Vienna in November 2017, I was confronted with an enormous quantity of documents, scattered across numerous folders on the composer's laptop. Although these documents contain a wealth of information with regards to the creation and the compositional method behind *The Anatomy of Disaster*, there is no structure or hierarchy in the way they are preserved. Lang comments:

> I had never thought I would need all this stuff ever again, so there is no real system or order behind this. It's more or less a documentary of the process: through many, many experiments to the final version. [...] [W]hat you have here is a scrapyard of sketches. [...] Actually, what I'm giving you is a mess! I'm a very well-organised person otherwise, but this was just for me! I don't know why I kept this. I have to confess. I didn't reflect on this so much. There was no intention behind it, to keep this or to structure this. [...] I just kept the results, you see. I did not keep all the information on the production.[290]

One folder in Lang's digital archive is marked 'Mon IX' and contains no fewer than 348 files in various different data formats. These range from text files containing the raw data outputs generated by CadMus, to MIDI files and PDFs containing musical excerpts converted from that output. Though even with this large number of files available, Lang claims that this folder is incomplete, and that he deleted those experiments he deemed the most unsuccessful.[291] It is, in other words, safe to assume that the CadMus output data that eventually found its way into the final score for *The Anatomy of Disaster*, is preserved among these 348 files. However, it is important to acknowledge that

[289] Bernhard Lang, in an interview with Christine Dysers (Vienna, 27 November 2017).
[290] Bernhard Lang, in an interview with Christine Dysers (Vienna, 24 November 2017).
[291] Bernhard Lang, in personal communication with Christine Dysers, 9 November 2017.

the data contained in these output files might not necessarily map onto the final score, as the composer might have made cuts or other adjustments as seen fit. For these reasons, the compositional data must be treated with a certain degree of caution.

The output data generated from CadMus

After comparative analysis and consultation with the composer, one file in Lang's digital archive was deemed most likely to contain data relating to the opening to *The Anatomy of Disaster*. This file was saved on the composer's personal laptop as 'z1ca12gran05.txt' and contains the raw and unedited output data as it was generated by CadMus (Figure 4.5).[292]

[292] It is safe to assume that 'z1' is short for 'zelle 1' (German for 'cell 1') and, as such, refers to the first generative cell to be used in *Monadologie IX*. This finding was supported by other materials found in the composer's digital archive, which indicated that filenames starting with 'z2' were linked to the B-section of the work's opening movement. Next, the indication 'ca12' indicates that the composer selected the twelfth out of thirty-five available cellular automata algorithms from the CadMus terminal to run on the generative cell. Finally, 'gran05' suggests that this file is the result of Lang's fifth 'experiment', that is, the fifth time the composer had adjusted the function settings in the CadMus terminal.

With these parameters # 0, 36 loops were written
Loop length 0 = 1024
Loop step 0 = 56
Loop step epsilon 0 = 56
Loop length epsilon 0 = 1024
Loop pause 0 = 0
Loop pause epsilon 0 = 0

With these parameters # 36, 12 loops were written
Loop length 36 = 555
Loop step 36 = 1
Loop step epsilon 36 = 121
Loop length epsilon 36 = 333
Loop pause 36 = 0
Loop pause epsilon 36 = 0

With these parameters # 48, 24 loops were written
Loop length 48 = 1000
Loop step 48 = 88
Loop step epsilon 48 = 55
Loop length epsilon 48 = 1000
Loop pause 48 = 0
Loop pause epsilon 48 = 0

With these parameters # 72, 13 loops were written
Loop length 72 = 444
Loop step 72 = 100
Loop step epsilon 72 = 55
Loop length epsilon 72 = 222
Loop pause 72 = 0
Loop pause epsilon 72 = 0

With these parameters # 85, 15 loops were written
Loop length 85 = 1000
Loop step 85 = 88
Loop step epsilon 85 = 55
Loop length epsilon 85 = 333
Loop pause 85 = 0
Loop pause epsilon 85 = 0

Figure 4.5: Raw output data generated by CadMus, as contained in text file 'z1ca12gran05.txt'

The data contained in this file suggests that the opening to Lang's *Anatomy of Disaster* contains five major structural changes. Operating on the highest hierarchical level, these five overarching parameter changes are indicative of the passage's formal structure. Additionally, the data specifies six looping parameters for each of the five structural sections. These looping parameters operate on a lower structural level and provide an insight into the looping processes that unfold in each of the five overarching sections. Disregarding the possibility that Lang might have cut or altered the output data for the time being, the data thus indicates that the opening to Lang's *Anatomy of Disaster* abides by the following formal structure (Figure 4.6):

Section I	Section II	Section III	Section IV	Section V
36 loops abiding by the same looping parameters	12 loops abiding by the same looping parameters	24 loops abiding by the same looping parameters	13 loops abiding by the same looping parameters	15 loops abiding by the same looping parameters

Figure 4.6: Schematic representation of bars 1-35, as based on the CadMus output data

Nevertheless, and as has been indicated previously, the formal structure shown in Figure 4.6 is not readily perceptible from the musical surface. As the passage under analytical scrutiny here is characterised primarily by pervasive microvariation, it is virtually impossible to distinguish five distinct structural sections.

Taking a closer look at the looping parameters might hence provide a way forward. Is it possible, for instance, to distinguish five different sections based on the behaviour of the repeated material? In order to make sense of the looping parameters, and, as such, to develop an understanding of the looping processes that unfold in each of these five structural sections, it is important to gain an insight into the workings of the looping technique Lang uses in his *Monadologie* series: that of 'granular analysis'.

Granular analysis

Lang's looping technique is best understood as a computer-simulated 'scratching' process.[293] The composer himself speaks of his looping strategy as one of 'granulation' or 'granular analysis', referring to the fact that only smaller fragments or 'grains' of the chosen sample (in this case, smaller fragments of Haydn's distorted opening motif) are being looped. The term 'granulation' or 'granular analysis', used here in the context of computer-simulated looping processes, might suggest a link with granular synthesis – a computer-based compositional method described by Curtis Roads as 'generating thousands of very short sonic grains to form larger acoustic events'.[294] Granular synthesis is usually classified as a type of additive synthesis, as its sonic result stems from the additive combination of thousands of musical 'grains' – i.e. microsamples which usually fall within the durational range of 1 to 50 milliseconds. Lang's concept of 'granulation' or 'granular analysis' is, however, quite different from granular synthesis in both method and sonic result.

Lang's 'grains', for example, are 'extragranular', as they fall within the duration range of 'anywhere between 50 and 7000 milliseconds'.[295] Instead of fleeting glitches and bleeps, Lang's grains are thus well-rounded musical units, figures or motifs. After Lang has decided what portion of the sample will be put on loop – that is, after a 'loop length' has been set – the loop progresses through the sample in a linear fashion (Figure 4.7). In the meanwhile, the loop may be either incremented, decremented, or scratched erratically – meaning that a random offset duration is added to, or subtracted from its previous starting position. The outcome is a series of vertical cuts; a fragmented process in which the grain is erratically stretched out over a larger durational span (Figure 4.7).

[293] Scratching is a DJ-technique in which musical sounds are created by manually and rapidly moving a vinyl record backwards and forwards under the turntable's needle. The technique is most often associated with hip-hop, DJ-culture and turntablism. The sonic result is often highly rhythmical.
[294] Curtis Roads (1988), 'Introduction to Granular Synthesis', in: *Computer Music Journal* 12/1, p. 11.
[295] Bernhard Lang (2006), 'Cuts'n Beats: a Lensmans View. Notes on the Movies of Martin Arnold', p. 7. Available at http://members.chello.at/bernhard.lang/publikationen/CutsAndBeatsNotesonMartinArnold.pdf (accessed on 1 September 2014).

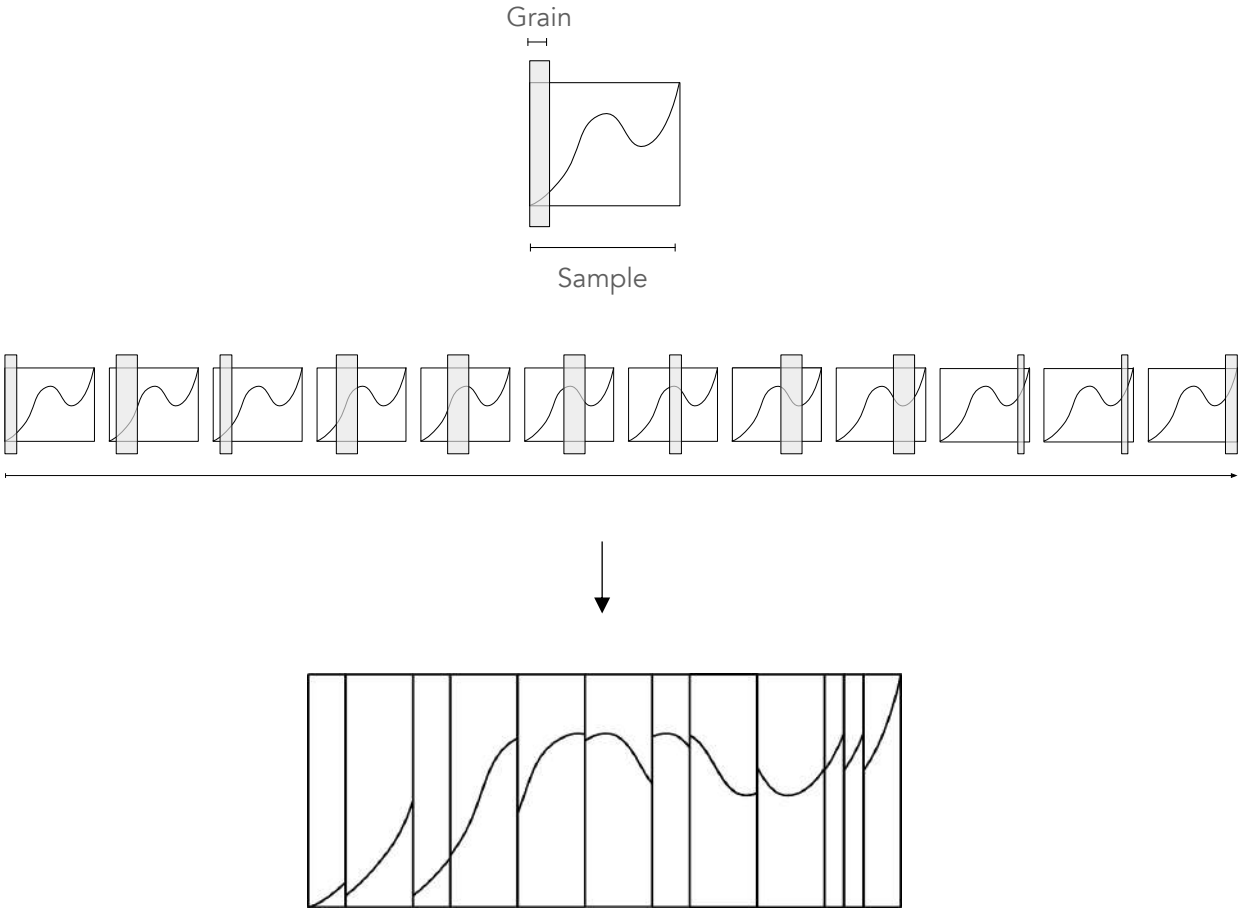

Figure 4.7: Granular analysis and its outcome

The process is very similar to the one used by experimental filmmakers Martin Arnold and Rafael Montañez Ortiz. In their so-called found footage films, Arnold and Ortiz appropriate and manipulate scenes from vintage Hollywood films by incessantly shifting backwards and forwards between the frames. As the linear development of the scene is disrupted by incessant repetition, the viewer is forced to relocate their attention from the actors and the general narrative to a more subconscious level, in which subtleties in movement and expression take central stage. The result of these frame-to-frame analyses is, at the same time, both humorous and suggestive.

In the opening scene of Martin Arnold's *Alone. Life Wastes Andy Hardy* (1998), for instance, we see the young protagonist, Andy Hardy, kissing his mother goodbye (Figure 4.8). As these few seconds of footage are continuously played back, incessantly repeated, shifted in tiny increments, and stretched out over several minutes, the innocent goodbye of a child to his mother changes into an Oedipal situation (video example 2):

> Andy's casual peck on Mom's cheek becomes a drama of sexual excitement and urgency. The kiss is magnified; his body seems to thrust into her as her face exhibits longing and sensuality in the flickering of her twitching lip. [...] [T]he scene also gives expression to the Mother's desire as Holden's heavy-lidded eyes and sighs suggest a sensuality caught in pensive regret at her treatment in the hands of Rooney's callow youth.[296]

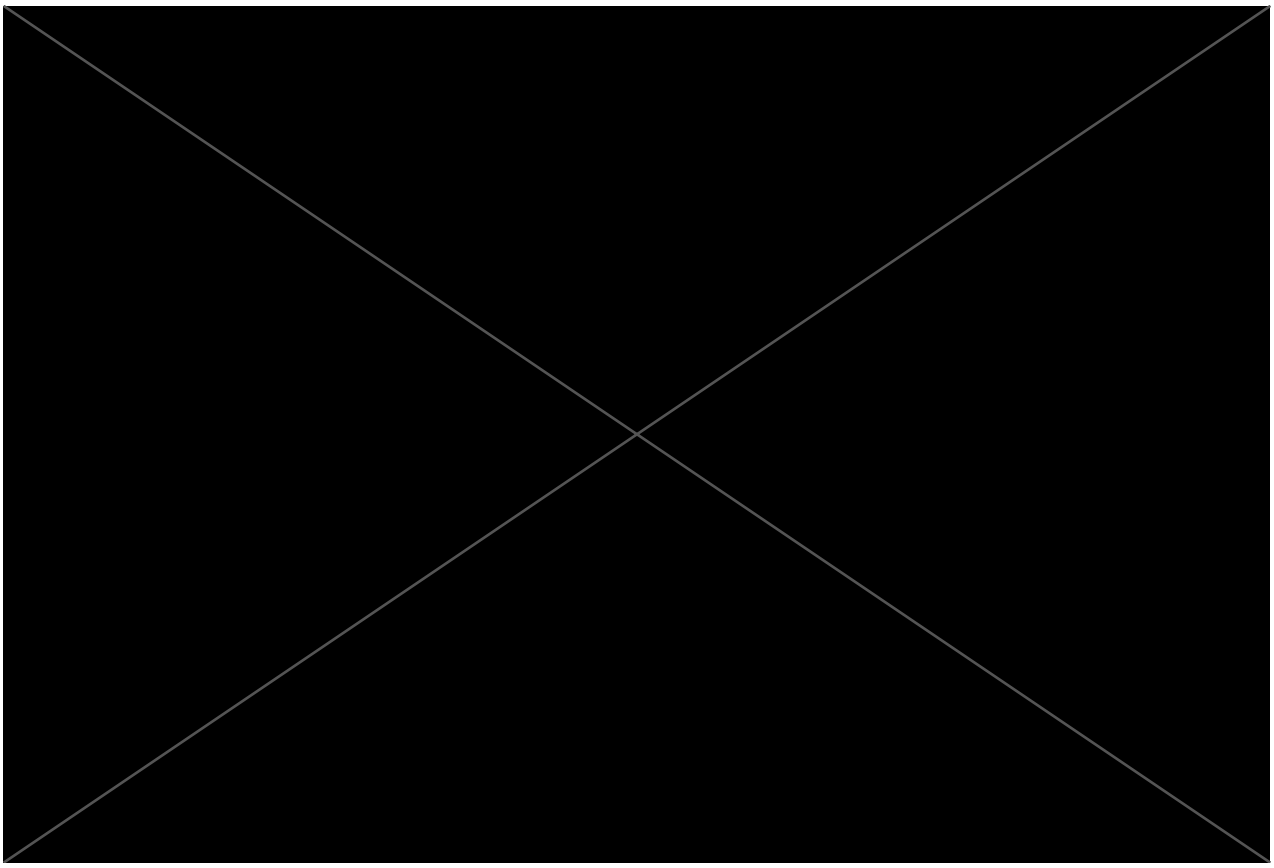

Figure 4.8: Andy Hardy kissing his mother goodbye
Film still taken from Martin Arnold - *Alone: Life Wastes Andy Hardy* (1998)

[296] Michael Zryd (2004), 'Alone: Life Wastes Andy Hardy', in: *Senses of Cinema* 32. Available at http://sensesofcinema.com/2004/cteq/alone_life_wastes_andy_hardy (accessed on 26 January 2018).

With the use of loop-based interventions, Arnold creates subtle choreographies of movement that bring out several layers of 'hidden, perhaps repressed, meanings' contained in the original footage.[297] In that respect, Martin Zeilinger argues that Arnold's cutting and looping aesthetic offers an analytical close reading of the original footage. Arnold's convulsing, jittering and stammering loops thus become 'an analytical strategy'; an analytical tool that 'interferes with the integrity of the original only insofar as it strives to create a new, meaningful connection to this original'.[298]

By analogy, Lang's jittering loops have the same 'analytical' effect in opening the granulated material up to new readings. Lang comments:

> Granular Analysis: this is a kind of time-stretch, but with a different look at the content: it results in a kind of microscopic analysis of the content, transforming it, re-interpreting it, revealing sub-layers of meaning. The best examples to demonstrate the effect of this [sic] loops on our perceptions stem from Raffael [sic] Montanez Ortiz.[299]

One of the most clear-cut examples of granular analysis in Lang's oeuvre is found in *Ach Ich,* which is one of the central arias in the 2006 opera *I HATE MOZART / ODIO MOZART* (video example 3). The aria shows how a process of granulation unfolds over the two first sentences of *Ach, ich fühl's* – one of the more iconic arias from Mozart's 1791 comic opera *Die Zauberflöte* (Figure 4.9).

[297] Martin J. Zeilinger (2014), 'Sampling as Analysis, Sampling as Symptom: Found Footage and Repetition in Martin Arnold's Alone. Life Wastes Andy Hardy', in: David Laderman and Laurel Westrup (eds.), *Sampling Media* (Oxford: Oxford University Press), p. 159.
[298] Ibid., pp. 158-159.
[299] Bernhard Lang (2018), Lecture at the Österreichisches Kulturforum, Warsaw (23 September).

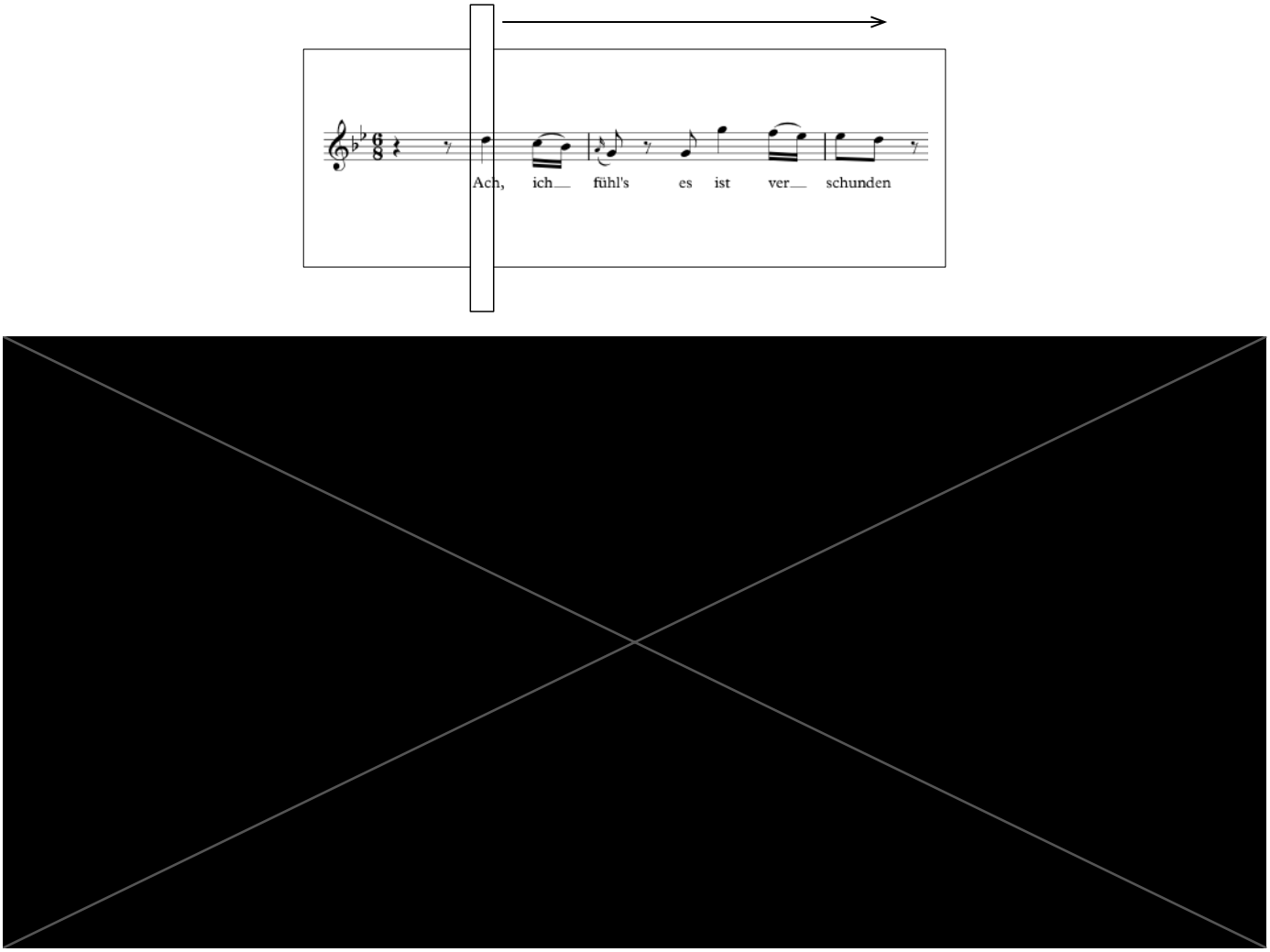

Figure 4.9: Granular analysis in *I HATE MOZART / ODIO MOZART* (2006) – Act 1, Scene 3B: *Ach ich* (vocal reduction)

In this example, Mozart's original material remains unaltered, apart from being cut up into smaller fragments or 'grains'. Step by step, the loop then 'walks through' the original material, meanwhile erratically scratching backwards and forwards, as well as shrinking and growing in the process. The resultant melodic line is fragmented and unpredictable in nature. Commenting on the process of granulation, Lang comments:

> What you hear is motion backwards and forwards with a tendency to go forwards. [...] For me it's very similar to the notion of stuttering. A stutter creates very high tension. If you stand before a person with a stutter and they want to tell you something, your sweat starts to run because you suffer with him or her.[300]

[300] Bernhard Lang (2009), in: Renáta Spisarová (ed.), *Ostrava Days 2009: Report* (Ostrava & New York: Ostrava Center for New Music), pp. 128-129.

Looping parameters

The six looping parameters shown in Figure 4.5 describe how the process of granular analysis unfolds in the opening to Lang's *Anatomy of Disaster*. For each of the five structural sections, a total of six looping parameters are specified: (1) loop length, (2) loop step, (3) loop step epsilon, (4) loop length epsilon, (5) loop pause, and (6) loop pause epsilon. Each of their durational values is expressed in midi ticks.

The first parameter, 'loop length', is, of course self-explanatory, in that it defines the length or duration of the looped material. Secondly, the 'loop step' determines the timespan the loop will progress through with each new iteration. Put differently, this parameter defines the extent to which the loop length progresses forward through the sample. The two other parameters – 'loop step epsilon' and 'loop length epsilon' – each introduce an element of randomness into the looping process. More specifically, these two 'epsilon areas' determine a timeframe within which either the duration of the loop or that of its forward movement can vary. For instance, if the 'loop length epsilon' parameter is set to a level of 1024, the loop will be able to either grow or shrink anywhere between 0 and 1024 midi ticks in duration with each new iteration. The last two parameters shown in Figure 4.5 – 'loop pause' and 'loop pause epsilon' – remain inactive for the entire duration of the passage. As such, they will not be considered here.[301]

Explaining the CadMus output data for *Monadologie V: Seven Last Words of Hasan* (2008-2009), which, remarkably, not only uses the same source material as *Monadologie IX*, but also opens with the exact same looping parameters, Lang comments:

> [T]hese are parameters for the cellular analysis for this file. [... T]he first 36 loops have a length of 1024, which means it's a quarter note in this grid. The loop step is 56, so the loop is progressing by 56 ticks through the sample. The loop step epsilon is the jitter, the random amount of the loop progressing. It's +/- 56, so to say. Also, the length is scratched, so the loop becomes longer and shorter with each repetition.[302]

[301] Whereas 'loop pause' indicates a duration of silence between two subsequent loop iterations, 'loop pause epsilon' indicates the maximum amount of increment or decrement for each such loop pause.
[302] Bernhard Lang (2009), in: Renáta Spisarová (ed.), *Ostrava Days 2009: Report* (Ostrava & New York: Ostrava Center for New Music), p. 78.

In other words, the parameters allow for a significant amount of freedom in the loop's development. With each new iteration, the loop can shrink or grow from a minimum of 0 to a maximum of 1024 midi ticks in length. As the loop length is set to 1024 midi ticks as well, this implies that the loop can theoretically double in durational size. The forward movement of the loop can vary from anywhere between 0 to 56 midi ticks per iteration, suggesting that the forward movement through the sampled material is slow and laggard. The rapid succession of backwards and forward motion gives the loop a stuttering impression. Figure 4.10 shows the looping process as it unfolds over the first structural section in the opening of *The Anatomy of Disaster*.

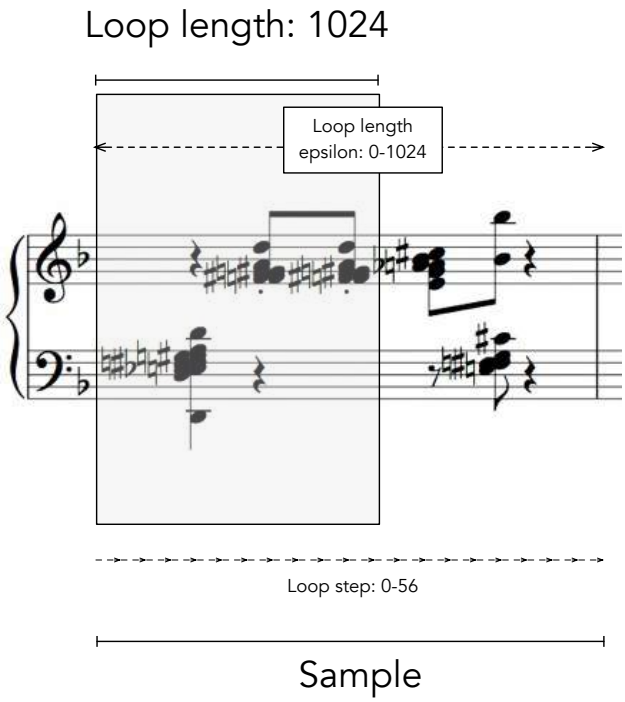

Figure 4.10: Looping parameters for structural section I

Overall, Lang's parameters make for a fluid, erratic, and highly unpredictable movement with each new loop iteration. More specifically, the looping parameters specified here (as shown in Figure 4.5) allow for a significant amount of freedom and variability in the repeated material's behaviour from one loop iteration to the next. Moreover, it is important to note that these looping parameters are but one piece of the puzzle in explaining the repeated material's behaviour from one loop to the next. In addition to the looping parameters, a cellular automata algorithm is also running on Lang's

generative cell. The specifics of that algorithm are, however, lost. As such, it is difficult to make any assumptions as to how the repeated material will behave on a loop-to-loop basis. Just like the five structural sections marked in the CadMus output data (Figures 4.5 and 4.6), it is not possible to distinguish five distinct looping processes from the musical surface. Instead, the loop's behaviour is erratic and volatile throughout the work's opening section.

Nonetheless, even though no explicit formal structure or distinctly different looping mechanisms might be readily perceptible from the musical surface, they may well still be there – hidden underneath the guise of repetition. In that respect, Dora Hanninen's theory of segmentation and associative organisation might provide a way forward.

4.4.2 Strategies for segmentation: disjunction versus association

Dora Hanninen distinguishes between three perceptual or cognitive strategies for segmenting a musical work into analytically meaningful objects: (1) disjunction, (2) association, and (3) theory.[303] Generally speaking, these strategies represent three distinctly different analytical orientations towards musical experience.

To take a disjunctive orientation towards a musical work, for instance, requires the listener or analyst to focus on the perceptual salience of difference. In other words, a disjunctive orientation focuses on 'edge detection' or marking boundaries between analytically meaningful objects by distinguishing 'significant disjunctions in sonic dimensions such as pitch, duration, loudness, and timbre'.[304] A disjunctive analytical strategy is thus one of individuating discrete objects; of creating boundaries between perceptual points of contrast.

To take an associative orientation towards the musical surface, on the contrary, requires the listener or analyst to focus on relational properties – that is, to focus on notions of sameness and similarity

[303] Dora A. Hanninen (2012), *A Theory of Music Analysis*: *On Segmentation and Associative Organization* (New York: The University of Rochester Press), pp. 23-50.
[304] Ibid., p. 19.

that connect groupings of musical notes with one another. Association is primarily a cognitive act of dividing the musical surface into both individual segments and higher levels of organisation. Hanninen argues that '[a]ssociation is the orientation a composer or performer adopts when she asks: "How can I link this moment with that one?"'.[305]

Finally, Hanninen argues that the listener-analyst can also take a theoretical orientation towards the musical work as it is experienced. In that case, the analytical attention is shifted 'from perceptual salience to the interpretation and representation of musical meaning'.[306] To adopt a theoretical orientation then, is to base the recognition, interpretation and organisation of significant musical units on a specific theory of musical structure, such as Schenkerian analysis or twelve-tone composition.[307]

When it comes to dealing with prolonged near-repetition as it is perceived and experienced, no theoretical principles have yet been discerned or formalised. Consequently, this study will not take a theoretical orientation in segmenting the opening to Lang's *Anatomy of Disaster* into analytically meaningful objects. Furthermore, Hanninen claims that, while a theoretical orientation might 'inform, shape, and [...] enrich the process of musical interpretation', it is 'not essential'.[308] The study will, therefore, take both a disjunctive and an associative orientation towards the opening of Lang's *Anatomy of Disaster*. For, according to Hanninen, disjunction and association represent 'basic and complementary strategies in human cognition'.[309] She explains:

> [W]hereas disjunction is predicated on adjacency in some sonic dimension, association responds to repetition of certain features in a specific context, often over long time spans. Disjunction defines boundaries and implies segments; association defines segments and implies boundaries. Disjunctions locate points of contrast; association, points of correspondence. Disjunction separates sound-events from one another and individuates analytical objects; association groups sound-events into analytical objects and supports categorisation. For the listener and analyst, disjunction and association are distinct, functionally independent strategies: disjunction individuates; association groups.[310]

[305] Ibid., p. 20.
[306] Ibid.
[307] Ibid., pp. 20-23.
[308] Ibid., p. 8.
[309] Ibid.
[310] Ibid., p. 20.

Segmentation motivated by disjunction

To take a disjunctive orientation to Lang's opening material, is essentially to scan the musical surface for moments of sonic difference; to look for perceptual shifts in psycho-acoustic dimensions such as 'pitch, attack-point, duration, dynamic (loudness), timbre, and articulation'.[311] Using these sonic criteria as a rationale for segmentation, it is indeed possible to discern five structural sections in the opening to *The Anatomy of Disaster* (Figure 4.15).

On the third beat of bar 22, the sudden shift to a *staccato sul ponticello* articulation marks a first segment boundary motivated by sonic disjunction (Figure 4.11). Although this abrupt change in articulation and timbre had already been prefigured in bars 3, 5, 8, 13, 15 and 16; the second half of bar 22 marks the first instance in which all four string parts simultaneously share the same *sul ponticello* articulation, and maintain it over a timespan that is longer than a mere two sixteenth notes.

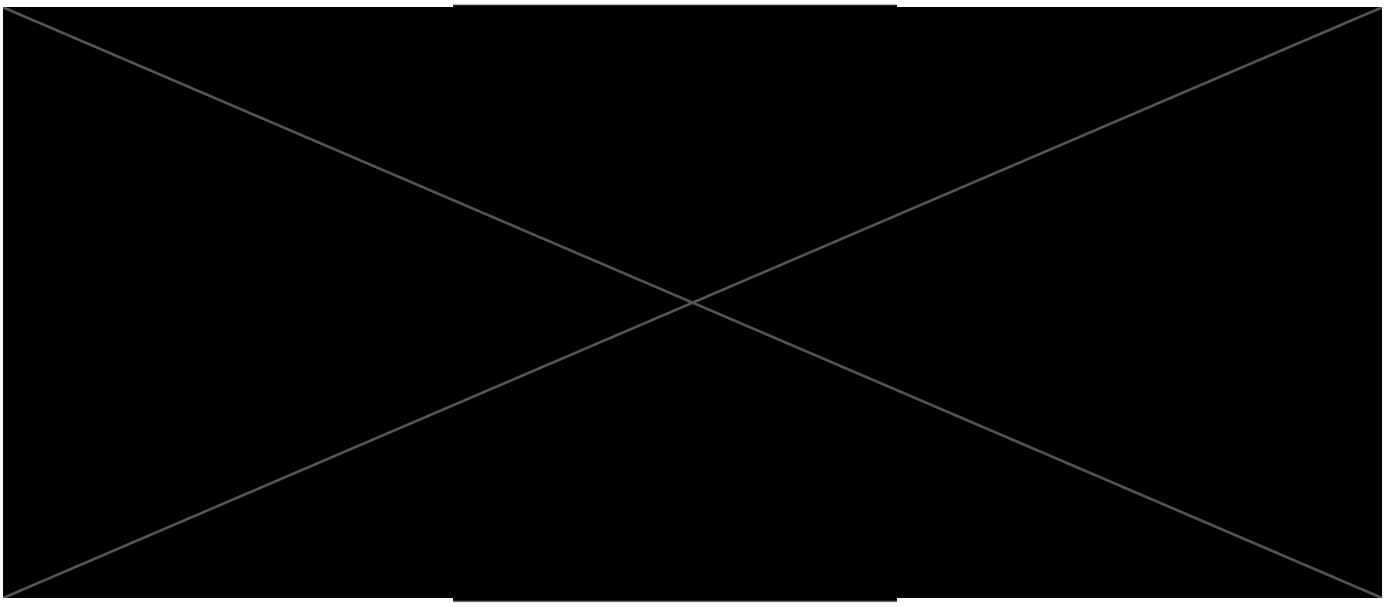

Figure 4.11: Sonic disjunction in terms of timbre and articulation, bar 22

[311] Ibid., p. 23.

A second and perhaps more perceptually salient instance of sonic disjunction is found at the end of bar 26. Here, a sudden turn to pressured bowing marks a rupture in the musical surface. As such, bar 26^{3} provides the location for a second segment boundary based on disruptive shifts in timbre and articulation (Figure 4.12).

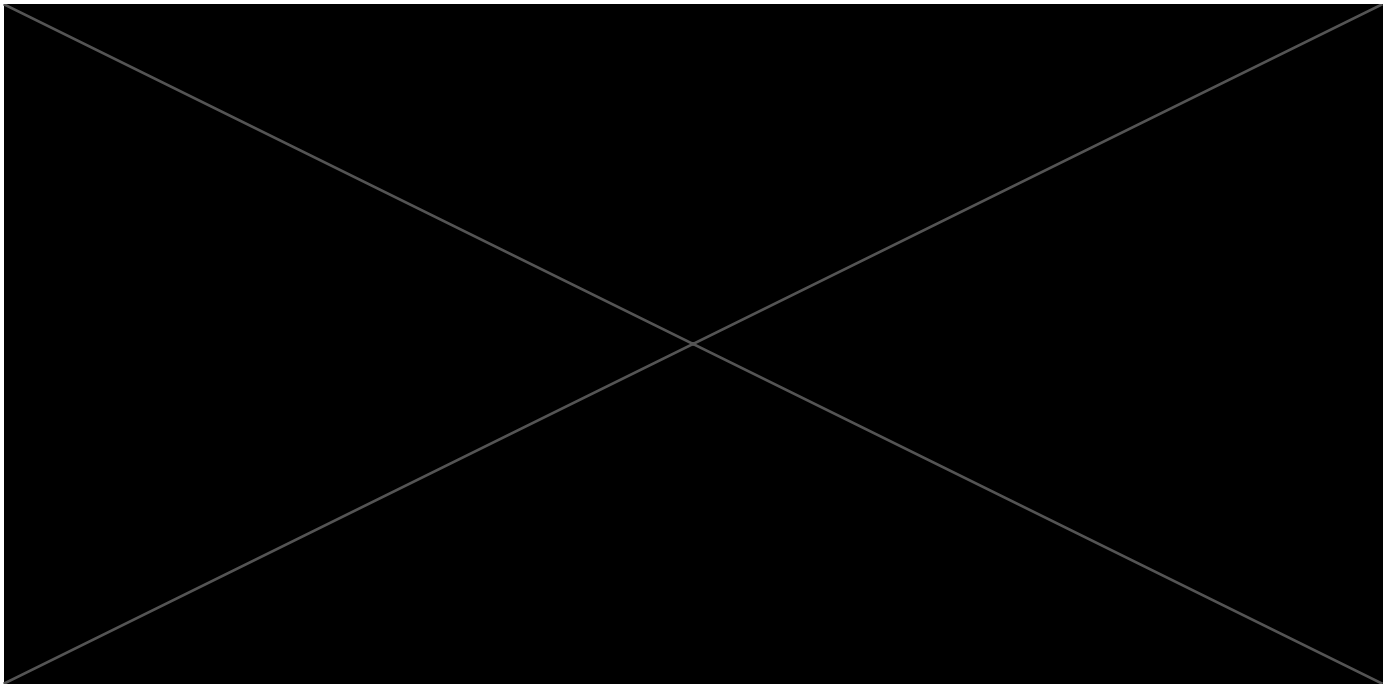

Figure 4.12: Sonic disjunction in terms of timbre and articulation, bar 26

A third segment boundary is located shortly after the second, at bar 27^{3}. Here, the pressured bowing that was just introduced is abandoned altogether, marking yet another shift in both timbre and articulation. At the same time, the dynamic volume of the music also drops to a *piano* dynamic. In a passage that had been characterised by an aggressive *triple forte* since bar 1 – the only exception being a passing *mezzo forte* on bar 27^{2} –, this creates a strong perceptual contrast (Figure 4.13).

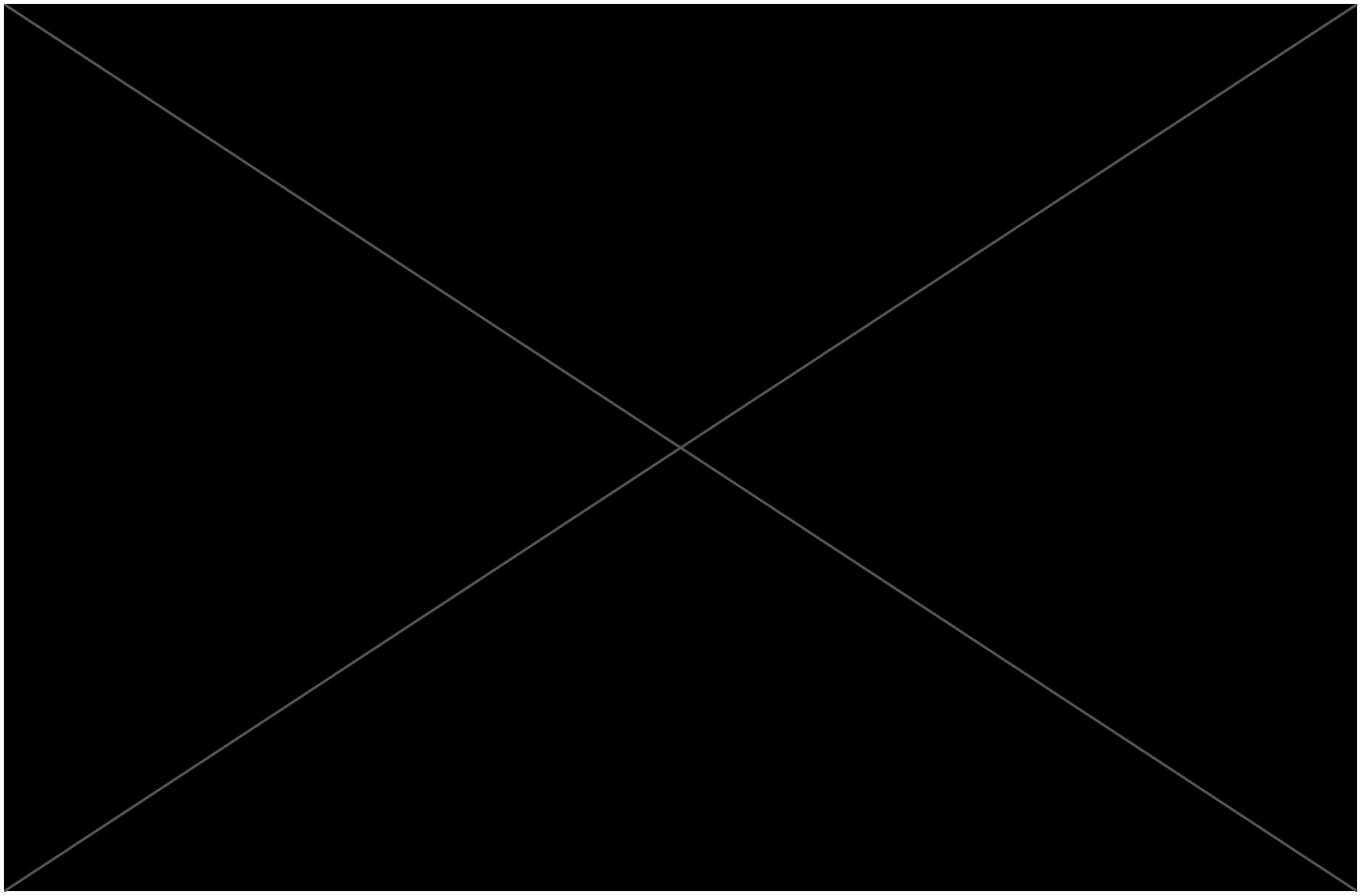

Figure 4.13: Sonic disjunction in terms of timbre, articulation, and dynamics, bar 27

This section, the beginning of which is marked in bar 27[3] by a sonic disjunction in terms of timbre, articulation, and dynamics, is characterised by a gradual return to *fortissimo* dynamics – the arrival of which marks a fourth and final segment boundary in bar 30. However, the sonic disjunction in bar 30 is not only marked by a change to *fortissimo* dynamics, but also by the return of pressured bowing, which is an element of both articulation and timbre (Figure 4.14).

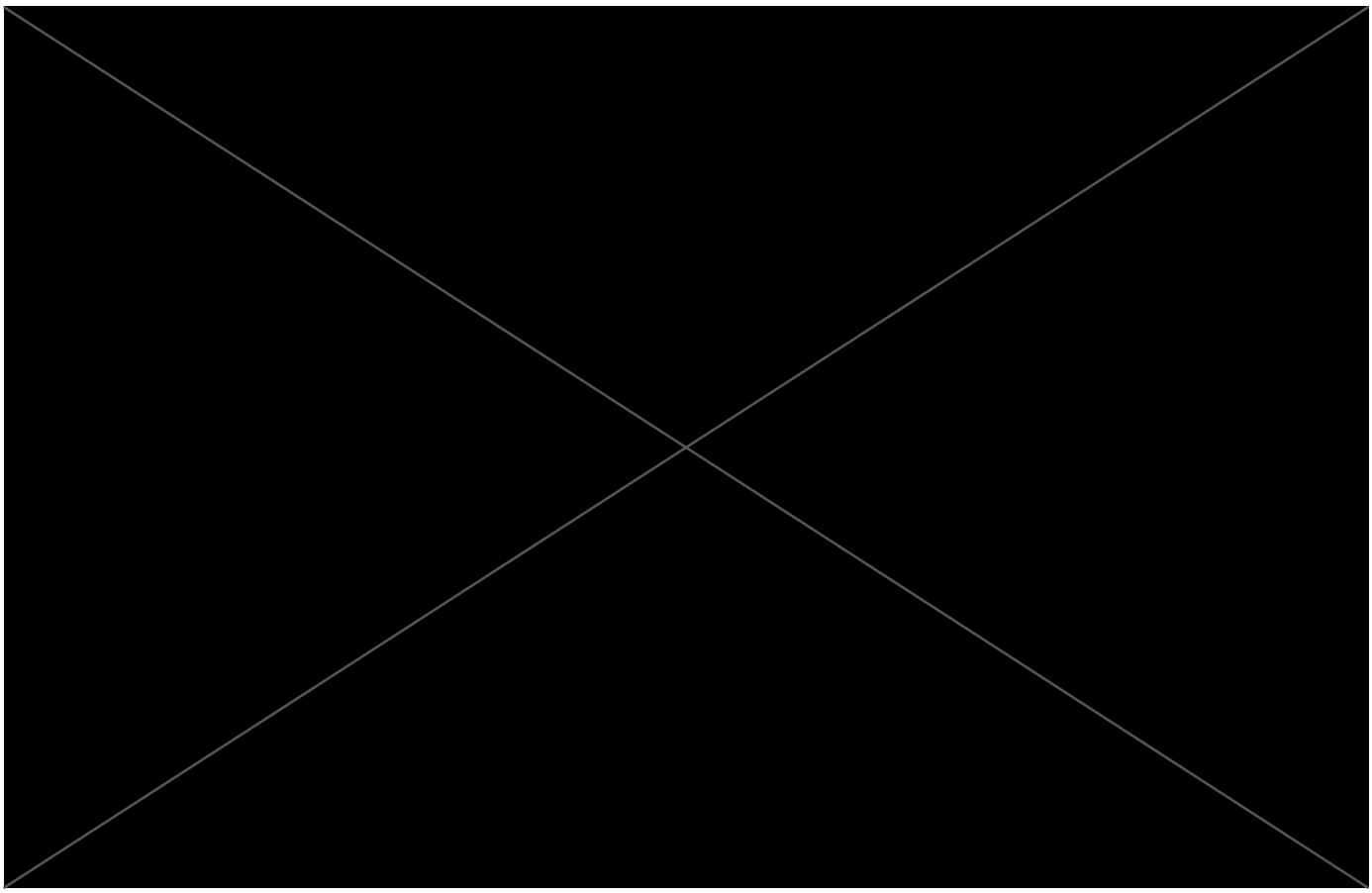

Figure 4.14: Sonic disjunction in terms of timbre, articulation, and dynamics, bar 30

No other sonic disjunctions can be found until the end of the opening section in bar 35. Adapting a disjunctive orientation towards this passage, it is thus possible to determine a total of four segment boundaries and five resultant structural sections (Figure 4.15). As such, this formal structure maps to the compositional data shown and discussed previously (Figures 4.5 and 4.6).

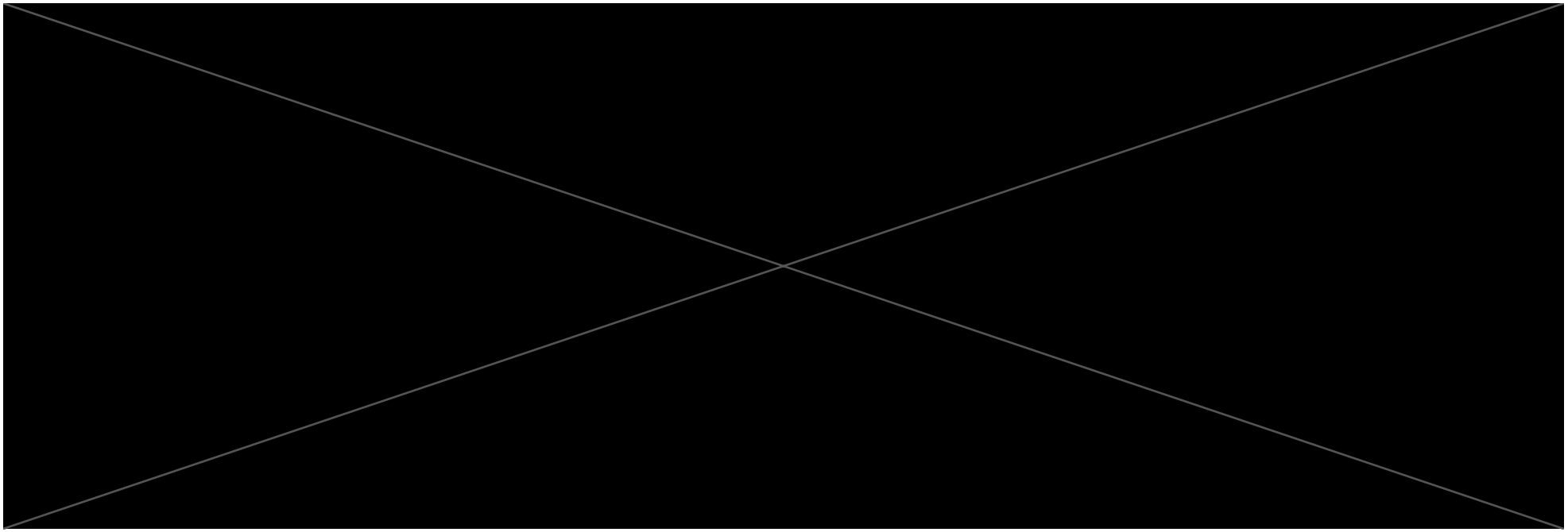

Figure 4.15: Segment boundaries motivated by sonic disjunction and resultant structural sections

Yet, not all four of these segment boundaries are equally convincing. In perception, the sudden drop to *piano* dynamics on bar 27[3], as well as the return to *fortissimo* dynamics in bar 30, both create relatively strong sonic disjunctions. The significant sonic contrasts created at these two moments are prone to grab the listener's attention. Hanninen confirms this intuitive finding when she argues that 'larger intervals create stronger boundaries'.[312]

Somewhat less convincing are the two segment boundaries situated in bars 22 and 26, which are based solely on changes in articulation and timbre; two sonic criteria that are not affiliated with linear, intervallic, and therefore measurable spaces (as opposed to pitch, duration, and dynamics). Hanninen too, admits that the relative strength of these criteria in creating sonic boundaries is more difficult to weigh and largely depends on musical context.[313]

Given that the specific musical context of this passage is one of prolonged repetition, it is, notwithstanding, reasonable to argue that the sudden changes to a *staccato sul ponticello* articulation at bar 22[3], and to pressured bowing at bar 26[3], do, in fact, leave a significant impact on the way the musical surface is parsed in perception, or, in the very least, on the way the listener's attention and expectations are directed. Research by David Huron, for instance, suggests that sudden changes in playing technique can indeed form an element of surprise, which in turn leads to a heightened sense of attention and, as such, grabs hold of the listener's attentional focus.[314] In other words, the specific nature of the musical context here does indicate that these two changes in articulation and timbre make for two relatively strong sonic boundaries.

At the same time, however, the relative strength of these four sonic boundaries is heavily clouded and contested by the similarity of the musical material contained *within* and *between* the five formal sections they create. If anything, the opening to Lang's *Anatomy of Disaster* is characterised by the persistent repetition of the same musical cell. The following rationale, therefore, adopts an associative analytical orientation, which Hanninen claims is 'essential to work in post-structural and

[312] Ibid., p. 31.
[313] Ibid.
[314] David Huron (2006), *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge, Massachusetts: The MIT Press), pp. 19-21.

intertextual music analysis that challenges unity as an analytical premise'.[315] Instead of scanning the musical surface for perceptual difference, the following section takes 'repetition, equivalence, or similarity between two (or more) groupings of notes within a specific musical context' as the starting point for object formation.[316]

Segmentation motivated by association

To take an associative orientation to Lang's opening material, is to scan the musical surface not for moments of sonic difference, but for moments of sameness or similarity; to look for associations between 'contextual criteria', such as 'pitch contour, pitch content, pitch-class set, scale degree, set class, and rhythm'.[317] Hanninen comments:

> Rather than fix one's analytical gaze on individual objects within musical contexts, the associative orientation that underlies contextual criteria asks analysts to think of objects as constituted not only, or even primarily, in and of themselves, but largely by their contexts.[318]

Adapting an associative orientation towards the opening of Lang's *Anatomy of Disaster*, it is possible to discern either one or five structural sections. The argument for considering bars 1 to 35 as one single musical segment is self-evident, as it considers all successive loop iterations to be in a relationship of sameness or similarity to their 'mother' cell. This mother cell, then, can be thought of as being either Lang's generative cell or the first statement of the repeated material in bar 1.

[315] Dora A. Hanninen (2012), *A Theory of Music Analysis: On Segmentation and Associative Organization* (New York: The University of Rochester Press), p. 20.
[316] Ibid., p. 32.
[317] Ibid.
[318] Ibid., pp. 33-34.

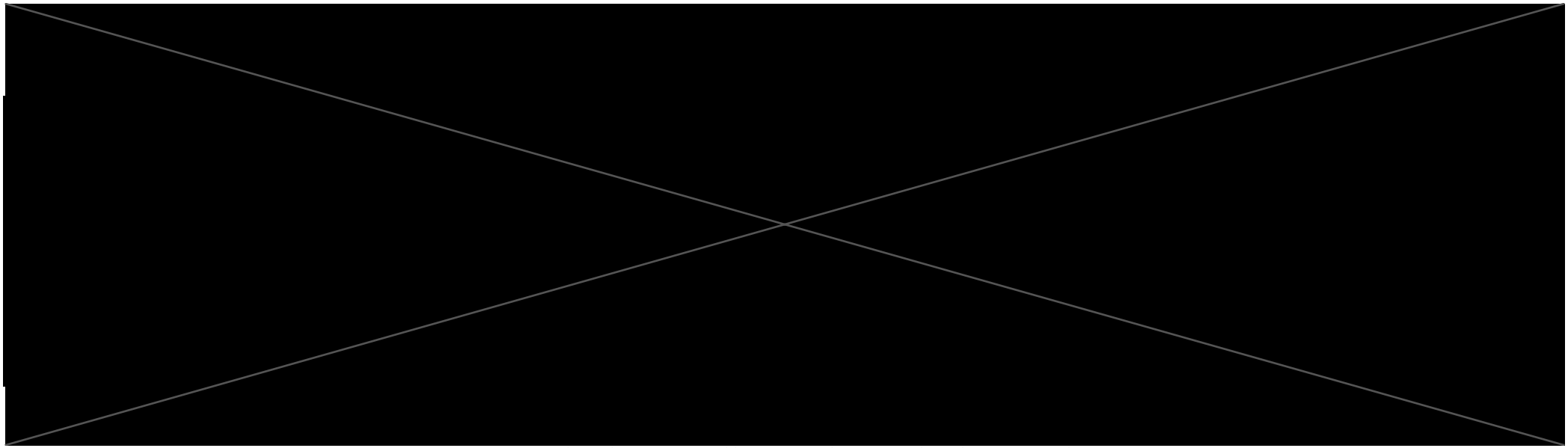

Figure 4.16: Segment boundaries motivated by contextual criteria and resultant structural sections

More convincing, however, is to conceive of bars 1 to 35 as comprising of five distinct structural segments (Figure 4.16). As Lang's looped material is continuously being altered by subtle microvariations, the musical properties or relational criteria that group these loops together are not criteria of pitch-class set or rhythm. Rather, what binds the repeats within these five structural segments together, is the section of the sample which is being looped – the loop window or 'grain' which is subjected to repetition. In the opening section (bars 1-22[3]) for instance, the distorted Haydn sample is repeated in its entirety, albeit erratically. Although the passage starts off by showcasing only the first half of the sample, the progressive increments of the looping window are readily perceivable, leading to a first full statement of the sample in bar 3 (Figure 4.17).

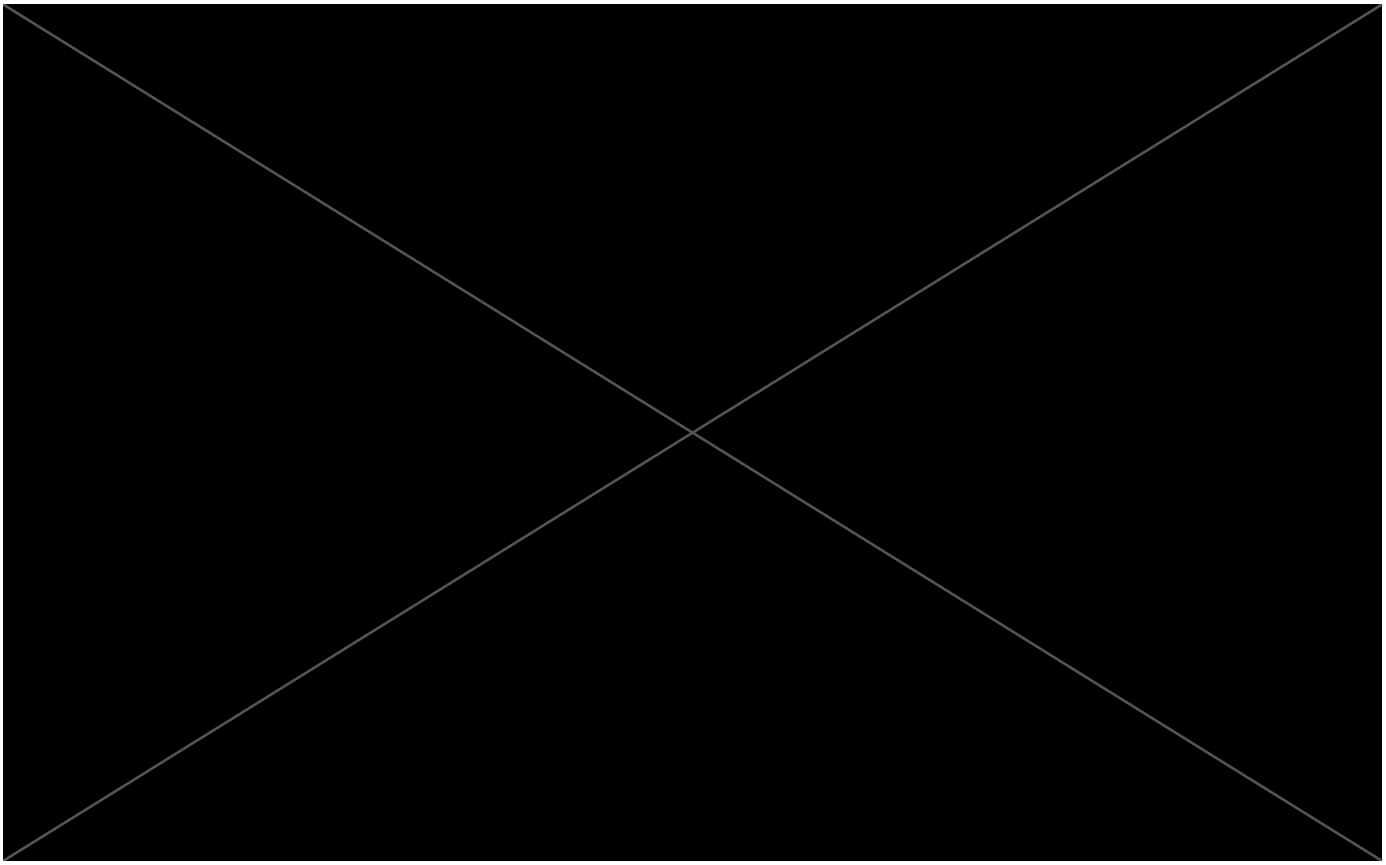

Figure 4.17: Progressive loop increments, bars 1-3

Speaking metaphorically: even through the needle may be stuck in a groove and is, as a result, continuously skipping back to the same starting point, the groove is erratically increasing and decreasing in length with each new attempt.

Keeping up with this analogy, the needle suddenly skips to an entirely different place in the groove and gets stuck there, marking a second structural section that spans bars 22^3-26^3. Here, the emphasis is placed on the end of the sample (Figure 4.18). The solemn melodic gesture of Haydn's falling minor second and rising diminished seventh (d – c# – b ♭) has here transformed into a falling minor second followed by a rising major sixth (e – e ♭ – c). As the focal point of Lang's insistent looping, moreover, the motif transforms into an almost aggressive stutter.

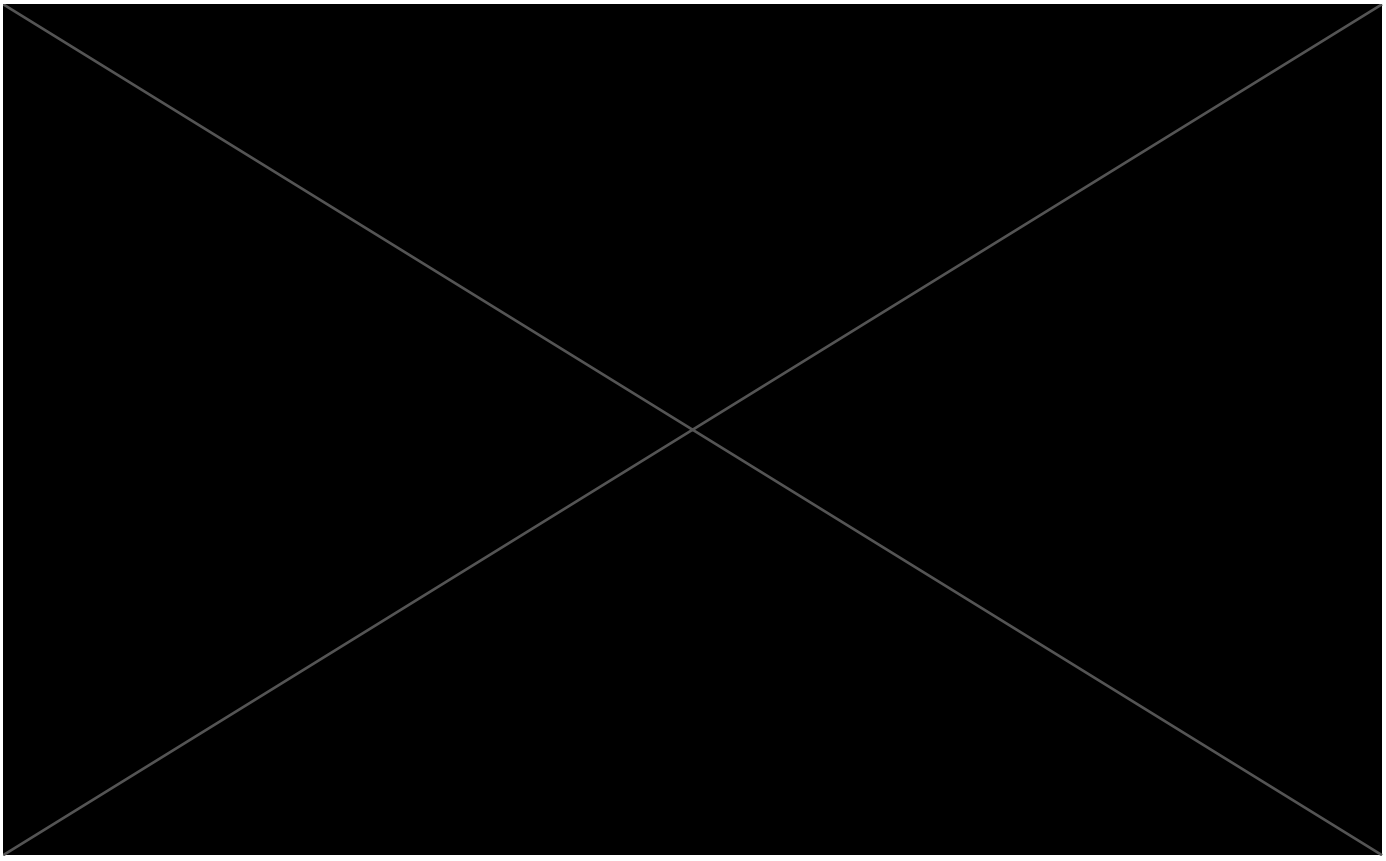

Figure 4.18: Looping the end of the distorted Haydn sample (fragment, bars 22^3-23)

The following two sections, respectively spanning bars 26³-28³ and bars 28³-33, zoom in on the end of the sample even further. More specifically, the third section places a strong emphasis on Haydn's final 'high note' – originally a b ♭ 5, yet a c6 in Lang's case (Figure 4.19). Combined with the pressured bowing, the music here seems to stutter and to collapse into a total standstill.

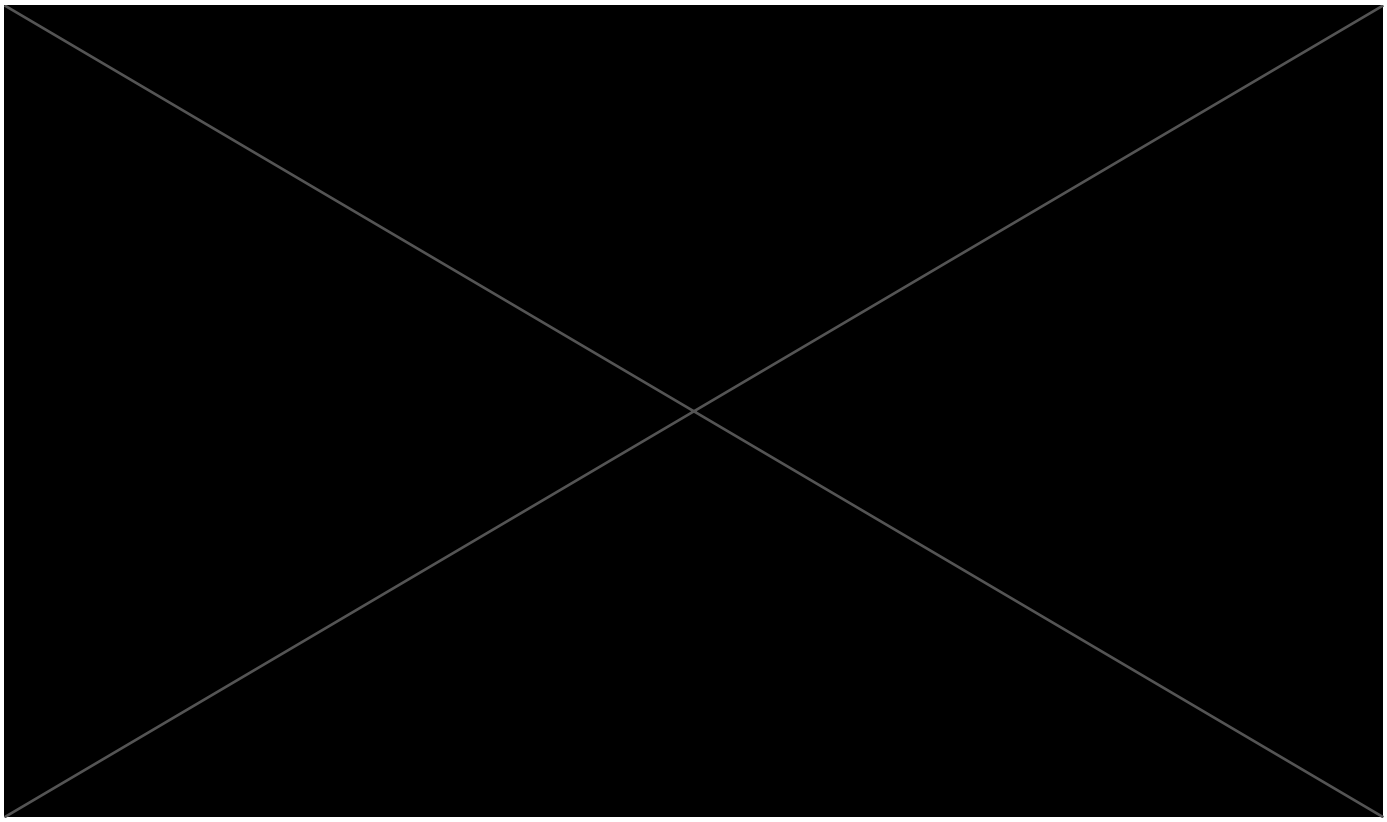

Figure 4.19: Third segment, marking a moment of standstill (fragment: bars 26³-27)

From bar 28³ onward, the loop window is moved slightly backwards, eventually to re-include the falling minor second progression (f – e; previously e – e ♭ in section 2 and d – cis in section 1) that leads up to a minor sixth (e – c; previously a major sixth progression e ♭ – c in section 2, and a diminished seventh interval c# – b ♭ in section 1). With this backwards shift in loop window, bar 28³ marks yet another segment boundary (Figure 4.20). Remarkably, the material looped here is virtually the same material that has been looped in the second structural section (spanning bars 22³-26³).

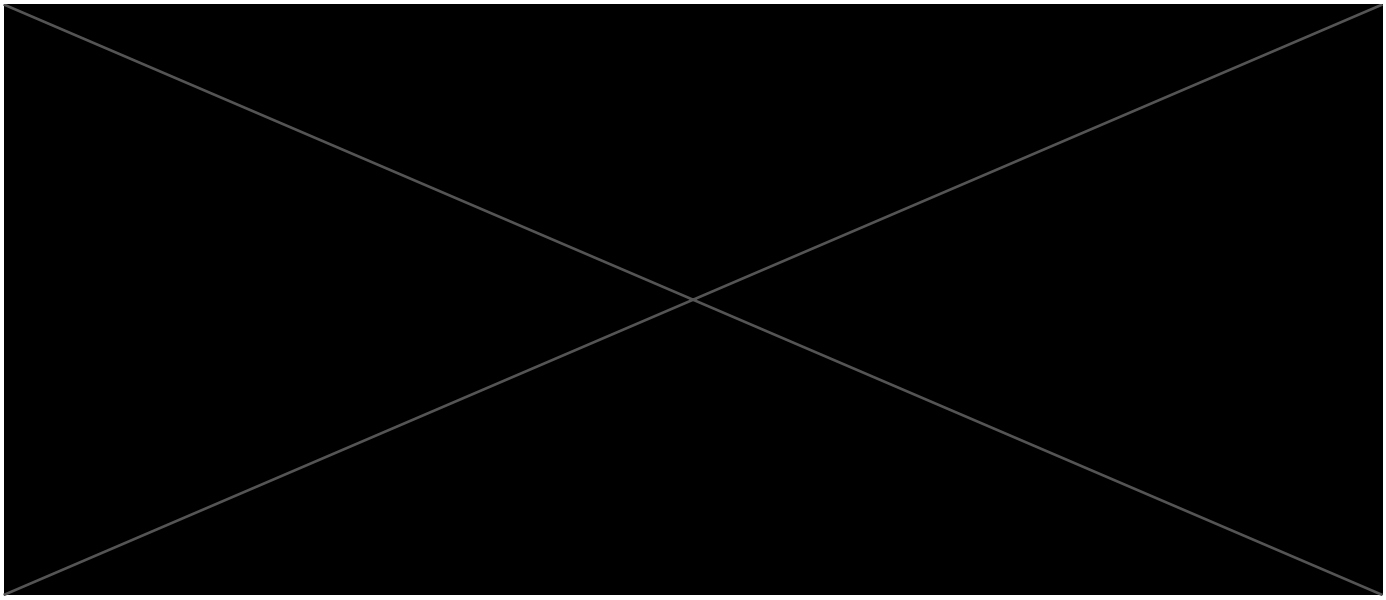

Figure 4.20: Fourth segment, marked by a backwards shift in loop window (bars 28-32)

Finally, in bar 33, the needle of the metaphorical record skips once more; this time hopping back to the beginning of the sample. Between bars 33 and 35, we can vaguely distinguish four full – albeit heavily distorted – iterations of the entire sample (Figure 4.21).

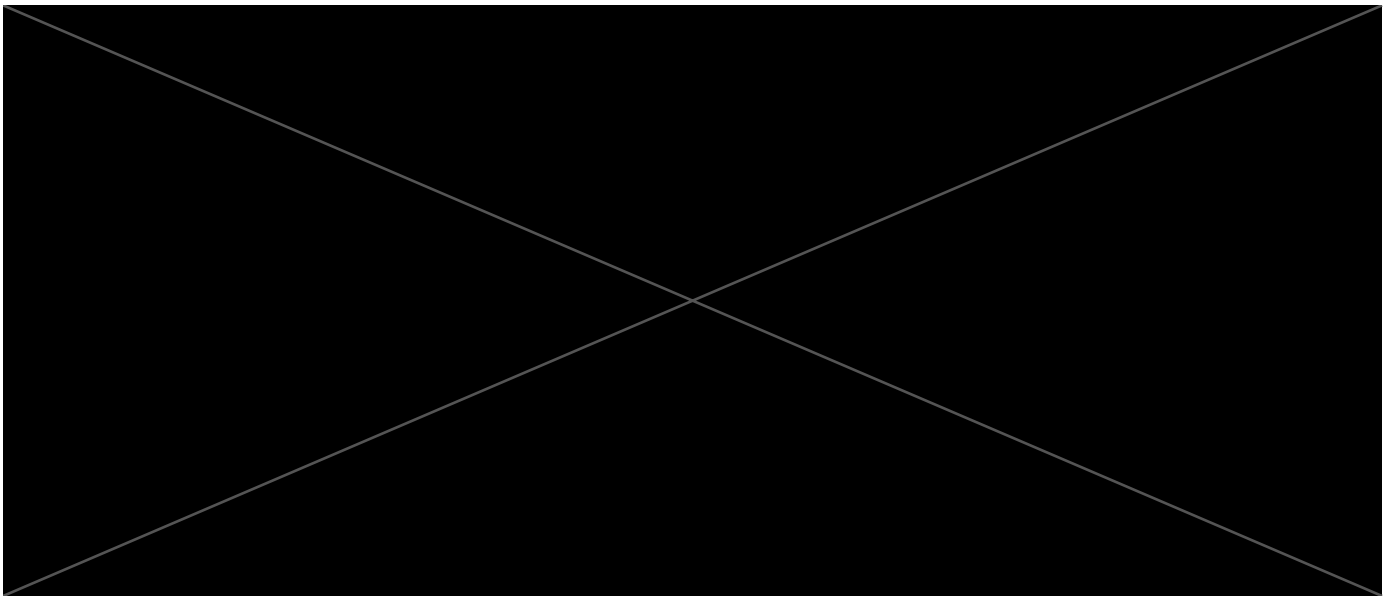

Figure 4.21: Fifth segment, containing four distorted iterations of the entire sample (bars 33-35)

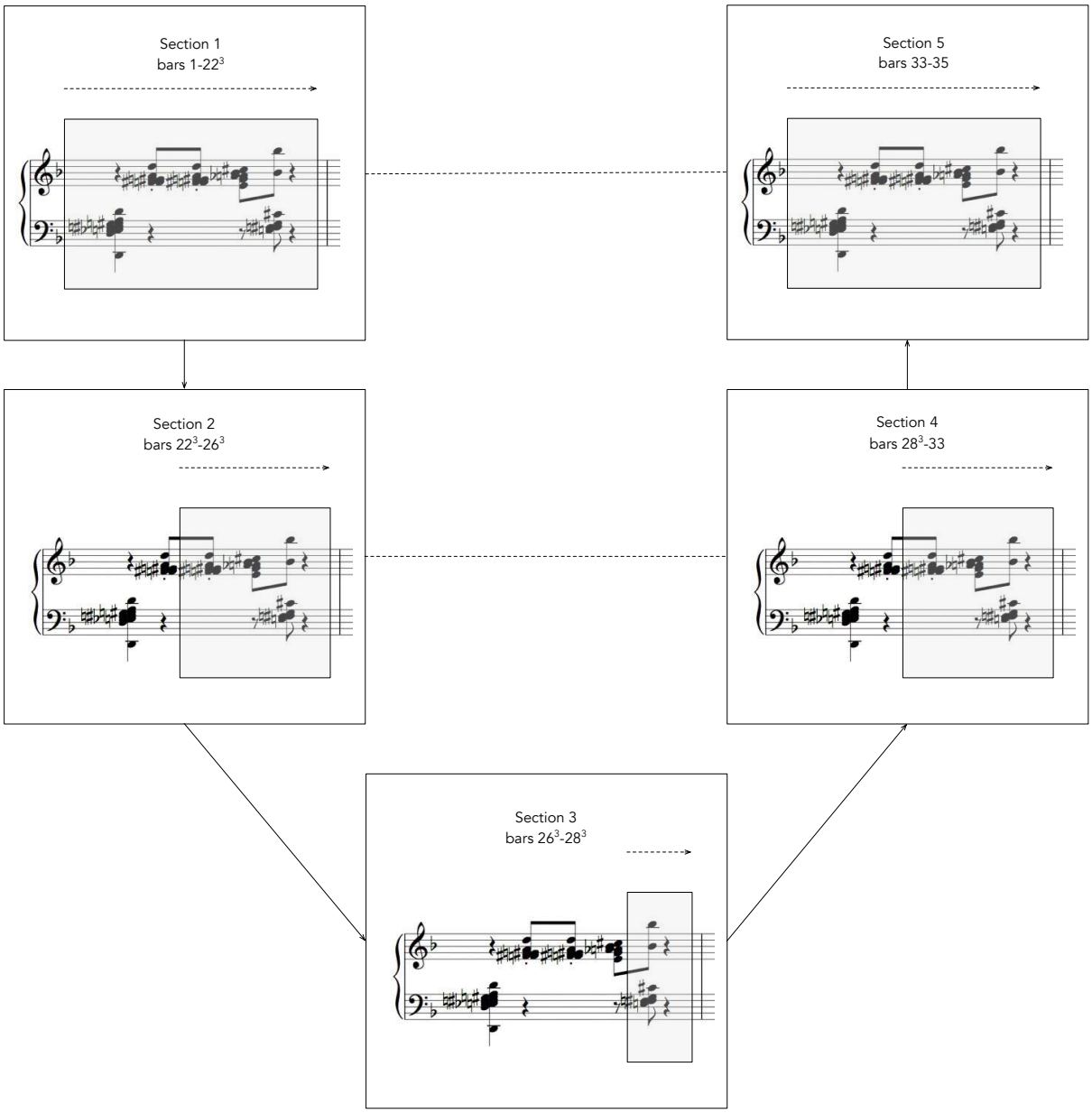

Figure 4.22: Hyper-symmetry between associative sections

Like the first structural section (spanning bars 1-22[3]), this fifth and final section (spanning bars 33-35) loops the sample in its entirety. As such, it is possible to discern a formal circularity to the opening of Lang's *Anatomy of Disaster*. Stronger even: in addition to sections 1 and 5, sections 2 and 4 are also characterised by the repetition of the same loop window or grain. The middle section was described as marking a moment of extreme stuttering; of blockage; of standstill. This middle section, hence, functions as the central axis over which the other four sections are mirrored. Taking an associative orientation towards the musical surface, it is, in other words, possible to discern a formal hyper-symmetry; a nested structure which leans towards self-similarity (Figure 4.22).

Such hyper-symmetrical build is, of course, in explicit contradiction to Lang's claim of the compositional process being an 'erratic wandering around, that constitutes the method of research and exploration'.[319] On the contrary even, Lang claims that:

> Usually, I create my pieces in one draft. I do it like writing very quickly in one line, I don't look back. Whenever something reoccurs, then it's because it happens like that, but not strategically. This operation of creating a remembrance, a recurring to an earlier stage, creates a formal bracket of sorts. [...] All the examples of Ortiz and Arnold do the same, they go straight forward through the material. The backward and forward is just within the loops, it's the cheater. The general tendency is forward, not looking back.[320]

In other words, this analysis suggests that Lang's compositional procedure might not be as spontaneous, fluid and heuristic as the composer makes it out to be. Although Lang happily admits to maintaining a certain degree of compositional control over musical results, he also tends to downplay the real extent to which he alters the output generated from CadMus:

> I have become quite unimportant as I see things evolving in front of me. This can also be dangerous because I could become the mechanic in love with his products that forgets about the rest of the world, which can lead to bad things aesthetically. For me the type of composer who glues things together is gone, as is the expressionist idea of the composer as inventor. I watch myself evolve. Perhaps it was the same with Cage's aleatorics; seeking not to be the proud hero of scores but to watch things evolve

[319] Bernhard Lang, in: Reinhard Kager (2010), 'Geschichte als Wiederkehr des Ähnlichen', in: *Musiktexte: Zeitschrift für Neue Musik* 126, p. 76.
[320] Bernhard Lang (2009), in: Renáta Spisarová (ed.), *Ostrava Days 2009: Report* (Ostrava & New York: Ostrava Center for New Music), p. 139.

> and grow. It is very fascinating and rewarding for the composer to make decisions. I enjoy making musical decisions, like now the tension breaks and I have to cut the loop here because it's becoming boring.[321]

The preceding analysis, however, revealed that besides cutting the number of loop iterations, the structural build of this passage was also either premeditated or had been extensively workshopped. More than a mere by-product of the algorithmic processes run in CadMus, the musical result is thus of major importance to the composer. In other words, this indicates a significant discrepancy between Deleuzian thought, in which the process is just as, if not more important than the outcome; and Lang's compositional method, in which the sounding result is prioritised.

Also remarkable is that the five segments identified by adapting an associative approach to the musical surface do not entirely correspond to the five structural sections which were distinguished previously, when taking a disjunctive orientation. While three out of five segment boundaries do correspond, two differ (Figure 4.23). There is, in other words, a discrepancy between a segmentation motivated by sonic difference, and one that is based on associative sameness or similarlity. In the opening to Lang's *Anatomy of Disaster*, pervasive repetition thus affords multiple, overlapping segmentations, rather than one definitive one.

Depending on their orientation towards the musical surface, the listener is thus guided along two distinct formal pathways, along the way coming across several opportunities for wandering off, venturing into side-tracks, and, as such, getting lost in Lang's complex musical landscape. A listener focusing on the similarity between repeated cells or grains might, for example, find themselves surprised by an element of sonic disjunction, as such shifting their analytical orientation. By analogy, a listener searching for elements of difference or sonic disjunction among an endless repetition of the same, might, along the way, get drawn in by the music's shimmering nuance of near-literal repetition.

[321] Ibid., pp. 132-133.

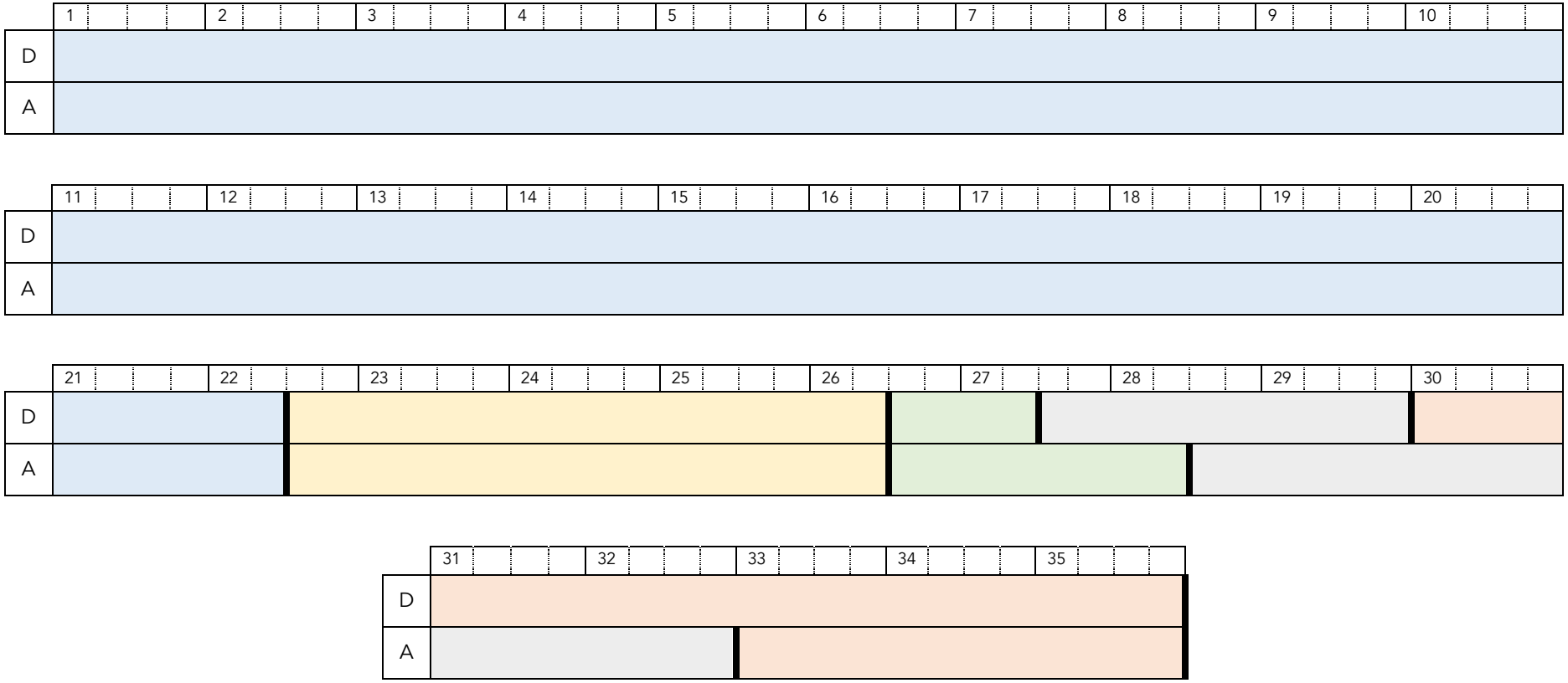

Figure 4.23: Discrepancies between segmentation motivated by disjunction (D) and association (A)

4.5 Mechanisms of drift

In Lang's *Monadologie* series, cellular automata algorithms introduce random and chaotic elements of change and transformation into a repeated musical cell.[322] Commenting on the transformational effect of these cellular automata algorithms on a repeated musical cell, Lang comments:

> [T]he machines [i.e. the cellular automata algorithms] are really distorting. They can actually distort the content [of the cell], mutate [it], and [make it] go through metamorphoses. In other words, I'm not only differentiating the time, but also the pitch constellation.[323]

While the previous analysis focused on the musical surface and its underlying formal structures, the third and final line of analytical inquiry zooms in on the transformational nature of the surface articulations. More specifically, the following analysis investigates the process of subtle yet continuous transformation that unfolds on a loop-to-loop basis. Where are elements of repetition and variation situated, and what musical and cognitive mechanisms do they activate? How does the process of microvariation unfold in the opening of Lang's *Anatomy of Disaster*, and does it affirm or contradict the formal claims made previously? What kind of dynamic transpires between memory, recollection, and anticipation? From the outset, the analysis distinguishes between two drifting landscapes – that is, two musical parameters in which elements of change and transformation are situated. After zooming in on the loop's shifting pitch constellations, the analysis focuses on the loop's continuously changing placement on the metric grid.

[322] See: Chapter 3.4.3.
[323] Bernhard Lang, in: Bernhard Günther (2010), 'Die Frage nach dem Original: Die Monadologie IX und Die sieben letzten Worte', in: Matthias Naske (ed.), *Back to the Future: Rainy Days 2010* (Luxemburg: Philharmonie Luxembourg), p. 90. Available at https://www.philharmonie.lu/media/content/download/documents/Publications/rainy_days-Kataloge/rainy_days_2010-back_to_the_future-Leseprobe.pdf (accessed on 19 July 2019): 'Jetzt verändern die Maschinen wirklich, wie du erkannt hast, verzerrend, sie können quasi den Inhalt wirklich verzerren, mutieren, Metamorphosen durchlaufen lassen, d. h. ich differenziere jetzt also nicht nur die Zeit, sondern auch die Tonhöhengestaltung'.

4.5.1 Drifting pitch

Looking at the score for the opening of Lang's *Anatomy of Disaster*, it is easy to distinguish minor changes in pitch constellation with each new loop iteration. Figure 4.24 is a stylised representation of the pitches contained in the first twenty loop iterations – i.e. a short fragment spanning bars 1-11[3]. The figure shows that, besides introducing subtle changes within the existing pitch constellation of the generative cell, the cellular automata algorithms also introduce so-called 'emergent' pitches, which were not previously included in the distorted Haydn motif (marked in blue).

Figure 4.24 suggests a high degree of similarity in pitch constellation between one loop iteration and the next. The process of transformation that is unfolding here is, therefore, one of microvariation. From one repetition to the next, the repeated musical cell is subjected to a minimal and almost imperceptible degree of variation in terms of pitch constellation. From one loop to the next, the repeated cell's sonority is imperceptibly shifting. However, as the repeated cell drifts further and further away from its original identity, it gradually grows into something else completely. As such, the repeated pitch constellation and its resulting sonorities unfold in a continuous process of becoming. The process unfolding here is a 'slow burn' and effectuates a creeping, gradual and more importantly, subliminal sense of textural drift.

Figure 4.25 shows how the repeated cell gradually but certainly drifts out of focus in terms of pitch constellation. In this figure, MIDI note 60 equals middle c. Time is measured in seconds, and vertical lines connect simultaneous pitch onsets or chords. The figure shows how the repeated cell incrementally moves into new registral territories. As such, the sense of textural stability once suggested by the notion of repetition gradually starts to crumble. For, although these textural changes might not be the most salient on a loop to loop basis, they are objectively happening and work on the listener on a subliminal level. The effect is one of a continually and erratically unfolding textural field, without a centre or a goal. The sense of textural or sonorous drift created here is not dissimilar to the perception of a Shepard tone, in that it is always moving but never arriving; perceptually suggesting harmonic stasis but effectuating intense textural unrest and instability over time.

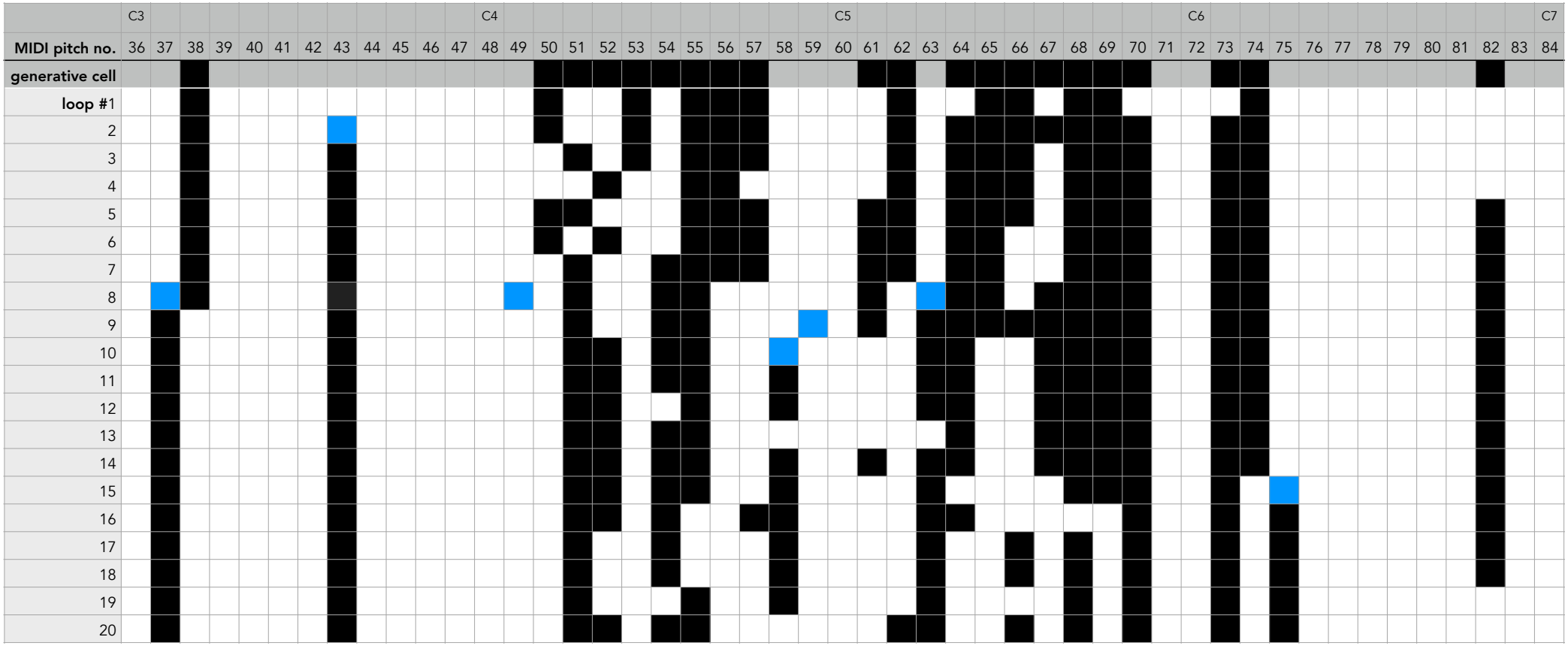

Figure 4.24: Changing pitch constellations for loops 1-20

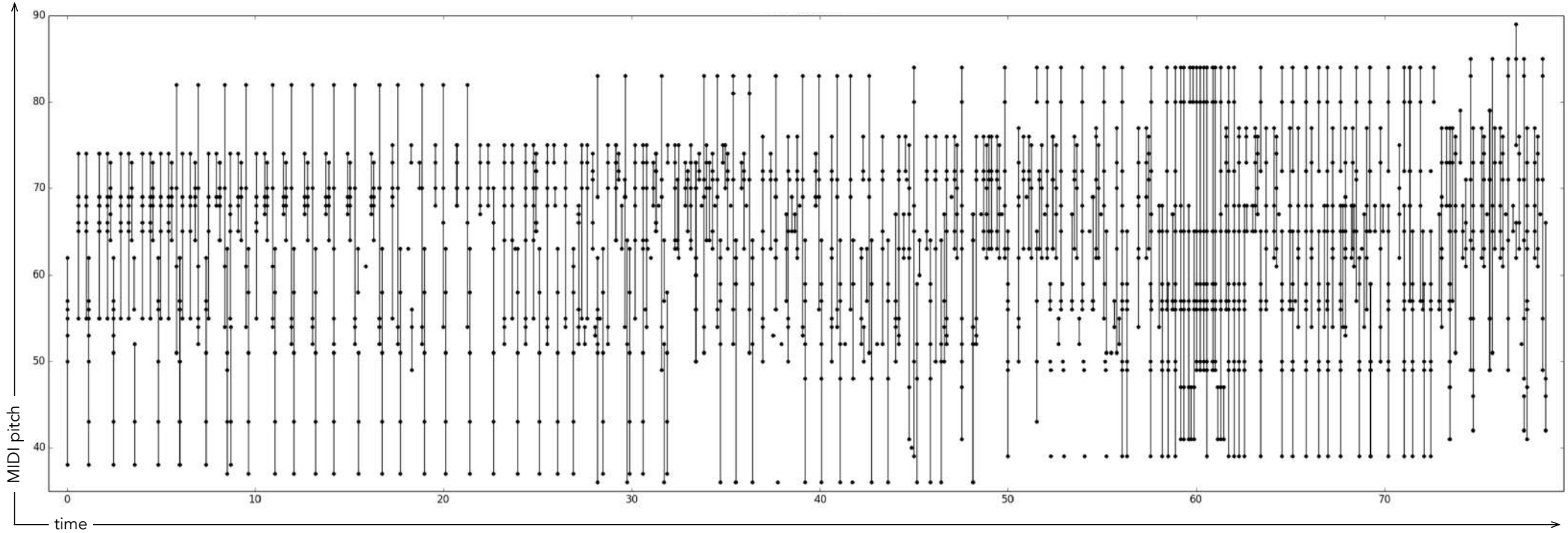

Figure 4.25: Drifting pitch constellation

4.5.2 Drifting metre

Besides triggering a process of transformation in terms of pitch constellation, Lang's cellular automata algorithms also alter the repeated cell's rhythmic structure and metric placement with each new repetition. Listening to the opening of Lang's *Anatomy of Disaster*, it is remarkably difficult to keep track of time. Starting from a position of metric stability, the repeated cell almost immediately starts wandering off and directing the listener into unstable metric territories. But how can the phenomenon of repetition, which is usually associated with periodicity and metric stability, induce the experience of wandering and of finally losing track of time, which, according to Rebecca Solnit, is to become 'lost in that other way that isn't about dislocation but about the immersion where everything else falls away'?[324]

Repetition and the experience of non-linear time

Appearing to start as well as conclude *in medias res*, and along the way seeming to drift and wander without any underlying sense of direction, the opening to Lang's *Anatomy of Disaster* is the very antithesis of a teleological experience of time. On the contrary: as the distorted Haydn sample is locked in pervasive repetition and scratched backwards and forwards with an endless momentum, Lang's erratic loops give rise to a nagging, jarring sense of being 'stuck' and unable to progress. Yet, while the experience of time is ateleological in this example, it is not entirely suspended. In fact, the experience of time in Lang's *Anatomy of Disaster* is close to what Jonathan Kramer identifies as a 'nondirected linearity', which he describes as being 'in constant motion, but the goals of this motion are not unequivocal'.[325] Kramer clarifies:

> In nondirected linear time there is no clearly implied goal, despite the directed continuity of motion. A graphical analogy [would be] a meandering line.

[324] Rebecca Solnit (2005), A Field Guide to Getting Lost (Edinburgh: Canongate), p. 37.
[325] Jonathan D. Kramer (1988), *The Time of Music* (New York: Schirmer Books), p. 40.

In other words, although a clear sense of forward motion can be distinguished in Lang's *Anatomy of Disaster*, this movement is not directed towards any well-defined end of goal. Instead, the experience of time in this work is one of wandering; of strolling about without any clear goal or direction in mind. While every new loop iteration provides the listener with a fleeting moment of gestural directedness, the cell's linear development is continually disrupted, and a sense of closure is never found.

Dynamic attending and metric drift

When listening to music, it is a basic human instinct to try and understand how it is organised in time. While we try to latch on to a stable beat or pulse to tap along with, we instinctively infer metric structures from the rhythmic events we perceive, prioritising those beats we perceive as 'strong' over those we perceive as 'weak'. In the act of listening, we thus intuitively direct our attention onto those moments in time that we perceive to be most salient, as such constructing the structural hierarchies of time which we call metre. Victor Zuckerkandl argues that the construction of metre is not the result of a successive experience of discrete rhythmic instants, but rather that of a 'wave-like motion' of intensifications and recessions of attentional energy:

> The equal portions into which musical meter appears to divide time turn out, upon closer examination, to be variously directed phases of wave motion; the moment of time at which a tone enters is not a point on a straight line but on a wave, the interval of time that tone fills in sounding is not a section of a straight line but a fractional phase of a wave. [...] This is what we *hear* when we hear music whose structure is metrical: the various directions of the successive wave phases.[326]

[326] Victor Zuckerkandl (1956), *Sound and Symbol: Music and the External World* (New York: Princeton University Press), p. 173.

Zuckerkandl continues:

> The listener is caught by the motion, drawn into it more and more, and finally carried irresistibly along with it. [...] We always sense it, in various degrees of intensity, when we hear music whose structure is metrical; it is a basic element of our experience of music; it can become the medium of the most powerful artistic effects. [327]

More recently, Mari Riess Jones has argued that human attention in listening is not directed equally at all moments in time, but that it is most acute at onsets and strong metric positions.[328] In her theory of 'dynamic attending', Jones stresses the dynamic processes by which listeners focus their attention to the music's temporal organisation, claiming that listeners tend to attune themselves with the music's most salient events. Moreover, Jones claims that such a dynamic targeting of the attention helps listeners to anticipate the location of future events.[329] Building on Zuckerkandl's idea of metric perception as a wave-like ebb and flow of attentional energy, Jones maintains that:

> A self-sustaining oscillation has two important features that make it appropriate for modelling the basic process of attentional dynamics. First, it generates periodic activity, an activity that we can refer to as an expectation. Expectations are similar to the ticks of a clock, with the important exception that an expectation is an active temporal anticipation, not a grid point in a memory code. Second, when coupled to an external rhythm, a self-sustaining oscillation may entrain, or synchronise, to that rhythm.[330]

Put differently, Jones' theory of dynamic attending suggests that metre may provide a time-based framework for temporal expectations, just like tonality may provide a pitch-based framework for melodic expectations.[331]

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[327] Ibid., p. 174.
[328] Mari Riess Jones, cited in: David Huron (2006), *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge, Massachusetts: The MIT Press), p. 176.
[329] See: Mari Riess Jones (2019), *Time Will Tell: A Theory of Dynamic Attending* (Oxford & New York: Oxford University Press).
[330] Edward Large and Mari Riess Jones (1999), 'The Dynamics of Attending: How We Track Time-Varying Events', in: *Psychological Review* 106/1, p. 124; cited in: Justin London (2012), *Hearing in Time: Psychological Aspects of Musical Meter* (Oxford & New York: Oxford University Press), p. 20.
[331] Caroline Palmer and Carol L. Krumhansl (1990), 'Mental Representations for Musical Meter', in: *Journal of Experimental Psychology: Human Perception and Performance* 16/4, p. 728.

Listening to the starting point for Lang's *Anatomy of Disaster* – that is, Haydn's opening motif –, the listener's attention is guided down a very transparent and periodic grid of hierarchical beat saliences. More specifically, the listener's attentional energy and attendant modes of expectation are directed immediately onto the strong metric accent on the downbeat of every measure (Figure 4.26; audio example 10).

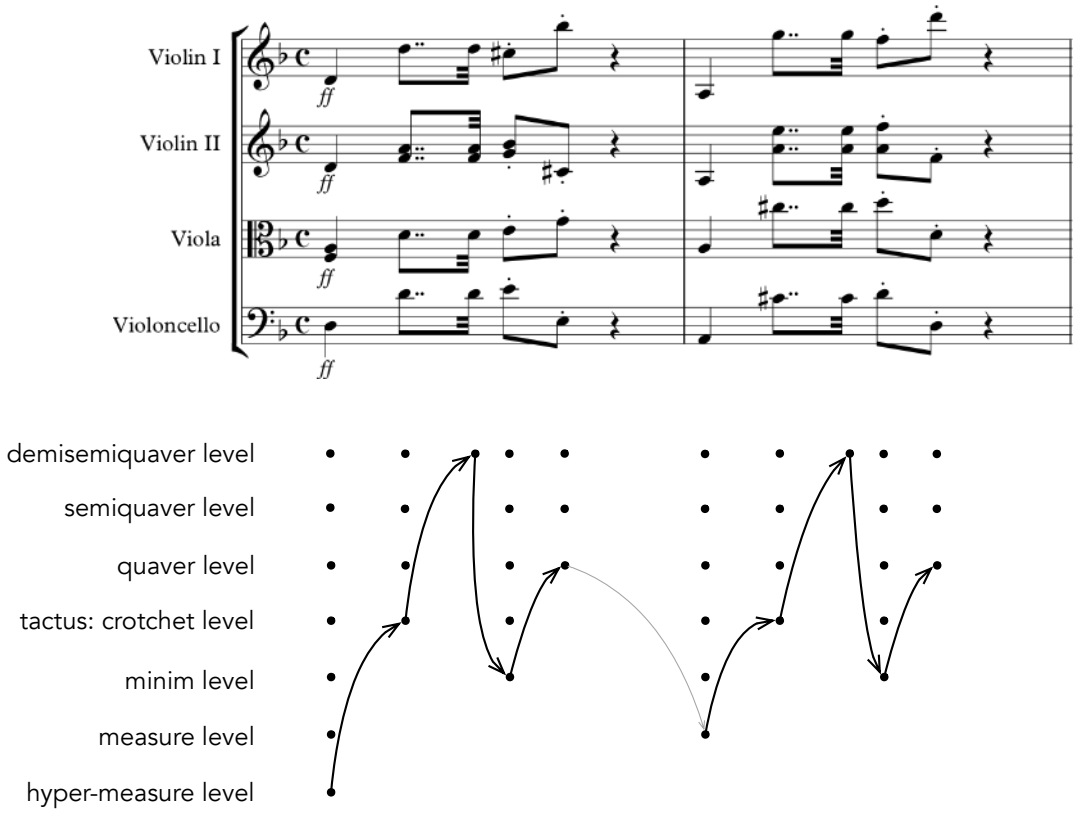

Figure 4.26: Dynamic attending in Haydn's opening motif, with dots indicating hierarchical metric accents and arrows indicating the direction in which perception is directed

It has been indicated previously that the generative cell used in the opening of Lang's *Anatomy of Disaster* bears a significant degree of resemblance to Haydn's original material.[332] In terms of both rhythmic construct and the placement of metric accents, Lang's generative cell is identical to Haydn's opening motif.

[332] See: Chapter 4.3.

It is thus safe to assume that the ways in which metre is experienced in Lang's work will be heavily coloured by any prior knowledge of Haydn's original the listener might have. For, in recognising the distorted Haydn motif, the listener will automatically try to induce a stable metre onto Lang's repeated musical cell; as such continuing the pattern of metric expectations set up by Haydn's original.

Beat induction will also be triggered in those listeners who are not familiar with Haydn's original. For, not only is beat induction innate; the composer also uses three distinct musical mechanisms to guide the listener's attention along the path of an illusionary stable metre.[333] The first of those mechanisms is the accentuated *portato* bass notes in the cello which place a strong rhythmic emphasis on the 'downbeat' – that is; on the opening of every new loop iteration. As the opening note of each new loop iteration is made much more salient, it immediately grabs the listener's attention with each new recurrence.

Secondly, the fact that a tonal idiom still lingers in the distorted Haydn sample also triggers the listener to try and infer a stable metre. Research by Caroline Palmer and Carol Krumhansl suggests that a mere familiarity with Western tonality sets up the expectation that such music will behave regularly and symmetrically in terms of metre.[334] In other words, the mere fact that Lang's looped material maintains a certain tonal idiom will cause the listener to automatically try and infer a stable metre.

Finally, the use of repetition in itself also tricks the listener into the illusion of a stable metre. Research by Palmer and Krumhansl indicates that listeners generally deem it likely for a repeated pattern to occur in the exact same metrical position on each of its different repetitions.[335]

In several different ways, the opening of Lang's *Anatomy of Disaster* thus sets the expectation of metric stability. However, such expectations are almost immediately thwarted, as the repeated

[333] Henkjan Honing et al. (2009), 'Is Beat Induction Innate or Learned? Probing Emergent Meter Perception in Adults and Newborns using Event-related Brain Potentials', in: *The Neurosciences and Music III—Disorders and Plasticity: Annals of the New York Academy of Sciences* 1169, pp. 93-96.
[334] Caroline Palmer and Carol L. Krumhansl (1990), 'Mental Representations for Musical Meter', in: *Journal of Experimental Psychology: Human Perception and Performance* 16/4, pp. 728-741.
[335] Ibid., p. 730.

rhythmic pattern quickly starts to wander off into a continuous metric displacement. For a large part, this sense of disorientation emerges from our intrinsic but ultimately futile tendency to try and place events on a periodic grid. For, in reality, the opening to Lang's *Anatomy of Disaster* holds no metric stability whatsoever. Although Lang's score is written in a $^{4}/_{4}$ time signature – as such visually mirroring Haydn's original –, this work is not at all written in a stable and simple duple metre. In fact, Lang's musical surface is highly aperiodic in nature, while the notated time signature is nothing but an abstract temporal framework.

Although Lang's $^{4}/_{4}$ time signature might be an aid in performance, it is perceptually opaque to the listener. The bowing techniques, which the composer has marked explicitly in the score, support this interpretation. Whereas a down-bow is usually stronger and more distinct, an up-bow is usually lighter, implying relatively less metrical importance. As such, the choice for these particular bowings, combined with the *marcato* and *portato* accents on stronger beats, and the *staccato* accents on weaker ones, suggest that Lang explicitly assigned a relative metric strength to each sounding event. Furthermore, a lot of weight is placed on the bass notes, which are in themselves perceptually more salient than the material contained in the higher registral bands. As such, although there is no actual downbeat in a strictly metrical sense, the perception registers the low registered, down-bowed, and marcato notes at the beginning of the Haydn sample as a downbeat. The performer's sense of metre is therefore not congruent with that of the listener, as the piece does not pertain to a shared temporal perspective 'from which melodic and rhythmic forms may be perceived'.[336]

Rewriting the individual loop iterations in terms of perceived metre, then, reveals a continuously changing metric landscape (Figure 4.27). Stronger even: the rewritten score reveals a total lack of metric hierarchy in this passage. In other words, the opening to Lang's *Anatomy of Disaster* is ametric in nature, in the sense that the placement of strong metric accents is entirely unpredictable.

[336] Mari Riess Jones, 'Perspectives on Musical Time', in: Alf Gabrielsson (ed.) (1987), *Action and Perception in Rhythm and Music* (Stockholm: Royal Swedish Academy of Music), p. 164. Cited in: Justin London (2012), *Hearing in Time: Psychological Aspects of Musical Meter* (Oxford & New York: Oxford University Press), p. 22.

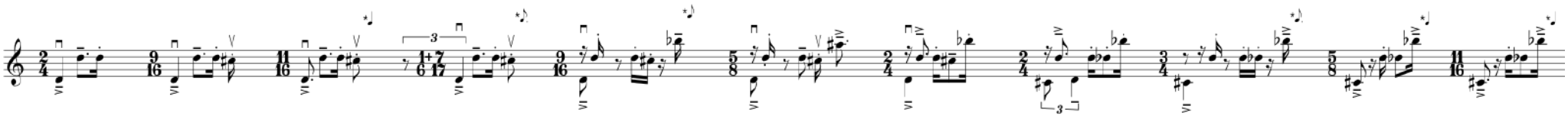

Figure 4.27: Rewritten score for *Monadologie IX: The Anatomy of Disaster, I: Introduzione*, bars 1-6.
Asterisks indicate an overlap between successive loops and show the sounding rhythmic value of the loop's closing note

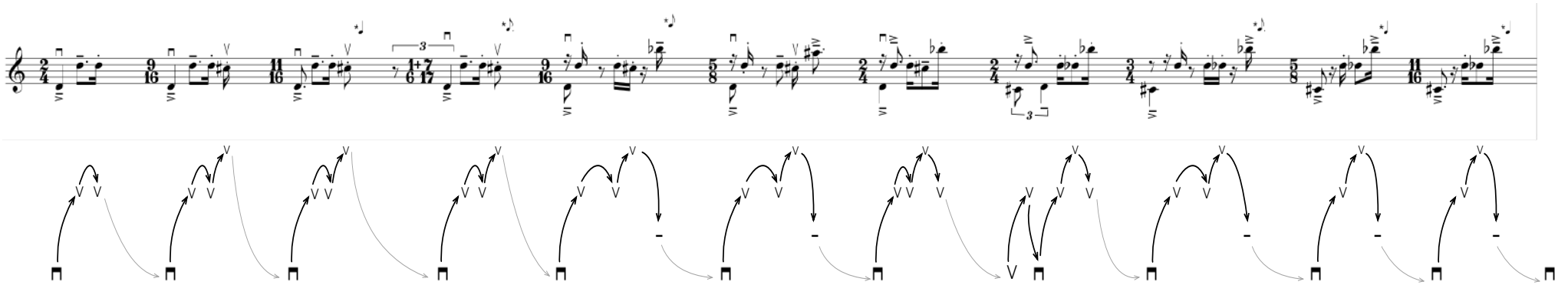

Figure 4.28: Metric drift in Bernhard Lang's *Monadologie IX: The Anatomy of Disaster, I: Introduzione*, bars 1-6.

Complicating the matter even further is the asynchronicity between the different string parts. The metrically strong 'downbeat', which signifies the start of a new loop iteration and which is implied by the accentuated *portato* bass notes in the cello, often overlaps with the end of the previous loop iteration in the upper voices. In other words: at certain times, the boundaries between beginnings and endings of loops are blurry and vague. As endings and beginnings become fuzzy and intertwined, rather than clear and well-defined, they obfuscate the demarcation of perceived downbeats and upbeats, or metrically stronger and weaker beats.

As such, a major discrepancy arises between Lang's highly ametric material, and the stable metre that we automatically try to infer from it. Although we cognitively try to grasp onto the expected stable metre, it keeps slipping away, as strong beats continuously appear to arrive too early or too late (Figure 4.28). The process that is unfolding here is remarkably similar to what Brent Yorgason describes as 'metric drift' – i.e. a situation in which the listener's placement of the beat slightly drifts, as the attention is drawn towards a metric stream that pulls the listener away from the notated beat.

Yorgason's notion of metric drift complements that of 'metric normalisation', a concept developed earlier by William Rothstein to describe the moment in which displaced metric events are restored back to their initial and stable position.[337] A brief moment of metric normalisation is created at the beginning of bar 11. More specifically, the first two beats of bar 11 are placed on the exact same metric position as those of the initial statement of the looped material, and, following from that, on the exact same metric position as the events in the original Haydn sample. The sense of metric stability that is created here by placing the start of the looped material on a downbeat, is, however, fleeting, as a new process of metric drift is initiated immediately on the following loop iteration (bar 11^3 –Figure 4.29).

[337] See: William Rothstein, *Phrase Rhythm in Tonal Music* (New York: Schirmer Books, 1990). Cited in: Brent Yorgason (2009), *Expressive Asynchrony and Meter: A Study of Dispersal, Downbeat Space, and Metric Drift* (Ph.D. Thesis: Indiana University), p. 257.

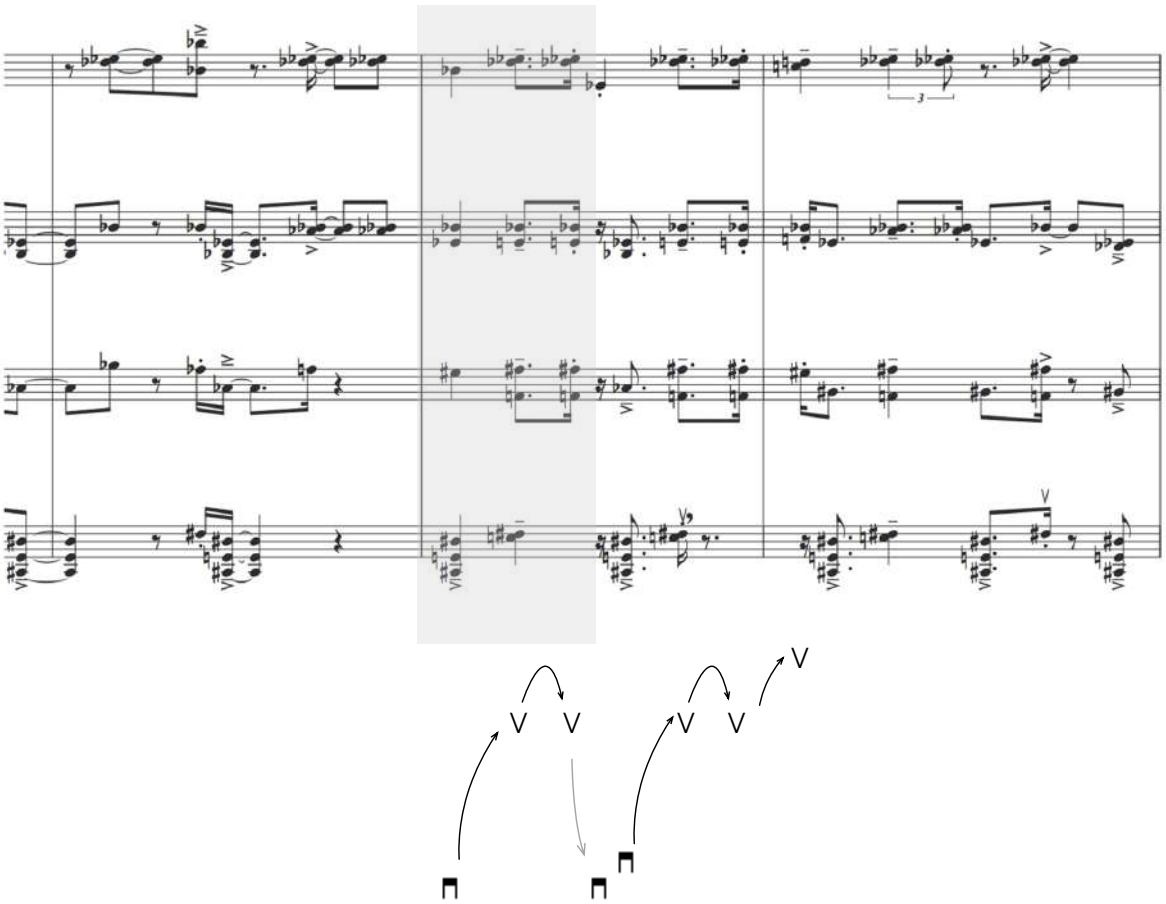

Figure 4.29: Fleeting moment of metric normalisation in *Monadologie IX: The Anatomy of Disaster, I: Introduzione*, bar 11.

4.6 Multiple pathways for getting lost

This chapter revealed that Lang has incorporated multiple pathways of disorientation into the opening of his *Anatomy of Disaster*. By approaching the object of analysis through three different analytical lenses, repetition was shown to work as a destabilising mechanism on multiple levels throughout this passage, providing the listener with several points of both orientation and disorientation.

The first strain of analytical inquiry looked at the tensions created by repeating a historical artefact, in the sense of both re-producing it and putting it on loop. The first locus of disorientation was situated in Lang's distortion, re-contextualisation, and looping of Haydn's original.

The second strain of analytical inquiry focused on the musical surface of the thirty-five bars that make up the opening of Lang's *Anatomy of Disaster*. Drawing on both the compositional data and Dora Hanninen's theories of disjunctive segmentation and associative organisation, the analysis identified two distinct yet overlapping formal pathways: one based on difference or sonic disjunction; the other based on repetition or sameness between repeated materials.

Finally, the third strain of analytical inquiry zoomed in on the process of microvariation unfolding on a loop-to-loop level. Two drifting landscapes were identified. First, the repeated cell was shown to drift off or lose its originary identity in terms of pitch constellation, resulting in an unstable and continually shifting textural field. Secondly, the repeated cell was shown to drift in terms of its placement on the metric grid. As metric expectations are continuously thwarted, ametricity and irregularity become the norm.

In several different ways, repetition is here shown to effectuate radical instability. As any notion of stability, sameness, recognition, unity, or identity is brief and fleeting, the work exists in a constant state of *becoming*. In the act of listening, the work is never fully formed, fixed, or finalised. Instead, it is in a constant state of flux, kept lingering between both familiarity and confusion. To listen through the opening of Lang's *Anatomy of Disaster* is thus to navigate multiple pathways of disorientation and dislocation. While these different streams of disorientation unfold autonomously, they also unfold simultaneously and in overlapping ways. As such, the work invites the listener onto the wavering path of the unknown and the unfamiliar; to freely wander about in an ever-changing landscape; and finally, to get lost – an experience Rebecca Solnit so eloquently describes as 'touching the edges of the unknown that sharpens the senses'.[338]

[338] Rebecca Solnit (2005), *A Field Guide to Getting Lost* (Edinburgh: Canongate), p. 12.

CHAPTER 5
CONCLUSIONS

> And perhaps this repetition at the level of external conduct echoes,
> for its own part, a more secret vibration which animates it,
> a more profound, internal repetition within the singular.[339]
> – Gilles Deleuze (1968)

This study set out to develop an understanding of Lang's 'loop aesthetics' in both analytical and philosophical terms. In that respect, the study sought to contribute to the ongoing debates on the practices, aesthetics, analysis and philosophies of repetition in contemporary music, and, as such, to contribute to the emerging field of repetition studies.

5.1 Loop aesthetics

First and foremost, the study established that repetition is at the very heart of Lang's aesthetic. More specifically, repetition was found to operate at various different planes within Lang's artistic world, and to work not just *within*, but also *between* musical works.

Within the confinements of an individual work, Lang's use of repetition ranges from the literal or near-literal repetition of small musical fragments, motifs or 'cells', to the re-production, re-

[339] Gilles Deleuze (2011), *Difference and Repetition,* translated by Paul Patton (London: Continuum), pp. 1-2. Originally published in 1968 as *Différence et répétition* (Paris: Les Éditions de Minuit), p. 7: 'Et peut-être cette répétition comme conduite externe fait-elle écho pour son compte à une vibration plus secrète, à une répétition intérieure et plus profonde dans le singulier qui l'anime'.

presentation and even re-composition of cultural and historical artefacts. In Lang's operatic works, repetition was found to operate even on the extra-musical levels of narrative, staging, and scenic events. However, repetition was also shown to operate as a structuring device *between* Lang's musical works. As a practice of continuously repeating a same or similar set of ideas, it is the concept of repetition that groups Lang's works into large-scale compositional series.

Repetition was found to dominate Lang's artistic thinking and making, too. His compositional practice was described as one of a continuous rumination; one of never-ending re-thinking, re-focusing, re-interpreting, and sometimes even of the convergence of same and similar ideas.

In other words, Lang's artistic world was shown to exist entirely through and out of repetition. Repetition was found to be nested in every possible corner of Lang's thoughts and works; inhabiting the oeuvre in many different shapes and forms, operating across its various structural levels, and effectuating a multitude of percepts and experiences. This amounts to a loop aesthetics: a creative practice in which the phenomenon of the loop – the never-ending repetition – is not merely one of many, but the single and primary focus.

5.2 Repetition as a multifaceted space of instability

Not unlike Deleuze's philosophical project, Lang's oeuvre thus activates not one, but multiple registers of repetition. Consequently, the study found that repetition is not necessarily the synonym to sameness, unity, or stability it is often automatically presumed to be. In fact, the study established repetition to be a highly complex and multifaceted phenomenon, which can embody many shapes and forms, and engender a multitude of experiences. Secondly, it also found repetition to be a space wherein radical displacements and instabilities can occur.

More particularly, Chapter 3 distinguished between two types of repetition which are activated within Lang's oeuvre: (1) repetition understood as sameness (exact or literal repetition, as was found to be most prevalent within the *Differenz/Wiederholung* series), and (2) repetition understood as similarity (variation or near-literal repetition, as was found to be most prevalent within the *Monadologie* series). Both types of repetition were shown to have radically destabilising qualities.

First, exact acoustic repetition was shown to be a utopian idea in both performance and listening. Further examination of the phenomenon revealed that exact musical repetition might not primarily *sound* as such – as the continuous reiteration of the exact same thing, being reaffirmed over and over again. Instead, it was argued that prolonged passages of exact acoustic repetition might, and are likely to, give rise to the illusion of perceptual transformation; to a perceptual flow of differing.

Secondly, Chapter 3 examined the idea of repetition as similarity, and introduced the concept of 'microvariation' to indicate the second type of repetition prevalent in Lang's work – i.e. that in which a repeated musical cell or identity is subjected to a minimal and almost imperceptible degree of variation. Here, again, the perceptual malleability of musical repetition was a key issue, as these subtly varied repetitions or 'microvariations' were shown to experientially 'drift off' into unknown territories.

Chapter 4 further assessed the destabilising effects of such 'drifting repetition'. In an attempt to overcome the challenges posed to music analysis by repetition, the study built upon Dora Hanninen's idea of taking the musical experience as a starting point for analysis. In this particular case, the sensations of drifting off and getting lost in a complex musical landscape marked the beginning for an analytical inquiry into the opening of Lang's third string quartet, *Monadologie IX: The Anatomy of Disaster* (2010). By approaching the object of analysis through three different analytical lenses, repetition was shown to work as a destabilising mechanism on at least three distinct levels. The first locus of instability was found in Lang's use of repetition in the sense of re-producing and re-presenting a cultural and historical artefact – in this case, the opening motif to Joseph Haydn's *Sieben letzten Worte unseres Erlösers am Kreuze*. The second locus of instability was

found in Lang's use of pervasive microvariation as a means of obscuring all notions of formal structure underlying the musical surface. The third and final locus of instability was found in the concept of microvariation itself. Pervasive near-repetition was shown to give rise to a continually shifting textural field, as well as to the phenomenon of metric drift. In other words, repetition was shown to effectuate radical instability in several ways and on multiple levels.

5.3 Lang as an artist-philosopher

The study also revealed several profound ontological and aesthetic connections between Lang's loop aesthetics and the philosophical project of Gilles Deleuze.

Chapter 2 demonstrated that Lang's oeuvre challenges the conventional notion of musical work – and, by extension, that of the compositional series – as a fixed, closed off, and well-defined entity. Instead, the three series making up the lion's share of Lang's current oeuvre – i.e., the *Differenz/Wiederholung* series, the *Theater der Wiederholungen* series, and the *Monadologie* series –, as well as the works contained within them, were found to be constitutive of a complex, fluid and 'rhizomatic' network of unexpected and chaotic interrelationships.

Lang's way of thinking and composing was shown to be Deleuzian in nature too, in that it was described as tentative, a-centered, and circular. Lang's compositional software environment 'CadMus', for instance, was depicted as an inherently modular environment for creating functional assemblages. Furthermore, Lang's compositional procedure was explained as a heuristic process of experimentation, in which a continuous flux of writing and re-writing was shown to be central.

Furthermore, and perhaps most importantly in the specific research context of this thesis, the study also showed that Lang's understanding of musical repetition is profoundly Deleuzian in nature. For, throughout Lang's oeuvre, pervasive repetition gives rise to radical open-endedness. Whereas the

composer's pervasive use of exact acoustic repetition creates a perceptual flow of differing, his idiosyncratic 'drifting repetitions' are designed specifically for the listener to drift off into a complex and radically unstable musical landscape. Lang's use of repetition – in the sense of re-producing and re-presenting selected cultural and historical materials –, aids in opening those materials up to new readings and new understandings. As such, repetition was shown to create a space for variance and divergence of meaning.

To account for repetition not merely as the action of saying things twice, as a reiteration of the same, or as a reinforcement of identity; but instead, to acknowledge repetition as a fluid and open process (or, indeed, as a *differential same*), allows for an active mode of listening, in which the listener can freely shift focus between different musical layers. Considered from that point of view, Lang's obsessive repetitions invite the listener *into* the music as active participants; taking them on a journey of constant discovery as they are forced to continuously reinterpret and refocus what has just been heard. In other words, the different registers of repetition Lang's oeuvre activates, work together in creating a music that is open-ended, that is difference-based, that is actively pursuing a dynamic multiplicity, rather than a stable and well-defined identity. With each new iteration, the material opens itself up to new readings and perspectives, eventually diverging its identity into multiplicity.

Deleuze points out that, by placing different types of repetition in play against each other, creative practice is capable of highlighting the idea of pure difference, and therefore of 'point[ing] out to philosophy the path that leads to the abandonment of representation'.[340] According to Deleuze, then, artistic practice holds the imperative task in helping us to think beyond the realms of identity and representation. These findings suggest that Lang is best described as a Deleuzian artist-philosopher. His oeuvre then becomes a project of 'artistic philosophy'; a practice of thinking the world *through* and *by means of* artistic creation.

For Deleuze, art and artistic practice are one of three distinct forms of reasoning. The first two forms, philosophy and science, serve the respective purposes of creating concepts and determining

[340] Gilles Deleuze (2011), *Difference and Repetition*, translated by Paul Patton (London: Continuum), p. 94.

functions. Art, then, holds the pertinent task of 'creating monuments through sensation'.[341] Deleuze explicitly links the 'sensations' art evokes to the underlying affective forces of the world, stating that 'music must render non-sonorous forces sonorous, and painting must render invisible forces visible'.[342] Those 'monuments' or works of art, then, are capable of merging thought and sensation in such an intricate way, that they open up the path to start thinking beyond the realms of representation and identity. In other words, Deleuze sees art not as a reflection of the world, but as a way of thinking it. As Joe Panzner explains:

> Deleuze [...] make[s] use of Wittgenstein's maxim, "a thing's meaning is its use", to describe this approach to artistic practice. Art's function is not to embody an eternal standard of beauty or rational organization, nor is it a tool for communication, but instead to develop new techniques of being, new styles of seeing and acting within a busy and complex world. [...] For [...] Deleuze, creativity is not introduced by the artist or the philosopher, but channelled and intensified by her – the role of the artist is to be conductive rather than creative in any conventional sense. An artist selects a set of potentials and sets them in motion. She renders them sensible – and therefore connectable – but stops short of prescribing how such connections must be made. Above all, the artist-philosopher is an experimentalist, not a moralist. Art is not the transmission of meanings or a vehicle of personal expression – it doesn't convey a message. It conveys potential itself, it renders palpable the potentials in sensation, and it gives an occasion for experience or the "conditions for a complex action" – and thus an occasion for possible mutation.[343]

As such, Lang's musical work is perhaps best understood as the 'rendering sonorous' of the non-sonorous forces of difference and non-identity, an effect which is created in this case through the pervasive and multi-layered use of musical repetition. Lang's artistic research into the phenomenon of repetition suggests a way of thinking *beyond* representation and categorisation. In other words, his oeuvre presents itself as a means of artistically thinking and activating difference as a musical sensation. Lang's artistic practice is hence best understood as one that 'poses [...] questions that are not [reducible] to identitarian modes of thought'.[344]

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[341] Gilles Deleuze and Félix Guattari (1994), *What is Philosophy?*, translated by Hugh Tomlinson and Graham Burchell (New York: Columbia University Press), ad passim.
[342] Gilles Deleuze (2005), *Francis Bacon: The Logic of Sensation*, translated by Daniel W. Smith (London & New York: Continuum), p. 40.
[343] Joe Panzner (2015), *The Process That Is the World: Cage/Deleuze/Events/Performances* (London & New York: Bloomsbury Academic), pp. 12; 14-15.
[344] Edward Campbell (2013), *Music After Deleuze* (London & New York: Bloomsbury Academic), p. 33.

To understand Lang's oeuvre as difference-based is, ultimately, to acknowledge the boundaries of identity-thinking as it resonates throughout music and the arts. It is to look beyond traditional concepts such as the work, the composer, the oeuvre, and the listener as well-defined and singular identities, and instead, to embrace their continuously fluid, permeable and radically unstable nature. Marianne Kielian-Gilbert describes such a Deleuzian process of 'becoming' as 'the forming of the "not yet", emerging, process in motion and movement, metamorphically [sic] changing and transforming states and conditions.[345] She argues that:

> Deleuze and Guattari's radical immanence calls attention to intensity, intensities in flux, and their varying dimensional speeds and affects. Their approach and philosophy is more about the play, becoming, and interaction of intensities than about meaning or interpretation per se. They emphasize expressive intensity, and the creative expression and performative engagement that metamorphically invents the new, novel, and unanticipated.[346]

In that respect, Lang's loop aesthetics are also indicative of a broader socio-cultural paradigm shift – that is, of a movement away from identity-thinking and towards non-essentialism and fluidity of reason. Sociologist-philosopher Zygmunt Bauman, for instance, has described contemporary life as 'fluid', in arguing that individuals in current-day society are no longer tied to singular or fixed identities, be it in their job, their nationality, or even their gender.[347] Resonating profoundly with Deleuze's notion of identity as a never-ending flux of *becoming*, Bauman similarly describes contemporary identity as fleeting, rootless and continuously in motion – as 'stopping being what one is and turning into someone one is not yet'.[348]

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[345] Marianne Kielian-Gilbert (2010), 'Music and the Difference in Becoming', in: Brian Hulse and Nick Nesbitt (eds.), *Sounding the Virtual: Gilles Deleuze and the Theory and Philosophy of Music* (Surrey: Ashgate), p. 204.
[346] Ibid.
[347] See, for instance: Zygmunt Bauman (2000), *Liquid Modernity* (Cambridge: Polity Press); Zygmunt Bauman (2005), *Liquid Life* (Cambridge: Polity Press); and Zygmunt Bauman (2011), *Culture in a Liquid Modern World* (Cambridge: Polity Press).
[348] Zygmunt Bauman (2005), *Liquid Life* (Cambridge: Polity Press), p. 8.

5.4 Ma fin est un commencement: opportunities for further research

The study also points to a number of significant opportunities for further research. An obvious space for future investigation is presented by Lang's oeuvre in itself. As the first extended study of Lang's work, this dissertation has focused largely on the different types and effects of repetition working both in and between the *Differenz/Wiederholung* series, the *Theater der Wiederholungen* series, and, most significantly, the *Monadologie* series. The length and scope of this thesis did not allow to investigate the phenomenon of repetition as it works in and between these and Lang's three other series – i.e. *Schrift* (1996-), *Hermetica* (2008-) and *Game* (2016-). Although it might be interesting to investigate the interrelationships between Lang's series even further, additional research into each of the six series individually may prove particularly fruitful. For instance, future inquiry could look deeper into the aspects of metadrama embedded in Lang's operatic works, or assess the ways in which concepts drawn from game theory are activated within his latest *Game* series.

Perhaps more pressingly, however, the study revealed that the analytical tools currently available for dealing with musical repetition as it is cognitively experienced are limited. While this study developed an analytical framework for explaining the experience of getting lost effectuated by most of the works contained in Lang's *Monadologie* series, further research is needed in order to develop an analytical understanding of other cognitive experiences engendered by repetition. These include, but are by no means limited to, the experience of standstill, timelessness, and stasis as it is produced by repetition in the late works of Morton Feldman, Jürg Frey, or Manfred Werder; the hypnotic and trance-inducing effects of repetition in EDM, or the simultaneously humorous and eerie sensations of estrangement and alienation that arise from repetition in the works of artists such as Peter Roehr or Ragnar Kjartansson.

Another way of welcoming the experiential side of musical repetition into music theory, is for the latter to shift towards more qualitative approaches that give special attention to musical cognition and perception. In that respect, one possible route for future research is to investigate the ways in which various degrees of repetition are experienced over different timespans. As this would

necessarily involve a complex weighting of numerous variables, such as memory, cognitive capacity, attentional focus, and patterns of expectation, the creation of such an analytical toolkit would most likely need to be an interdisciplinary project, in which music theorists join forces with psychologists, cognitive scientists, and possibly even mathematicians.

In other words, the concept and phenomenon of repetition opens up a vast space for further research, both within Lang's oeuvre and beyond. As such, the lyrics to what is perhaps the oldest piece of explicitly repetitive music known today – Guillaume de Machaut's rondo *Ma fin est mon commencement* (ca. 1390s) – spring to mind: 'in my end is [a] beginning'.

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APPENDIX I

LIST OF WORKS CURRENTLY CONTAINED IN THE *MONADOLOGIE* SERIES

Monadologie No.	**Subtitle**	**Year of composition**	**Source material**		
			Composer	**Title**	**Year of composition**
I		2007	Newly composed material by Bernhard Lang		
II	*Der Neue Don Quichotte*	2008	Richard Strauss	*Don Quixote*	1897
III	*Lamentatio / Metamorphosis*	2008	Richard Strauss	*Metamorphosen*	1945
IV	*Robotica I*	2008	Transcriptions of several percussion works by Iannis Xenakis, as well as of a live recording of John Coltrane's 1973 concert in Japan		
V	*7 Last Words of Hasan*	2008-2009	Joseph Haydn	*Die Sieben Letzten Worte unseres Erlösers am Kreuze*	1786
VI	*In Nomine*	2008	*In Nomine* (Gregorian chant)		
VII	*...for Arnold*	2009	Arnold Schönberg	Chamber Symphony no. 2	1906-1939
VIII	*Robotica II*	2009	Newly composed material by Bernhard Lang		
IX	*The Anatomy of Disaster*	2010	Joseph Haydn	*Die Sieben Letzten Worte unseres Erlösers am Kreuze*	1787
X	*Alla Turca*	2010	Wolfgang-Amadeus Mozart	Piano sonata no. 11: *Rondo Alla Turca*	1783
XI	*...for Anton*	2010	Anton Webern	*Symphonie* (Op. 21)	1927-1928
XII		2010-2011	Miles Davis	*Get Up With It*	1970-1974
XIII	*The Saucy Maid*	2011-2012	Anton Bruckner	Symphony no. 1	1866
XIV	*Puccini-Variationen*	2011	Giacomo Puccini	*Madame Butterfly*	1904
XV	*Druck*	2011	Transcriptions of several percussion works by Iannis Xenakis; and of a recording of John Coltrane's 1973 concert in Japan		
XVI	*Solfeggio*	2011	Kaiser Friedrich	*Solfeggio*	
XVII	*SheWasOne*	2011	Petr Kotik	*Many Many Women*	1981

XVIII	*Moving Architecture*	2011-2012	Bob Dylan	*Like a Rolling Stone*	1965
			Selected texts by Rose Ausländer		
XIX	*SacRemix ...for Igor*	2012	Igor Stravinsky	*Le sacre du printemps*	1913
XX	*...for Franz I*	2012	Franz Schubert	Piano Trio no. 1 (Op. 99)	1828
XXI	*...for Franz II*	2012	Franz Schubert	Piano Trio no. 2 (Op. 100)	1827
XXII	*SolEtude for Re*	2012	Henry Purcell	*Oh Solitude*	1684-1685
XXIII	*...for Stanley K.*	2013	Richard Strauss	*Also Sprach Zarathustra*	1896
			Johann Strauss	*An der schönen blauen Donau*	1866
			György Ligeti	*Atmosphères*	1961
XXIV	*The Stoned Guest*	2013	Wolfgang-Amadeus Mozart	*Don Giovanni*	1787
XXV	*10 Paintings*	2013	Newly composed material by Bernhard Lang, inspired by 10 paintings by Lisa Abbott-Canfield		
XXVI	*...for Pauline and Conrad*	2013	Niccolò Paganini	Caprice no. 24	1807
			Johann Sebastian Bach	Sonatas and partitas for violin solo (BWV 1001–1006)	1720
XXVII	*Brahms-Variationen*	2013	Johannes Brahms	Clarinet Trio (Op. 114)	1891
XXVIII	*Seven*	2013	Ludwig van Beethoven	Symphony no. 7	1811-1812
XXIX	*London in the Rain*	2014	Newly composed material by Bernhard Lang		
XXX	*Hammer*	2014-2015	Ludwig van Beethoven	Piano sonata no. 9 (*Hammerklavier*)	1817-1818
XXXI	*...for Franz III*	2015	Franz Schubert	String Quintet	1828
XXXII	*The Cold Trip Pt. 1 & 2*	2014-2015	Franz Schubert	*Winterreise*	1827
XXXIII	*ParZeFool*	2015-2016	Richard Wagner	*Parsifal*	1882
XXXIV	*...for Ludvik*	2016	Ludwig van Beethoven	Piano concerto no. 3	1800
XXXV	*Henry Purcell III*	2017	Henry Purcell		
XXXVI	*Chopin: 12 Etudes*	2016-2017	Frédéric Chopin	*12 Études* (Op. 10)	1833
XXXVII	*Loops for Leoš*	2017	Leoš Janáček	*On an Overgrown Path*	1900-1912
XXXVIII	*Das Kinderspiel*	2018-2019	Wolfgang-Amadeus Mozart	*Das Kinderspiel*	1791
XXXIX	*Op. 81a*	2019-2020			

APPENDIX II

INTERVIEW WITH BERNHARD LANG

Leuven (Belgium), 26 October 2013

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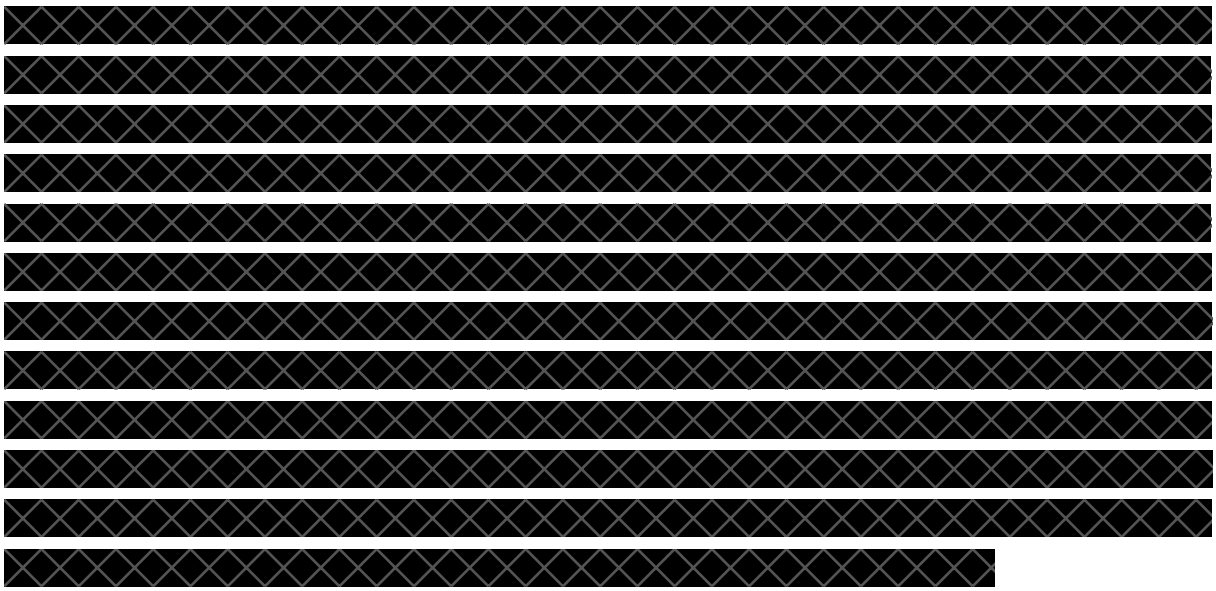
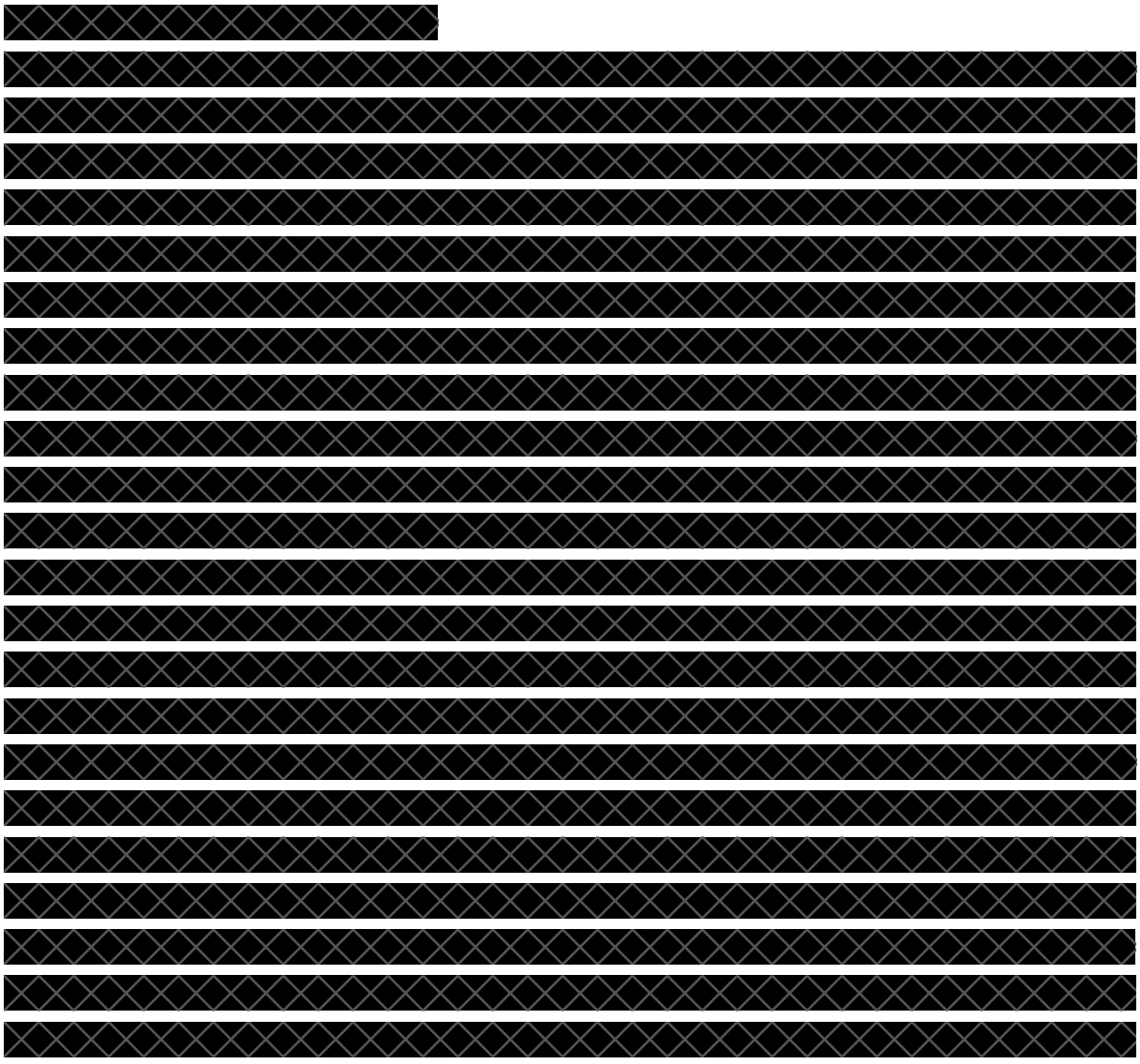
APPENDIX III

INTERVIEW WITH BERNHARD LANG

Vienna (Austria), 24 November 2017





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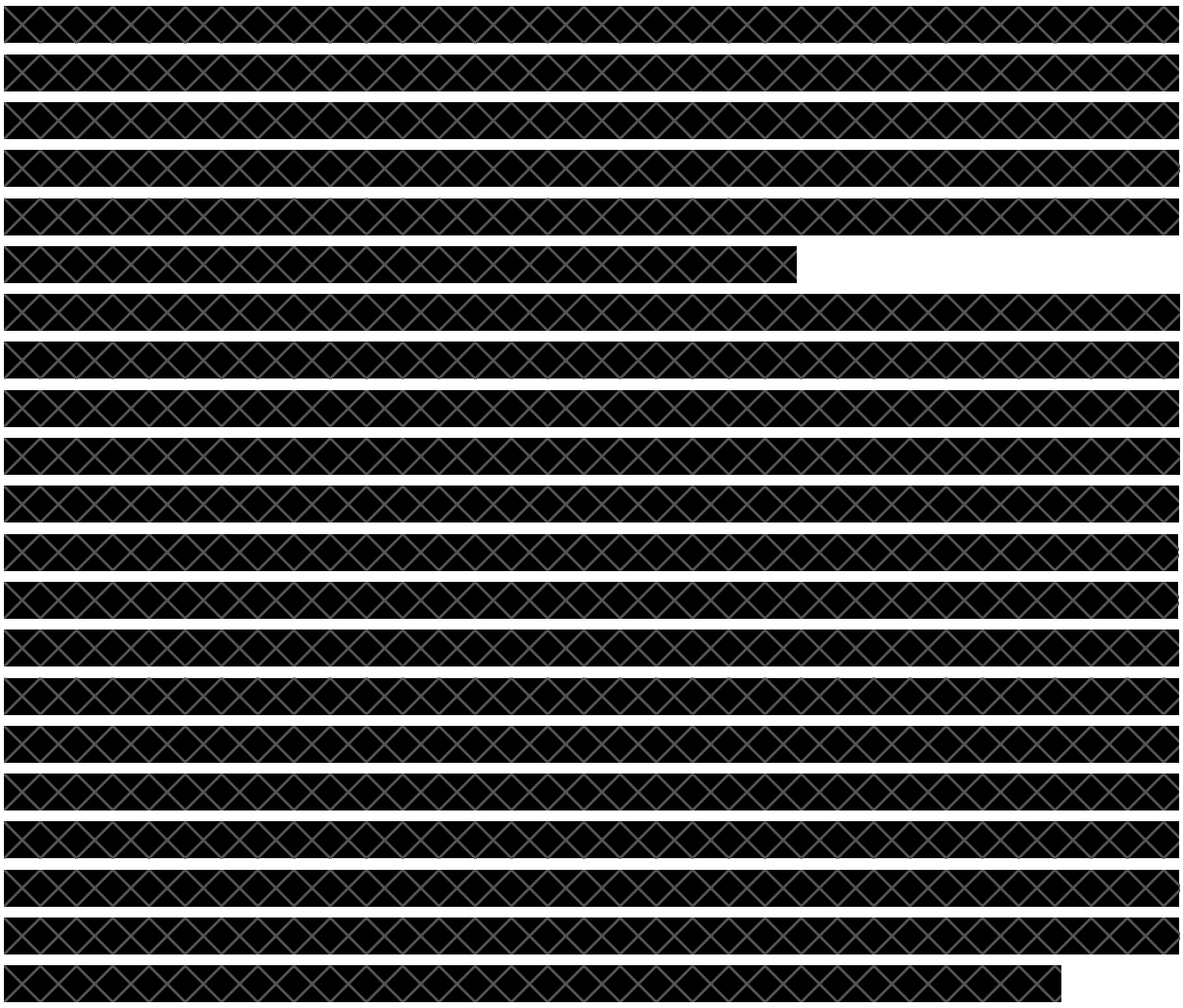

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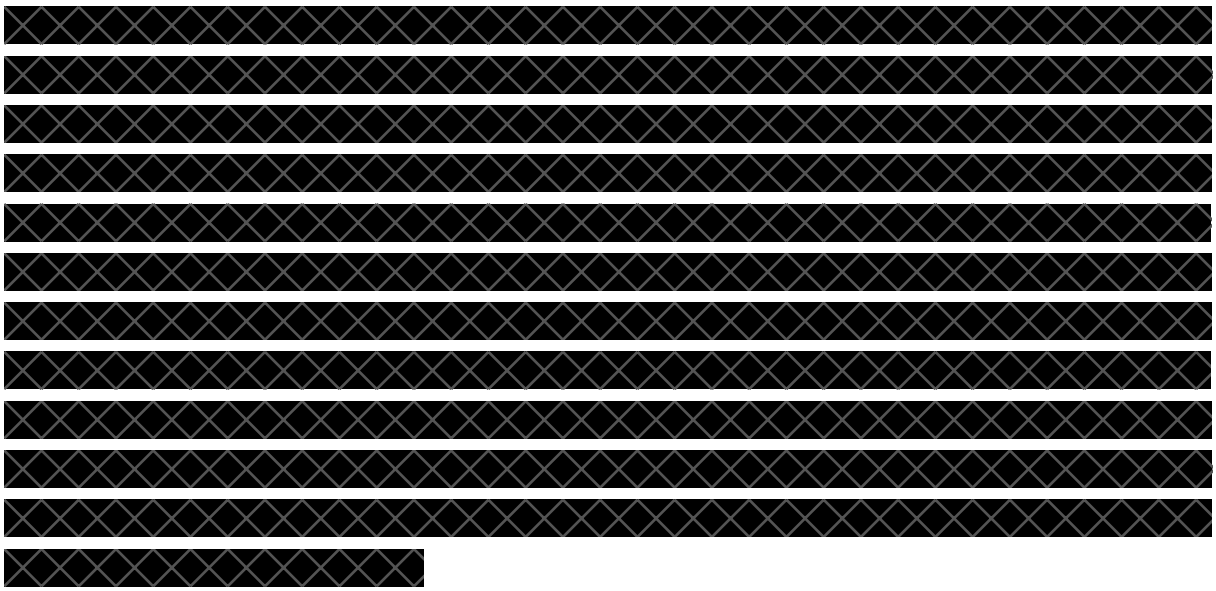

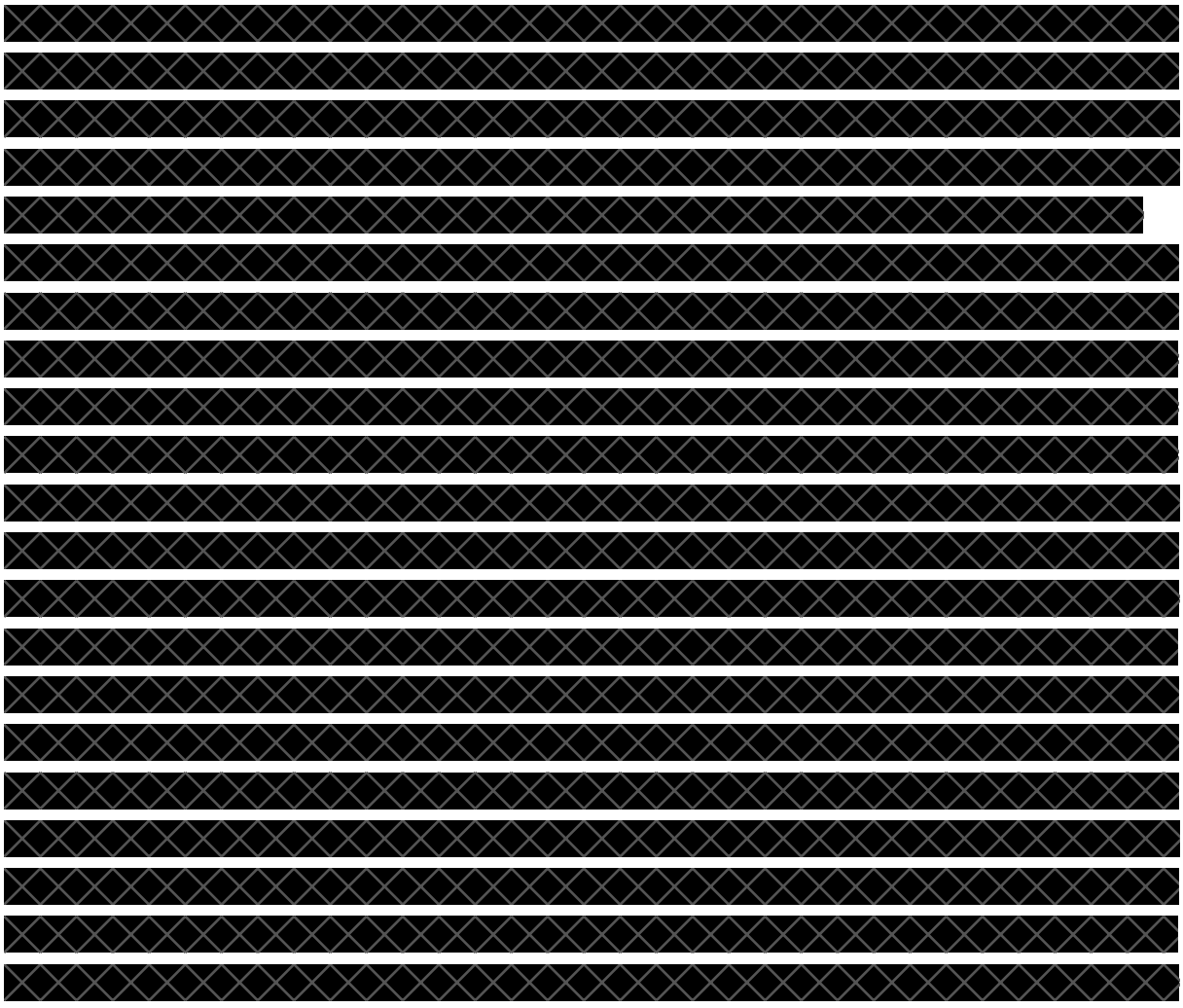

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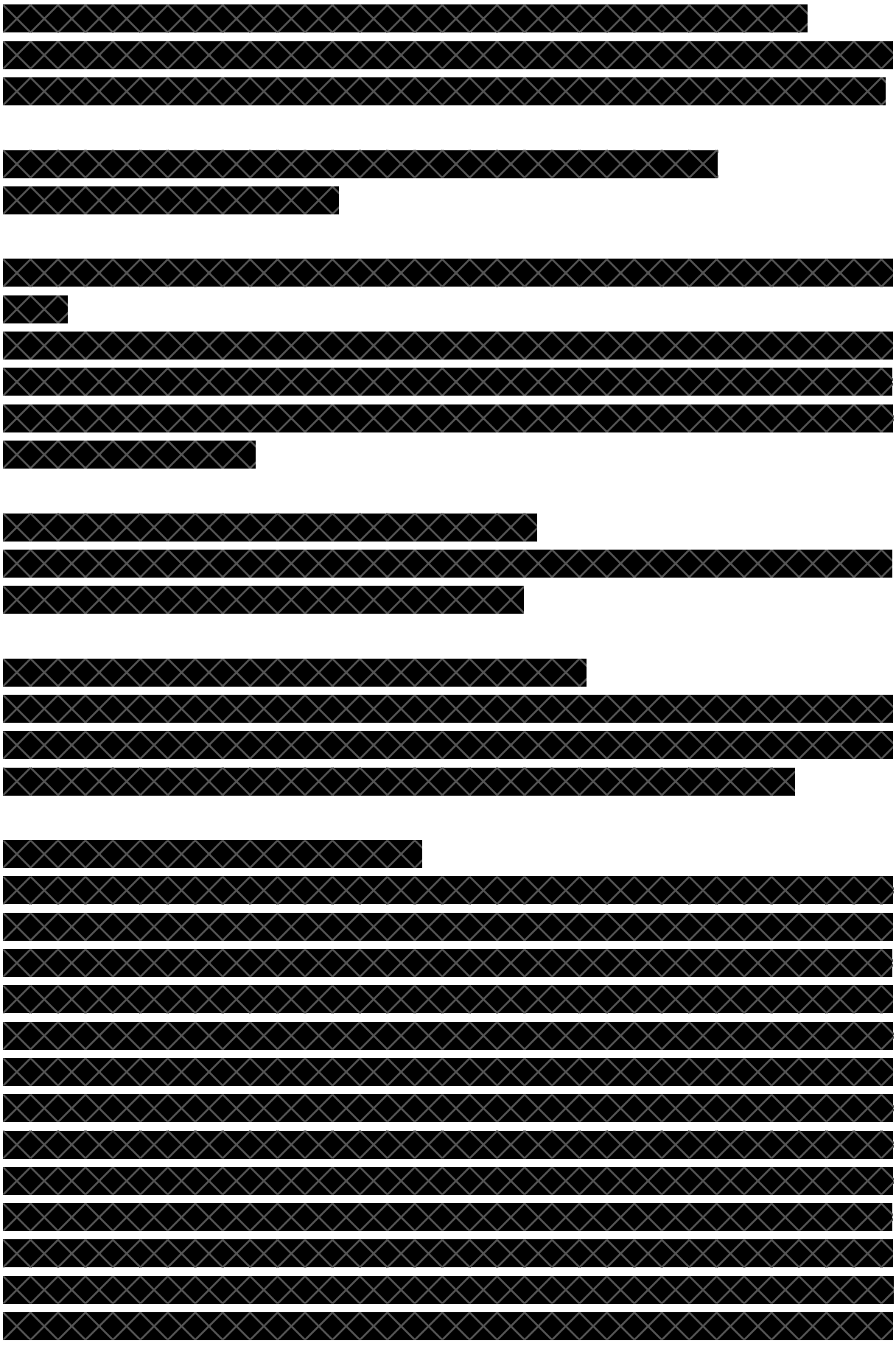

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APPENDIX IV

INTERVIEW WITH BERNHARD LANG

Vienna (Austria), 27 November 2017

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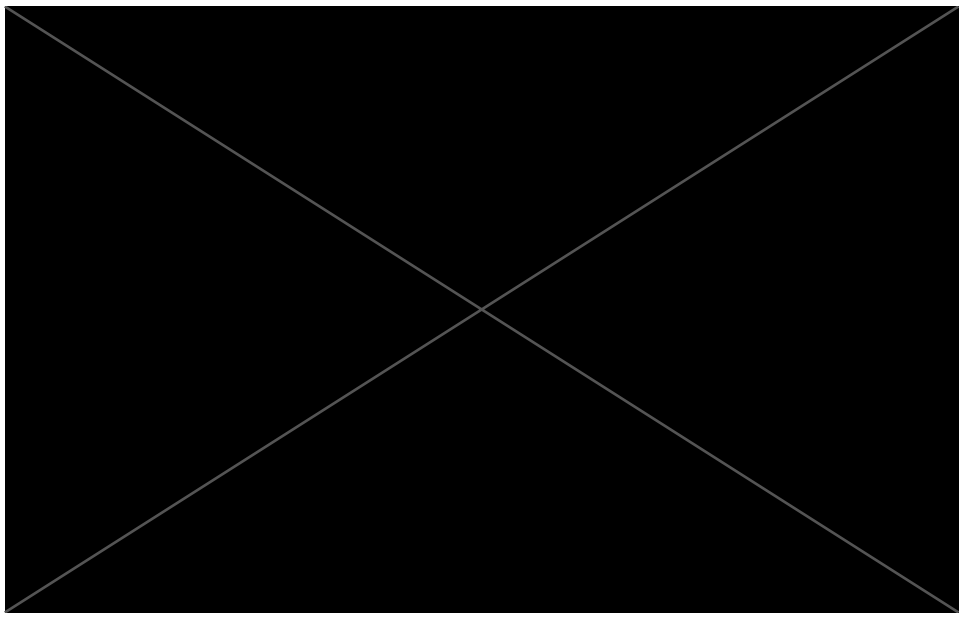

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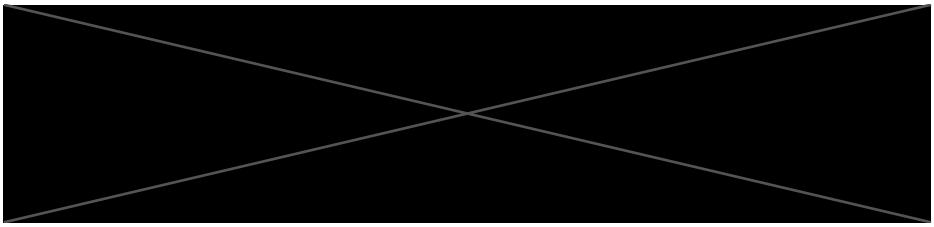

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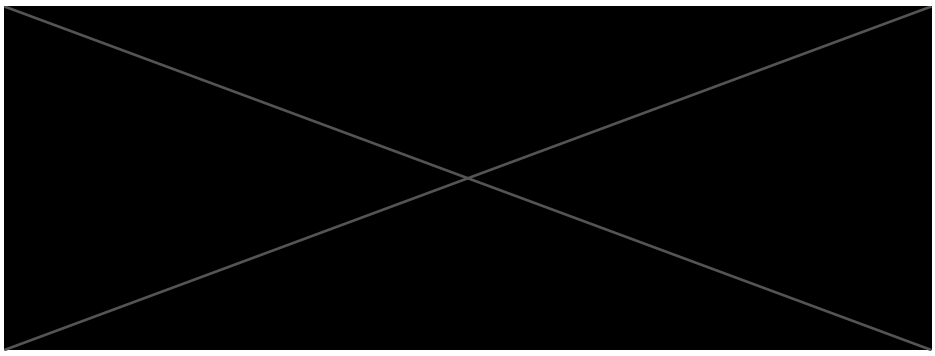

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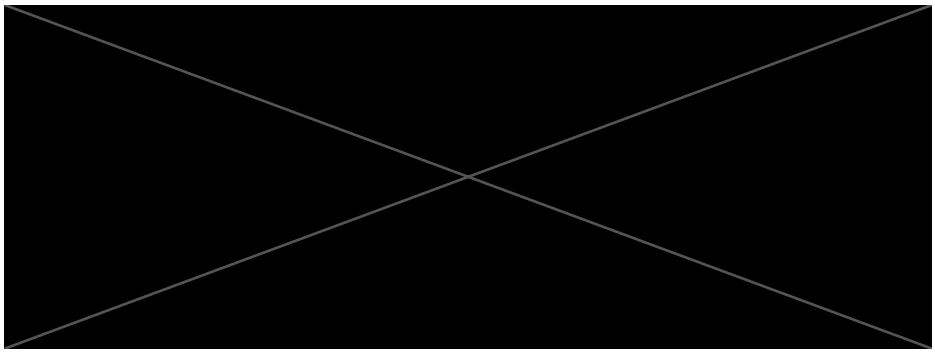

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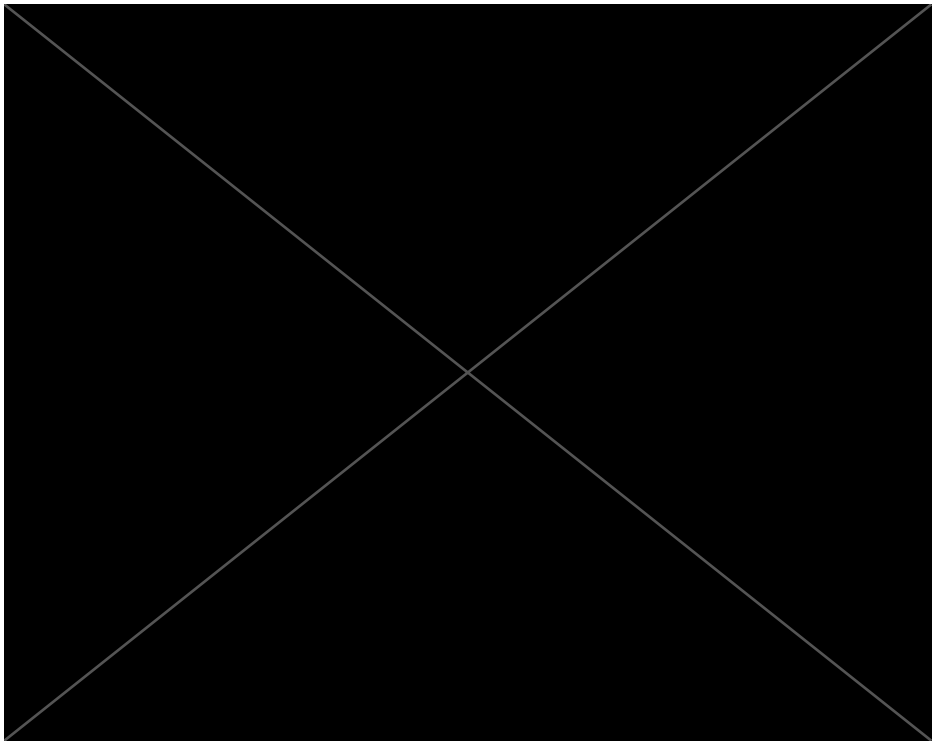

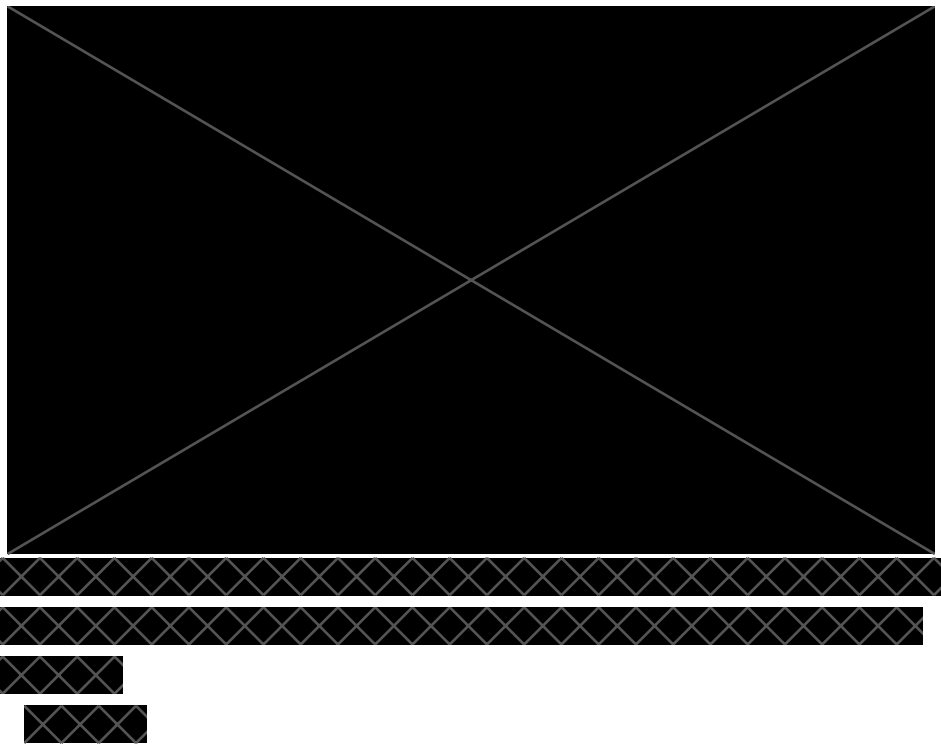

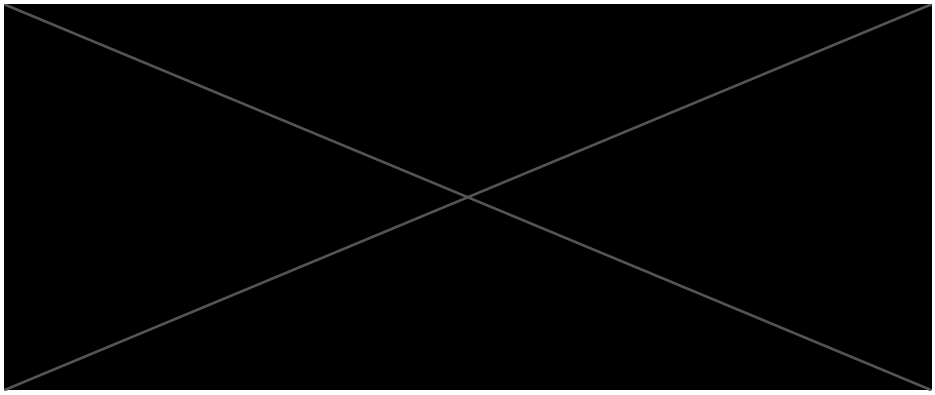

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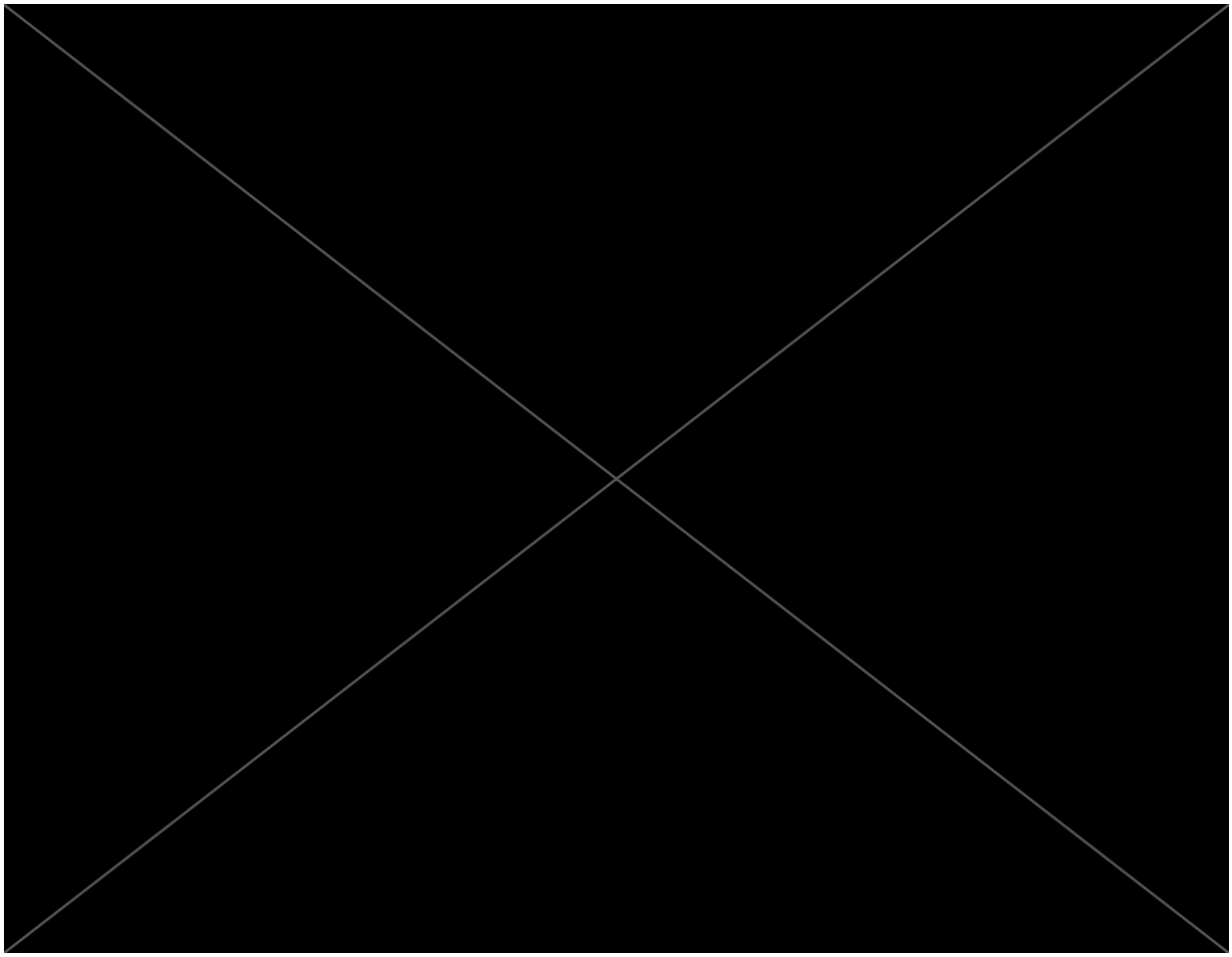

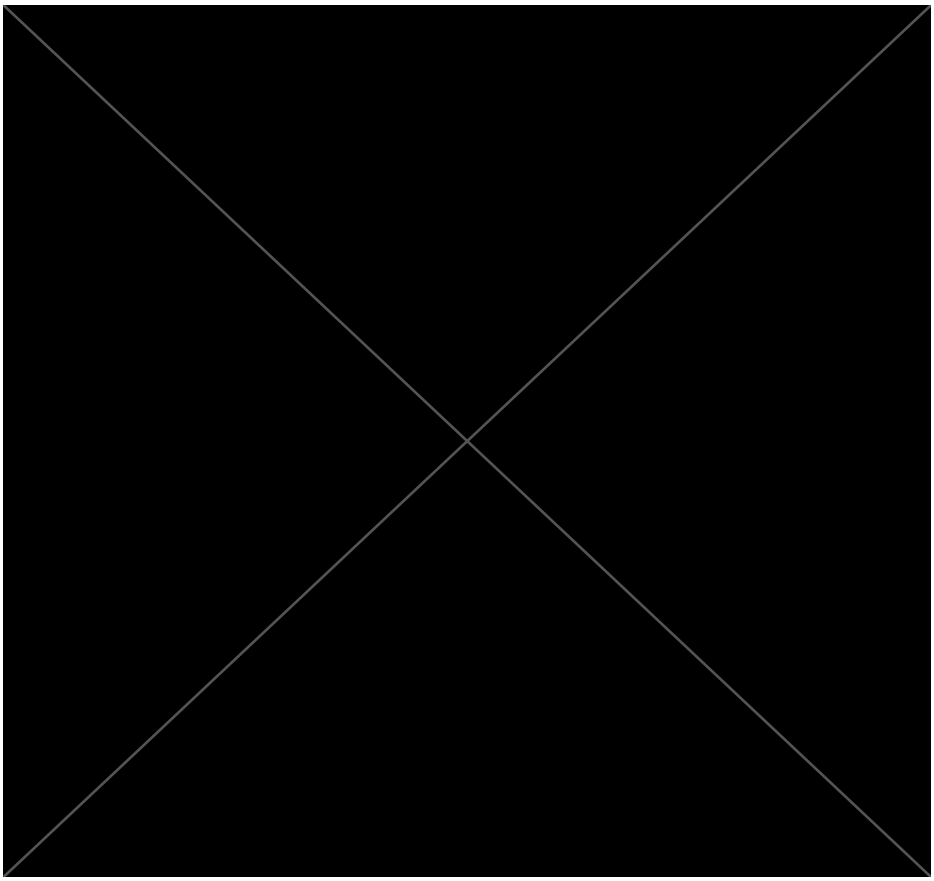

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APPENDIX V

SCORE EXCERPT

Bernhard Lang - *Monadologie IX: The Anatomy of Disaster – I: Introduzione*,

bars 1-35