Determinacy, indeterminacy and collaboration in contemporary music-making

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Declaration page

This should be inserted at the front of the thesis

"I hereby declare that I am the sole author of this thesis; that the following thesis is entirely my own work; and that no part of this thesis has been submitted for another degree or qualification".

Signed ……

Abstract

This thesis is structured around three key phases in the process of collaborative music-making—composition, preparation, and performance—examining the function of indeterminacy at each stage, and the way in which musical factors are determined. At what point in the creative process a musical decision is made, the path chosen, and critically, by whom the decision is taken, are all explored in the context of a portfolio of pieces performed and recorded as part of this practice-led research. The portfolio comprises recordings of projects undertaken with composers, as well as pre-existing repertoire, and the written commentary explores my creative role as a performer in relation to that of the composers and the other performers I have worked with. Practical issues faced in collaboration, practice, and performance are dealt with, as are questions of musicality, and the notion of success in musical performance.

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Portfolio

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by Dave Lloyd

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All programme notes written by Emma Lloyd.

KUBOV album

This is the first album made with Jess Aslan as our violin and electronics duo KUBOV. From a working process developed from an initial collaboration on Jess's three pieces for violin and electronics, we have jointly developed a musical language through improvisation. The album comprises eight pieces which retain the improvisational approach and liveness to our music-making.
1-*Valdrada*
2-*Zenobia*
3-*Despina*
4-*Zirma*
5-*Zora*
6-*Isuara*
7-*Argia*
8-*Octavia*

Improvisation

The improvisation in this portfolio is from a live performance with Karin Schistek. The rest of the programme contained pieces by Bach, Beethoven, and Webern. In an attempt to create a coherent programme of notated music and improvisation, we pre-determined a structure of four 'movements', deliberately keeping musical material minimal for each and creating noticeable contrast between them.

Partita

Lutosławski's *Partita* is in five movements, movements II and IV being short ad libitum sections interspersed between the three more substantial parts.

The composer writes

> The three major movements follow, rhythmically at least, the tradition of pre-classical (18th century) keyboard music. This, however, is no more than an allusion. Harmonically and melodically, *Partita* clearly belongs to the same group of recent compositions as *Symphony No. 3* and *Chain I.*[47]

The first performance was given in 1985 by Pinchas Zukerman and Marc Neikrug for whom the piece was commissioned. It exists in its original instrumentation for violin and piano as well as an orchestrated version which the composer made for violinist Anne-Sophie Mutter.

bet denagel

bet denagel is one of a set of pieces by Matthew Sergeant entitled *The Eleven Churches of Lalibela*, the name of which comes from a collection of churches hewn from the ground in northern Ethiopia. In the composer's words,

> the compositions contained with the cycle do not in any way attempt to be poetically descriptive of the churches as physical structures—instead, the churches have served as a multidimensional metaphor for the creative space I am seeking.[1]

This piece is for solo baroque violin and comprises thirteen 'districts' of music throughout which the performer can move at will, following pre-defined paths. Any district can be visited as many times as desired and not all of them have to be heard in a performance. Only two districts must be played. The starting and finishing point are the same, in other words there is only one entrance to *bet denagel*. There is also one unique district which must be played at some point in the performance and may only be played once.

The first performance of this piece took place in Edinburgh in October 2013.

Aus den sieben Tagen

This is a collection of text pieces written by Karlheinz Stockhausen during a seven-day period of isolation in May 1968. The pieces, mostly specified as 'for ensemble' are often described as 'intuitive music', requiring a performative approach that shares a blurry boundary with improvisation. The pieces ask questions of the performers' relationships with their own bodies and minds, other players, their surroundings and existential consciousness. The recording in this portfolio is of *Verbindung*.

> play a vibration in the rhythm of your intuition[64]

Solo for viola d'amore and electronics

This piece is the fruit of on-going collaborative work with Matthew Whiteside involving the creation of a new interface for the physical control of live electronics. A glove with sensor allowing the pressure of the performer's finger on the string to manipulate a ring modulator allows expressive control of this facet in a similar manner to vibrato.

The ring modulation, vibrato and trills subtly ornament and enhance the underlying musical material which is sparse and tonal, the space drawing attention to the natural resonance of the viola d'amore. The amplification allows the increased projection of the resonance of the sympathetic strings of the instrument which give the unusual metallic edge to the timbre.

Ulation

Ulation for viola and live electronics is a single movement piece with a continuous build from sparse viola pizzicato and sine waves at the beginning, through rhythmic pizzicato passages, culminating in a shredding and screaming arco line which is delayed and distorted by the electronics.

The composer describes the role of the computer as 'a second instrument' which 'through intentional glitches and samples triggered when certain notes or gestures are hit' will 'listen to and change the sound of the viola'.[2]

[1] http://matthewsergeant.tumblr.com/lalibela access:17/11/15
[2] http://www.matthewwhiteside.co.uk access:17/11/15

104, *mechanica* and *softly, softly*

This is a set of three pieces for violin and electronics each of which explores a different timbral facet of the acoustic instrument. The electronics vary in their role between extension of the acoustic instrument, accompaniment and as a second player in a duo. *104* uses the subtle timbral differences between natural and artificial harmonics and the live electronics magnify and process points of fragility in the sound. The electronics in *mechanica*, by contrast are created from recorded fragments of percussive violin with which the live instrument plays similar material. Beginning sparsely, it grows until the sound of the live instrument is consumed. *softly, softly* uses almost entirely a technique of creating sub-harmonics on the violin, whereby a combination of the right bow pressure and lateral point on the string it is possible to play a number of intervals below the normal sounding pitch of the string. The timbre of this sound is unusual and not lyrical—loud yet fragile and the electronics, in a similar way to those of *104* magnify and exaggerate this.

[kiss]

Matthew Sergeant's *[kiss]* is a piece for solo violin and twine bow, lasting between four and six hours.

The score comprises four pages each with six systems. The form is open, meaning that the performance can begin and end in any of the 24 modules. It uses a Lachenmann clef, so left and right-hand movements are notated within the same space. Each module has between two and four possible bowing patterns, and twenty of the 24 can be played in any one of four different tempi. All modules can be played on any of the four strings of the violin. Lines on the score indicate between which modules movement is allowed, and where a change of string should take place. Movement between pages allows for a change to a different bowing pattern. In addition to this material, there is a section of contrasting material lasting approximately 45 seconds, to be inserted at any point, but only once in the entire performance.

The first performances of *[kiss]* took place at the Rampant Chaos festival in Manchester, and at Tempting Failure in Bristol, both in November 2014.

A card with the following note, written by the composer, was made available to audience members during the performance:

> [kiss] is made mostly of noises and glitches on the edge of audibility. At an [sic] non-predetermined moment within its duration, a passage of music to the absolute contrary [bold/wrought] will sound. Either through absence or innocence, most of you will miss it.

[2520] Individual works for violin

The score of Ian Vine's *[2520] Individual works for violin* comprises seven postcards from which the performer must choose five and arrange in an order of their choice to construct a single version of the piece. Ian says of the piece

> this piece partially takes its title from sculptures by New York artist Allan McCollum: Over Ten Thousand Individual Works (1987/88)

> is a collection of unique pieces made from casts of ordinary objects that are combined to form an Individual Work.[3]

There are 2520 potential permutations of the work.

December 1952

December 1952 is part of a set of pieces entitled *Folio and Four Systems*. The score is entirely graphic, consisting of 31 black rectangular objects of varying shapes and sizes, on a plain white background. Instrumentation, pitch, rhythmic and other ostensibly identifiable musical characteristics are not determined either in the score or in other information provided by the composer. The primary focus of the performance notes is the relationship between time and the spacial dimensions, the composer offering a choice between a three-dimensional interpretation of the notation—'vertical, horizontal, and time'—and one 'where all four dimensions are active'. In the former, it is specified that there should be a relationship between the thickness of the blocks and the 'intensity' of the sound, where as to intuit the fourth dimension, the relative sizes of the objects should inform this.

[3]http://www.ianvine.com/individualworksforviolin.htm access:17/11/15

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Chapter 1

Introduction

> Composing's one thing, performing's another, listening's a third. What can they have to do with one another? —*John Cage*[11, p. 15]

The primary focus of this research is to examine a performative approach to different forms of indeterminacy in music. Key areas of interest are explored in the context of my own practice as an instrumentalist, and my collaborations with composers and other performers.

These include looking at the way in which indeterminacy in music can be a point of contact and collaboration between two musicians, and questioning the responsibility of a performer in interpreting indeterminate material in a score. Underlying this research, and central to my musical approach, is the concept of *musicality* in performance: musical decision making, and how musical intentions are transmitted in performance, which, in turn, lead into methods of communication with other performers, and with the audience.

Over the course of the project a number of issues arose and have become the focus for the commentary on the works in the portfolio. These include the identification of the discrete creative roles of both composer and performer in a collaboration; the process of discovery, alone and while working with someone else; and serendipity, and the importance of allowing this to play a role in the creative process. Specific practical concerns include learning music with limited historical foundations, particularly pedagogically speaking, for example, pieces which employ new notation or non-standard techniques. Unusual performance situations, for example those requiring abnormal levels of endurance, or instrument preparation and extension, have presented their own line of enquiry relating to commitment in performance and the significance of showing dedication to the music, and respect for the composer/collaborative partner. Reflective analysis on our own musical performance, and our notion of success or failure in this respect is notoriously problematic, but necessarily plays a continuous role in the life of a practicing musician, and the method and effectiveness of doing so is discussed.

Having studied for my undergraduate degree at a conservatoire, as a first study violinist, and detoured via a masters' degree in Musicology[1], I was driven by a need to combine my practice with a more analytical engagement with the

[1] Royal Northern College of Music, 2006-2010, and University of Edinburgh 2010-2011, respectively.

music. My interest in contemporary music and in working with composers had been developing over a number of years. I had also discovered a particular interest in graphic notation, having focused my masters' dissertation between Cardew's *Treatise*, and a joint project with artist Cate Smith, interpreting her paintings as musical scores. As a practitioner with a wide variety of musical interests, I was keen to examine how the different challenges encountered interact and inform each other, and to assimilate what I learn from performing a variety of indeterminate scores into my practice as a whole.

1.1 Function of the portfolio

This thesis comprises two parts: a portfolio of recorded performances, and an analytical commentary on the working processes associated with the works presented. In the portfolio, I have attempted as far as possible to present a varied programme. I have made an effort to represent solo and ensemble work, notated and improvised, acoustic and electronic, and more traditional notation as well as graphic and text-based scores.

The criteria for inclusion are that I have performed the work in public, and that I have a high quality audio recording (live or studio).

With the portfolio I have aimed to represent the amount of time on this project devoted to collaboration with composers—most works presented are new and written for, or with me. New works have been chosen over better-known, pre-existing works to reflect the working process, as I felt that it is important that the thesis as a whole represents the research in character as well as in content. As above, the reason for including several examples of improvisation is to reflect the important role this has had in the development of my practice. It also represents some musical relationships that have been vital to the progression of my practice, particularly the work I have done with Karin Schistek and Jess Aslan.

The inclusion of works in this portfolio is in no way intended to imply that they are (or are not) archetypal examples of specific forms of indeterminacy. Nevertheless, each has its own contribution to make to the discussion of the associated collaborative and performative issues.

While works have been picked for inclusion primarily for artistic reasons, contributing factors to this decision have included a combination of fortunate timing, successful recording, and availability of other performers.

1.2 Chapter outline

The remainder of this chapter is dedicated to methodology. With reference to the literature which has informed the approach, the interaction between practice and theory is discussed. A set of priorities which guided the methods employed are outlined, as well as the importance of social influences. Lastly, the logic behind the presentation of the research is detailed.

Chapter two of the thesis attempts to contextualise the focus on 'indeterminacy'. Parallels are drawn with experimentalism and a discussion of the performative implications is opened. A taxonomy of associated and subsidiary terms is introduced and definitions are provided. Finally, the progression of a

musical collaboration is illustrated which explains the division of the following three chapters

Chapters three, four and five contain the commentary directly related to the portfolio. The division into three chapters represents what I identify as three key stages in the development of a musical venture: the composition, the preparation (learning, realising, developing), and the performance. While in some ways it follows Cage's divisions (see introductory quotation) more of my focus is on the stage of development which interlinks the compositional and performative phases. *Listening* is dealt with in a more peripheral, but nonetheless essential way, in context with each of the three aforementioned stages. As Peter Nelson proposes, "The first musical act is listening."[51, p. 109]

My discussion of the compositional phase is focused on collaborative relationships with composers Matthew Sergeant, Jess Aslan and Matthew Whiteside, and the chapter is divided into three main sections, the first of which explores the collaborative exploration of a musical instrument and its determining potential, and the other two which develop the idea of instrumental extensions, both acoustic and electronic. The fourth chapter, which focuses on the preparatory stage, deals with the communication of musical ideas via notation. Highly prescriptive and complex scores are examined, as are examples of graphic and text notation. The development of musical ideas through improvisation is also discussed. The final phase as described here is the performance, which is the focus of chapter five. While this mostly explores indeterminate factors from my point-of-view as a performer, the perspective of the listener and their determining role is also discussed, particularly where this role departs from the status quo. Chapter six provides some concluding remarks and a reflection on personal development throughout the period of research, on collaboration with other musicians, and on the performative and pedagogical implications of my findings.

Appended is a list of technical terms used, a webpage with video examples and commentary to explain some of the instrumental techniques that are referred to in the thesis and are significant to the analysis, and photographs of the instruments used.

Presenting the commentary in this way necessitates referring to the same work in two or even three chapters. The alternative, which was to deal with the repertoire work-for-work would require more repetition and, I felt, had no logical order. This structure better represents the working method and is intended to provide a more coherent narrative throughout the thesis. The need to present a non-linear working method in a linear structure is in itself problematic and some repetition and arbitrary juxtaposition is unavoidable, however, I hope the elements of this do not distract the reader and can instead serve to positively and naturally represent some of the chaos inherent in this type of practice.

1.3 Methodology

In focusing on indeterminacy as an aspect of contemporary music-making, I was fundamentally interested to explore the practice and process that would be developed as a means to performing the repertoire I would engage with. This meant that the research would not be centred on a hypothesis, but rather it would incorporate the multiple potential paths of enquiry that would be

opened, the navigation of which is paralleled in some of the complexities of this practice. Having decided early on that it was important not to impose artificial limitations on the process, i.e. limitations due to the 'research' angle of the work, which would not be a necessary part of my practice, I found more and more throughout the course of the work that it was vital to the analysis and honest reflection to allow the project to naturally take its shape. In the words of Paul Feyerabend:

> The only principle that does not inhibit progress is: anything goes.[23]

The methodology adopted for this project drew influence from several corners of available literature: books which focus on practice-led research[62][25], written accounts of musicological and ethnomusicological research[56][17], other PhD projects which have similarly been founded on practice[57][33] and other papers which have, in more focus, looked at collaboration and performance practice[24][31]. The existing PhD research and some other specific projects[2] have also been extremely helpful in finding a suitable way to present my research.

1.3.1 Practice-led research, research-led practice

This research necessarily became an extension of my existing practice as a performer. Finding a balance between the practical and theoretical aspects of the work has been a challenge throughout, but the flow of information naturally found its own pace and purpose, or what Smith and Dean refer to as an 'iterative cycle'[62], where practical and theoretical work feed into and support each other. To give an example, Mari Kimura's research into subharmonics[41] allowed me to develop my own instrumental technique, and it eventually became an important part of my collaborative work with Jess Aslan. Smith and Dean cite Barbara Bolt, who makes a distinction between practice and 'praxical knowledge', the latter being the knowledge one possesses as a result of being a practitioner in one's own area; what is more commonly termed 'experience'. She highlights here one of the key difficulties of this transition from practitioner to researcher, or rather one of the potential difficulties with research that relies to some degree on this praxical knowledge, which is the way in which "particular situated and emergent knowledge has the potential to be generalised so that it enters into dialogue with existing practical and theoretical paradigms".[62, p. 7]] I have tried to avoid this tendency towards generalisation by adopting a largely observational approach. This does indeed make it difficult to reference existing conceptual discourses, however, the process of attempting to write about these issues has been a useful tool in identifying those paradigms on which my practice had been based. The observations themselves, and the metaphors and descriptive method of the writing, are of course open to discussion within the frameworks opened up by a number of other researchers, such as Fitch and Heyde's account of their collaboration, as they say, "We have felt it worthwhile to present an account of our work, in so far as it represents a more dynamic model of the collaborative process, in order to articulate some of the ways in which creative practice may be understood as research."[24, p. 73] Incidentally, the first part of the title of Smith and Dean's book 'Practice-led research, research-led practice…' became almost a mantra for the balance that I was striving to achieve in this work.

1.3.2 Priorities

My key priorities in finding a suitable methodology for this work were, firstly, to find a way to research and present the work as far as possible without making generalisations that could not be substantiated; and secondly to ensure that the methodology would support and help to develop the existing practice, and not interfere with it.

The imaginary protagonist

The introduction to Timothy Rice's ethnographic study of Bulgarian music and musicians[56] has some very pertinent advice on dealing with bias in research. A key point is to avoid generalising about a group of people; for example, inventing a "fictitious author" such as 'the Bulgarians', when actually it is only a select few individuals who are representing the group in question. Rice focuses his study on two people who, in many ways, represent the culture he is observing, but he is careful not to generalise based on their experiences in the presentation of his research. In a similar way it was important for me to develop a discourse that did not rely on making generalisations (or relying too heavily on paradigms), but that was nevertheless analytical of my own approach—that would be an honestly subjective account of my own practice, and which would draw a set of useful conclusions that does not presume that my experience is representative of that of a larger group of people.

Methodology versus praxis

Heather Roche's research[57] was based on her collaborative work with a number of composers throughout her PhD. She documents her role in the process from the first meeting (pertaining to the collaboration) with the composer, through to the performance of the new work. While her focus is on dialogue in these collaborative relationships, her approach, like mine, is practice-led and from her perspective as a performer. She found that a grounded theory based methodology allowed her the freedom necessary for her research:

> In searching for the appropriate methodology, it was critical that I found a method that was flexible, one that acknowledged the complex and interactional aspects of my research; something that would not bind me into analysis of cause and effect but allowed for the intangible and irrational aspects of human behaviour.[57, p. 31]

An approach that required defining a hypothesis too early in the process would have been detrimental to the project, as is clear from her description of the growth of her research. Inevitably, in research of a practical nature, analytical and experimental progress will be accompanied by an improvement in technical skills. This feeds back into the accompanying scholarly work and progressively changes one's research technique. Roche describes how things she learnt from one collaboration would influence the next, particularly as she experienced some of the problems that can be associated with creative collaboration. In her introduction she remarks on how even her understanding of the word *collaboration* deepened throughout the research process:

> it was clear from the beginning that there would be many possible ways to define collaboration...my understanding of collaboration developed alongside my practice of collaborating[57, p. 7]

Charmaz and Mitchell identify key steps in this methodological approach[15]. These enable the researcher to alternate between the collection and analysis of data, rather than leaving analysis to the final stages of the project. Codes and categories for organising this data are derived from the information gained during the research, in the absence of a preconceived hypothesis, which also allows theories to develop throughout the course of the project. In terms of research by musical performance, the fundaments of this model allow for continuous acquisition of knowledge and simultaneous development of understanding. Keeping a journal, or personal memos, means that important information can be stored and analysed when required, avoiding the problem that Steven Pace identifies[53] where the methodology can be an interruption to and distraction from the practice. One of his key arguments is that it is necessary to make a distinction between 'evocative or emotional autoethnography' and 'analytic autoethnography'. The latter does not have the association with autobiography, but allows for using techniques borrowed from ethnography in studying one's own practice.

Returning to the notion of 'Practice-led research, research-led practice', in a chapter by Haseman and Mafe[62, p. 211-228] the authors address the problematic task of establishing a methodology in practice-led research, particularly where "a full research plan and proposed timeline is required". While this is commonplace for many other forms of research, it is difficult to apply to a creative method of research, where it is much easier to examine the methodology in hindsight. They list six 'conditions of practice-led research', citing Carole Gray who also observes that the necessity to specify the research question closely, early in the project, is 'an impediment for creative practitioners'. In a similar vein to the memo-taking aspect of grounded theory, they suggest taking methods already used to develop your practice, for example, a sketchbook or journal, and repurposing them into the language and methods of research.

Steven Cottrell identifies some of the difficulties of researching within your own field of practice. In his study of the professional music scene in London[17], he was keen to present himself as another working musician, rather than as a researcher, a step removed from the action. This meant that much of the time it was necessary to leave documentation of observations until after the rehearsal or gig in question, so that the note-taking did not interfere with the event. He acknowledges that there can be problems with relying on memory for these purposes and that it is necessary to keep this in mind when drawing on one's own experience.

Early on in my research, I tended to make recordings of rehearsals and meetings with composers, which I found to be of very limited value. Generally, my own written notes directly after the event were as, if not more, useful than a recording, and the presence of a recording device, however small would always add a certain amount of tension to the situation. As time went on I would almost never (unless it was of use to someone else) record entire meetings, but recording sections of playing became more and more a routine part of my practice, in my solo playing and in ensemble contexts. Examples of this, in context, are given in later chapters, but as a general point, this, along with keeping a journal was

an example of repurposing and developing methods already contained within my practice for my research.

An important point made to me by the composer in the early stages of working on *[kiss]* with Matthew Sergeant was the importance of time to *forget*. Leaving space and allowing your mind naturally to clear away the less important, less relevant, and less interesting findings is a necessary part of the creative process, and it is important not to allow the documentation process to interfere with this.

Subjectivity

It has become more and more important over the course of this research to be careful not to 'over-theorise' the reflection, or to downplay the inherent subjectivity of the work. At risk of allowing too much of the 'evocative or emotional autoethnography' as opposed to the 'analytic autoethnography', I have attempted to give honest accounts of the working processes, which include identification of error and influence of social and emotional factors. As Smith and Dean assert, the definition of knowledge in the context of music or visual art "must include the idea that knowledge is itself often unstable, ambiguous and multidimensional, can be emotionally or affectively charged, and cannot necessarily be conveyed with the precision of a mathematical proof."[62, p. 3]

David Sudnow presents a personal account of learning jazz piano in 'Ways of the Hand'. In his words, "the aim isn't explanatory but descriptive, a phenomenological account of handwork as it's known to a performing musician…with "no one but himself to consult," to quote philosopher Maurice Merleau-Ponty."[65, p. 3] While the phenomenological angle of his experience separates it from the other practice-based research mentioned here, my own included, the text offers great interest value for practitioners and autoethnographers, and is an example of how the acknowledgement of subjectivity in research does not undermine its importance. Personalised analyses of creative work can be added to a body of knowledge and combined with other perspectives. By expanding this with multiple view points, they validate each other. Shelemay cites Charles Seeger in saying:

> The specialist—and most of us have functioned as specialists—must, of necessity, employ a narrow view in the conduct of his work. It is only by adding together the many narrow views that we get a broad view of the field[60, p. 14]

1.3.3 Serendipity and personal relationships

The deliberate absence of an initial hypothesis meant that serendipity was allowed to play its part in influencing the contents of the portfolio. I had intentions of what repertoire to study, some of which had to give way to professional engagements and other interesting opportunities for collaboration that arose. As a result, the project became much more focused on collaboration than I had initially expected would be possible, and which I hope the following chapters will demonstrate has been extremely valuable.

The open nature of the research allowed me to build on work that had been successful and interesting, which often was a result of interaction with others

with whom I had been working—the dynamic of the social relationship—as much as it was a result of more absolute musical factors.

The occurrence of collaborative opportunities was usually connected with previous professional work and/or friendships and, as is detailed in the following chapters, many of the projects begun in the course of this PhD research were continued, developed or followed by new projects involving the same people.

1.3.4 Presentation

I have attempted as far as possible to make the presentation of this work reflect the process. The written element is built on the contents of the portfolio which, in turn, have been decided by the eventualities (both intentional and unintentional) of the work itself. The focus is on the practice, and on the importance of the performance stage of musicking—the musical 'work' in its live sonic form.

In this way, and also as a result of much of the work presented in this portfolio being un-scored, the traditional reliance on visual musical examples is of limited use here. This is a downside to the normal printed-text presentation of academic work which I felt was a barrier to Sudnow's otherwise interesting account of his practice. The musical examples are in the form of diagrams and photographs which, to me, was lacking in the presentation of a practice based on sound. Less orthodox presentations of musical research include the DVD of a project by Amanda Bayley and Michael Clarke entitled Evolution and Collaboration (which they detail in a paper 'Analytical Representations of Creative Processes in Michael Finnissy's Second String Quartet'[2]) where they examine the Kreutzer quartet's rehearsal process. The DVD format enables the reader to take an interactive approach to the combined text, audio and video data. My approach for my own work has been to take inspiration from this format, but to retain a linear form of presentation as a thesis. In some cases there is both printed score and audio, and in others just audio or video clips to accompany the text, in addition to the full recordings of the music discussed.

1.3.5 Summary

In *Blood, Sweat and Theory* John Freeman refers to "a practice-as-research methodology", continuing to say that one "that is dynamic is one that finds ways in which the constituent elements of the process of discovery will evidence flexibility, awareness, responsibility, ethical consideration, creativity and experimentation: these are staples rather than deviations in performance practice as research"[25, p. 129]. While my approach is autoethnographic, thinking in terms of Timothy Rice's account of ethnography[56], the fluidity and openness of the concept of 'practice-as-research', in Freeman's terms, being a methodology in itself, actually represents my conscious working process.

My research began with a survey and analysis of the methodological approaches taken in various practice-led projects, e.g. Roche[57], Fitch and Heyde [24], and ended with a reflection on what my own approach had become. A sense of fluidity in how I defined my methodology was important to me, as much as a sense of fluidity in my music-making. As Shaun McNiff observes, we have to realise "that nothing happens in creative expression unless we show up and start working on a project, even with little sense of where we might ultimately go with it"[42, p. 32]. At the same time as considering what an

appropriate methodological approach would be, taking into account the literature referenced in this chapter, practical necessity led me to 'show up and start working', and this route, with its in-built spontaneity, ultimately became the core of my methodology.

My work with Jess Aslan in the compositional, preparatory, and performative stages respectively, which is explored in each of the main chapters of this thesis, is a primary example of how this flexible and open approach to the collaboration became an actual methodology. Beginning with an idea to work on a set of pieces, as a composer and a performer in our discrete roles, our social relationship, our access to space and facilities within the university, and our freedom of time allowed us to work in such a way that we developed a longer-term musical project, which became a co-compositional, co-performing duo. In terms explained by Hayden and Windsor, it developed from a 'directive', hierarchical relationship into a truly collaborative one[32, p. 33]. From the very beginning we documented rehearsals by recording sections of music, listening back together and discussing them, and by keeping our own written notes, which allowed us to reflect on the progress and development of our work together. This gave us both short-term and long-term feedback—we were able to critique our playing in terms of what we were trying to achieve at the time, but also to notice further down the line how our perception of what we had made had changed. Essentially, this process of recording and listening was part of our practice methodology, and also enabled us to re-listen to recordings made a year or more apart and to observe how these recordings appeared in the context of our current practice. Written notes were also valuable for noticing more long-term change as I documented my feelings and observations for each rehearsal, I was able to see over time how certain ideas had naturally concluded and been forgotten, and how others had become central to our practice, such as the way we would search for musical material through improvisation which would then find its way into more pre-determined structures. Crucially it was our lack of a fixed term plan that allowed us to develop our project in this way. Had we been aiming towards a goal or hypothesis we would not have had such an experimental dynamic—we would have been inhibited by the possibility of failure. As it was the more we worked together, the more freedom we both felt to let go of our inhibitions—an observation we discussed regularly—and the more potential we discovered in our music-making.

Chapter 2

Indeterminacy

2.1 What is indeterminate music?

The purpose of this chapter is to define *indeterminacy* in my own terms in a way that pertains to the practice which is the focus of this research project. This has been necessary in part due to an inconsistency in the way the term is applied and defined in other literature, but also because the process of unpacking the meaning of some of the terminology relevant to the music explored has played an important role in the development of the practice it describes. This concurrent development of practice and theory has involved the assembly of a subset of terms including some in common usage and some new. Points of discussion have been drawn from existing literature. In considering indeterminacy, it seems pertinent to begin with Cage, using his writings on indeterminacy as a starting point, a backstop, and a springboard to develop, via my own musical practice, an interpretation of its various meanings and functions. On the subject of collaboration, Cage's relationship with David Tudor is well-documented, and the effect they each had on the other's musical careers is unmistakable.

2.1.1 John Cage and David Tudor

While I do not wish to embark on an analysis of this collaboration, it being out-with the scope of this project, and also having a wealth of literature already devoted to the subject[1], it provides important context for my work in terms of collaboration and indeterminacy. It would be hard not to think of the relationship between Tudor and Cage as a famous example of composer-performer collaboration, but the way in which they worked is far from typical and, indeed, challenges their respective identities of 'composer' and 'performer' in the usual understanding of the words. The following quotations give examples of some of the notably unusual aspects of their work together.

> The score [for *Music of Changes*] is laid out spatially: a quarter note equals $2^1/_2$ centimeters from left to right on the page. In addition Cage randomly indicated accelerandos (speeding up) and decelerandos (slowing down) from point to point, overriding the spatial nota-

[1] For example, Martin Iddon on their correspondence[36], and John Holzaepfel[35][34]

> tion. Tudor consulted a mathematician to try to discover an accurate way of accomplishing this.[46, p. 17]

The dichotomy between Tudor's calculated precision in his methods of realisation and some of Cage's more indeterminate notation resulted in a creative relationship that would raise questions of compositional ownership—Tudor had such a high level of input, and not only in the final realisation stage:

> The story goes that Cage would compose a section of *Changes*, Tudor would work it out and, based on his decisions about playing, Cage would continue working. Later Cage would remark that Tudor was *The Music of Changes*.[46, p. 18]

The crucial point here is that this was a relationship that developed out of mutual respect and interest—an identification that they could make something together that amalgamated their creative minds. What is important is not the way in which Tudor realised these scores, but the fact that he did have such an individual method which Cage and others knew about, and which prompted them to write, not just for his instrument, but for him specifically as a performer. Speaking of his piano pieces, Bussotti said that "the element "for David Tudor" in the title is not a dedication, but rather an indication of instrumentation."[37, p. 248]

> If Cage felt, as he often suggested he did, the need to set new challenges and puzzles for Tudor, to keep him interested, *Water Music* does little to press forward in this regard. That said, the score is suggestive, at least, of a private joke between the two.[36, p. 42]

The element of humour involved highlights this process as a social exchange, not just a musical one. The point that the score contains information for the performer that does not have an audible result for the listener—the *augenmusik*—is a vital consideration for composers notating their music in positive and negative ways.

In writing on "composition which is indeterminate with respect to its performance" [11, p. 36], Cage notes specifically that "*Music of Changes* is not an example"[11]. The important difference to note here is between music that has not been fully determined by the point it reaches its performance, and that for which aleatory processes contributed to the compositional method. As evident from the previous comments, it also does not take into account the determining influence of Tudor during the compositional process—presumably by the point of performance, Cage considered the primary musical factors to have been determined already, albeit in collaboration. In an attempt to encapsulate the process as a whole, I take Cage's idea of indeterminacy with respect to performance as one section of a whole, and examine, from the outset of composition in collaborative circumstances through to the performance, the process of determining musical factors.

2.1.2 Indeterminacy and experimentalism

The word *indeterminacy* has a strong association with experimentalist movement in the latter half of the twentieth century. The works of such composers

as John Cage and LaMonte Young in America, and Cornelius Cardew on the other side of the Atlantic, are frequently categorised as and used to exemplify 'indeterminate music'.

In writing on indeterminacy in composition, Cage states that 'that composition is necessarily experimental. An experimental action is one the outcome of which is not foreseen.'[11, p. 39]

Nyman's introductory chapter 'Towards (a definition of) Experimental Music' is structured around the Cage quotation which opens this thesis, subdividing the first part of chapter into sections on composition, performance, and listening. His aim is to "isolate and identify what experimental music is, and what distinguishes it from the music of such avant-garde composers as Boulez, Kagel, Xenakis, Birtwistle, Berio, Stockhausen, Bussotti, which is conceived and executed along the well-trodden but sanctified path of the post-Renaissance tradition."[52, p. 1] One comparison he perceives is on the subject of what he terms 'the unique moment'[52, p. 9], and where he states that "the experimental composer is interested not in the uniqueness of *permanence* but in the uniqueness of the moment…By contrast the avant-garde composer wants to freeze the moment, to make its uniqueness un-natural, a jealously guarded possession." Nyman continues on to cite Cage again: "A performance of a composition which is indeterminate of its performance is necessarily unique. It cannot be repeated. When it is performed for a second time, the outcome is other than it was…"[52, p. 10]' This, combined with the previous statement, highlights the overlap between the terms 'experimental' and 'indeterminate'.

Is it then the case that experimental music is necessarily indeterminate, and conversely, that indeterminate music is experimental?

Cage writes that

> Objections are sometimes made by composers to the use of the term *experimental* as descriptive of their works, for it is claimed that any experiments that are made precede the steps that are finally taken with determination, and that this determination is knowing, having, in fact, a particular, if unconventional, ordering of the elements used in view…the word "experimental" is apt, providing it is understood not as descriptive of an act to be later judged in terms of success and failure, but simply as of an act the outcome of which is unknown. What has been determined?[11, p. 13]

Nyman's rather negative discourse on the subject of avant-garde composition (which he presents as an opposition to the experimental) draws attention to a branch of modern and contemporary composition which tends towards determining a high level of detail in the notation, which is exemplified by *some* of the composition of the composers he lists in his introduction. The implication in his phrasing is that, not only is it the goal of the composers he names, but that they may be successful in wholly determining all musical factors via notation.

Boulez describes the method of using chance procedures in composition as a "bifurcation in the idea of composition"[6, p. 42]. Contrasting this with his own methodology, there are clearly different strands of compositional ideology, although, he examines "whether by surmounting certain contradictions it is not possible to absorb chance" in the context of his own work and 'rubato' (which he applies to dynamic and registers, as well as tempo). In terms of performance: responsibility, decision-making, commitment, etc, there is not such a clear-cut

divide. Consider Tudor's mathematical precision in realising and re-notating Cage's pieces for performance[2], and the technical demands of Boulez's work; both require a high level of engagement and commitment from the performer in the preparatory stage, as well as in performance.

From my own performance perspective, the juxtaposition of avant-garde composition as an opposite to experimental and highly indeterminate music is unhelpful, which I hope will be explained in the context of the pieces presented in the portfolio. From this perspective, I personally find it interesting to note that the programme with the premiere of John Cage's 4'33", given by David Tudor for the Woodstock Artists Association in 1952, also featured the first piano sonata of the then little-known Pierre Boulez.[27, p. 7]

In the context of music-making today, a number of questions are raised. Does indeterminacy in music necessarily mean that the outcome is not foreseen? How does the nature of the word 'experimental' differ when applied to the composition compared to the performance? Is music that was experimental at the time of writing necessarily still experimental when performed today? And finally, what is the nature of the experiment?

As James Saunders points out in the preface to the Ashgate Research Companion to Experimental Music[58] the qualifier for an experiment is not simply for the outcome to be unknown but also for the results to be assessed. If the experiment is a compositional one, such as was often the case with the œuvre of the composers previously mentioned, there may come a point, after one or many performances, where the 'experiment' could be considered complete. Thus, future performances of a work which once was an experiment may no longer involve the same kind of enquiry. Cage's 4'33" for example, which was undoubtedly experimental in its time, has reaped its results and had a profound influence on contemporary musical thought. Are then present-day performances of the piece, while they may be of interest and indeed shocking to someone unsuspecting in the audience, a repeat of an experiment for which the outcome is more or less known? Or does the continually changing context in which the work is situated today, this being present day composition and performance, a huge amount of which builds on Cage's legacy, continually refresh the enquiry and continue the experiment? William Brooks, in comparing the experimental music stance of John Cage and Lejaren Hiller uses a simple analogy in his explanation:

> Picture me on my bicycle. I'm riding home by my usual route. There's a road that angles off to the right. I ask myself, 'I wonder if this is a faster route?' I take it; I arrive home later than usual. It is not a faster route. Now picture me arriving at the juncture and asking, 'I wonder where this goes?' I take it; it turns out that it goes past a pub, a sports field, a small wood, and much more, before returning to the main road. I cycle home, remembering…Though I might describe both adventures as 'experiments', they are actually quite different. In the first, I test a hypothesis; in the second, I simply observe.[7, p. 38]

In experimental music, for example 4'33", it depends very much on what we want to discover. In testing a hypothesis, then perhaps the experiment has a logical

[2]Martin Iddon describes much of this process in detail, along with some of the correspondence between Cage and Tudor in [36]

conclusion, but in observation, an entirely qualitative enquiry, the experiment continues.

As to whether indeterminacy and experimentalism can exist independently, perhaps it depends on *who* the subject of Cage's statement is—to whom is the outcome unknown? And does it rely on the sonic outcome of the performance being unknown to all, including the performers, or only the audience? Is it the music itself that is the experiment or the reaction of the audience? On one hand, works that were once experimental, will not necessarily always be, and on the other hand works that are not by their nature experimental—not compositionally—can be subjected to an experimental performance strategy. A recent performance of Beethoven's Symphony no.5 by the academy orchestra of Lucerne Festival used a set of instruments designed by artist Johannes Willi for their visual representation of the instruments rather that their sonic capabilities.[3] Throughout, the instruments gradually disintegrated (bridges fell out etc) and the sounding result was a mixture of unusual timbres and familiar rhythmic material.

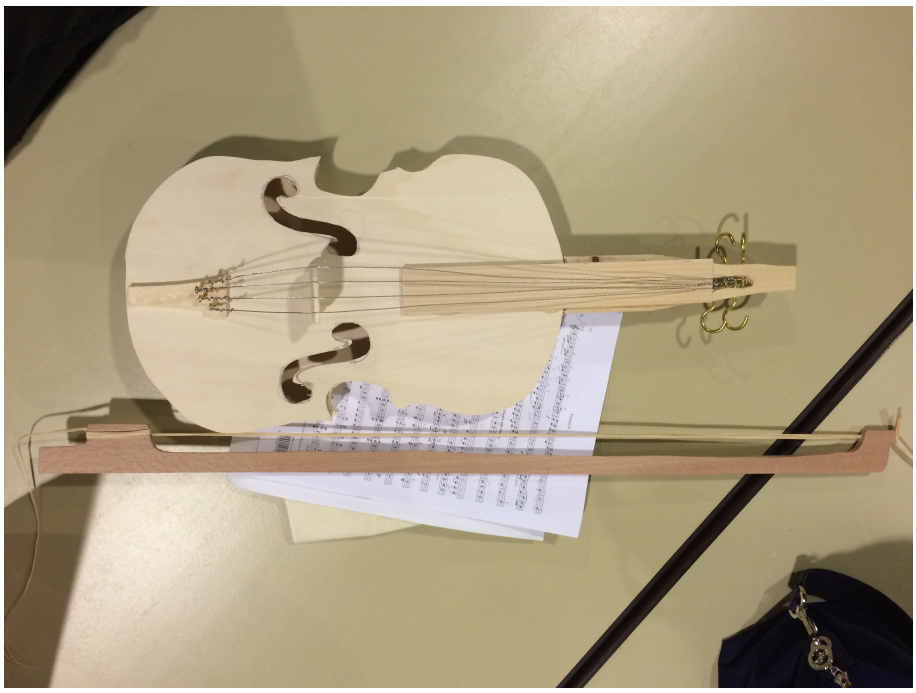

Figure 2.1: Johannes Willi's violin and bow

2.1.3 Indeterminacy in practice

In the context of my own practice, my approach to dealing with indeterminate notation involves certain considerations. What do I know about the context in which the work was written and what interpretative implications does this

[3]Video of full performance here: `http://www.srf.ch/kultur/im-fokus/weltklasse-sommerkonzerte/humor-ist-wenn-man-trotzdem-spielt`

have? What information is given and what is not? Where lies the character of the piece—what gives it its identity? How do I achieve a 'successful' performance of the piece? What are my responsibilities as a performer? These questions could be applied equally to approaching Cardew's *Treatise* as to a Bach sonata, therefore from a performative perspective, it does not make sense to categorise them in a divisive way, but rather to consider all music indeterminate to a degree. In more specific terms, any piece of music can be analysed by what has been determined and what has been left indeterminate. Here, from a performer's perspective, certain patterns emerge. The performative approaches to dealing with a variety of indeterminate characteristics can be comparable. By developing a subset of terms with which these characteristics can be described we can find these links, aiding the development of a practice.

In the words of Barney Childs;

> A work is indeterminate when the notation allows fields of possibilities, limited or otherwise, for performer choice and 'realisation'.[16]

On closer examination, this applies to a greater or lesser extent to all notated music. Even Boulez, who Nyman compares to Cage as "represent[ing] opposite extremes of modern methodology"[52], explores his own music in the context of what is indeterminate, giving examples of what he considers to be different strands of 'rubato'.[6]

The word *indeterminate* can not describe a genre of music as it encapsulates neither a single compositional approach, nor a performative one. While so far I have focused on the similarities I perceive, it is also true that each score, however determinate or indeterminate requires a unique approach. As Philip Thomas states, "the notion that indeterminate works require a common approach is an illusion."[69] Rather than considering it a genre in its own right, the word can helpfully be used to describe a multitude of musical attributes. Categorisation via a subset of terms can create useful links which aide the development of a practice, however this process can also be detrimental as our language choices can also create barriers. By talking about 'indeterminate music' we pigeon hole pieces and create a (mis)conception that it differs from 'other'[4] music. If instead we talk about indeterminate characteristics or factors in music it becomes applicable to any music, and also becomes a practical consideration, rather than an abstract concept. Indeterminate musical elements can be determined, can question, can be solvable or unsolvable problems.

2.1.4 Determinacy of non-notational information

So far the discussion has focused on that which is communicated (or deliberately not) via notation. However, vital information to the interpretation of a work is implicit and understood from the context in which it was written. Knowledge of the composer's œuvre—development of their musical and/or notational style—can give clues as to the interpretation of the piece in question. The composer's influences—the musical and non-musical environment in which the piece was written—may give information on what inspiring factors manifest in the piece and how that may be important as to the performance of it. For whom was

[4]Or at least insinuates that there is such a thing as 'determinate' music.

the piece written? Pre-existing collaborations may also hold important interpretational information. Finally, the time at which the piece was written is of importance in understanding the implicit aspects of the notation.

The 'historically informed performance' (HIP) movement which mostly involves itself with the performance of baroque music using period instruments (many modern-day replicas of old designs), and has developed into a practice partly through what is learned from the design and function of the instruments and partly from research into scores and certain documents on technique and performance practice that survive from the time when the music was written.

The contentions surrounding the term I will leave to the numerous books already written on the subject, but in the context of my own practice, which includes the performance of early music, I find it useful to draw some parallels between HIP and the performance of contemporary music.

The list of non-notational factors above can be equally applied to the music of today and the music of bygone eras. I feel, once again, that this is an example of language and categorisation being unhelpfully divisive. The word 'historical' excludes the same approach to making a well-informed interpretation of newer works. If the word 'historically' could be replaced with 'contextually' then, while sadly failing to preserve the ironic acronym, it does at least help to break down some of the false barriers between the musics of different eras.

On this, there are several considerations to be made. In the context of baroque music, the difference is the absence of living ties. We must consider what can we 'know' about a piece of music—in this enquiry, the process of understanding it in a performative context—a factor which rests on cumulative experience. John Butt makes the link between HIP performance and the study of other musical cultures: "It cannot be fortuitous, I believe, that HIP and ethnomusicology flourish at the same time; a sense of cultural disorientation is assuaged by trying to establish something certain about the past and by trying to assimilate an entirely 'other' culture."[8, p. 143] Kay Kaufman Shelemay highlights the falsity of this academic rift in observing that, traditionally, it has been "musicologists who study the West and ethnomusicologists who study the Rest."[60]

Our understanding of music from previous eras is developed from incomplete data and assimilated in the context of a contemporary education, therefore it is important to remember that HIP practice is a contemporary practice in itself and similarly a victim of fashion as can be observed by comparing HIP recordings from a few decades ago with those made today.

It should be noted that while necessary to take contextual information in to account when discussing determining factors, it is not in itself a determiner, rather a means by which a performer may make interpretative decisions—i.e. a means by which the performer will determine musical factors. As Judy Tarling expresses, playing music is not an "academic exercise"—knowledge of context and rules contribute to the development of a personal interpretation.[66]

This has not yet accounted for the de-contextualisation and re-contextualisation of musical material, which Johannes Willi's Beethoven project is an example, and also includes, for example, sample based music, re-mixes and arrangement to name but a few.

2.1.5 Creative hierarchy

This section is about what is described by John Butt as the 'musical food chain'[8] which places the composer at the top, the theoreticians in the middle, and the performer at the bottom. While what he is describing in this case is the the environment in which he did his doctoral research in the 1980s, this hierarchy still exists to a large extent.

There are two sides to this. On one hand, too often performers do not get recognition of their level of creative input. On the other, performers can shirk responsibility of a bad performance by allowing the full blame to fall on the part of the composition. In addition to recognising performance as an important part of music-making, performers must also be accountable.

Richard Taruskin writes that "If two new CDs by the English violinist Andrew Manze are any indication, early music may finally be shedding one of classical music's most venerable but useless assumptions: to wit, the funny notion abroad among classical-music reviewers that the best thing a performer can do is disappear."[68, p. 129]

This notion that the performer should be neither seen nor heard, but rather the composition should be in a pure form, unadulterated by interpretation or realisation, is implied in much discourse surrounding musical performance, and indeed pedagogy. Music that does not fit within this hierarchy or 'musical food chain'—the experimental, the indeterminate—challenges this attitude and explores the nature of the performer's input in a way that is applicable more generally to musical performance.

While views may have softened since the 80s, the deference towards the composer (as long as they are deceased—living composers have a much more difficult time) still remains and the practical result of this is often that fidelity to (what is perceived to be) the composer's intention is given more value than the pursuit of a successful performance.

This is not to suggest that performers need necessarily take more creative license in their interpretations but rather that it is important to acknowledge—as a performer, composer or third party—that the expressive personality of the performer is there. The performer is always a determiner of certain musical factors for better or for worse.

As Taruskin says, "We impose our esthetic on Bach no less than did Liszt, Busoni, or even Stokowski."[67, p. 62] This again reinforces the fact that HIP is a contemporary practice, but I would also add that we impose our aesthetic on Bach no less than we do Mozart, Brahms, Stravinsky, Feldman or Boulez.

2.2 A taxonomy and explanation of terms

The following sets out an explanation of some of the terms used in this thesis. These definitions may not be consistent with those found in other literature, but where terms are used throughout this document, the following definitions should be understood.

The central theme of Cage's lecture on indeterminacy is "composition which is indeterminate with respect to its performance"[11, p. 36]—which informs the organising principle I take for this section. While methods of determination in the compositional process are mentioned, primarily my research has dealt

with performative issues (although often this has played an important part in the compositional phase, as detailed in the case studies in chapter three). The concept of indeterminacy dissects not arboreally but into a network of characteristics which interact with and redefine each other. After Cage, I identify two principally different forms of indeterminacy for their inherently different performative implications: that which is chance-based, and that which is resolved consciously by the performer. Specific characteristics—structure, pitch, timbre—may be indeterminate at the interpretative/preparatory/performative stage and, often, an interpretative challenge is to identify whether the determination should be made by aleatoric or deliberate means.

Ian Cross identifies the way in which "the same piece of music can bear different meanings for performer and listener, or for two listeners"[48, p. 30], describing music as having a "floating intentionality". This can, again relating to Cage's lecture, extend to all sound having a floating intentionality, in the way that other, non-composed, ambient sounds can be listened to as music (and indeed used in a compositional sense). The way in which both this human aspect of our musical decision making, and the way in which we listen to music also affects musical determinacy concludes this section.

Indeterminacy

That which is indeterminate, which is to say that which has not yet been determined. This is a term that can be used to describe a range of different attributes, rather than being a musical characteristic in itself. Broadly, there are two categories—indeterminacy as a result of incorporating chance elements, and indeterminacy that invites conscious interpretative decision-making.

Aleatory

From ālea, ae: die, dice-play, gambling, chance, venture, risk[50]
That which employs elements of chance. Aleatory can be used as part of the compositional process, in preparation or in performance. Cage's *Music of changes*[9], which he specifically describes as *not* indeterminate ("with respect to its performance")[11, p. 36], used chance, or aleatory procedures in the compositional process (i-ching). The preparation for a performance of Cage's *Fontana Mix*[10] involves layering transparencies over one of several bases, the 'score' being the resulting amalgamation of detail. Depending on how calculated this process is—are the transparencies placed deliberately to make an intended result or scattered randomly allowing chance to entirely determine the layout? Are the individual elements chosen consciously or picked at random? This can be an example of aleatory in preparation. Chance, to a certain extent, will play a part in every performance as there is a host of potential external influences, as well as what might loosely be described as 'human error'. Both of these are explored in separate categories, which may or may not be sub-categories of aleatory, as, while they may still be chance elements, *musically* they present different challenges to the incorporation of deliberate chance procedures. Examples of intended aleatory in performance may be, for example, in the form of a game, or live algorithmic generation of score. Hugh Davies *Mobile with Differences*[20] divides a shuffled pack of instruction cards between five performers who then work their way through the selection in the order determined by the

chance process.

In this definition it should be noted that, while *aleatory* implies indeterminacy, *indeterminacy* does not imply *aleatory* as the process of determination need not use chance, but may be a conscious and deliberate decision, for example, by the performer during a performance.

Ad libitum

Ad libitum, from Latin 'at the pleasure [of the performer]'[26] can refer to a variety of musical factors including instrumentation, ornamentation or cadenza, or time. This term may be used to contrast with aleatory methods of determining musical factors. The term has a broad range of applications, from a direction in a score implying some temporal freedom in a certain passage, to a familiar way of describing improvisation (not necessarily musical, but often for a speech). Whether an improvisatory approach is taken, or whether it is pre-planned, 'ad lib.' implies *choice* as opposed to chance.

While aleatory and ad libitum represent two strands of indeterminacy which can each be applied to the 'subcategories'—discernible, determinable musical factors—there are two other key concepts which affect our interpretative approach. The first is the classification of notation as either prescriptive or descriptive, and the second is the notion of notational hierachy.

Prescriptive and descriptive notation

Mieko Kanno identifies two strands of notation[40]—the *descriptive*, "notation that informs us of the sound of a musical work" and the *prescriptive*, "notation that informs us of the method of producing this sound". Examples of each are given in early music, with pitch, rhythm and dynamics being familiar examples of descriptive notation and notation of organ stops and mutes as prescriptive. Examples of contemporary repertoire where a more unusual notational approach has been taken include Berio's violin sequenza[4] in which a prescriptive fingering notation has been chosen in place of pitches and Aaron Cassidy's tablature notation in *The Crutch of Memory*[14].

Where certain notations clearly fit into either category, others are less clear. 'Sul pont.', literally meaning 'on the bridge', is normally understood to mean playing closer to the bridge than normal to the extent that the sound will contain cracks and squeaks of the higher partials of the pitch. While this is, to an extent, prescriptive of the action required to achieve this, the following must be considered: A literal interpretation, i.e. playing directly *on* the bridge results in an almost pitchless sound, mostly consisting of the breathy noise of the horse hair against the wood. Factors such as the speed and pressure of the bow, and the thickness of the string require a different lateral position for a 'clear' sound (more on this in appendix A.2), therefore for a 'sul pont.' sound on the E string of the violin, it is necessary to play much closer to the bridge than on the G string. A 'sul pont' effect can be achieved with different combinations of bow speed and position, resulting in subtly different sounds.
Bowing and fingering indications are by nature prescriptive, however they can also be an indication of musical intention, and therefore descriptive. For example, a fingering may show two notes to be played with the same finger, neces-

sitating a shift and therefore portamento between the two notes. While some fingering may be altered to suit the individual player, it may be interpreted that the original fingering implies that the portamento effect should be preserved.

Notational hierarchy

A musical score contains multiple layers of information, each giving instructions on a feature of the music it describes. In a typical, and relatively simple example, the position of the note heads will indicate pitch, other details of the symbol will show the length of the note which, along with other information and other notes in the bar will show a rhythm. Usually a dynamic scheme is notated under the stave and various diacritics and lines indicate the articulation and phrasing. Some notated material such as fingering and bowing would be considered advisory and may be editorial. While all notation on the page is generally considered important to the performance of the music there is a hierarchy. The bulk of western classical music over the last few centuries is clearly centred around pitch and rhythmic content. Earlier music may have no more than this notated, the rest being decided or inferred by the performer, and the more recent the composition the more likely it is to have more detail regarding other musical characteristics. The increasing complexity and experimentalism in notation has resulted in compositions where this traditional hierarchy no longer applies. Feldman's *Projection IV*[22] for example uses a notation to indicate only pitch range, rather than specific pitches deliberately to avoid unnecessary specification—in other words, the identifying characteristic of the piece is not in its pitch structure but in the texture and interaction between the two instruments.

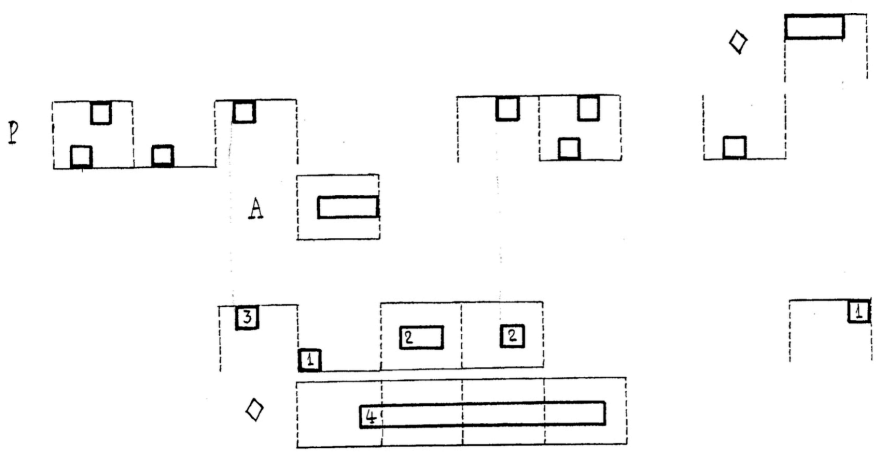

Figure 2.2: Excerpt from *Projection IV* by Morton Feldman

Considering the hierarchy of notation is an important step in learning a piece of music as, especially with certain contemporary works, it will not always follow tradition. Particularly in pieces with a high level of notational complexity, the decisions made on this level will inform the learning process, which will have an effect on the resulting performance[5].

Graphic notation

If we consider 'standard' notation to include the collection of symbols commonly used to notate Western classical music which have more or less direct meanings, for example time signatures, clefs, notes which indicate pitch and rhythm, dynamic symbols, there is another large category or categories of pictorial notation that sits outside this.

In some contexts this graphic notation can be used in combination with standard notation, for example in Penderecki's *Threnody for the Victims of Hiroshima*. Feldman's *Projection IV* (example above) similarly uses graphics to replace standard pitch notation (in a similar way to his *Intersection 3*, which Cage uses as an example of a work "which is indeterminate with respect to its performance" in his lecture on indeterminacy[11, p. 36]. Some of Christian Wolff's pieces, for example *For one, two or three people* or *Edges*[70] use a combination of familiar symbols and graphics, as well as what appears to be standard notation but its placement in the score means it does not retain its original meaning, for example, a note head without a clef or stave.

Figure 2.3: Excerpt from *Edges* by Christian Wolff

Cardew's *Treatise*[12] is an example of an entirely graphic score. Although some symbols from standard notation can be found, the decontextualisation means that their function is, in the same way as the rest of the notation, open

[5]Mieko Kanno made this point to me in conversation

to intuitive realisation by the performer. Graphic notation can be symbolic, with meaning attached, such as in Stockhausen's *Plus-minus*[63], or we can also find what might be described as 'art-notation' such as many of Randy Raine-Reusch's works where the interpretation is left extremely flexible and the score itself has a non-musical visual appeal, e.g. *Of pine and silk*[55]. *Treatise* sits somewhere between these two camps, while clearly symbolic, the composer does not give any indication as to how these symbols should be interpreted and many of the pages appear to be larger-scale illustrations and not so clearly involving discrete symbols.

Text scores

Similarly to graphic notation, text based notation can either function as an extension to standard notation, or it can stand alone. Most notated music will include some text (not including the title and attribution), such as a tempo or character indication (e.g. allegro, grave, lamentoso). Dynamics can be indicated by means of text or a graphic (compare *crescendo* with $<$). Satie extended this idea, giving evocative descriptions to accompany his symbolic notation ("En se regardant de loin" (looking at oneself from afar))[6]. Entirely textual scores exist, some as a set of instructions—Cardew's *The Great Learning* ("Make or hear an isolated sound and hear out the following general pause…"), and others as more abstract conduits for intuition, such as Stockhausen's text scores, some of which will be dealt with in more detail later.

Scores which depart from traditional western notation in this manner can also be open to interpretation by those not working within a western classical music tradition, in a way that more standard notation might inhibit. Lindau notes that the aesthetic Sonic Youth give to a number of pieces with these characteristics on their album *Goodbye 20th Century!* "is not derived from the Webern-like sound world of much postwar art music, but rather from rock and free improvisation."[54, p. 33] In this way, notation with a less rigid traditional basis can be a way to form bridges between genres normally separated.

As shown with the variety of instances of graphic and text notation, both can be used for prescriptive or descriptive purposes, and it can even be an interpretative decision as to which way the notation should be understood. A common function of non-standard notation, such as a bespoke graphic system, is to alter the notational hierarchy which will often automatically be assumed to be the same as the historical model described above.

The following is a list and description of some of the subcategories of indeterminacy, or rather musical factors that could be left indeterminate. The identification of these factors is useful in finding a suitable interpretative approach—a way of determining or allowing them to be determined with respect for the musical integrity.

Temporal indeterminacy

Indeterminacy of musical factors that rest on time. The fermata is a common example of this. Spacial notation, where space rather than rhythmic values

[6] From Le Fils des Étoiles.

represent rests between notes may also present some temporal indeterminacy. Rubato is a form of temporal indeterminacy commonly assumed in notated music.

Pitch indeterminacy

Where the pitch of a musical note is not determined. This can be extreme, represented by alternative note-heads or graphics which may or may not indicate a pitch range but not a specific note. This is also more widely present in music that may be interpreted within a choice of temperaments, e.g. music of the baroque era, or in sections of music where the tuning of a certain note could be determined with reference to a choice of other pitches, meaning intonation is non-determinate and a factor resting on performer choice and musicianship.

Structural indeterminacy/indeterminacy of form

To use Cage's definitions of *structure* as the 'division of the whole into parts', and of *form* as the 'morphology of the continuity'—the shape—it can be seen that, while the two characteristics are distinct, they will often be related. Cage's example of Stockhausen's *Klavierstück XI* allows for a number of different permutations of the piece, each using the same components, resulting in a varied overall shape and therefore a 'a unique expressive content', but the individual parts and points of division remain unaffected. Structural alteration would imply that the individual components comprising the resulting piece are varied, which would also result in an indeterminate form. Structure in this context is therefore inseparable from form, but vice versa the two are mutually exclusive.

Timbral indeterminacy

Timbral indeterminacy occurs when a prescribed action (notated or otherwise) results in an indeterminate sonic response. As with many of the musical characteristics discussed here, it is a sliding scale how determinate a physical gesture is when playing an instrument, but there are many examples in contemporary music where this kind of indeterminacy has been exploited. The environment for this kind of indeterminate response can be created in a number of ways. Aaron Cassidy's *Crutch of Memory* is, to begin with, written 'for indeterminate string instrument', more specifically for 'any four-stringed, non-fretted, bowed instrument' (the composer points out that an instrument with more than four strings can also be used, the performer choosing four adjacent strings). The pitches are unspecified, the notation instead indicating the string, hand position (laterally/along the string), and finger spacing (five stages between all fingers placed as close as physically possible and as wide as physically possible). Furthermore the performer is instructed to detune the instrument to an indeterminate microtonal tuning. In addition to this, the left and right hands are 'decoupled' and bow behaviour is notated on a separate stave to the left-hand notation which results in a number of unpredictable sounds. For example, where harmonic pressure is indicated, this may or may not be at a natural harmonic node. In addition, the bow will not necessarily be instructed to move in such a way for the harmonic to sound clearly, or may be moving around laterally between a point where the harmonic will sound and places on the string that

will give a muffled, scratchy surface noise of the bow hair against a string that is being prevented from vibrating clearly. The point of clarity and duration for which the harmonic will ring depends on a number of factors including dynamic (the scheme of which is also independent), the thickness of the string and the speed and pressure of the bow. All of these elements collide in the piece, often working against each other, but indeterminately allow moments of clarity and homogeneity.

Instrumental indeterminacy

A piece that does not specify the instrumentation used, naturally contains a kind of timbral indeterminacy, but there can be other implications as explored by a number of composers. In Cassidy's *Crutch of Memory* the instrumental indeterminacy results in different intervallic relationships due to the differing lengths of fingerboard (and spacing of the intervals along this string) between, for example, the violin and the cello, either of which could be used to perform the piece.

Cornelius Cardew's *Volo solo* 'for a virtuoso performer on any instrument' instructs the performer to 'play as many of the written notes as possible', delineating on the score the range of the instrument and therefore creating a version of the piece that melodically and rhythmically is unique to the instrument. Cardew gives an example of how this may be realised for a bassoon:

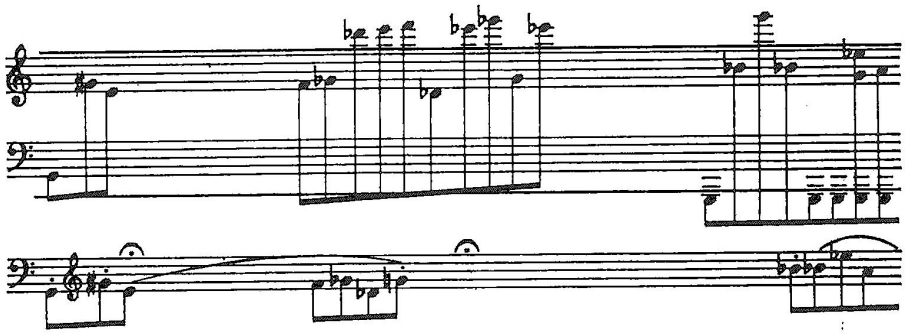

Figure 2.4: Excerpt from *Volo Solo* by Cornelius Cardew

The two lines above are a segment of the full score with the range of the bassoon superimposed. The single line below is remaining musical material—what a bassoon version of the piece would sound like.

Bryn Harrison's *Five miniatures in three parts* is for flexible instrumentation, provided that the range of the instruments fits the range of the parts. This gives the potential for a different balance between instruments, and therefore different details to be heard in each performance. It also gives, as Cage describes it in the context of flexible instrumentation in Bach's *The Art of the Fugue*, the potential for a "unique overtone structure"[11, p. 35] for each combination of instruments used.

Ambient indeterminacy

This term is intended to cover elements of a performance that are determined by the surrounding environment. There are two main aspects to this, the first being related to the acoustic of the space. The resonant qualities of the surroundings will mould the sound from the instrument which, as well as affecting the sound the audience hears, also feeds back to the performer and causes them to make subtle alterations to their playing. This can be to do with articulation, or most noticeably, tempo which will vary between performances of the same piece to accommodate the length of the reverberation in the room. The second has to do with ambient noise—something which, for the majority of classically rooted performance is considered to be a nuisance and ignored to the best of anyone's ability. Everywhere there is a noise floor consisting of constant sound, such as the hum of central heating or an extractor fan, and more sporadic noises, such as people moving, floors creaking and birds whistling. To an extreme, without any of these external noises the sound made by one's own body means that there is never complete silence[7]. Often these extra noises are something a performer has to overcome in a concert. For the sake of their own concentration it is necessary to shut down the peripheral hearing to a certain extent, making sure, for example, that a phone ringing in a concert or someone walking in or out does not distract them from playing. In other situations these sounds may be deliberately incorporated into the performance—reacted to or played *with*. Christian Wolff's *For one, two or three people* allows the performer(s) to interact with any sounds heard, which is often necessary particularly in a performance with just one player.

Human indeterminacy

The human element of performance yields its own indeterminacies which are perceived in different ways. On one end of a spectrum we have what is commonly referred to as 'human error' and on the other end we have the musical nuances that give each performance its individuality. Roughly speaking these are positive and negative ways of looking at the same thing. Both depend to a large extent on a subconscious response to the environment, on other performers and the variation in their playing, and on one's own mood and state of well-being.

A person's physical and mental capabilities also mean that there is a limit to what is possible for a performer to play, which naturally varies from person to person. Pushing the limit between the possible and impossible has been an ongoing game between composers and performers over centuries which has been a driving force behind the development of instrumental technique and virtuosity and is explored and challenged in some very highly complex music today, some examples of which are dealt with in later chapters.

'Anthropoindeterminacy' is fundamental to improvisation, both in the development of the practice and the performance. Error is key to exploration and discovery, and therefore to pushing your own limitations and finding your own voice as a performer. The ability to respond musically to your own emotional state, to the environment and to other performers is what separates improvisation from regurgitation.

[7] As Cage discovered on hearing his own blood and nervous systems in an anechoic chamber [52, p. 36]

Finally, it is this difference, person-to-person, day-to-day, in the way we each *listen* to music that affects our active and passive engagement with music, and even results in variation between what we each define as music in the first place.

2.3 Lineage of Determinacy

By deconstructing the concept of indeterminacy, it becomes apparent that, first and foremost, the performer must identify at what point in the creative process any aspect of the music should be determined. At the time of composition, the composer determines certain elements of the music, these are then passed to the performer (with or without going via an editor or teacher who may choose to determine certain factors themselves) who will, in preparation for a performance, study the score, annotate, practice, and rehearse. During this process more of the music will be determined prior to the performance, both consciously and subconsciously. In performance, similarly, decisions are made and factors are determined both within the control of the performer, and out-with their control. Arguably the final stage in this determining process does not necessarily lie with the performer, but with the listener, whose job it is to interpret and digest the combination of sounds that reaches them. This lineage of determinacy also contains iterative cycles, which, depending on the piece, can have a significant effect on the resulting performance.[8]

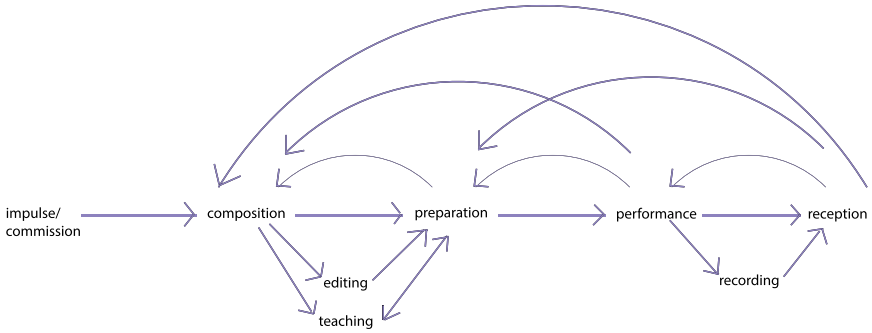

Figure 2.5: Lineage of Determinacy

To give a typical example of how this may work, the following hypothetical narrative follows the determining process in a piece for a solo performer from conception to concert. A violinist commissions a composer to write a 10 minute solo piece for two performances. Already the instrumentation and the length of the piece have been determined. The composer writes the piece and sends it to the performer who begins to learn it. On discovering some inconsistencies in the articulation and a double stop that is not possible to reach, an email is sent enquiring if the inconsistencies are deliberate or whether x was the intention, and if another solution could be found to replace the problematic chord. Having

[8] In Amanda Bayley and Michael Clarke's paper[2] there is a diagram showing 'knowledge flow' between stages which holds some similarity to my 'lineage' diagram, however the focus here is specifically on determining factors.

resolved these details a meeting is set up ahead of the concert to rehearse the piece. On hearing the piece, the composer makes certain suggestions about the interpretation—phrasing and dynamics, changes the notation of certain articulation markings, and removes the lower notes of some double-stops to make the phrase smoother. The concert goes well and the audience respond enthusiastically, but the performer finds that in the very resonant acoustic it is necessary to harden the articulation of some passages and that the tempo needs to be reduced in very fast section otherwise the harmony is not clear. In the week before the second performance of the piece, the performer decides to change some bowing to make the articulation more easily adaptable to the acoustic.

This illustration, for the sake of simplicity, does not take into account a number of real-life external factors that can also contribute heavily to the determining process. Our composer was only given three months to write the piece and in that time she had a pre-existing large scale commission that meant she had limited time to work on the piece. That being the case, while she would have liked to experiment stylistically, the lack of time meant it was necessary to stay within the limits of the tried and tested. In the second performance of the piece an alarm went off close by which distracted the performer and she made a mistake which threw her confidence for a section of the piece and the intonation was poor.

This portfolio is primarily occupied with music where the course and/or method of determining has been unusual in some respect. As the research has been by practice, I have tried as much as possible to give an honest and reflective account of some of the difficulties faced along the way to include some of the extraneous determining factors that can often be buried. The following three chapters deal with the compositional, preparation and performance stages of this lineage, respectively, although certain aspects of the reception and audience involvement and feedback are also dealt with.

Chapter 3

(In)Determinacy in the compositional process

This chapter deals with pieces where I have actively collaborated with the composer during the writing process. These include three pieces for violin and electronics by Jess Aslan, which was our first project together and which paved the way for more recent improvisational endeavours; two pieces by Matthew Sergeant—*bet denagel* and *[kiss]*; and *Solo for viola d'amore and electronics* by Matthew Whiteside. In the context of each piece, I discuss my possible influence and/or interference both through my involvement in the early stages of creation, and as the intended performer of the piece. The chapter is divided into three sections, examining threads of collaboration between performer and composer which were productive and interesting elements of our work together. The first of these sections deals with the collaborative exploration of the instrument itself, and the next two sections deal with the acoustic and electronic extension of instruments respectively.

3.1 Exploration of an instrument

Taking an exploratory approach to playing an instrument is, to me, fundamental to learning to play it, as well as to improvisation, which is discussed in more detail in chapter four. In the collaboration between a composer and a performer, an instrument can be explored in ways that combine the technique, and physical relationship with the instrument, of one person—the performer—with the auditory curiosity and proclivity of two.

Playability

The playability of a piece of music is broadly dependent firstly on whether it is *possible* in terms of the instrument used and the physical capabilities of the performer, and secondly, on how idiomatic the music is to the sound making capabilities of the instrument for which it is written.

A series of questions should be posed when assessing the playability of new material, roughly illustrated in figure 3.1. A negative answer to the initial question could be due to notational demands that do not take into account the

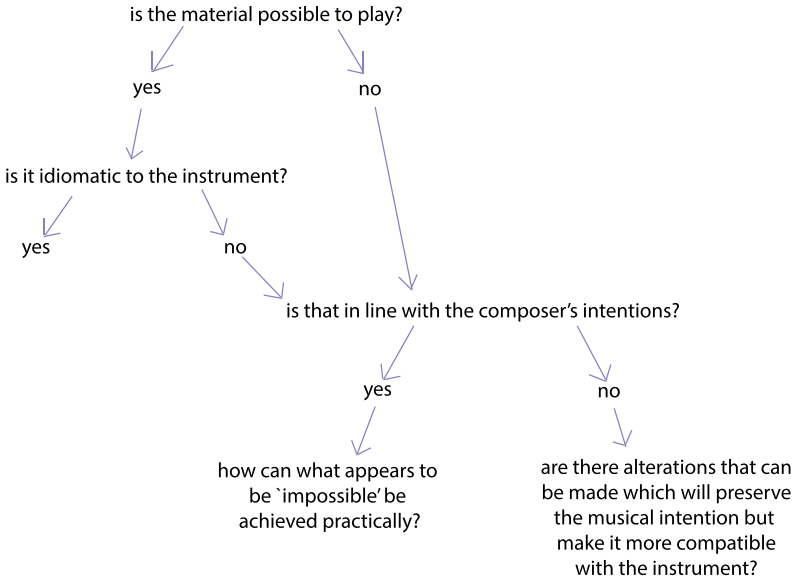

Figure 3.1: Playability question diagram

mechanics of the instrument, for example a double-stop where the two notes cannot be played on adjacent strings, or where the interval is too large for the player to stretch.

In the case of a passage or technique that appears impossible, it must also be questioned at this stage what the composer's intention is—is it a mistake or is the inclusion of material that appears impossible intended? For example, the nearly four-octave glissandi in Xenakis's *Mikka*[72], or the overlapping double-stopped glissandi in *Mikka «S»*[73] pose certain technical problems that the performer is able to overcome by creating the illusion of a continuous glissando while changing strings, essentially interpreting the notation as *descriptive* more than *prescriptive*. Irvine Arditti writes of a conversation with Xenakis on this subject:

> I had been pondering over the very fast *glissandi* (covering more than three octaves), and told him that this was impossible to play. He replied that I might find it so now, but that in the future I would find a way to do it. I think this advice held good for me for many years to follow: the idea of finding ways to achieve things in new music and making them part of a (new) tradition.[39, p. 219]

Often, a performer will receive music from a composer that presents nothing *impossible* as such, but is difficult and unintuitive for the instrument, so as to feel and sound awkward. A question that can be asked at this stage is whether the material can be reworked into a more instrumentally idiomatic form. Similar to a situation where the musical material is not possible in its current form, and certain changes are essential, it can often lead to a more satisfactory solution

for the composer and performer if minor details are changed in favour of the musical intention. However, similarly it is important to query the composer's intention as the path of least resistance is not always the desired one.

Discovery

Discovery of an instrument's sonic potential goes beyond basic questions of playability. Finding and focusing on specific characteristics of the instrument allows both the development of new techniques, and the finer control of existing ones. The design of the instrument itself is developed so as to favour certain qualities of sound, in a similar way to the development of technique. For example, the holding of the instrument and the bow, bow technique, and vibrato all contribute to qualities of tone production and projection which the design of the instrument facilitates. The majority of repertoire for the instrument is written to favour these fundamental characteristics, the most virtuosic part of this repertoire is intended to show off and push the limitations of standard technique further along this path.

On the other hand, the intricacies of the sound production of an instrument can offer a palette of interesting sounds when standard technique is deliberately disrupted. Techniques combined to achieve a certain sound can be pulled apart and mixed in different ways (de-coupled), leading to new effects and allowing existing, inherent sounds to be exaggerated.

3.1.1 Harnessing timbral indeterminacy in Matthew Sergeant's *bet denagel*

The baroque violin

Matt and I began working together on *bet denagel* in January 2013. Knowing each other well already, both musically and socially, the purpose of our first meeting was to explore the specific characteristics of the baroque violin, particularly the ways in which it differs from the modern instrument. Rather than giving a demonstration of the instrument as I already knew it, I was keen to allow Matt to lead the way with questions as to how it differed from a modern set up and to add my own contributions from that point.

The most notable distinguishing feature of the baroque set up is the uncovered gut strings, which have a very recognisable sound. Without the metal winding, the presence of surface sound along with the pitch when bowing the string is much more audible. The relative thickness of each string is also different when using equal tension[1] meaning that an unwound G-string is much thicker than a wound one. While the pitch of any string can be distorted by bow pressure, this string is notably more susceptible to this distortion, so to play with an even pitch and tone, the bow technique has to be very precise. The combination of tension, thickness, and quality of the material also results in a different and more audible percussive effect when the string is depressed quickly against the fingerboard. The E-string on the baroque violin is also uncovered gut, unlike in a modern set-up where it will be solid metal. This means that its

[1] There is a good explanation of this here: `http://www.themonteverdiviolins.org/strings.html`. Also see appendices A.2 and A.3 for more images and audio comparison between all gut and wound strings.

sound lacks not only the projection and power of the E-string on the modern instrument, but also the metallic quality, so the tone in comparison to the rest of the strings is more uniform.

The baroque bow also differs from the modern design[2] which is built to give preference to the sustaining of an even tone from heel to tip.[3]The outward curve of the stick of the Baroque bow means that it is weaker at the tip than at the heel, resulting in a natural *decrescendo* on a long bow from the heel to the point, and vice-versa.

Matt was interested in how scordatura might affect the sound of the instrument, and in particular how this might change the behavioural traits peculiar to the baroque instrument. Thinking of the instrument as a 'roughened canvas'[45], he was particularly interested in glitch aesthetic, as described by Kim Cascone[13] and the way in which Agnes Martin would use the texture of the canvas to determine her pencil drawn lines[59]. Initially, we retuned the strings in intervals of a minor 6^{th} (without changing the top string). The lowering of the fourth string in particular reduced the projection of the tone and increased the surface noise and the instability of the pitch when the string was bowed. From there we continued to lower the pitches of all four strings, retaining the intervallic relationship, noticing how the sound of the instrument became increasingly unstable and unpredictable. This continued to the point where I felt that any further detuning could endanger the stability of the bridge and the sound-post.[4] The low tension of the strings prevents them from projecting in the same way as they do at normal pitch, and also means that any bow pressure bends the string and thus alters the pitch. The balance of the sound—between the pitch content, the surface sound and the left-hand percussion—is substantially altered, and the noise-to-pitch ratio is raised.

Decoupling: layers of behaviour

In normal circumstances, certain musical instructions will imply a combination of physical movements required to achieve the desired effect. For example a *crescendo* will be achieved by the combination of an increase in bow pressure and speed, adjusting the tilt of the bow so more hair is in contact with the string, and playing closer to the bridge. This final factor is also affected by the left-hand as, by stopping a note, the string is shortened and the bow position must be adjusted proportionally. Subtle adjustments to the balance of this combination will produce a variety of different colours and timbral effects, such as the 'sul pont.' or 'flautando' sounds.[5] More extreme separation, or *decoupling* of these physical processes can result in an indeterminate palette of sounds.

In *bet denagel*, different disconnected layers of behaviour are superimposed over a pitch progression.

In district U(see Figure 3.2), the layers of dynamic and tempo change exist independently of one another. The dynamic variation alone moves between *ppp* and *fff*. At its quietest, the bow pressure is so light that the string—the lowest

[2]Since the development of a particular design by Tourte in the late 18^{th} century, bows have generally been based on this model so very little variation can be seen, unlike those preceding it where there is huge variation in style.

[3]See appendix A.3 for images.

[4]It is the tension of the strings alone that keeps these in place, no adhesive is used.

[5]These details of bow technique are explained in further detail in appendix A.2.

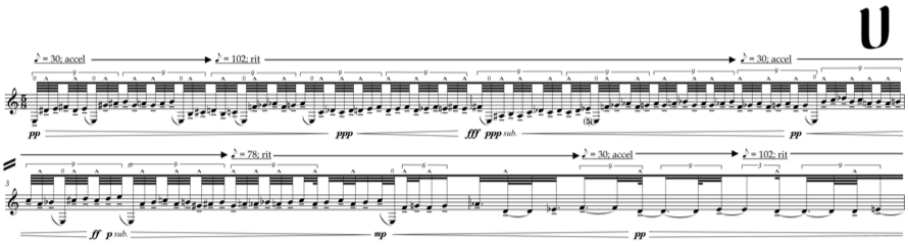

Figure 3.2: *bet denagel* district U

and thickest (this district is all to be played on string IV) does not vibrate in such a way as to produce a clear pitch, so the sound is almost entirely surface noise. In the low-to-mid range, pitches are audible and relatively stable, but as the dynamic increases from there, so does the level of pitch distortion. The increase in bow pressure and speed required for the higher dynamics makes the sounding pitch of the string sharper by up to around three quarters of a tone. This is also dependent on left-hand movement as the shorter the string, i.e. how high on the fingerboard the note is stopped, the less the pitch will be altered. Therefore, the sounding pitch of this excerpt is the outline of the written notes, transposed down more-or-less a fifth, with microtonal transposition superimposed according to the dynamic and left-hand behaviour. The tempo changes have a similarly extreme range and are in a constant state of change. Around the slowest tempo markings the notes are distinguishable, provided the dynamic allows this. The fastest points turn into a cloud of sound as the instability of the detuned string does not allow a clear articulation.

The score of *bet denagel* uses two bespoke clefs to dictate bow movement. The first, shown in district h(see Figure 3.3), indicates both how much bow length to use and which area of the bow to play in, between the heel and the tip.

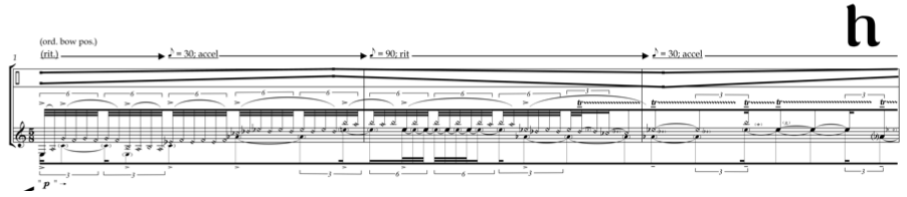

Figure 3.3: *bet denagel* district h

This information, combined with the bowing pattern notated normally with slurs, controls the speed of the bow which has a direct effect on the dynamic. The *p* marking at the beginning is described as 'input' or 'effort' dynamics, with the following explanation in the performance notes:

> During such passages, the performer should use an amount of physical exertion appropriate to the dynamic contained within the inverted commas, however, it is expected that the sonic result will actually naturally fluctuate (possibly even substantially) in relation

to the changing additional performance techniques (e.g. sul pont, col legno, harmonics) within the material. During these passages the performer should, under no circumstances, attempt to compensate for such naturally occurring dynamic fluctuations.

The dynamics are further manipulated by a layer of constant tempo fluctuations which also alter the speed of the bow as the notes under a slur, to be played in a specified length of bow, could be in a fast or slow tempo. The uneven weight distribution of the baroque bow means that, depending on the direction of the bow, there will be a *crescendo* or a *diminuendo* through the notes under the slur. Where the music is notated in the upper half of the bow it will be weaker and with more surface sound and higher partials than in the lower half where the weight of the bow will help to 'grip' the string better and produce more pitch. This same passage uses a left-hand pattern of open strings and flageolets which are unevenly responsive. In parts the combination of bow pressure and speed is not enough for them to sound and surface noise is almost all that is audible. In others, they will ring out with a pure sound.

The second of these bowing clefs notates the lateral bow position in a manner similar to Lachenmann's clef (used, for example, in the *Toccatina*[44], see Figure 3.4) which shows where the material should be played within the space of the body of the instrument. From top to bottom the range given is from *molto*

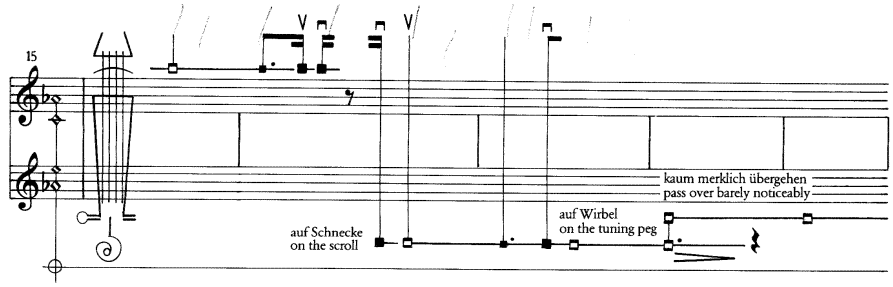

Figure 3.4: Excerpt from Lachenmann's *Toccatina*[44]

sul pont. to *molto sul tasto.* District (see Figure 3.5) gives an example of this. As with the other behaviours, the lateral bow movement is constantly

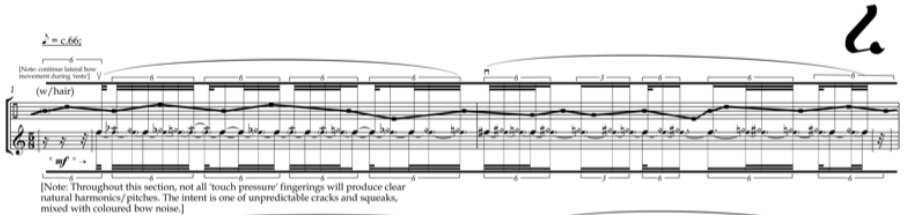

Figure 3.5: *bet denagel* district

fluctuating, including at points when there is no length-wise bow movement or left-hand activity. Bowing is indicated in a pattern of slurs with up and down-bows prescribed, resulting in their own dynamic manipulation as described above. The left-hand material is a pattern of fully stopped notes and flageolet

pressure, some at true harmonic nodes and others not. The latter either produce no discernible pitch or an indeterminate high pitch. Harmonics are extremely sensitive to bow position, meaning that they will not ring out if the bow is not at the right point on the string, so the lateral bow behaviour combined with the left-hand movement creates an indeterminate pattern of noise and pitch. The continued lateral movement in the rests produces a scraping sound of the bow against the texture of the gut string.

The same lateral bow behaviour produces a different kind of indeterminate pitch pattern when combined with a different left-hand technique. District ሸ shows a progression of four-note chords connected with glissandi.

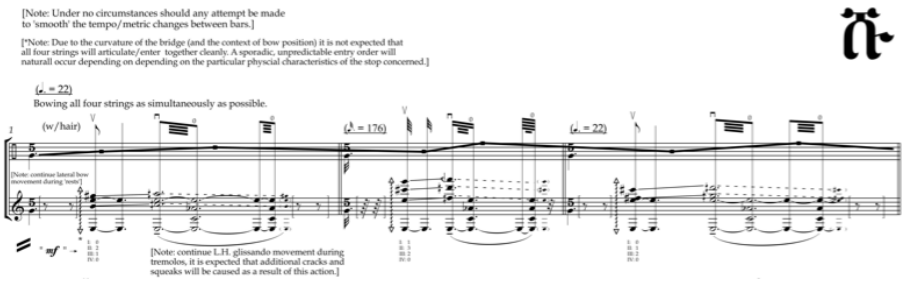

Figure 3.6: *bet denagel* district ሸ

Due to the curvature of the bridge, on open strings and under normal circumstances it is only possible to play on two adjacent strings at a time. Stopping the string at any point lowers the string, altering this curvature at the bowing end, and this becomes more extreme the higher up on the fingerboard the string is depressed. The further away from the bridge the string is bowed, the smaller the angle of the curve and the more it is affected by the change from the stopped strings. These two factors combined mean that it is possible to play on three or four strings at the same time or to miss out one or two strings in the chord. The result of the decoupling of the two techniques in this district is that the constant movement produces an unpredictable combination of between one and four notes of a variety of timbres—from those with the high partials of a 'sul pont.' sound to a mellow 'sul tasto'.

Much of the collaborative process was spent learning about the response of the instrument to these techniques, in particular its sensitivity to subtle technique changes. The decoupled notation explores this, taking fundamental techniques of playing the instrument and splitting them apart so that only at certain points will all the techniques combine to produce a response such as is typically desired from the instrument. Matt's existing understanding of the modern violin was the basis of his line of enquiry, which mostly focused on the differences between the baroque violin and the modern instrument. My knowledge of his previous compositional work naturally influenced my contribution. My relationship with my instrument, my technical ability and my personal preference also had an influence on the exploratory process, as I would try out different passages and techniques both with notated material and without. The individual instrument itself was also an influential factor at this stage. Physical attributes, such as the length of the fingerboard of my Baroque violin, which is shorter than on a modern violin and not necessarily the same as that on

another baroque violin, determined the highest note possible (to play with a clear sound). I had strung the instrument in equal tension and it had a pure gut G-string at the time, rather than the wound one I sometimes use, which ultimately became essential to the timbral palette of the piece and is stipulated in the performance instructions.

3.1.2 Character studies in *104*, *mechanica* and *softly, softly* by Jess Aslan

My work with Jess Aslan began after discovering a cross-over of interests as a result of sharing an office[6], having started our PhDs at the same time. The project started with what was to become *104* and later expanded to include *mechanica* and *softly, softly.* Each piece explores a different characteristic of the violin and has a different working approach using improvisation, recording analysis and more traditional notation. The change in process from piece to piece also reflects how Jess and I got to know each other both artistically and socially. Initially, for each piece, my engagement with the compositional process was solely concerned with the physical sound of the instrument, since at the time I had almost no experience with electronics. In addition to the development of these pieces, this project provided me with invaluable experience learning to play with live electronics. Jess's knowledge, and the time we had to experiment, meant we were able to try out different approaches and to modify various things without the usual pressure of limited rehearsal time and a concert deadline. Similar to my work with Matt on *bet denagel*, much of the early work on these pieces was concerned with the exploration of the acoustic instrument, which is the stage of the collaborative process detailed here. Later developments involving electronic extensions, at a point where I had more of an engagement with this side of the music, are dealt with further on in this chapter (see Section 3.3.1).

Our first session on *104* was in the studio, working with some preliminary notated material that Jess had produced. She asked me to play the series of harmonics on different strings and with different bow positions, producing different pitches and timbres which she recorded and then spectrally analysed to produce more material for the composition. At the time of this first session I did not know how the material would be used so my intention while playing was focused by my own timbral preference, attempting to produce a clear, good quality tone to give Jess some decent material to work with in whatever way she chose. Despite my ignorance, my initial contribution in this studio session determined certain aspects of the harmonic structure of the piece. Also, significantly, it was the specific balance of harmonics and resonances produced by my violin that resulted in the material Jess used to write the piece.

As with *104*, our work on *mechanica* began with a characteristic focus, giving Jess some sonic material to work with in the compositional process. This time we were exploring the percussive potential of the violin, using pizzicato, pencil taps and mutes to create a variety of subtle timbral changes. Here, our initial studio session was not structured around notated material, but improvised, informed by prior discussion of the type of material that would be useful. Again I was

[6]What we had always assumed to be good chance but turned out to have been an insightful decision on the part of the then postgraduate secretary Karen Bradley, to whom we are very grateful.

in the dark about how this would develop into a piece so the session was a free mutual exploration of the percussive timbral offerings of the violin. The electronic part for *mechanica* turned out to be a fixed collage of some of the sounds recorded in this initial session, which the live violin plays with and is eventually subsumed by. The influence of my particular instrument is even more overt here than in *104* as the sounds of the track are specific to my violin, meaning that when I play with it, the live part is impossible to distinguish from the recorded sounds unless the performance is also seen.

The collaboration on *softly, softly* was perhaps the most unorthodox process of the three. We had both developed a bit of a fascination with one of the lesser known and little used timbral regions of the violin which is the potential for the instrument to produce pitches below the tuned frequency of the strings. These pitches are known as 'subharmonics'[7] and are achieved via a specific combination of bow pressure, speed and lateral position. Our process was unusual as it was something that we were both interested in exploring but neither of us knew quite what would be possible. I was familiar with Mari Kimura's work, and aware of what she had been able to achieve, but I had not investigated myself what I would be able to manage and I did not know how long it would take to learn or what difficulties I would find along the way.

With a bit of experimentation I found the the octave transposition was relatively easy to achieve on the open and stopped notes on the G-string. However I struggled to make them reliable, finding that sometimes it would take a few attempts to get a true pitched note rather than just a scratch. From this point, however, I felt that it was something I could practice and improve so Jess could use these extra pitches for the piece.

Unlike the other two pieces there was no manipulation of recorded material but the notated score structured the piece from the sonic field we had been experimenting with. In many ways this was the quickest and easiest process of the three as, by that point, we had established a working method and a mutual trust, meaning we were able to adopt an openly experimental approach.

Our decision to begin working together in the very early stages of the creative process was to exploit the potential of a more dynamic exchange of musical material: a way of working where the material might be permitted to mutate gradually as the pieces were formed. Our informal working process and social relationship were vital to this as it allowed us to learn from each other and to develop the music in a collaborative way. This is a relationship that has continued to progress and our more recent work together is explored in the next chapter.

The early contribution of 'performed' material had a clear influence on interpretative issues in notation. By the time the scores were finalised, the concept, energy, musical space—the aesthetic in general—were already in existence. Thus, the score served as a guide to the structure and a determiner of certain pitches, rhythms and actions, but did not require any 'interpretation' as such, as not only had this work already largely been done, but I, and my instrument, had been a part of the process. In this way, Jess's exploration of the instrument for which she was writing was as much influenced by me as a musician as it was by my violin. However, my initial input was not a response to, a modification

[7] A term used and explained in detail by Mari Kimura who has developed the technique in her own performance and composition[41].

of, or an interpretation of pre-generated musical material, as much as a response to a pre-defined concept and a way of working.

3.1.3 The viola d'amore

My first encounter with the viola d'amore, following on from the *softly, softly* experience, was once again slightly unorthodox as it was preceded by my agreeing to perform a piece for the instrument which, at that point, I had never played before. The project with composer Matthew Whiteside, which would later become *Solo for viola d'amore and electronics*, was for Matthew to compose a new work, drawing on the collaborative exploration of the potentials of sensor technology and the viola d'amore. Being a bowed string instrument, I had a pretty good idea of what I would be dealing with but I knew that I would need some time to acquaint myself with it before beginning work with Matthew.

Getting acquainted with the instrument

Borrowing an instrument from the university, the first task was to put a new set of strings on as it was not at the time in playable condition. Changing the bowed strings is not difficult but it is time-consuming as it requires tying the gut, threading it through the tail piece and the peg, lubricating the peg and grooves in the bridge and nut[8] and a lengthy tuning process for each string as they need to stretch before they settle in pitch (See Appendix A.3 for pictures of the instrument). With the ambition to begin work with Matthew as soon as possible, I optimistically decided to leave the lower level of sympathetic strings as they were, in the hope that they might not need changing, but as it transpired it was necessary to put a complete new set on and, having already changed the top layer of strings, it required some creative problem-solving to work out how to do this. This process of restoring the instrument to working order was actually quite beneficial to me. iIt allowed me to get to know the instrument, both in terms of maintaining it, and being aware of any problems that might arise, and in terms of its sound. My existing interest in the minute timbral details of an instrument, such as were explored in both *bet denagel* and Jess's pieces, was piqued by the various pitched and un-pitched sounds that came from different parts of this incredibly resonant instrument while I was working on it.

My approach to learning the instrument used a combination of improvisation, technique exercises and notated repertoire. By improvising, as well as playing with the palette of sounds I began to discover while restringing, I was able to get used to the sensitivity of the tone production—the link between the sound and the contact point of the bow on the string. I used scales as I would practising the violin and viola—for intonation and tone—but also in this case to get used to the very different finger patterns needed to play an instrument that is not tuned regularly in fifths. My repertoire was a combination of baroque music[9] and contemporary repertoire that Matthew had asked me to play for a tour he was organising. Learning the notated music meant that I began to associate the intervals on the page with the new left-hand configurations, and to push my technical abilities on the instrument, which the fast, virtuosic passages in Ed Bennett's *Ghosts*[3] required.

[8] With peg-paste and graphite respectively

[9] Found on IMSLP—*Methode facile pour la viole d'amore* by Monsieur Milandre[49].

Initial work on a new piece

Having reached a stage with the instrument where I felt I knew it well enough to introduce it to someone else (although admittedly well before I felt comfortable with it), Matthew and I arranged our first working session on the new piece. Much of our time, in the first session and subsequent ones, was focused on the technological side to our collaboration which will be dealt with in more detail further on in this chapter (see Section 3.3.2). In the early stages of the project, Matthew was interested to see how motion sensors might be used to trigger sound so I spent some time improvising so we could both observe what physical movements were involved in playing, and specifically what movement could be measured and used to trigger sounds musically. These improvisations also formed the basis of Matthew's introduction to the instrument. I had tuned it in a D minor chord at this point[10], on my own improvisatory whim, which ended up staying in the piece. Matthew normally recorded our meetings, and segments of my improvisations from these sessions were included in or influenced the compositional material.

3.2 Acoustic extensions

In some ways the viola d'amore had a very different personality to the other instruments I play regularly—the chordal tuning system and the irregular finger patterns having a lot to do with this—but for the most part it felt like an extended violin/viola hybrid. The extra strings required a significant *adjustment* to bowing and left-hand technique, but the fundaments—the relationship between sound and physical movement—were the same. The large body and the sympathetic strings alter the timbre and add extra resonance in a similar way to how electronic reverb and filters might be used, but the extensions in this case are purely acoustic.

The basic idea of extending or transforming an instrument plays a part in traditional instrumental performance practice, the most common example of this probably being the use of different mutes to create an overall alteration of the timbre of the instrument. String instruments have mutes of various different materials—wood, leather, rubber, metal—each filtering the sound of the instrument in a different way. A 'con sordino' direction on a score is non-specific, but most commonly people will use a small rubber mute. Some composers call for more specific materials—György Kurtág, for example, in *Signs, games and messages* [43]requires that the string instruments have metal practice mutes. Other composers and performers have experimented with making their own mutes, or 'resonators' to extend the sound of the instrument acoustically, for example the collaborative work between Giacinto Scelsi and Frances-Marie Uitti[11].

Much of my current improvisation on my own, and with Jess as KUBOV, involves creation of new instrumental additions and use of non-standard playing implements, the process of which is detailed in the next chapter. Two examples of acoustic extensions that have become a regular part of my toolkit were created in collaboration with composers for a specific purpose.

[10]Not too much of a deviation from 'standard' tuning (if such a thing exists for the viola d'amore) of D major, which it was necessary to retune to for the pieces in Milandre's collection and for *Ghosts*.

[11]`http://www.uitti.org/scelsi-uitti_resonators.html`

My friend and periodic collaborator, composer Charlie Usher asked me several years ago what I thought it would sound like if I haired a bow with coarse wool. To find out, I purchased the cheapest violin bow I could find and I cut the horse hair at the heel, leaving it attached at the tip and winding it around the stick. I bought some different grades of wool and created two strips of material that could be fastened to the stick at either end and were tensioned using wine corks. This creation was dual purpose as the interchangeability of the 'hair' mean that it could be used as a prototype for any number of alternative bows, and it also provided me with the 'guiro bow'[12] which I use regularly in improvisation now.

When Matthew Sergeant and I came to work together again (following *bet denagel*), Matt was keen to explore the potential of the 'Charlie-bow' and to test out some new materials in the same way, which would lead to the creation of a new tool for *[kiss]*.

3.2.1 DIY with Matthew Sergeant: the *[kiss]* bow

Beginning similarly to how we approached *bet denagel*, we had a session with the prototype bow to find out what sort of effect the materials we had so far would make, and to discuss where we might go from there. We were both inclined to experiment further and decided to take our imaginations to B&Q to see what we could find.

A trip to B&Q

Armed with another cheap bow to customise, we browsed the aisles of the DIY store for a variety of noise making materials. Some, such as bits of rope and twine could be fashioned in such a way that they could be attached to my existing prototype bow. For others, such as velcro tape, we bought some wooden dowels of different widths on which the material could be mounted. We spent an afternoon experimenting with these materials, on their own and in various combinations, and created a small selection of 'bows' for consideration. These included two wooden dowels of different shapes with a combination of the hook and loop sides of velcro, and two 'perruques' for the prototype bow—one with a single length of rope, and the other with garden twine.

Decision and redesign

Ultimately it was the twine bow that Matt chose for *[kiss]* for the glitchy nature of its sound production. The material produced some audible primary pitch of the string, but on a similar volume level to the surface noise and the secondary pitch, determined by the lateral position of the bow.[13] The uneven texture of the twine produced an irregular, indeterminate interference as the small fibres of the twine pluck the string when the hair is drawn across the string.

Once this decision had been made, I began to redesign the bow into a form that would be both easier to use and stronger. The prototype, requiring the

[12]Which I had first seen done for a performance of Liza Lim's *Invisibility*(2009) for cello and two bows and I had been keen to try it on the violin.

[13]This effect can also be heard with 'col legno', and is demonstrated in appendix A.2 with a video example.

Figure 3.7: Before and after

wine corks to give the hair enough tension, is very difficult to use with any subtlety as it is large and quite heavy. The instrument would also have to survive for at least two performances of between four and five hours, so I had to build something sturdier. In the end, I used the second cheap bow I had bought before our trip to B&Q and attached a double layer of twine over the existing hair, which I left to provide tension. The most important thing was to ensure that the new design sounded the same as the original, which I believe I achieved. This new design kept the shape of a normal bow, which was better for me as it was closer to the object I am used to controlling. It was also much lighter and, therefore, easier to wield, which was important as I knew I would be struggling for stamina with this piece.

Figure 3.8: [kiss] bow prior to first performance

3.3 Electronic extensions

The key issues I associate with using electronic extensions to an acoustic instrument fall into two main categories. The first is the extension and manipulation of the sound of the instrument, in a similar way to how acoustic extensions might work—indeed acoustic and electronic extensions are often used together. The second consideration for playing with electronics is the interface—the usability of the design, whether or not it interferes with normal playing technique, and who or what has control. In simpler terms, the difference between these two

categories is that the first is a problem for my ears and the second is a problem for my feet.[14]

3.3.1 Addition of foot pedals to *104*

The first performance Jess and I had together was of *104* on its own (preceding any work on the following two pieces). In this first version of the piece Jess was in control of any manual triggering in the patch as well as the balance of the sound, all of which was still fairly mysterious to me at this point. I was primarily occupied with the notes and my lack of understanding of anything occurring past the microphone meant I was also quite disengaged with it musically. While I enjoyed what I could hear, this was limited as I would always have to be behind the speakers to minimise feedback. I did not at this point really understand the relationship between the acoustic part and the electronics—I was aware that the electronics were live and responding to what I played, but I did not know what parameters Jess was controlling and how.

Following the premiere, Jess modified her patch to make certain parameters controllable with a foot-pedal. Whereas before she had been triggering different effects throughout the piece which would pick up on the live violin sound and transform it, now I was in control of both the exact point at which to trigger, and of which of the three transformations to use. This new interaction between me and the electronic part meant I was better able to understand how the patch was working and I was able to practice with it, exploring the different sonic effects and how much control I could have of the timbral extension depending on how I timed the trigger. I was also now aware of the dual nature of the electronics in this piece—which elements formed a hybrid with the acoustic instrument and which were more accompanimental.[15] Giving the responsibility of determining the timing of these effects to me as the performer had an influence on the temporal scheme of the composition. Notated spatially and quite freely, I was able to respond to the electronics with the timing of each note, giving space or intensity where needed.

Much like every other aspect of playing a musical instrument, foot pedals involve physical gestures that need to be practised. Using pedals to finely control musical expression requires technique (which will be obvious to any pianist) that is not within the the normal practice of a violinist. To be able to play musically and expressively, the physical control of the instrument has to be natural and much of it has to be automatic. While I was certainly able to use the controls expressively, I did not get to the point where I was able to use them as naturally as the other expressive devices ingrained in my violin technique. When using the pedals to control the electronic triggers, my concentration would mostly be focused on that aspect of the performance, I think to the detriment of my tone production and sometimes of the musical phrase.

3.3.2 Creation of an interface with Matthew Whiteside

The second phase of my work with Matthew Whiteside was to create an interface for controlling the electronics in his new piece. The aim was to involve the physical movements associated with playing the instrument in the control of

[14] Not necessarily just feet, but primarily associated with physical gesture.
[15] John Croft identifies these different paradigms in [18].

the electronics. Taking inspiration from existing research, the idea was to collaborate on the building of a bespoke system that would work with Matthew's compositional language, and be practical to perform with.

Research

A key question that recurred throughout this first phase of work was what do we want to measure and why? Matthew's initial interest was to see how motion sensors might be used to allow my arm movements to manipulate the electronics. He had amassed a selection of gadgets that could all be used to transmit information to a Max patch via an Arduino board[16] so our challenge at this point was to work out which of the physical movements I already make when playing could also be used to control the live electronic part of the piece expressively.

To me there is a fundamental difference between movements I make to balance or reposition the bow or my left hand, and physical gestures that directly correspond to the sound. For example, my right elbow moves depending on which string the bow is on and what part of the hair between the heel and the tip is making contact with the string. The elbow position contributes to the fine control of the bow but is not in itself a musical gesture. In contrast, the speed of the bow along the string is one of the parameters of expression, and the movement of my hand and forearm is what controls this directly. Because the movements of the right hand and arm are a complex combination of expressive gestures and technical adjustments, it is not a straightforward task to gain meaningful information from the motion alone.

While exploring the possibilities of measuring certain aspects of my right-arm movement Matthew talked about a paper he had read that detailed a project from IRCAM where they had put a strain gauge into the hair of a bow to measure the bow pressure on the string[21]. The strain gauge is a variable resistor that changes its resistance as it bends. It is very small (we had ones of 5mm and 8mm long) and extremely sensitive to minute changes, making it ideal for measuring very subtle expressive movements. I had the idea at this stage that it might be possible to use the same technology to measure pressure of the fingers of my left-hand as they stop the strings. It seemed that pressure on the tip of the finger caused my nail to bend slightly, so, by attaching the strain gauge to the back of the nail, it might be possible to measure pressure on the other side.

Original design

Matthew made a circuit to these specifications so we could see if the basic idea worked or not prior to worrying about how this could be used while playing. By attaching the sensor to my finger nail using a cutting of a double-sided adhesive pad, we found that we could see a change in the numbers generated from the Arduino (as a result of a change in resistance) that was consistent with the change in pressure on my finger tip. While it felt like a bit of a break-through to discover that the concept actually worked, there were two substantial problems to deal with before it would be usable for a piece. The first of these was that we

[16]This is a small, low-cost microprocessor. More information can be found here: `https://www.arduino.cc/`

found that when I bent my finger or moved my arm in certain ways the numbers would jump about. We worked out that this was due to a change in resistance as the connecting wires between the sensor and the amplifier (which is needed to gain results from the sensor) would bend. This meant that we would have to minimise the distance between the sensor and the amplifier, and use a different kind of connecting wire that would be less sensitive to change of shape. The second problem was one of wearability. For it to be usable for a piece, we would need to work out not only how to attach all of the components in such a way that the right information could be measured, but also in a way that did not interfere with my playing technique. As it was, it was both uncomfortable and impossible to play without getting the wires tangled with my fingers. This also meant that too much pressure was put on the very delicate soldered joints which would break quite quickly.

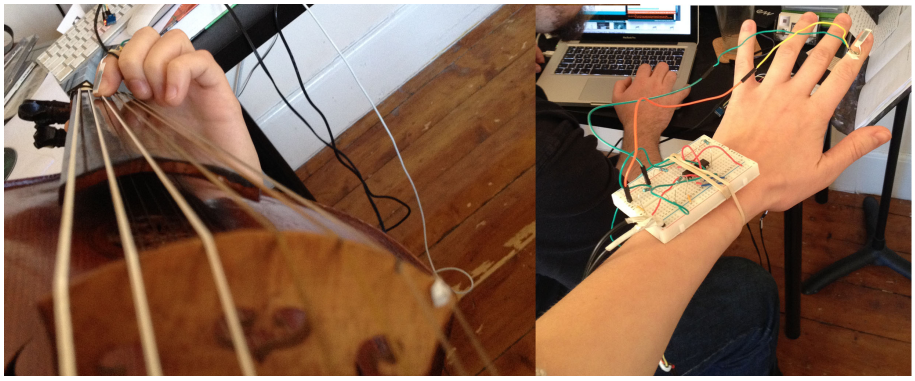

Figure 3.9: Original circuit

Development

At this point Matthew and I split the job of developing this idea—Matthew would go away and work on the musical material, both the notated acoustic part and the electronics, and I would take the prototype circuit away and make a practical design. It seemed at this point that it would best to contain the circuitry in a glove, and I began to investigate wearable electronic components with the idea of making a secure but flexible model. After several substantial redesigns using different materials, and one problem that took several months (and people) to solve, which was largely based on a lack of understanding about how the circuitry worked, I finally had a glove that could comfortably and (so far it seems) reliably be played with. For the wires between the sensor and the amplifier I ended up using very thin copper wire, knitted into two single strips and sewn into either side of a strip of material cut from a pop-sock. The variation in resistance as I bent my finger was negligible and the wires were kept in place so they did not get in the way as I played. The copper wire is also coated so there is no risk of short-circuiting at this point. It was important to preserve the life of the sensors as much as possible to minimise on cost and time spent re-soldering. To attach the sensor to my finger nail, the best way we have found so far is Matthew's original idea to use Command adhesive pads

which are intended as a Blu-tack substitute to stick posters to a wall and can be removed without damaging the surface as they lose their adhesive property when stretched.

Reflection

The electronic component of Matthew's piece allows the speed of ring modulation to be controlled with finger pressure. The sensitivity of the control here means that it can be a really expressive device, the sonic effect and the method of control being very similar to normal vibrato. The compositional method was unusual, as the first stage of invention was technical, and this determined the nature of the electronics to a large extent, and the notated material which was written with the ring modulation and the method of control already in place.

Jonathan Impett says of Laetita Sonami's sensor glove[17] that "taken alone [it] tells us little of the sonic world which it might shape"[38]. In terms of functionality, the glove is an instrument in its own right—naturally it has limitations and a decision to use it will inform the compositional or improvisatory outcome as it has a determining capacity in its own right. Sonically, like Sonami's glove, it relies on software and the other instrument(s) it is used with for its identity. So far it has only been used for this piece, but the way it works means that it can be programmed to produce a wide variety of different electronic effects, and also has the potential to be developed further technologically by stream-lining the current design and by adding more sensors.

[17] http://sonami.net/ladys-glove

Chapter 4

(In)Determinacy in preparation

The method undertaken to learn music has an effect on the final product, to a greater or lesser extent. This chapter examines the creation of a relationship with pre-existing repertoire, including ways of dealing with high levels of complexity in music, as well as the preparation or realisation of the other extreme end of notation in the form of highly indeterminate graphic or text scores, and the creation of music in the absence of a compositional phase, through improvisation.

4.1 Performance and interpretation of existing works

This section details the preparation and rehearsal processes for two pieces—Lutosławski's *Partita*[47] for violin and piano, and Matthew Whiteside's *Ulation* for viola and electronics. There were two contrasting methods—working with the composer in the case of *Ulation* and in the absence of the composer but with another musician for *Partita*.

4.1.1 Interpretation of 'ad libitum' in Lutosławski's *Partita*

Partita was the first notated piece of music that Karin Schistek and I had worked on together, having played in free improvisation settings for some time before this. Neither of us had prior experience of this piece to pre-empt any challenges we might discover along the way. This also meant that musically our relationship with the piece developed as an ensemble—verbalised decisions were made together and non-verbal interpretation was influenced mutually.

Ad libitum necessarily implies that one or more factors are indeterminate and therefore to be determined by the performer through musical preference rather than aleatory means. In *Partita*, the three ad libitum sections have parts for both instruments, but not a combined score, with the instruction 'The violin and piano parts should not be co-ordinated in any way.' However, despite

the implied temporal freedom, both parts have rhythmic values notated clearly. The frequent bracketed fermatas indicate points of rhythmic deviation, but are still suggestive of a proportionate relationship as the fermatas are over rests of different lengths. The instruction that we should not coordinate in any way presented two problems. The first was that this instruction appeared to conflict with the apparent coordination in the writing. To take the beginning of the second movement as an example (see Figure 4.1), the violin part begins with a series of notes followed by a crochet rest with a fermata. The piano part (see Figure 4.2) begins with a fermata rest followed by some notes which musically appear to reply to the phrase at the beginning of the violin part, and so the conversation continues.

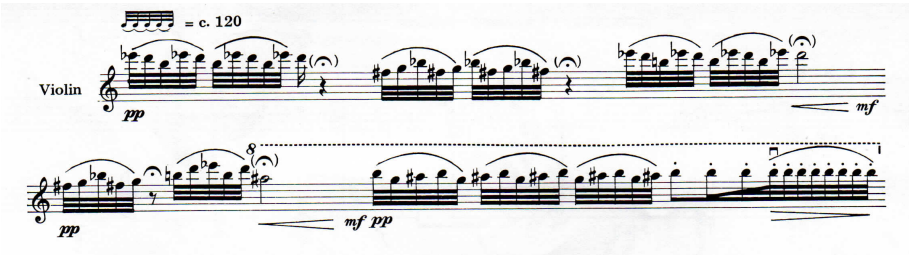

Figure 4.1: Lutosławski *Partita*: excerpt of the second movement, violin part

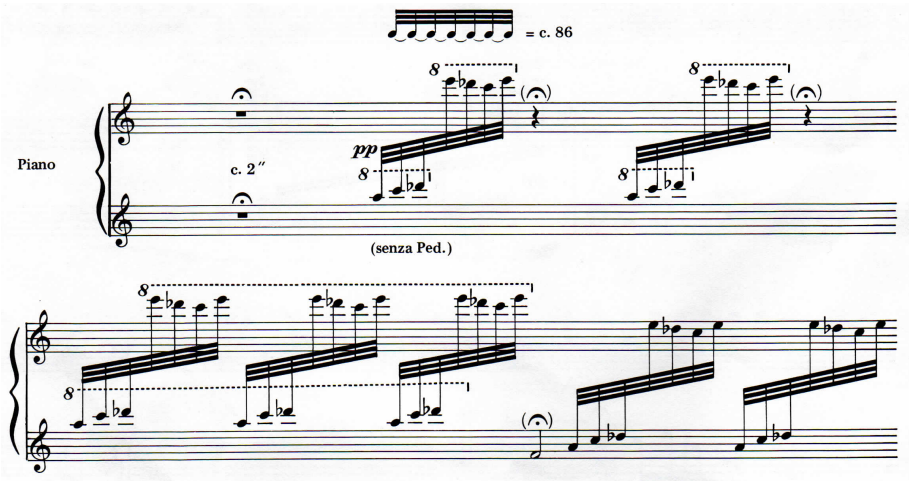

Figure 4.2: Lutosławski *Partita*: excerpt of the second movement, piano part

The other issue for us was that, as improvisers, it seemed unnatural and almost impossible to deliberately avoid coordination as, by listening to each other, we will each adjust naturally to what we hear. Our solution was to take a non-literal interpretation of the instruction—the result would be coordinated to an extent in terms of us listening to each other and responding to each other as musicians, but not pre-determined by discussion. In other words, the section would be coordinated only through our non-verbal interaction while playing, by

the same means as we would improvise. As it happened, the more we practised the piece, the more determined the interaction of the parts became as the process of rehearsing the section drew us into a routine.

This second movement, the first of the ad libitum sections, has quite a substantial mismatch in the amount of material in each part. When we played through it, we found that Karin had got to the end of the piano part long before I had finished my notes. The question was whether to give the piano part more space to try to even this up a bit, or whether to allow it to 'run out', leaving the violin to a quasi-cadential solo. We opted for the latter, interpreting that situation as part of the deliberate non-coordination.

The notation is highly determinate throughout in terms of pitch, rhythm, dynamic and, to a certain extent, timbre, with areas of temporal indeterminacy interspersed between tightly notated rhythmic exchanges in other movements. The interplay between the violin and piano is present throughout, but changes in intensity from very loose, in the ad libitum sections, to a complex counterpoint with continual rhythmic displacement and realignment. This rhythmic exchange from chaos to synchronisation is determined exactly in the three larger movements, but is mirrored in the relationship between those movements and the ad libitum sections which always lead *attacca* into a point of cohesion.

4.1.2 Revision and development of an existing piece: Matthew Whiteside's *Ulation*

Ulation was the first of Matthew's pieces that I played, and it had previously been performed by at least two other violists. When I came to learn it, I had a few questions for Matthew about how some of the notation should be interpreted, and he had some comments which came out as we worked through the piece, playing and talking. Most alterations were of minor details—rhythmic and gestural—but I had one idea that would have an effect on the piece as a whole. As I was practising, I was always searching for a more resonant sound. It occurred to me that this resonance could be increased if the A-string of the viola was detuned to an A♭. This would mean that an open string could be used for most of the pizzicato and arco triplets, allowing them to ring out more clearly. It also would mean that even when a stopped A♭ is played on the D-string, as at the beginning of the piece, the tone would be more resonant, as the open string would vibrate at the same time. In this way, the scordatura supports the tonal centre of the piece. I presented this solution to Matthew to see how he felt about it, demonstrating a few sections with and without the detuning and he supported my idea.

Matthew made a small alteration to the patch which enabled me to trigger changes throughout the piece (shown in the score as a ☒ and a number next to it) with a foot-pedal. This was for two reasons—it meant that everything could be controlled by me, with the laptop and interface on stage, so it made the set-up simpler for some of the venues we played in. It also would not require a second performer, so theoretically I would be able to perform it without Matthew there (not that this was likely and it has not happened so far). More importantly, the pedal allowed me to practice with the patch as, without this ability, I was in a similar position as I was at first with Jess's pieces, knowing the notes on the page but this being only half of the music. Being able to practice without

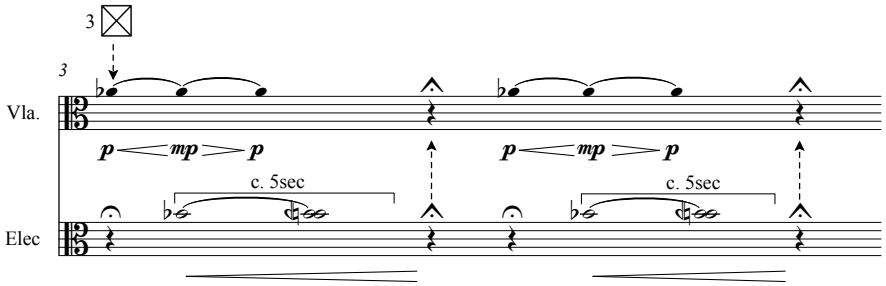

Figure 4.3: Whiteside *Ulation*: excerpt first section

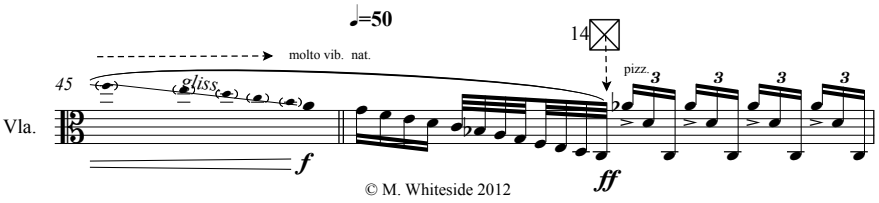

Figure 4.4: Whiteside *Ulation*: transition to pizzicato section

Matthew was important for practical reasons—unlike with Jess, there was more of a physical distance between us so we could not rehearse together so regularly. Practising at home allowed me to work on some of the more challenging parts of the score, for example the final triplet section, with the electronics so I could get accustomed to what I would hear and how the electronic and live viola parts interact.

More recently, following a number of performances of this and Matthew's piece for viola d'amore, there have been some further minor adjustments based on how my perception of the character of the piece developed. For example, I asked if I could play the screechy electric guitar-like sections sul pont. which Matthew was happy for me to do. By this stage I felt I could make suggestions quite openly, as I got to know the character of the piece and the person, but I would have felt uncomfortable with that level of input or interference with the notated music had I not been able to work with the composer and ask him questions during that working process.

4.2 Dealing with complexity in the learning process

Highly complex scores can present problems to performers primarily because of an overload of notated information, which can be overwhelming and challenging even to know where to begin. Such scores will often contain unusual combinations of techniques that will not previously have been part of the performer's practice or will not normally be part of core instrumental learning. The notation of different parameters, alone or in combination with others, can be extremely complex and often require several steps to learn. Irregular time signatures and

nested rhythms, for example, sometimes need to be worked out mathematically, and beats and subdivisions marked on the page. Practice with a metronome can be useful to check that an unfamiliar rhythm is fitting into the correct number of beats, and to provide consistency until the performer develops a 'feel' for the rhythm. Quarter-tone or microtonal intonation can present problems for someone who is not used to the intervallic relationships. Again this comes back to what is part of the core pedagogy—diatonic scales train the fingers and the ears to work in tones and semi-tones, but smaller intervals can be much more difficult. Prescriptive bow behaviour can account for a huge amount of information on the page, which is largely absent from any score pre-dating 1950 (and most since then as well). Bow movements are more generally a response to descriptive musical factors, such as dynamics or timbre (sul pont./tasto), or they are adjustments made to balance other parameter changes in order to maintain a clear tone (see appendix A.2). Another key problem faced by performers is a lack of repetition and recognisable patterns in the music. There is a sliding scale of easily sight-readable music—which relies on both of the aforementioned features—to music that requires memorisation because the quantity of information and lack of familiarity, both technical and aural, make it impossible to read at performance speed.

4.2.1 De-coupling and re-coupling *bet denagel*

As already seen in section 3.1.1, each district of *bet denagel* combines several layers of behaviour to produce a complex and timbrally indeterminate progression. My approach to learning the piece was largely informed by two phases of prior experience. The first was the work I had done to learn Aaron Cassidy's *The Crutch of Memory*, a highly complex score that similarly features a decoupling of techniques. Coming to learn this piece with very little experience, certainly none at the level of difficulty that *The Crutch of Memory* presented, I think in hindsight that, with one exception, I managed to make a mistake with my approach to every single challenging factor in the piece. Along the way I was able to work some things out, and a rehearsal with Aaron gave me a lot of insight, both musically and technically, as to how the piece should be approached. He was also able to pass on some advice that he had picked up from other performers he had worked with. Unfortunately this meeting was quite close to the performance and, while it made a huge difference, my performance still suffered from the mistakes I had made early on in the learning process. On a slightly more positive note, one early decision I made which I would repeat was to create a metronome track in Logic which contained every time signature change and tempo change, including every ritardando and accelerando. Having worked out and marked in each beat, this gave me a framework in which to work out the rhythms, which I learned first by clapping and then by playing along with the metronome.

When it came to learning *bet denagel* I was pre-armed with the experience I had gained with *The Crutch of Memory*. Matt and I had also worked together throughout the compositional phase, meaning that I had already built up a level of musical understanding about the piece. Technically I understood each notated parameter in the score and what sort of effect these parameters were intended to produce, but I knew that the challenge for me would be to combine everything.

My first step was to learn the notes in rhythm and at a steady tempo without the second level of scordatura. It was necessary to tune the instrument in minor sixths, but I did not detune the whole instrument further than that. I chose to begin with the note sequence because I perceived this to be the fundamental material which the other layers of behaviour would manipulate. If the pitch progression and the basic rhythm were not secure, the effect of this manipulation would be lost.

It was important to practice the pitches without the detuning as this caused the sounding pitch of the string to be very unstable and it was impossible to play in tune in this state. Just as with the other layers of behaviour, the stopped pitches had to be secure for the severe detuning to have a meaningful effect. Essentially, the notated pitches provided a spacial pattern for the fingers of the left hand which had to be learnt technically. At speed, and with the detuning, the intervallic progression is recognisable but the actually pitches of the notes are constantly wavering.

Having learnt the notes, I then began adding the other layers of information in different combinations, trying to analyse the relationship between physical movements and sound, and in particular to notice where one layer of instruction would be leading another astray—for example where I would try to link the dynamic and tempo changes erroneously because it was my instinct to do so (after too many years of playing nineteenth century music). These de-coupled lines, when they each seemed to have a level of security on their own, could eventually begin to turn into compound gestures. I did find, however, even when it came to record and perform the piece, that this battle persisted, and it was a constant challenge to maintain accuracy as each layer tried to disrupt the others.

4.2.2 Practice mode: perseverance in *[kiss]*

Much like *bet denagel*, the score for [kiss] uses decoupled layers of behaviour to produce a timbrally indeterminate field. Some of the material is much simpler, for example there are no notated pitches as all of the left and right hand movements are indicated in the same Lachenmann-style clef which shows the relative position of all activity between the nut (at the top of the fingerboard) and the bridge.

The left-hand material is in black and grey, indicating approximate pitch as well as vibrato, trills or sustained pitch and glissando, while the coloured lines show bow movement, which in the case of Figure 4.5 is near the top of the fingerboard, right up against the left hand. In *[kiss],* almost every one of 24 modules can be played on any string, at any one of four tempi, and choosing between two, three or four possible bow patterns. Movement between modules and pages is up to the performer's choice, within certain rules. With so many variables (if all possibilities were notated there would be 800 modules rather than 24), it seemed unfeasible to attempt a re-coupling stage, as with *bet denagel*. Instead I spent my time working on splitting my brain between two contrasting (and sometimes conflicting) tasks, to allow the left and right-hand behaviours to co-exist but not coordinate, which, in hindsight is perhaps how I should have practised *bet denagel*. Particularly with the bow behaviour, it was necessary to get accustomed to reading the unusual notation—the left-hand material could be memorised partially so more of my focus could be on

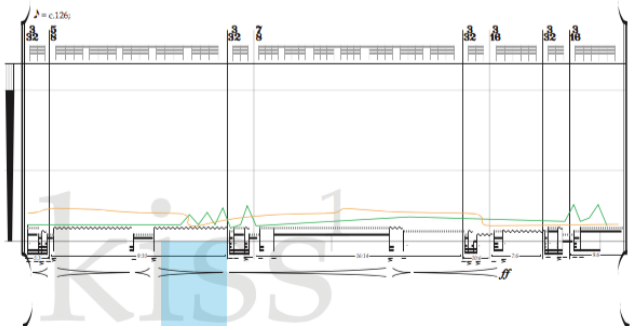

Figure 4.5: *[kiss]* excerpt from page 1

the variable bow notation. The string changes were relatively simple to add as the choice was limited to adjacent strings. Tempo changes were more difficult to be accurate with—I practised individual sections with a metronome at each of the four tempi, but as the tempo relationships and links between modules were variable I tried to feel each as a mood in which to contextualise the rest of the material.

On top of the technical difficulties, the main challenge *[kiss]* presented was that of endurance. The length of the performance is given as between four and six hours, which involves playing the material of the 24 variable modules continuously, apart from one interlude of approximately 45 seconds of contrasting material which may appear at any point in the performance, but only once. I found it impossible to practice the piece for long periods of time—my concentration and energy would dip very quickly. I was also reluctant to try to do so to the detriment of my focus on the detail - when playing for a long time I would be aware of making mistakes, but unable to practice them properly in this mode. For me it was more important to practice the decoupled behaviours, and to find out how to coordinate them, than to be testing my perseverance at this stage. My ability to maintain the performance for such a long time would have to rest on adrenaline and sheer determination not to be beaten by the challenge.

4.3 Improvisation

Over the past few years improvisation has become a fundamental part of my practice, both in performance and the development of my technique. The next

section details three different examples of my improvisation-based work—on my own, with Jess Aslan in KUBOV, and with Karin Schistek. Some of the work I do with a group called Grey Area, which is also largely improvisatory, is discussed in section 4.4.2.

4.3.1 Development of a personal aesthetic

Part of my practice as an improviser has been to allow my own voice to develop. In playing much notated music, while a performer will have their own individual interpretation, they will assume a persona—the character of the piece, much like an actor will play a role in a play. Naturally this voice will be affected by mood, by interaction with others and by the surroundings, but improvisation allows the performer to speak as herself. Part of the continuing challenge is to find a way to break away from physical and aural memories—inadvertent plagiarism and regurgitation of previously heard or played material. This, as in writing or speaking, does not mean that the same language cannot be used, but the precise manipulation of that language must express the thoughts and feelings of the author.

Personal exploration of instruments

Much of the development of my own improvisational aesthetic has involved exploring the instrument for new sounds and new methods of sound production. Whereas the initial work I did with Matthew Sergeant was also exploratory, it followed his line of enquiry predominantly and was also a search for material that would eventually be notated. For my own improvisation, the exploration of the instrument is led by my own preference for certain sounds and my own interest in how timbres can be varied and controlled. In this way it not only serves to expand the palette of sounds at my disposal, but to obtain better control of the sound production of the instrument (where control is desired).

Mistakes are also a hugely important part of this exploratory process, and can involve finding sounds by accident that then become part of your vocabulary by choice. In reflection on a workshop I took part in, led by Eddie Prévost[1], two key considerations stayed with me. The first is the need to balance one's own exploratory relationship with the instrument and one's ensemble awareness—in other words to divide attention between listening to your own instrument and interacting with other people. The second is, in performance, to find an area on the edge of your comfort zone where it is still possible to take risks—to make mistakes and to discover new things—but while still maintaining enough control to play with musical integrity.

Influence of the instrument

Another important aspect of the development of my improvisational practice has been to recognise the influence of the instrument itself and to learn from it. The discovery of different reactions to the same technique on different instruments means that my improvisation changes depending on what I am playing. This can mean a difference not only between a violin and a viola, for example, but also between two instruments of the same variety. Awareness of this played

[1] Edinburgh university, spring 2014

an important role when I was looking for a new viola and trying many different instruments. Improvisation has improved my playing skills by helping me to understand the subtleties of the instruments' responses to my physical movement. The addition of amplification also has an impact on this, as it makes a difference to what palette of sounds is available—I can use some of the timbral qualities of the instrument that would otherwise only be audible to me. A conscious part of my approach to improvising is to play around with the control of the sound production and with timbral indeterminacy. Improvised material has been determined once it has been played but the role of determiner is balanced between the player and the instrument. My improvisation is a combination of my voice as an improviser and the voice of my instrument.

4.3.2 An improvisational language in KUBOV

KUBOV developed as a project from the initial work Jess and I did together on the set of three pieces. From there we began to improvise more freely and to generate material together. Without predetermining anything, we were able to discover new materials. Part of this was simply through playing together and seeing what new material we brought out of each other, but also we could both get to know the violin and computer in their hybrid state. Constantly trying different combinations of acoustic material and electronics we could both get a feel for what worked. In some ways this was a matter of taste, so naturally our repertoire is built on our own preferences for certain sounds, but we also found certain combinations problematic—for example producing too much feedback or finding that the acoustic material would not have the right attack to trigger the electronics. One solution to this was to make a network so I could see what parts of Jess's patch were enabled and know what type of material I could play. On top of this visual communication, and both of us learning how we could adapt our playing to each other, we began to find natural links between different types of material and we created a loosely pre-determined form for our live set.

Creating 'pieces'

The extension of our instruments has been, and is continuously, integral to our development as a duo and exists on multiple levels. Starting with my violin and bow, and Jess's computer, she has expanded her electronic set up with a Mini-brute synthesiser and a sample pad, while I have built up a repertoire of techniques employing extra objects such as mutes, pencils and a chopstick, and instruments I have constructed, such as my 'guiro bow'. One of our earlier sessions together was spent recording samples of me playing my violin in a drippy and very resonant tunnel.[2] These samples gave us some starting material for live improvisation—Jess would choose how to manipulate them, and I could respond to the sounds of the environment in the recording (including the water dripping from the roof, and people walking and cycling past) and also to my own previously improvised playing. This involved a mixture of quite pure pitches and glissandi, and other other less recognisable sounds such as crunching the hairs of the bow on the bridge which I used to imitate the water sounds of the recording.

[2]Part of the old Innocent railway in Edinburgh.

Another combination of discoveries we made together involved me sticking a chopstick between the strings of my violin to produce an unusual set of percussive timbres when either plucked or struck with a pencil. Jess included into her repertoire a collection of recorded samples of a piano she had prepared and we found that we could use these two preparations in an interesting dialogue.

In looking for performance opportunities and applying for conferences and festivals, we found that applications generally demanded a name for the 'piece' being submitted. Our improvised sets based around the two themes above became *absoluteZero* and *concoct* respectively, each existing in a mutable format, with variable length depending on what was required for the performance. Our live set gradually changed to incorporate new material but we would always decide on a loose plan in advance. Over time these sections had become more clearly defined and, although the set ran continuously, it began to feel like we had shorter 'pieces' within that.

Playing with other people

As a duo we have had the opportunity to work in larger groups a number of times. Two occasions in particular I feel have had a notable influence on our duo dynamic. The first of these is a workshop we took part in led by Eddie Prévost, which I have already mentioned in relation to my own improvisational development. For this workshop we used a stripped-back set—no computer and no toys—I had only my amplified violin and normal bow, and Jess had just the Minibrute. The sessions ran over three days and involved fourteen musicians most of whom were using electronics of some description. In this large group improvisation, we had some of this time to play as a duo and some to play separately with others. We also spent a significant amount of the workshop time discussing various aspects of improvisation and how to overcome certain problems, particularly those associated with improvising in large groups. I found this really useful for a number of reasons, for my own skills as an improviser and for our duo work as KUBOV. Our development of material and ideas so far had always involved addition—new sounds, new equipment. This stripped-back set up allowed us to focus on the sound potential of our instruments without many of these additions, to engage with each other and with the other musicians and to think predominantly about communication.

The second of these occasions was when we went to Graz for the Impuls festival academy in February 2015. We took part in the Performative Computer Music course run by Richard Barrett and David Pirró and we were teamed up with Bernardo Barros for the duration of the course where we rehearsed together daily, had coaching from Richard and David, and ended with a performance as part of the festival. As with the workshop with Eddie Prévost, we had a lot of opportunity to discuss our practical approaches and observations from this. Working together intensively in this way, rehearsing every day and constantly trying and developing new ideas, brought about a fast and noticeable improvement—the difference between the beginning of the week and the end was clear to us and to other observers. All three of us observed that our playing had changed—adapted to the group, to the other players, and a new character was emerging as an ensemble. Jess and I noticed afterwards when we came back to playing as KUBOV that, while we returned to our old material (with some new), our energy and group dynamic seemed to have been affected in a

very positive way. Our ensemble interaction seemed tighter and our individual contributions seemed more daring and confident.

Making of an album

When we came to make our album, our live set had further developed to incorporate more new material. This included a technique of producing a mixture of harmonics, glissandi and textures by playing with my guiro bow and normal bow at the same time, and a way of producing multiple pitches and timbres with a set of tuning forks and mutes. We took our material from the live set and divided it up into eight tracks. We pre-determined an order for these and Jess made a harmonic progression for the album (as the material is predominantly timbral, it can be 'transposed' easily). The material for our album has developed gradually from all of the work we have done together so far, even though often the context has changed, for example the 'bridge crunch', which I originally used to imitate the sounds from the tunnel samples, became a duet with the Minibrute and the sampled material was not used on the album.

The making of the album has fed back into our live performance in the way in which it has further defined the structure of our live set. Determining form and structure allows us to work within a specified time frame, which is always a necessary consideration for a gig, gives us confidence, and gives us a strong basis on which there is freedom to find new and unexpected material. Our improvisation together has involved the creation of a language we both understand. The other person may not respond to the same thing in the same way each time—much like in conversation—but we will still find a dialogue that makes sense musically. The predetermination of certain aspects of the music gives us a mutual 'comfort zone' which we can play on the edge of, so while our form and structure are factors that we determine before the performance, and are based on a language we have developed together, the performance is still fundamentally improvised, and we will each find new ideas in rehearsal and performance.

The process of recording ourselves in rehearsal and performance, and then listening back has been a valuable part of our practice from the outset. This enables us to hear the balance of our combined voices and also to be able to assess how well the structure, flow and duration of the performance is working. While making the album we did this more intensively than ever and that in itself has helped hugely to develop our practice as a whole.

4.3.3 Including improvisation in concert programmes with Karin Schistek

Having first played together in a larger improvisation group, Edimpro, Karin and I continued to improvise together in this group and as a duo, while also playing a variety of notated repertoire. For our first full-length concert together we put together a programme of Bach, Beethoven and Webern, and we were keen to improvise as well, but uncertain as to whether this would work alongside the other repertoire. When we improvised together in rehearsal we would generally begin without any prior discussion or decision about what to play, and we noticed that it would often show an influence from the other music we had been playing. We also played around with a 'stylistic' approach to improvisation

where we would play something 'in the style of' a composer, for example Webern. When it came to programming the concert we decided that there was no reason why improvisation should not work with the other pieces, given that it was improvisation therefore we could make it work—but we should think about how to make something that would fit with the rest of the programme but still use our own musical vocabulary. With each of the other pieces being in four movements, we decided to use this form for our own improvisation, but rather more like Webern than Beethoven, making four contrasting miniature movements.

The next concert programme we curated for ourselves took a very different format, contrasting very rich, energetic music of Gorecki and Lutosławski with extremely calm and minimal pieces by Feldman and Simon Opit who wrote the piece for us. Our concert was preceded by a recording session for the Lutosławski *Partita* and we used some of the remaining time to record some improvisation. In this session we found some sounds we liked and decided to base our improvisation in the concert on the same minimal idea which we felt would work well with the extremities of the programme we had chosen. We determined a single focused idea and a timbral palette for this performance, so the 'rules' we imposed on ourselves were more strictly defined than we would normally use, however the interaction within these pre-defined parameters was free.

4.4 Graphic and text scores: Embracing highly indeterminate notation

This section deals with two examples of highly indeterminate notation, meaning that almost no musical factors are fully determined by the notation. One—*December 1952* by Earle Brown—is an entirely graphic score with some fairly vague performance instructions on how the score should be approached. The other example is a selection of pieces from Stockhausen's *Aus den sieben Tagen* which are entirely text.

4.4.1 Process of 'realising' Earle Brown's *December 1952*

Initial plans

This realisation of *December 1952* in a virtual environment is the result of a collaboration between me and my brother Dave. At this stage in my PhD work as a whole I had already developed my concept of the lineage of determinacy and the taxonomy of terms, and I was searching for examples of music in which the *listener* would have an active role in determining the musical outcome. The initial idea for this realisation was to use a large space and create a traversable installation with blocks containing speakers playing continuous sound—a large, three-dimensional version of the score. While lamenting the expense and impracticality of creating such a thing, Dave and I came up with the idea of creating a virtual version of the installation. He created the visuals using computer game development software, and I did the musical realisation.

Sonic schema

The timbral palette for the realisation was derived from the combined desire to create something which, to me, would be representative of the minimalistic visual characteristics of the score, and, at the same time, to design something where each individual sound source would be interesting in itself, giving the whole realisation enough complexity to retain the listener's interest. Each individual block was arbitrarily categorised by me, according to size and shape, with each of the five categories being given its own timbral characteristic. While the timbral effects used were entirely based on my own personal intuition about the score, the decisions made do obey the directions given by the composer regarding relative intensity of the sounds.[3] In addition to the five timbral categories, I decided to divide the score between violin and viola which increased my harmonic options as well as giving more timbral variation.

The harmonic structure of the realisation is deliberately static, a decision also derived from a visual characteristic I perceive in the score. A quasi-linear progression of major seconds and perfect fourths (allowing octave transposition), imposed upon a non-linear form creates a non-leading, non-resolving, chord sequence. Other intervals, such as major thirds are created as a consequence of the non-linearity. I decided to create a mostly consonant atmosphere[4], and the lack of leading harmony or resolution was important. However, I felt that areas of tension were also needed, and I created these by imposing a quarter-tone shift halfway through the pitch progression. An invisible line through the score marks the point where the harmonies are distorted, and beating can be heard between the close pitches.

For each block in the score, the material is based around a single pitch, although various types of 'interference', such as harmonic trills or col legno tratto[5], are imposed upon this. Within the boundaries of my own harmonic and timbral systems, the individual sound samples were improvised.

To retain a sense of real space a small amount of background noise was artificially introduced and the 'character' the listener controls to navigate throughout the space has audible footsteps.

Determinacy

What is generally described as a process of 'realisation' in relation to graphic or text-based scores is a process of determining musical factors not determined by the notation or performance instructions. In the case of *December 1952*, the score determines the visuals in terms of colours, relative distance, and shapes, while, sonically, it determines the structure (the division of the whole into parts). In realising the score, I have determined pitches (and resultant harmonies by specifying the radius of projection of each sound source), the instrumentation, and the timbre. Much of this was determined through careful planning prior

[3] Although of course the interpretation of the word 'intensity' in this context may be challenged.

[4] Encouraged by my brother who tentatively suggested that I make it sound 'nice', possibly as a result of him knowing my penchant for making noise (having, on multiple occasions, recorded me doing so).

[5] Which always results in a kind of multi-phonic as, in addition to the pitch of the stopped note, there is an additional pitch which varies according to the (lateral) contact point between the wood of the bow and the string—see appendix A.2 for examples.

to recording but exact details were determined at the time of recording each excerpt as they were 'performed' in an improvisational manner. Exact details of the interaction between each sound source is determined within the installation (as all sound files begin playing when the game commences and loop in a fixed manner) but occurred by chance as each file is of a different length so, as the game continues, the samples will repeat at different rates, causing the overlap of sounds to be constantly different.

What remains indeterminate, in other words what is left to the audience to determine, are the form and length of the event.

4.4.2 Improvisation and communication in pieces from Stockhausen's *Aus den sieben Tagen*

Each of the text pieces of *Aus den sieben Tagen* (*From the seven days*) provides the players with a set of instructions for performance, some of which could arguably be interpreted literally—'Play a tone…'—and others which are much more ambiguous. I find that rehearsals with Grey Area tend to be focused more on observation than intention. We will talk a bit about the scores, about how to interpret certain directions—multiple ways in which some things might be interpreted—and then play, after which we will talk again about how we ended up interpreting things individually, and how this seemed to work in the group.

> *Verbindung* (*Connection*)[6]
>
> play a vibration in the rhythm of your body
> play a vibration in the rhythm of your heart
> play a vibration in the rhythm of your breathing
> play a vibration in the rhythm of your thinking
> play a vibration in the rhythm of your intuition
> play a vibration in the rhythm of your enlightenment
> play a vibration in the rhythm of the universe
>
> mix these vibrations freely
>
> leave enough silence between them

I joined Grey Area after the group had already been established, and had been performing Stockhausen text scores and open form pieces by Christian Wolff. This repertoire was entirely new to me at the time and, as the others had been acquainted with them for a while, particularly Sean Williams whose research was focused on Stockhausen's music which, as Owen Green says "gave him some authoritative status"[29], I was inclined to step back and try to fit in with how they were already working.

My personal interpretation of the directions of this score takes a literal approach where possible, for example playing with my breathing pattern, and allowing the later directions of the score to be influenced by the earlier ones, but exactly how this will manifest I do not know until I am playing it. My own interpretation of these instructions is almost certainly different to how the other

[6]The english translation of the score is given here, although the original is in German.

members of the ensemble will choose to think of them—it seems unnecessary and even contrary to the instructions to agree exactly about how to interpret these lines on a personal level. Unlike some of the other pieces in this set, the score makes no mention of how the player should interact (if they should interact) with the other players of the ensemble, or with the sounds they are making, although it is clear that it is an ensemble piece.[7] For me, awareness of being in the ensemble gives me a passive engagement with the sounds the other players are making (their own interpretations of the instructions), allowing the rest of the parts to influence my state of mind (and thus the 'rhythm of my thinking'). An example of how this can manifest is audible in some of the similar sounds Owen and I use to play. The only verbal part of group consensus was to have a sense of pace and a mutual agreement on when the performance started and ended. We would tend to find quite often that in a first rehearsal of a piece, people would move through the score at different speeds, and therefore have conflicting feelings about how long it should go on for. With *Verbindung* it was generally clear where in the score the other players were, particularly when the second, or final, section ('mix these vibrations freely') had been reached.

Most rehearsals with Grey Area would include some time on a score, such as *Connection* or whatever we were going to perform next, as well as some 'free' play. For me this balance is important as it allows me time to assess what the function of the score is in the case of highly ambiguous notation. While using my own improvisational voice, this is done in a way that is very different from playing 'free'. In the group improvisation the focus is on the communication between players but, while this remains for the pieces as it does with any ensemble playing, there is also a requirement for the players to follow a set of instructions and to communicate their response to that.

[7] 'for ensemble' is written at the top of the page.

Chapter 5

(In)Determinacy in performance

This chapter deals with the final determining stages of a piece of music. The first section looks at three contrasting examples of structural indeterminacy and how each is dealt with in performance. Following this, I look at issues specific to ensemble playing, returning to Grey Area performances of Stockhausen. The third section of this chapter discusses the effect of the environment on performance and finally I look at some of the problems and solutions that have come from working with technology.

5.1 Structural and formal indeterminacy

5.1.1 Architectural exploration in *bet denagel*

While the timbral palette had essentially been determined in the compositional and preparatory phases, as described earlier (cf. sections 3.1.1 and 4.2.1), the actual timbral pattern would be determined each time in performance. So too would the overall structure and form—the combination and order of the districts played, any repetition, and the duration of the piece.

Relinquishing control of determining factors in performance

In learning *The Crutch of Memory*, one fundamental mistake I had been making, which the composer of the piece, Aaron Cassidy, made me aware of, was to try to reinterpret the notation—to 'fix' it. What I think I had not really understood at this stage was that where the notation contained conflicts to the point where the sonic outcome was either unpredictable or 'wrong' (for example where the pitch of a note was inaudible due to the bow behaviour), this was to be allowed.

What I had not appreciated before working on this piece was *why* this was such a challenge in itself. In the first place, I had not been aware that I was interfering in this way, but then, even with that knowledge I found it extremely difficult to resist. Being much more used to responding physically to what I hear, it was very hard to switch off this response and follow the notation on a purely technical basis. Not to listen at all was impossible. Not only did it feel

unnatural but it was also very un-rewarding. I do not want to disengage with the music, but how to remain engaged as a performer but not to 'fix' what is not broken was the biggest challenge I faced with this piece.

The timbrally indeterminate material of *bet denagel* presented a similar challenge. The preparation of the instrument and the combination of behaviours sought a particular palette of sounds which magnified the pre-existing aberrant qualities of the instrument. Points where the decoupled material would not 'work' were integral to the sonic environment of the piece, and it was essential that I allowed this sonic outcome to happen. Rather than determining the sound myself, I had to allow the instrument to be the determiner, rendering my role as the physical realiser of the prescriptive notation, and also as the listener.

Relationship of micro- and macro-structural indeterminacies

As well as being highly indeterminate on a timbral or micro-structural level, *bet denagel* is also highly indeterminate in terms of the larger-scale structure and form of the piece. Abiding by certain rules[1], in performance I can work my way through the districts at will. Not all of them have to be played at all, and the duration of the piece is not fixed. Prior to the first performance, I had intended to pre-determine my route through the score as I was afraid that not knowing where to go would be confusing, and add an extra level of stress to what was already a challenge. However, I discovered that I was wanting to break my own rules and to revisit certain parts of the score. I realised that it was important not only that the macro-structural plan was not pre-determined but that it was done by choice rather than by chance. In allowing the instrument to determine timbral factors, my musical engagement with the piece came from the exploration of its architecture. In wandering freely through the score I could hear new sounds each time I visited each of the districts, so it was important to me to retain this exploratory process in the performance.

5.1.2 A personal connection with Ian Vine's *[2520] Individual Works for Violin*

In deciding how to determine the structure and form of the piece it is important to ask what purpose the indeterminacy fulfils. Whereas in *bet denagel* the freedom to determine these factors in the performance has musical significance, for *[2520] Individual Works for Violin* I do not think that the ability to decide in the performance which direction to take is valuable. The form of the piece, in any permutation, clearly comprises five sections of music, but each version of the piece should feel like a single entity, rather than five very short pieces. Having to make decisions about which card to take next would be a distraction and very possibly interrupt the flow of the performance. It is also important to me to actively choose a permutation that I want to play, rather than leaving it to chance (for example by shuffling and drawing the cards), although surprisingly I have never repeated a performance, so I have unintentionally chosen different versions each time.

[1] The starting district is always the same and there are links between districts so only certain ones can follow others. There is also one district that must be played once and only once in a performance.

The piece could easily have been written out in all 2520 possible versions, however, aside from the impracticality of this, while the indeterminacy would not have been lost—the decision of which version to play is still to be made by the performer—the visual information of the character of the piece contained in the extra-notational detail of the score would have been removed.

To me, this piece is very intimate, a quality it gains from a number of characteristics. The dynamics range from *ppp* to *p* and this combination of low volume and double-stopping makes the minimal musical material quite technically demanding as it requires intricate bow movements to produce a clear tone and to balance the chords. As well as this very close kind of playing, there is almost a secretive element to the score—the performer has chosen five of the seven cards to construct the piece, leaving two material elements of the score that the audience will not hear, like hidden facets of a personality. In its post-card form, the score itself, to me, contains a metaphor for this kind of communication—a personal message of a friendly or familial nature (as opposed to business), short and sweet.

For the initial performance I had made a photocopy of the 5 cards of each of the three permutations I would play on to single sheets of paper. The reasons for this were multiple. In a concert with many pieces of music and three other performers I was terrified of losing one of the postcards. I also knew that I would be nervous, and I didn't want to spend the time reorganising the cards on the music stand and worrying that they might not balance securely, especially as I had to perform the piece three times in the same concert. I also did not want to damage the cards by writing on them, and I needed to write a few fingering and bowing reminders for myself. While, for all practical concerns, this solution was a good one, in hindsight I think it was a shame not to have the original score present for the performance. For subsequent performances I have always used the original score, even when practically it would be easier to read from the iPad. I consider the score to be part of the performance. The visual information given by having the artefact there, and by seeing the performer set the cards out on the stand, gives the audience some context that I think is important to appreciating the intimacy of the music.

5.1.3 'Performance' of *December 1952*

What is provided in this realisation of Earle Brown's *December 1952* is a structure determined in its shape by the graphic score and fixed in its sonic components by my pre-recorded samples. Being an interactive environment, a virtual installation, the 'performance' of the piece is essentially done by the listener as they are in control of the only remaining indeterminate factors. The duration of the performance is entirely open, allowing the listener to explore the space ad libitum, and, as well as at any time, it can finish at any place in the score. While the available components are fixed, which and how many of them are heard is also up to the listener who is not obliged to visit all parts of the space, and therefore may not hear all of the sound sources.

The interaction between the sound samples is fixed by the radius of projection I determined in the realisation, however, the balance of these sounds is determined by the position of the virtual character, and therefore by the listener. In addition, the sound is spacialised so the direction the character is facing will affect the stereo balance.

It occurs to me in hindsight to draw a comparison between this piece, particularly the 'performance' of it, and the performance of *bet denagel*. My personal feeling is that the free exploration of the virtual installation is similar, from a musical perspective, to the architectural exploration of Matt's piece.

One difference I would point out is that, as opposed to *bet denagel* which is structurally and formally indeterminate, I consider the structure of this piece, and therefore its realisation, to be determined as, even though the listener may not visit all parts of the score and so not hear all of the available sonic components, they are none-the-less ongoing throughout the duration. The components of *bet denagel* may be played or not played according to the will of the performer.

5.2 Ambient indeterminacy

The indeterminacy caused by external factors contributes to any performance, from the wholly improvised to the most intricately determinate notated music. These factors can affect the sound of the instruments—the acoustic changes the sound that is made within it. It will also influence *how* the performer plays in a number of ways. Other ambient factors may change *what* the performer chooses to play, contributing more actively to the musical performance. The next section takes examples of the determining effect of the environment, followed by an analysis of how a combination of factors had a more profound effect on the function and identity of Matthew Sergeant's *[kiss]*.

5.2.1 Ambience as filter or disrupter

The acoustic of the space in which a performance takes place changes how we hear the sound of the instrument being played. To the performer, this can have a number of influencing effects. The ease with which the sound projects in the space changes how hard the performer has to work to make the sound carry. This ultimately will contribute to determining the dynamic range of the performance as, in an acoustic where the sound is not supported well (for example outside) and the performer has to put a lot of effort into the projection, the quietest dynamic will have to be louder than in an acoustic where the sound carries easily.

Different acoustics will also support different frequencies more than others, meaning that for a solo performance certain ranges may be easier to play in than others. In a group performance, it may be necessary to change the balance between the instruments consciously, for example for a string quartet playing in a space where the lower frequencies carry more easily than higher ones, the cello will have to play less loudly than they might normally, while the violins will have to work harder to be heard.

Tempo adjustment depending on the resonance of the performance space is often necessary. For fast passages it may be necessary to reduce the tempo in a reverberant acoustic, to allow the articulation to remain clear. It can also change one's perception of space in the music. The resonance softens the gaps between sound and silence, often having the effect that the performer will feel comfortable enough to take more time. This can be important in a piece with a temporal freedom, such as Jess Aslan's *104* or in improvisation, where a different acoustic environment might have more of an effect not only on *how*

the musical material is played but on what direction that material takes, for example, where the player perceives that the projection of the sound is difficult, they may choose to improvise with material that does not rely on a great amount of dynamic contrast.

In addition to the acoustic properties of the space, the ambience will invariably contribute it's own noise to the mix. Especially in improvisation, or music with a high level of indeterminacy in performance, this noise may form an active role in the music. Many of the notations in Christian Wolff's *For one, two or three people* require the performer to play something in relation to another sound they hear. In a performance with two or three performers, these sounds can mostly, but not necessarily, be made deliberately by the players. When there is only one performer, it is necessary to respond to ambient noises—to treat the sonic environment as an active participant in the performance.

The presence of an audience changes the acoustic and adds noise that could be in the background (raising the volume level of the 'silence' or in the foreground, such as contributing to the musical interaction. One of the determining factors of a performance to which the audience contributes greatly is the energy. In terms of communication, it makes a big difference to the performer what message you feel is coming back to you from the audience, and, depending on what kind of music and what kind of event this may be, in the form of silence, noise or movement. Lacking a connection to the audience breaks this sense of communication—who are you playing to? If not an audience, perhaps you are just playing to yourself, which tends to result in certain subtle factors that mean the audience finds it more difficult to engage with the music. Likewise, without feeling anything from the audience, the performer can feel alienated. Many things contribute to this feeling of commitment from the audience, only part of which is the appreciation shown before and after the performance takes place. A lot of this is related to the relationship between the ambient noise and the dynamic of the music—I have noticed before, for example with KUBOV, where we have played in a bar or club environment and the volume of background noise changes throughout the performance. Times when the audience have been extremely quiet, enabling us to play at the extremes of our dynamic range, have given us a feeling of intense energy and have had a definite effect on the energy of our performance.

5.2.2 Mutable identity in two performances of *[kiss]*

In its composition and performance this piece was experimental—for Matt and me there were many unknowns prior to the first performance. Psychologically, I considered it very much in the same vein as *bet denagel*, in terms of allowing the instrument and bow to be the determiners of timbre, with me as the instigator of the physical gestures as prescribed in the score. However, it also had the added weight of the durational challenge, and it was not clear how I or the audience would deal with this. There were two initial performances, the first in Manchester and the other in Bristol two days later.

The premiere was part of the Rampant Chaos festival and took place in a small theatre upstairs in the Kings Arms pub in Salford. There was room for a maximum of about 10 people in the theatre at any one time, and people were able to come and go at will throughout the performance, splitting their time between the pub and the theatre and also bringing drinks in with them

as they liked. The score itself, not unlike *bet denagel*, presented certain mounting problems due to its size—with four A3 sheets of paper to be placed in a quadrangular (not linear) formation, plus an additional A4 page. We attached four lengths of string between the floor and the ceiling to create a double easel for the A3 pages, and taped the A4 segment to the back wall. The audience was mostly opposite me, so behind the easel, although there was space for two or three people around the sides as well. Ambient noise levels were low, most noticeable contributions being from the door creaking and footsteps as people came and left, and the occasional banging of fireworks (November 5th). The performance began a little late due to a number of reasons, so the total performance length was only around 3hrs 35mins. Throughout the duration I felt my energy varying, noticing that my accuracy suffered at times when I felt physical and mental fatigue. The large number of possible outcomes the notation offers, combined with the non-predetermined structure, meant that I was able to take control of my energy input to a large extent—where I needed to make it easier I could hover around some of the less complicated and slower moving material which required less concentration and a lower level of physical exertion. On the other hand, when I needed to boost my energy I could move on to a faster or more active area of the score. Many of the audience members were friends of Matt's and/or mine, Manchester being where he lives and where I did formerly. As a result we had the support and encouragement of a home crowd—many of whom had some background information on the piece and who were also keen to give us feedback after the event.

The following performance in Bristol was part of the Tempting Failure performance art festival, and took place in a cell of a former police station which is now an arts venue, although no conversion of the interior design has been done. The festival took over the whole venue, so throughout the evening there were always multiple performances going on, of varying volume levels. Inside the cell there was space for a maximum of four audience members in the room at any one time—three on the bench behind me and one on a box next to me. While for the first performance my primary concern was whether or not I would actually be able to get all the way through it, for the second performance I was torn between the reassurance that I had managed it, and the concern that I would not be able to do it again.

The preparation of the bow and the deliberate decision not to use amplification, to emphasise the intimate nature of the piece, meant that I was not able to play louder to compensate for background noise, which sometimes reached high enough levels that I could not hear my own playing. The challenge to persevere was paramount, not only because the duration is an integral aspect of the piece but also because it was essential to my own engagement with the piece. Being partly meditative and partly obsessive, the ethos of the piece meant that even when I knew I was on my own I could not stop. Despite all external factors, I knew I had to keep going, even knowing that it was at times inaudible, and I did so for four and a quarter hours. At times the room was full and at others I was alone but aware that there were people outside the room. We had made the decision to keep the door shut to try to minimise the noise bleed from the other spaces, which meant that I was aware of it opening and closing, and of people coming in and out, which they did at a much greater frequency than in Manchester. As this time we did not know anyone else there, most of the audience would not have realised that Matt was the composer, so he was able

to observe people spectating, led by their curiosity. He told me afterwards that there were often people watching me play through the tiny window in the door, even when there was no one else in the room—perhaps due to inhibition to enter the room. To them, and to those who were present when the background noise was high, the piece, which had originally been intended as music, was a purely visual one.

> Theatre is all around us, says Cage, and it has always hung around music—if only you let your attention be 'distracted' from the sounds: Cage prefers the sight of the horn player emptying out the spit from his instrument to the sounds the orchestra is making; you may prefer to watch Bernstein with the volume control turned down to zero.[52, p. 22]

As with any musical performance, for all of the music included in this portfolio, the visual element—the theatrical—is significant. The two performances to date of *[kiss]* show an example of this in an extreme form, where the different theatrical environments have a strong influence on the identity of the piece. While Matt and I were both aware of certain theatrical elements of the piece—it was consciously 'staged' to a certain extent, with the score suspended with string and some consideration given to the lighting—it was only on reflection and with the feedback from others that another dimension of this became clear. The contrasting environments naturally played a key part in this, but, as exemplified by Cage (via Nyman), so does the point of view of the listener. Comments following the first performance brought ethical issues—concerns particularly from people who knew me, who felt uncomfortable watching me struggle after several hours of continuous playing. From this also came suggestions that it was in a way voyeuristic—something that perhaps became much more prominent in Bristol with people watching the performance through a prison door. It should also be noted that the audience in Manchester consisted primarily of musicians, whereas in Bristol the presentation was part of a performance art festival and therefore attracted a much broader artistic demographic. Certainly in both performances a significant *visual* impression was left on people; someone joked, seeing me a few months later, that they had not recognised me because I wasn't in a cage of red light. But comments on the sonic aspect of the piece made it clear that this was the focus of the Manchester performance (people complaining about the door creaking as it opened and closed showed that they were bothered by the sonic disruption), whereas in Bristol the focus was necessarily much more on feelings inspired by the visual and theatrical elements of the performance. In a more recent performance of *[kiss]*[2], it was requested specifically by the curator that we suspend the score with string as we had done previously. Matt and I were interested and rather entertained that our make-shift solution to a problem had, for observers, become an integral part of the performance. An audience member remarked to me that they liked how the four strings holding the score in place represented the four strings of the violin; I like this observation, and I do think it adds a pleasing aesthetic balance, although I have to confess that the thought had not crossed my mind until this point.

[2] At NMNW festival at the RNCM in Manchester, January 2016

Figure 5.1: Performance of *[kiss]*, RNCM, January 2016. Photo credit: Matt Whitham

5.3 Involving electronics

Music using any live electronic manipulation or even just amplification presents its own category of indeterminacy, related to the ambience and the instruments involved. The positive potential and some of the problems associated with using a microphone on an acoustic instrument are explored in the first section, followed by some of the practical discoveries made while working on various projects, particularly when performing with KUBOV.

5.3.1 The microphone as determiner

An aspect of electronic and amplified music that can be seen for its positive and negative effects is the determining effect of the microphone itself. Because microphones do not have selective hearing, like people, they will not discriminate between sounds that are intended to be part of the performance and those that are not. The ambient indeterminacy, the acoustic qualities and background noise, will encourage varying amounts and frequencies of feedback which can be a welcome or unwelcome contribution. Nicolas Collins, in a piece called *Room-tone variations*, uses a process where he analyses the resonant frequencies of a room and then constructs a score for acoustic instruments to play, thereby al-

lowing the acoustic properties of the space to determine the pitches of the piece. The microphone used in a performance or a recording is a determiner, just as the instrument itself is. My choice to use an omni-directional microphone is for a number of reasons. The fidelity to the sound of the acoustic instrument is excellent and I much prefer it on my instrument to the sound from a contact microphone. It also suits my style of improvisation which makes use of many of the timbral qualities of the instrument that do not originate between the bridge and the end of the fingerboard. As it is small and clips behind the bridge on the instrument, it is unobtrusive and allows me to move around. As it is naturally much more prone to feedback, it makes monitoring very difficult, but as part of my instrument when I perform with electronics the solution is to know it well and to have a catalogue of responses to different problems. For a performance of Matthew Whiteside's *Solo for viola d'amore and electronics* in the Maritime Museum in Aberdeen[3] we found that the acoustic ambience and the loud background noise of the heating meant that the level of the instrumental amplification and the live electronics had to be so low that it was almost impossible to hear the ring modulation and, with limited time and resources in the venue, we were unable to find a satisfactory balance. We did, however, find that during the performance we got some unplanned but beautiful feedback which Matthew was able to control so it was incorporated into the piece.

5.3.2 Feelings of dislocation in amplified or electroacoustic performance

An on-going difficulty I have had when working with electronics is how to deal with the dislocation of my sound when using amplification. The volume, which in an acoustic setting would be entirely controlled by me, is out of my control and I cannot tell what the volume or balance is like from where I stand on stage. Part of overcoming this problem was to learn to trust the sound engineer to balance the parts, but at the same time monitoring on stage is essential, to be able to hear other performers and to hear yourself. Particularly with Jess I use a lot of sounds that require amplification for them to be heard by anyone other than me, and for these techniques I find it very difficult to use them if I have no sense of the amplification. Part of the difficulty is from using an omnidirectional microphone, as to have a speaker facing me for monitoring produces too much feedback. One solution that was reached in our tutorials with David Pirró and Richard Barrett at Impuls was, instead of having my amplification in front of me, with all the sound projecting away from me so I could not hear it, to have it behind me but still facing away, the sound reflecting off a wall or a music stand. This seemed to solve the problem of feedback while allowing me to hear better how my amplified sound was blending with the other two players. The other solution that came from this set-up was to include a volume pedal in my control of the amplification. This meant that I could compensate for my very wide dynamic range, and boost the volume for certain very quiet effects, while making sure the loud parts weren't deafening.

Having felt like this was a breakthrough, our next gig was in a small club with a rock PA, and we found that it was not possible to balance my live signal with Jess's electronics unless my sound was also in the main PA. Our

[3] At Sound Festival 2015

compromise since then has been to have a small, indirect speaker for the violin, as well as including it in the main mix, the indirect speaker primarily functioning as monitoring which is really important to my perception of how my sound is affected by the amplification, and how it combines with the other parts. While certain difficulties I have had with an amplified set up have been down to experience—in a similar way to how one has to get used to the difference between auditorium and stage acoustics in un-amplified performance—from the point of view of being musically committed and involved in the performance, being immersed in the sound and feeling how your own part interacts with others is vital.

The experience from working with Jess in this way has fed into other projects, for example for Matthew Whiteside's *Piece for Viola D'amore and Electronics* or for Grisey's *Prologue* which I performed with Matthew controlling the artificial resonators via a Max/MSP patch. In both cases we found that using indirect speakers behind me helped with the balance of acoustic and electronic sounds and helped to minimise feedback.

5.4 Ensemble playing

Certain plans or decisions made in the rehearsal process will be on the assumption of other musical factors which may or may not go according to plan in performance. The differences in performance may be due to whim or error; tempo, for example, may be different because one person feels it should be faster or slower than rehearsed and others have to follow. In the moment, one player feels a musical inclination to take extra time to phrase a certain passage and the other players will follow. Someone may play a rhythm incorrectly, adding or losing some time from the bar and not realising, which forces the other player or players to accommodate in their own parts. Someone may knock some music off the stand by accident and the other player will hold a fermata for longer to allow them time to retrieve it. Naturally these same anthropo-indeterminate factors exist in solo performance as well, but there are particular performative implications when the source of the indeterminacy is someone else rather than oneself.

5.4.1 Perception in performance and pre-decision

In an improvisational scenario, looking for, identifying, and deciding whether to take potential endings that appear from the music is determined through communication between the performers of the ensemble. Taking the Grey Area performance of Stockhausen's *Unbegrenzt* (*Unlimited*)[4] as an example:

> *Unbegrenzt* (*Unlimited*)
>
> play a sound
> with the certainty
> that you have an infinite amount of time and space

[4] April 2014, McEwan Hall, Edinburgh

The primary problem with a performance of *Unlimited* is that, normally, concert programming either dictates the length of a performance or, at least, requires it to be pre-determined for practical reasons. In rehearsal, it was hard to engage with the score fully—to really believe that there was unlimited time. As with *[kiss]*, it felt like we could need the energy and feeling of occasion that came from a performance to commit to the mindset it required. I found I became aware of different limits—not scored limitations but those you impose on yourself, and that you perceive come from other people.

When we performed the piece, it had the final slot in the concert, and we made it clear to the audience that it would be long, but we did not know how long. In fact the performance was not such an epic, but the measures to accommodate that possibility seemed necessary to the character of the piece. We had pre-decided that the performance should be long, but that we should not decide on a duration. There were several possible ending points throughout the performance that one or more people actively passed by, the actual ending of the performance being when nobody drove it on. To me it seemed like one of the more unsure endings of our performances, perhaps because of a sense of uncertainty or lack of commitment—it ended because no one stopped it from ending rather than out of a group sense of finality. In discussion afterwards we found that some people had wanted to end earlier, and others had felt it could have continued.

Particularly in these scores that require an improvisational approach, there can often be a tension between a desire to be true to the directions in the score and the necessity to communicate to the audience: fidelity versus commitment to the performance. Perhaps the performance loses energy, perhaps the group pace has not gelled, but someone will depart from the 'plan' or the understood interpretation of the score to carry the performance through. In a similar way, when working with more traditional notation, one might improvise some notes to make up for a mistake that has been made—the continuation carries the phrase through whereas to omit notes would draw attention to the error. Part of the rehearsal process can involve the making of contingency plans for points of perceived danger—in other words, the "if we get lost here, we'll get back together here" approach. While obviously it is never the goal for this to be a substitute for adequate preparation, it creates a safety net in the knowledge that sometimes there will be unexpected moments in performance. Working with Karin on the Lutosławski *Partita*, we found that psychologically it was important for us to find those moments of security so we could work towards them. These were always moments of musical clarity after passages of displaced counterpoint.

While some of these performative indeterminacies involve crisis management and others interpretative flexibility, the connection is that the unexpected elements of performance must override pre-determined factors, whether notated or not. The performative implications of this are that it is necessary to know your own part well enough to keep attention on the other parts of the music, to know the other parts well enough to detect variation and to be able to embrace these unexpected or improvisational elements in your own playing. Rehearsal is for identifying what rules already exist for the piece, and for making others—determining additional factors according to group preference and circumstance. In performance these rules can be broken by accident or on purpose, the latter of these depending a great deal on trusting the other members of the ensemble

to be alert and inclined to respond.

Chapter 6

Conclusion

As outlined in the introduction, there have been certain key points of interest explored in the course of this research, as well as other considerations which emerged as a result of the collaborative projects that became parts of the portfolio. The conclusion now seeks to draw these matters together, in order to reflect on what has been learned.

My own personal development as a musician, an instrumentalist, and a collaborator has gained hugely from the work undertaken over the last few years, and I will begin by reflecting on that. Collaboration has been essential and integral to the work as a whole, and therefore one of the principal topics of discussion. Connected with this is a sense of responsibility, and I reflect on how this manifests itself and how it was dealt with in a number of practical situations. The musicality of a performance—continually discussed, ever abstract, and often contentious—has been a constant subject of fascination to me, and I have some thoughts, in the context of this research, to contribute. Finally, the attempt to assess a level of success in one's own musical endeavours is, for the musical practitioner, an inherent problem in this kind of research, an emotional trial, and many things in between. I will reflect on the role that this process of analysis has had throughout my work.

6.1 Personal development

The development of my practice throughout this research has been primarily through working on new repertoire, often collaboratively, and supporting this practice with reading, conversation, and coaching from a number of experienced musicians. A selection of the work I have done throughout this time is included in the portfolio, but many of the discoveries made along the way have been through having an active performing schedule, with a variety of repertoire from different eras and of different genres. All of this experience has contributed to this project. Some of the work has involved playing repertoire that I would not have approached had I not been asked to perform it, not necessarily due to a lack of interest, but because the pieces have been extremely technically demanding, and the incentive to learn them has been the performance opportunity. The generation of new repertoire has been a key incentive for me, and the serendipitous opportunities for collaboration with composers and other performers at

the right time, has been hugely influential on the outcome of this work. Beginning to improvise, which by coincidence rather than design I did around the same time as I began this work, has drastically changed the way I approach my instrumental technique and, also, a lot of notated repertoire. Importantly, my practice methodology today has drawn hugely from the mistakes I have made in the past, many in the course of this research, which I have tried to reflect on honestly in the case studies that form the main part of the thesis.

6.1.1 Reflection on 'mistakes'

While reflection on, and identification of success is useful, and entirely necessary for the morale, the old adage that we learn from our mistakes is important to bear in mind, particularly when reflecting on working processes. It is always tempting to try to protect feelings or pride, and to report on success and final product without drawing attention to error, but a lot of useful information can be lost this way. Learning a lot of contemporary repertoire has set up the opportunity for making many mistakes, which have then informed my approach to the next collaboration, or to the next piece of music I set out to learn. In order to reflect candidly on the development of my practice, this is a necessary acknowledgement to make.

To say that practice makes perfect is misleading, as this is only true if the practice process itself is perfect.[1] Practice is repetition and mistakes are also habit forming, therefore repeated mistakes are practice of error, and the longer this continues the harder it is to correct the error.

On a larger scale, mistakes can be made in the fundamental approach to a piece. For example, with Aaron Cassidy's *The Crutch of Memory*, I had not initially understood the notational hierarchy, which made the learning process much harder. I had also resolutely stuck to my theoretical method of learning it—I had made a plan of attack based on my level of knowledge and experience at the time which, although not insignificant, was extremely limited with regard to some of the problems I faced in approaching this piece. Although I knew that I was struggling to learn it, I thought, at the time, that it was due to my own technical limitations and lack of experience, not that my basic method was flawed. This experience, challenging though it was at the time, informed my working process for the next repertoire I learned, in particular *bet denagel*. The understanding of these factors has led me to two things. Firstly, the experience gained from the work I have done so far means that I can approach certain types of notation from a much better informed starting point. Secondly, for music that is new to me, that I do not yet know how to learn, I will approach it in a less rigid way initially, experimenting with different methods and techniques at first, finding what is easier or more natural, and identifying what requires a different technique, as opposed to what simply needs repetitive practice. In order to achieve this, it is necessary to adopt a creative approach to practising, experimenting with techniques and sounds, trying extreme combinations of techniques to find the right balance. I also now tend to create exercises to practise new technique, separating some of the technical practice from the actual piece. I find that this helps to avoid association of technical difficulty

[1] Eyal Kless, my former teacher at the RNCM, used to say that practice does not make perfect, practice makes *permanent*.

with the musical elements of the piece, and avoids premature commitment to a methodology for that particular piece. Another element of practice that I find to be extremely important is the maintenance of technique. If the base point for learning a piece is higher, i.e. if the technique is already in place, then there are more options as to how to play it, in particular how to experiment with it initially, which will be determined, to an extent, by what is in the realms of possibility at the time.

6.1.2 Improvisation and technique

My practice as an improviser supports my work with notated scores and, likewise, learning notated music feeds back into my improvisation. As well as for notated music, the maintenance and development of technique is integral to my improvisational practice.

The invention of exercises and challenges for myself is done in an improvisatory way, separating intention from notation, so attention can be devoted to listening, rather than to reading the notation. As well as raising my basic level of technique, which naturally has an effect on playing notated music as already mentioned, the separation of the subtleties of sound production that can be achieved in this way means beginning with more interpretative options for timbre and phrasing in notated music.

At the same time, the demands of some notated music require discovery and practice of new techniques which will not only inform future work on notated music but can also feed into improvisation. The general discovery of new techniques and sounds contributes to an individual improvisational language.

For improvised performance, while most musical elements are not predetermined, this developed vocabulary and syntax from one's musical practice as a whole determines the material from which a unique recital occurs. Consciously, my improvisation mixes that which I control and that which I set up to allow my instrument to control, which takes definite inspiration from some of the collaborative projects I have been involved with along the way, particularly the process of discovery involved in learning *bet denagel*.

Improvisation with other musicians has given me the opportunity to develop skills and to test ideas in different challenging environments. My work with Jess Aslan in KUBOV has given me the opportunity to learn to play with live electronics, discovering in detail how to play with a complex system of effects. Larger groups such as Grey Area and Edimpro, which combine acoustic and electronic/amplified playing, have also contributed to this, have led to the discovery of new potential in my own instrument and playing, and have presented a range of other challenges, including finding a balance between a number of instruments with different volume capabilities, violin not being the noisiest.

My ability to improvise also lends a feeling of security in performance of notated music by supporting some of the technical challenges in the pieces I play. Having developed my relationship with my instrument through improvisation, I know that if I do make a mistake, or if external factors interfere with my ability to play, I have a good enough understanding of the function of my instrument and the intention of the music to recover, either by finding a different way, technically to achieve the requirements of the notation, or by substituting with something suitable.

6.1.3 Experience/acquired knowledge

It is the cumulative effect of the musical work I have done, not only during the period of time this research has occupied, and not only that which is directly relevant to the topic, which has amounted to the instrumental technique and musical perspective which contributes to the way in which I, in my involvement with music-making, determine musical factors.

Reflecting on experience and knowledge acquired essentially asks, why and how do I know or think what I think I know? As already discussed, error has been a significant factor in gaining experience, but there are a number of other contributing factors which have been important supporting influences on the work as a whole, but not focal points for the case studies featured in this document. Playing a number of different instruments, rather than just one has helped in the understanding of the individual characteristics of the instrument and their direct effect on sound and playability—the determinacy of the instrument itself and my interaction with it.

In addition to the music presented in the portfolio I have played music of a variety of genres including baroque, classical and romantic repertoire, working with bands and musical theatre and recording samples for fixed-media pieces. This has involved working on my own and in groups of different sizes. All of this experience has contributed to a greater or lesser extent to my current level of experience, and therefore to how I approach new work. While it was necessary to focus, for the purposes of presenting this work, it has been important to me all along to keep my interests and study broad, and I have noticed as I have begun to pick up new skills, for example through playing electroacoustic music, that it has influenced my perspective as a whole.

Learning new techniques for a purpose (such as a particular piece) means that they become an ingrained part of one's technique as a whole. When presented with a challenge, the range of possible solutions consists mostly of what has been tried and tested in the past. Often this can be subconscious. In sight-reading, for example, there is an automatic physical response to notation, from an expanding repertory of techniques.

Playing baroque music—learning from the instrument as part of HIP practice—has parallels with the performance of new music, particularly those pieces that explore timbral indeterminacy as a feature. The concept that the instrument itself has idiosyncrasies, and more specifically that this is *desirable*, was fundamental to the creation of *bet denagel*, and was developed to the extreme. This concept of instrumental (in)determinacy also became crucial to my approach to improvisation, developing what I consider to be a collaborative relationship with my instrument.

Aaron Berkowitz (citing Nick Ellis) talks, in the context of improvisation, about 'implicit learning' which

> is defined as "the acquisition of knowledge about the underlying structure of a complex stimulus environment by a process which takes place naturally, simply and without conscious operations…a nonconscious and automatic abstraction of the structural nature of the material arrived at from experience of instances." By contrast, explicit learning is "a more conscious operation where the individual makes and tests hypotheses in a search for structure…[5, p. 7]

Knowledge acquired from literature is much more easily accountable for than that acquired from conversation, but the nature of my work involves much discussion in and out of rehearsal situations, usually informally. Certain ideas people have put forward have been new to me and clearly formed, but other ideas have developed gradually over the course of many conversations with different people and different experiences. Experimenting practically with these ideas and reflecting on them in my writing has helped me to develop them from my own point-of-view.

My engagement with new and experimental music has changed the way I approach all music. Rather than looking at the notation and seeing what has been determined, I can instead ask what has *not* been determined. Approaching very complex, technically demanding notation, there is no longer the barrier of impossibility, the question of 'how are you supposed to do that?' but, rather, the embracing of a challenge, 'how shall I find a way to make it work?', and attitude shift which allows for the continuing development of my instrumental technique, and discovery of new sounds.

6.1.4 Pedagogical consequences

Reflecting on the development of my own instrumental practice as part of this work, a better understanding of technique, the learning process, and the approach to finding solutions to challenges presented by notated music—problem solving—all feed back into my teaching method.

Specifically, they facilitate the creation of exercises to practise technique away from the context of the piece; the identification of choices presented by the notation—finding multiple solutions to problems and discussing *how* to make the decision. Is it about what is physically possible? Which way sounds better to you?

The activity of explaining these things, and exploring these ideas while teaching also feeds back naturally into my practice, while questions asked push me to develop ideas further, and to challenge my own understanding of these matters.

Teaching improvisation in a group similarly gave me the opportunity to test and challenge ideas in terms of development, musical exchange, and purpose.

While we do not want to embark on a lengthy process of reinventing the wheel, practice as a journey of self-discovery is not so much a means to an end, but a way to truly understand the route. Learning a technique through instruction is less memorable than finding a way oneself. It is not just about understanding the technique but, much more in fact, about understanding one's own body.

6.2 On collaboration

Any music-making that involves more than one person is a combination of skills and creativity, and is therefore—at best—a collaboration. This can be with other performers, playing improvised or notated music; with composers directly or indirectly; with technical support for the performance; with editors, either at a notational stage or for recorded material; and so on. The performance of notated composition involves a combination of at least two musical minds, and therefore (whether or not the composer and performer meet) the result is a

collaborative effort. Assessing what one's creative role and responsibilities are at any given point of the process is essential.

Referring to Christopher Small's ideology in *Musicking*[61], Owen Green points out that "music is something that people do…rather than some *thing* that could be encapsulated as an artefact"[28, p. 134]. Handing a score to a performer is not like feeding it into a machine that will recreate the composer's exact wishes (even performing machines rarely do this), but it is passing it into the care of another creative musical mind. As a performer, being entirely inert is not an option (harking back to Taruskin's observation of the attitude that "the best thing a performer can do is disappear."[67, p. 129]), so in each collaborative circumstance it is necessary to gauge the nature and degree of creative input.

Writing on "improvisation as a creative process within contemporary music", MacDonald, Wilson, and Miell discuss "creativity as a social activity", and the way in which research must take into account the more long term process, rather than being "measured only by the production of quantifiable cultural artefacts"[30, p. 249]. With each collaboration that has taken place in the course of this study, whether involving improvisation or not, there has been an extended social relationship which has been interlinked with the music-making. The performance or performances have been only one part of a whole process which has developed and continues to evolve. In the case of my work with Matthew Sergeant, for example, which occurred as a result of an existing friendship and mutual musical interests, we were able to reflect on our collaboration continually during the creation of two pieces, with multiple performances. It was the many informal discussions, on top of our work together on *bet denagel* which led to the development of a very experimental approach to the creation of *[kiss]*.

Fitch and Heyde reflect that "a successful collaboration will not attempt to defuse the difficulties of the situation, which are in any case unavoidable, but will harness its provocative and questioning aspects"[24, p. 73]. At times, when certain pressures on collaborations (often as a result of deadlines), such as in the compositional and technical design stage of Matthew Whiteside's *Solo for viola d'amore and electronics* have caused some difficulties, we have managed to come to a solution which we then reflected on, discussing how we might learn from the experience for future projects. The rest of this section reflects on the different creative roles assumed in a collaboration, whether directly with, or in the absence of the composer. I also consider the way in which indeterminacy becomes a point of creative contact within these collaborations.

6.2.1 Creative roles

The participants in a collaboration each have their own discrete creative roles, and that of a performer can vary dramatically depending on the context—the nature of the indeterminacy. An area of contention surrounding highly indeterminate music concerns the job of the composer—if much is left to the performer to determine, has the composer shirked their responsibilities? Should the performer be bestowed with some of the compositional credit? For my part, it is not a question of what my role *should* be, based on my job description as a performer, but more about establishing what my creative role is in that particularly relationship.

Martin Iddon examines the creative exchange between Cage and Tudor, in

light of this contention. He suggests that, while it might be arguable to consider Tudor's role a compositional one in many cases, it may be more useful to think in terms, borrowed from Giorgio Agamben's philosophy,[1] of *praxis* and *poiesis*.

> Cage's scores across the 1950s…allow, which is to say they reveal, a poietic space, within which truthful forms of praxis can in turn be revealed…in order that Cage's music may become recognizable *as* music (or art, for that matter), it requires the praxis of a Tudor; in the world in which Cage and Tudor lived, it was necessary that Cage had someone who was prepared to close the circle, to frame a particular form of unveiling of possibilities at a particular moment.[36, p. 215]

The example of Cage and Tudor is particularly stark, given Tudor's mathematical and meticulous approach to Cage's compositional games. I would, however, argue that the point Iddon makes applies more generally to collaborative musical processes. Recognising one's creative role in a collaboration in terms of its levels of *praxis* and *poiesis*, rather than being concerned with what is within the remit of one's job, has the potential to lead to interesting and unique collaborative dynamics, embracing unpredicted development and exploration.

Direct collaboration with composers

In creating something where elements of each other's roles have been influenced by the other person, the end result is something that would not have come to life without both protagonists. My collaborations with Matthew Sergeant, Jess Aslan, and Matthew Whiteside each presented a different balance of responsibilities. With both *bet denagel* and *[kiss]* the conceptual detail of the piece—the *poiesis*—was worked out in detail by Matt, while my *praxis* role was primarily to do with my physical relationship with my instrument.

With Jess, from the outset we discussed our collaborative method. Jess was keen that I should be involved in the creative process from the outset and, as we were working primarily with the manipulation of sound over notated material, we were careful to avoid a case of "the performer giving the composer access to his 'box of tricks"'[24]. In this unusual case, after the earlier pieces, our creative relationship did deliberately transition into one of joint authorship and joint performance.

Establishing our discrete roles was, I feel, a less successful element of my work with Matthew Whiteside, and resulted in some stresses and strains throughout the process, which we have since been able to reflect on. Some more detailed collaborative instrumental exploration, such as that which took place with Jess and Matt, could potentially have saved some of the multiple phases of rewriting that were necessary due to a mismatch between Matthew's vision for the piece, and the capabilities of the instrument. In hindsight, I also felt that, had I restricted myself more improvisationally when demonstrating certain aspects of the music, it would have been less influential which, in the context of this collaboration, would have been preferable, as I felt that it was more of an imposition than a positive contribution to the musical material. More successful in this case was our work together in designing the electronics for the piece for which we found a productive combination of our skills and imaginations.

Collaboration in the absence of the composer

The repertoire for which I did not have any input in the compositional phase can be divided into that with a living, contactable composer, and that without. In the case of *Ulation*, as I observe in chapter 4, I felt that I had flexibility to experiment with techniques and scordatura that the musical material suggested to me, partly because I was able to demonstrate different options to the composer for him to give his opinion. In the case of the *Partita*, as with other music where my relationship with the composer is only via the notation, I felt more restricted to interpret the notation without altering it.

While we normally refer to collaboration as being project-based work in the compositional phase, as I suggest at the beginning of this section—any music-making involving more than one person is collaborative. In the case of music that is notated prior to the performer's involvement, even in cases that lack living ties altogether, the music as a process (rather than an artefact) still involves the creative input of more than one person. The composition—the pre-determined musical material—stays the same, but the performer changes: the *collaboration* is different.

6.2.2 Indeterminacy as a point of collaborative contact

Having spoken about creative roles within a collaboration, various types of indeterminacy can form a point of contact between these two, or more, contributions.

Discovery

> What have Cage's pieces to do with self-expression? Nothing. They've got everything to do with discovery.[46, p. 11]

Cage's compositions were the stimulus for the process of discovery that Tudor would undergo. Although entirely different in character, and not devoid of self-expression, the notation of *bet denagel* provided an impulse for the exploration of the sonic capabilities of the instrument. While un-notated, the inherent indeterminacy in Jess's electronics, and the timbral indeterminacy of certain violin techniques used, were a contact point in our collaborative work, which explored the instruments in a hybrid state.

Virtuosity

The notion of virtuosity in performance is still often equated with nineteenth century aesthetics, however, virtuosity can be considered in terms of the challenge set by the composer to the performer, and, in a broader way, to performance paradigms. There are numerous historical tales of performers declaring new works to be 'impossible'—works that are now part of the standard repertoire, as solutions were found, and techniques developed that became absorbed into the established pedagogy of the instrument. Virtuosity is entwined with the idea of the 'impossible' in music, but, as illustrated by Irvine Arditti talking about Xenakis[39, p. 219], it is only impossible until someone finds a way to do it. Pushing the limits of human ability in this way is dependent on the art of collaboration, and is, by nature, indeterminate.

6.3 Responsibility

> Morton Feldman, in an unpublished interview with Robert Ashley (1963): 'I know that in performance I have occasions within my work where I would designate a certain amount of notes to play in the graph things, and I would hear "Yankee Doodle" coming out of the horn section. The players decide together before the concert, actually to sabotage it - and they decided in this particular section they were going to play "Yankee Doodle": with the amount of note called for and in the register of the score - there was nothing I could say it wasn't inherent in the instructions of the piece. But of course I said "Manslaughter is one thing, but not homicide; I have not given you license to murder the piece". So for the younger generation the implication is a moral question that has to be decided ultimately'. [Entire quotation from Childs, *Some Notes Toward a Philosophy of Notation*[16]]

The above quote negatively demonstrates the responsibility one must take as a performer, particularly when extra creative licence has been afforded. The performance of any music must be informed by the context in which it was written, historically, instrumentally, and in terms of the composer's œuvre which, in Feldman's example, was the problem—while the instructions may have been followed, the notes played were entirely inappropriate stylistically. The other problem is that the farcical inclusion of the tune, amounting to sabotage, showed a deliberate lack of commitment to the musical performance—a demonstration against it, in fact. While this protest was overt, it exemplifies the need for commitment, particularly in the performance of music of an experimental nature.

6.3.1 Contextual information

Contextual information must be taken into consideration. An illustration of this occurs in the discussion of the playability question (p. 26), where the composer's use of notation, and their apparent intention, should be queried. Had the performers in the example above taken account of Feldman's musical aesthetic, it would have been impossible for them to apply the 'rules' in such a way. In my own performance practice, this contextual information has played a significant role in a number of circumstances. Collaborating with Matthew Whiteside, I found that my knowledge of his compositional style, mainly via *Ulation*, was extremely useful in communicating with him about decisions in the *Solo for viola d'amore and electronics*. Working on *bet denagel*, the conversations I had with Matthew Sergeant about de-coupling, in the context of his other recent pieces, and those of other composers, gave me an insight of how to deal with the practical implications of such notation. Similarly, the work we had already done together contributed to our next project *[kiss]*.

6.3.2 Commitment

The idea of commitment, while being vital for any compelling performance, is especially important for compositions that call for a somewhat unusual performative situation. In some situations, the performer may be leaning towards

feeling ridiculous, and may feel embarrassed about fulfilling some of the directions called for in the score. If this is conveyed to the audience, the whole performance becomes a farce, but if the performer can give a committed and compelling rendition of the piece, the integrity of the work is preserved. Part of the responsibility that goes along with experimental performance is to play with dignity, and respect to the composer and their piece. This does not rule out *humour*, but rather ensures that the composer and the performer are playing for the same team.

6.4 Musicality

What people perceive as a *musical* performance (that is as opposed to unmusical, rather than to distinguish it from other types of performance) is, in part, a performer's ability to communicate what they hear in the music—what they discover, how they understand the notation, what they prioritise. To give an example, if a performance of a piece of music does not seem to be phrased in a 'musical' way, it could be for a number of reasons. Perhaps the performer has not analysed how this should be done, maybe they have, but they have prioritised other musical factors so they are not communicating this, or perhaps they have identified the phrase and they believe that they are communicating it, but they are not really listening to what they are playing. We can perceive a performance to be 'musical' without agreeing with the interpretation, so it does not necessarily require the performer's priorities and relationship with the piece to match that of the listener. It does require, however, an element of unpredictability.

Kiene Brillenburg Wurth "analyzes how "musicality" (connoted as in-definity: infinity and indeterminacy) can be seen to project a sublime as *liminality* instead of transcendence: an experience *at the limit* (in a "proper" sense of "sublime")"[71, p. 15]. I find the correspondence between musicality and indeterminacy suggested here to be particularly apt, applying to any performance.

Thurston Dart's tirade against new music includes the opinion that "musical notation…has enmeshed the performer in an ever-closing net of precise and tyrannical directions." He goes on to say that "Composers like Stravinsky and Schönberg leave the interpreter no freedom whatever; every nuance of dynamic, tempo, phrasing, rhythm and expression is rigidly prescribed, and the performer is reduced to the abject status of a pianola or a gramophone."[19] While it is only fair to point out that this was written in 1954, I am sadly not surprised when I hear people (musicians included) make similar comments about new music today. There is a misunderstanding that notating detail detracts from the performer's expressive musicality. I hope that cases such as *bet denagel* demonstrate that this is not true. The sometimes minute differences between performances of the same piece, even by the same performer demonstrate this living personal connection—the human indeterminacy—and the sublime in both Wurth's "proper" sense of the word, and a more metaphorical way.

6.5 The notion of success

It has struck me more and more often recently, that one performer's perception of the 'success' of a performance can be radically different from that of the other performers, and from that of the audience. Indeed, as exemplified by Owen Green talking about an early performance of Stockhausen's *Verbindung*[29], our perception of the quality of our own performance can change radically over time, comparing one's reaction to a recording with one's memory of the same performance. What makes a successful performance? Is it necessarily one that matches expectations? A performance from a well-respected soloist would probably be disappointing if the intonation was poor, as it would be expected that they are able to play in tune, however, it is not enough simply to meet expectations. Perhaps it is a performance that necessarily does *not* match expectations that changes its status from 'good' to a more superlative description—the musicality of human indeterminacy. What is more, a performance is not *necessarily* required to tick all of the boxes of the expected qualities to be deemed successful.

Reflection and perspective

Part of the reason for people having very different opinions on the same performance is that, as a performer, we have the tendency to focus on mistakes—undesirable indeterminacies due to human fallibility. Problems, errors, and interruptions tend to be the focus of attention in immediate hindsight. These are generally not the outstanding features of a performance to the audience, who will, for the most part, be less familiar with the score. Minor errors are often forgotten over time and so, when the performer listens to a recording of the performance months or years later, they do so from the perspective of the audience, and can often be pleasantly surprised by how their negative expectations (based on memory) do not match their new impression. Likewise, as the performer, one can have the impression of a successful performance but, on hearing a recording, find that it was not as good as had initially been thought. This, I believe, comes down to expectation. If no conspicuous errors were made, the performance had energy and commitment, and the quality matched that of the practice in preparation for the performance, it will appear to have been successful. However, this last point is crucial, as, if the practice included, for example, poor intonation or sound quality, this will have been transmitted to the performance, and will likely come across to the performer in the recording, within a different perceptual context.

Process

Experimental musicking is a process that does not accommodate the same expectations of perfection as the classical canonic repertoire. Improvisation—what is a 'mistake' in an improvisation?—can elicit a whole range of emotions and reactions from the audience, and in the absence of a score to assess if the product matches the intention, the way people (performers and audience) feel is the only way to attempt a measure of success. Happiness and enjoyment are by no means what everybody is searching for in music (or other art forms), but to have thoughts provoked, to have one's emotions manipulated in such a way that they are a response to what has been heard or seen. To create something of

interest and to make people feel *something*, or perhaps not know how they feel, but to evoke a response rather than no response, I would argue is a better way to reflect on the success of a performance. Entering a world of contemporary and experimental music performance, it was important for me to let go of the desire to please everyone—I cannot expect everyone to like the music I engage with, but I can always hope to give the audience something to think about. As an audience member, I try to have this attitude as well—not all of the concerts I attend are enjoyable, and nor would I particularly want that. Personally, I would rather see a performance that was an unmitigated catastrophe than one that was merely mediocre.

6.6 Final thoughts

I would like to finish by addressing Cage's question, cited at the very beginning of this thesis, in the context of my own practical outlook: "Composing's one thing, performing's another, listening's a third. What can they have to do with one another?" For me, these three activities have a particular link in terms of determinacy in music. It is the act of listening in a specific way that can render an incidental or unintended noise musical—the most indeterminate form music can take. By creating a sound with the intention that it is musical, at the very least its purpose has been pre-determined. Adding further layers of determinacy, we reach the compositional phase. "The first musical act is listening"[51], the second is the deliberate making of musical sound (performing/improvising), the third is predetermining these sounds and their order (composition). By reversing the order of Cage's list, the connection between the three activities shows an inextricable dependency, and a compelling template for collaborative action and ambition.

Appendix A

Terminology and A/V examples

A.1 Technical terms/glossary

Here is a short list of terms used in the thesis which are either specific to violin playing or electronic music, that the reader may not be familiar with.

Down-bow	Drawing the bow in the direction of heel (the end it is held) to tip.
Double-stop	More than one string played at the same time.
Glissando	Sliding pitch.
Harmonics (artificial/natural)	Notes in the harmonic series. On a violin this is achieved by touching the string lightly, rather than depressing it to the fingerboard. Natural harmonics are those of the open string. Artificial harmonics are played by stopping one note (depressing it to the fingerboard) and lightly touching the string at a harmonic node above the stopped note with another finger.
Harmonic pressure	Touching the string lightly in the same way as to play a harmonic, but not necessarily at a harmonic node.
Lateral bow movement (laterally)	Movement of the bow along the string in the direction of bridge to fingerboard, or vice versa.
Patch	A programme written, for example, with Max/MSP for the electronic manipulation of live sound.
Portamento	A slide between notes, either of which may be of indeterminate pitch.
Scordatura	Non-standard tuning of the instrument
Sul pont. / Sul ponticello	On the bridge. This normally describes a sound which is harsher than 'normal', with an indeterminate mix of the sounding pitch of the note and its high partials. It usually indicates that the bow should be closer to the bridge than the contact point that would be used for a clear,

	projected sound, as opposed to actually on it, which results in an almost pitchless sound. See A.2 for video example.
Sul tasto	Over the fingerboard. This describes a sound which is weaker than 'normal' and means bowing the string further away from the bridge than the contact point that would be used for a clear, projected sound. See A.2 for video example.
Up-bow	Drawing the bow in the direction of tip to heel (the end it is held).

A.2 Bow technique

An explanation of some of the more technical aspects of instrumental technique, referred to in the course of this thesis, is contained with the portfolio and can be viewed in a browser—please see the text file if there are any problems opening the page. It contains a number of short videos in demonstration of the techniques described.

A.3 Photographs of instruments used

I have included a gallery of photographs of the instruments used on the accompanying media USB drive. It is categorised as follows:

1. Violin
2. Baroque violin
3. Viola
4. Viola d'amore
5. Bows and other implements
6. Electronic devices

Appendix B

Associated artist links

Jess Aslan

www.jessicaaslan.com

Dave Lloyd

www.lostoscillation.com
www.stillhound.co.uk

Karin Schistek

https://sites.google.com/site/karinschistek

Matthew Sergeant

http://matthewsergeant.squarespace.com

Ian Vine

http://www.ianvine.com

Matthew Whiteside

http://www.matthewwhiteside.co.uk

Grey Area

Members:
Owen Green http://owengreen.net/
Emma Lloyd www.emmajanelloyd.com
Nikki Moran http://www.eca.ed.ac.uk/reid-school-of-music/nikki-moran
Dave Murray-Rust http://www.mo-seph.com/
Armin Sturm http://www.aqua.stir.ac.uk/about/people/armin-sturm
Shiori Usui http://shioriusui.com/
Sean Williams http://sbkw.net/

Appendix C

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