



**MONASH** University

*The Development of Manipulative Aural Skills  
in Improvising Musicians via Mental Practice  
during Performance Preparation*

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Doctor of Philosophy (PhD) – Music Performance

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## **Abstract**

The research carried out for this project centred on developing the ability to improvise in the mind, while away from the instrument, via mental practice. For this project, the aforementioned ability and associated skills were termed 'Manipulative Aural Skills'. The project sought to ascertain how Manipulative Aural Skills are best developed, and whether developing them could be an effective vehicle for improving the author's improvisational skills and performance preparation regime. A significant preoccupation of this project was investigating whether the streamlining of Manipulative Aural Skills would enable the author to more clearly realise, and execute musical ideas that are heard in the mind while improvising during a performance. The various impacts of developing and streamlining Manipulative Aural Skills on the author's approach to improvisation, improvisational skills and performance preparation are detailed in the exegesis. The results of developing Manipulative Aural Skills are also manifested in the primary outcome of the project, the recordings.

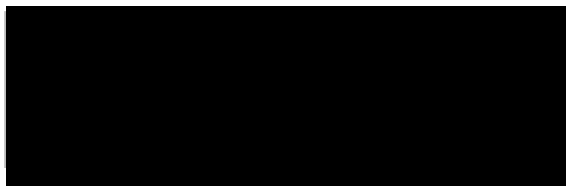
The main method of research in this project was research-led practice: Information was collected in the first half of the project that could then be applied within my creative practices in the second part, in order to generate artistic outcomes. Qualitative semi-structured interviews were carried out, examining how seventeen high-level improvising musicians experienced and developed Manipulative Aural Skills. This enquiry sought to observe approaches that the musicians had taken to lessen the effort associated with the generation of auditory imagery during mental improvisation. Data pointing to how this had been achieved was then applied in various approaches to performance preparation in the second part of the project. In the second part, practice-led research was the main research method that was applied: Iteration and reflective analysis of the different processes enabled the systematic refining of an approach to developing Manipulative Aural Skills, one that satisfied the practical and artistic needs of the author, a professional improvising musician.

This research project yielded many insights in relation to how Manipulative Aural Skills may be developed and streamlined in professional improvising musicians. It has shown how their development and engagement can be beneficial to a musician's creative practices, and an efficient tool for affecting artistic outcomes.

## Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

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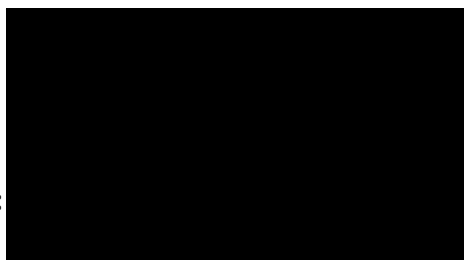
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Without the love, patience and unwavering support of my wife Marine, this project would not have been possible. I am eternally grateful. Finally I would like to thank my daughter, Lucie, for her love and inspiration.

## Content of CD

Piece	Track Number	Composer	Approximate Duration (min:sec)
<b>Green Dolphin Street (1<sup>st</sup> Phase Recording)</b>	<b>1</b>	<b>Bronislaw Kaper</b>	<b>04:13</b>
<b>My Funny Valentine (1<sup>st</sup> Phase Recording)</b>	<b>2</b>	<b>Richard Rogers</b>	<b>04:58</b>
<b>You Stepped Out Of A Dream</b>	<b>3</b>	<b>George Shearing</b>	<b>03:53</b>
<b>You'd Be So Nice To Come Home To</b>	<b>4</b>	<b>Cole Porter</b>	<b>03:18</b>
<b>How Deep Is The Ocean</b>	<b>5</b>	<b>Irving Berlin</b>	<b>03:34</b>
<b>Skating in Central Park</b>	<b>6</b>	<b>John Lewis</b>	<b>06:52</b>
<b>Invitation</b>	<b>7</b>	<b>Bronislaw Kaper</b>	<b>07:43</b>
<b>Yesterdays</b>	<b>8</b>	<b>Jerome Kern</b>	<b>05:49</b>
<b>All Or Nothing AT All</b>	<b>9</b>	<b>Arthur Altman</b>	<b>06:19</b>
<b>Lazy Bird</b>	<b>10</b>	<b>John Coltrane</b>	<b>03:34</b>
<b>Nica's Dream</b>	<b>11</b>	<b>Horace Silver</b>	<b>06:54</b>
<b>Night Dreamer</b>	<b>12</b>	<b>Wayne Shorter</b>	<b>05:18</b>
<b>Green Dolphin Street (4<sup>th</sup> Phase Recording)</b>	<b>13</b>	<b>Bronislaw Kaper</b>	<b>04:28</b>
<b>My Funny Valentine (4<sup>th</sup> Phase Recording)</b>	<b>14</b>	<b>Richard Rogers</b>	<b>06:46</b>

Performers: Tim Willis – Guitar, Tom Lee – Double Bass, Aaron McCoullough – Drums.

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# CHAPTER 1 – INTRODUCTION

## 1.1 Introduction

This project will investigate how the development of specific approaches to performance preparation impact upon the performance experience, creative practices and artistic output. The term ‘manipulative aural skills’ (MAS) was created for this project to describe the particular type of aural skill that enables an improvising musician to improvise in his or her mind, while away from the instrument. Thus, during mental improvisation, it is the mental representations depicting rhythmic, melodic and harmonic materials that are manipulated. In this project, the term ‘improvising musicians’ refers to musicians with a jazz improvisation musical language derived from the bebop, post-bop and modern jazz traditions<sup>1</sup>. Developing MAS during performance preparation formed the basis of this research. A primary outcome of this research-led practice project was a series of recordings, accompanied by a written exegesis that provided a critical commentary on the recordings and the approaches explored within this research.

Reflections on my previous approaches to improvisation highlighted an inability to fully realise the full potential of musical ideas during performance. I observed that I would often play melodic phrases, but was unable to revisit and develop the melodic and/or rhythmic possibilities contained within the original melodic ideas. The reflective analysis on this problem stemmed from frequent dissatisfaction with my improvisational abilities and unfulfilling performance experiences. The impetus for conducting this project is therefore to explore novel ways of improving my improvisational abilities and additionally, improving the quality of my performance preparation.

It was hypothesized that several potential benefits could arise from developing MAS that may in turn lead to such improvements. Some of these included: improving the ability to generate and manipulate musical ideas in my mind during performance, and improving the degree of

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<sup>1</sup> Musicians from this background are familiar with improvising over pieces of music with changing harmonic structures, fixed forms and a constant pulse. For this project the term improvisation will be understood in line with ideas that have been presented and discussed by Berkowitz (2010 pp. 61-63) and Johnson-Laird (2002 pp. 423-424). These authors have stated that musical improvisation involves the real-time selection and recombination of previously learned material. This notion has been examined in greater depth in the key terms section and the literature review in section 2.2.2

preparedness I experience prior to performances. Via reflections on my own experience, I ascertained and discussed the ways in which MAS development led to beneficial changes in my artistic output, creative practices and the performance experience.

An examination of the literature relating to the concept of MAS informed the view that cognitive processes involved in the operation of MAS are most active, and are therefore best demonstrated, while away from auditory sensory stimuli (Janata 2001, pp. 28-30; Pike 1974 p. 88). In this project, MAS was therefore developed via mental practice (Bernardi et al. 2013a, p. 284; Driskell, Copper & Moran 1994 p. 481). For this project mental practice was understood as practice that takes place away from the instrument, when the musician imagines music in his or her mind (Driskell, Copper & Moran 1994 p. 481). It was also understood as practice that is engaged in for the express purpose of developing mental representations for a given task (Bernard et al. 2013a, p. 275). Mental practice is one of many potential approaches to performance preparation (Jorgensen 2004, p. 92), it is highly focused, and has been observed to involve a great deal of concentration and effort (McAllister 2012, p. 197). It may be possible to argue that the effort involved in engaging in mental practice (and therefore engaging MAS away from the instrument) can be an impediment to the engagement and development of MAS. As such, a contention put forward in this project is that the concentration involved in engaging MAS via mental practice, stems from the effortful nature of generating musical auditory imagery. Therefore, the research conducted for this project provides an opportunity for myself and other interested parties to consider how MAS may be engaged and developed in a way that mitigates this effort.

An important component of this research project is a qualitative semi-structured interview of seventeen professional improvising musicians. This enquiry was carried out in order to better understand MAS and to look for ways that their application might be improved. The study was an important component of the project because it generated data that formed the basis of approaches trialled and developed in the second half of the project. The weighting of marks of this research project was altered to allow for this study. Fifty percent of marks will be awarded for the creative component (performance outcome), and fifty percent will be awarded for the exegesis.

## 1.2 Manipulative Aural Skills

The development of MAS was at the core of the creative processes and outcomes within this research project. Therefore, before presenting the central aims and research questions of this project, an overview of the concept of MAS will be presented. Situating MAS as a type of aural skill enables this project to demonstrate the lack of methods that are specifically aimed at developing it in improvising musician practitioners. This notion is explored in greater detail in the literature review.

I seek to create a paradigm whereby aural skills are understood as a set of skills that enable musicians to both, perceive music in their external environment<sup>2</sup>, and imagine music while away from their given instrument. My interest in this topic has drawn me to consider the understanding that information kept in the mind is recalled as representations (Eysenck & Keane 2001, p. 244). The type of mental representation of central importance to this project is known as auditory imagery, described by Halpern (1992, p. 1) as “sounds in the head”. The literature discussing aural skills development suggest that it is a process that may be understood as the deliberate construction of Knowledge Structures and Mental Representations (KSMR), that support and enable the rapid generation or triggering of auditory imagery (Covington 2005, pp. 33-35; Klonoski 2000, para. 20, Butler 1997, p. 47)<sup>3</sup>. From this it can be extrapolated that aural skills may be understood as the faculties that enable musicians to exert control over their KSMR responsible for generating musical auditory imagery. With this in mind, aural skills can be understood as the ability to quickly access information from one’s KSMR needed for the generation of musical auditory imagery.

Musical auditory imagery is also generated for purposes other than perception, such as when one imagines music while away from the instrument (Keller 2012, p. 207; Janata 2001, pp. 28-29). Thus, the skills governing our ability to generate musical auditory imagery while away from the instrument, may indeed be considered as another type of aural skill also. In this

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<sup>2</sup> Here ‘external environment’ refers to anywhere that a musician hears music that is not mentally generated.

<sup>3</sup> In many of the texts reviewed for this project the terms ‘ear-training’ and ‘aural skills development’ are employed in reference to processes that seek to develop the ability for musicians to rapidly generate musical auditory imagery. For this project the terms ‘aural skills development’ and ‘ear-training’ will be considered as the same, and the former will be the term that is employed.

project, the concept of MAS can be situated in this second category of aural skill. Accordingly, mental improvisation carried out away from the instrument requires the musician to draw only from their musical KSMR to generate the auditory imagery for their mental improvisations. In Chapter Two, literature was reviewed that suggested how the processes associated with auditory imagery generation, for the purposes of mental improvisation, differ to those engaged when the musician is remembering a piece of music in their mind. Though there may be such differences, we can nevertheless assume that there could be a degree of bidirectionality in their engagement: engaging one might be aided by engaging the other. Indeed, this project investigated whether this is the case.

An examination of the literature relating to mental improvisation, suggested that MAS may be best exercised, and therefore more clearly observable, when there are no external sound sources present: in this state MAS are not subject to interference or influence by external musical sound sources (Janata 2001, pp. 28-30; Pike 1974 p. 88). Therefore, in this project, improvements in my ability to engage MAS were brought to light via the analysis of unaccompanied vocalised improvisations over a jazz standard repertoire. The rationale behind this approach was based on the understanding that in order to accurately sing a pitch, the individual needs to generate a clear auditory image of that pitch (Pfordresher & Halpern 2013 pp.747-754). From this, we can infer that vocalising my improvisations is a good way of observing whether MAS development has improved my ability to generate musical auditory imagery.

### 1.3 Central Aims and Research Questions

This project had four central aims. The first was to improve my ability to improvise during performance. The second was to improve the quality of my performance preparation. The third aim was to ascertain whether MAS development was an effective approach for improving my improvisational skills and generating positive changes to my performance preparation. Finally, the fourth aim was to investigate how my MAS may be developed, efficiently engaged and streamlined.

Achieving the first three of these aims was facilitated by answering the questions:

*How did the development of MAS during performance preparation impact upon my creative practices and artistic output?*

*Did MAS development improve my improvisational abilities and approach to performance preparation?*

Providing comprehensive responses to these questions permitted the project to address and realise the first three aims. This was achieved via observations and reflective analyses of how MAS development affected my artistic output (in particular, whether it had a positive impact on my approach to improvisation). Such observations indicated whether my improvisational skills had indeed been positively impacted upon by this project. Additionally, similar observations and reflections relating to the impact of MAS development on my creative practices were also recorded in this exegesis. These observations and reflections are discussed in terms of whether changes made to my performance preparation resulted in improvements in my improvisational skills, and the quality of my approach to performance preparation.

It is important to note that the first aim (improving my improvisation abilities) additionally sought to address a particular ongoing focus of my performance preparation: the exploration of enhanced ways of both generating musical ideas that are heard in the mind during performance, and realising these ideas on the instrument. It was believed that improving my ability to make improved connections between musical ideas heard in the mind, and where these might be realised on the instrument, could have significant positive impacts on my improvisational abilities. Such musical ideas (that are heard in the mind while improvising during performance) are referred to by Hargreaves (2012, pp. 359-364) as ‘audiation-generated ideas’, and this is the term for these types of musical ideas that will be employed for this project.

As MAS development was the main medium through which results are realised in this project, the fourth aim was achieved by asking: How are MAS developed, engaged and streamlined? Satisfying the fourth aim meant that further questions needed to be posed as part of the qualitative enquiry, discussed in Chapters Three and Four. These questions were informed and formulated via a close examination of the literature relating to mental practice, musical imagery and auditory imagery. Data acquired via the accounts of the reported experiences of

the interview participants helped in pointing to how MAS, and the auditory imagery associated with MAS, could be more readily generated.

Reflective commentary on practice-led research conducted in this project will articulate how developing MAS has impacted upon and improved my improvisational abilities. Chapters Four, Five and Six will see the compiling of such information.

## 1.4 Methodology Overview

This project required two main methodologies: research-led practice (Smith & Dean 2009, pp. 7-9) and practice-led research (Smith & Dean 2009, pp. 7-9). In the following paragraphs I provide an overview of how these methods were applied in yielding the results of this project. A more detailed account of how these methods were applied takes place in Chapter Three.

Research-led practice formed the overarching method through which the outcomes of this project were realised. The first part of this project saw research carried out in order to collect relevant data. The second part will see the assimilation of this data into my creative practices and artistic output. The main method for obtaining the desired data in the first part of this project was qualitative semi-structured interviews. An enquiry was conducted into how a cohort of seventeen high level, professional improvising musicians experience MAS, and systematically obtain data from this group of musicians demonstrating how MAS have been applied for performance preparation. I was specifically looking for ways that participants in this group have streamlined the development and application of this skill by rendering the generation of musical auditory imagery less effortful.

Practice-led research was the main research method applied in the second part of the project. Practice-led research is a method whereby the processes associated with creative/artistic practices generate new discoveries (Smith & Dean 2009, p. 5). Research insights and data was generated via the analyses of transcriptions of my performance improvisations, as well as reflective analyses of performance preparation and the performance experience.

The second half of the project saw the development and refinement of an approach to performance preparation that embraces MAS development as the central vehicle. Data acquired from the qualitative study informed initial approaches. Developed over four phases, each phase of performance preparation culminated in a recording which produced a total of

fourteen recorded works. The process was iterative; the findings of analyses and reflections made after each recording impacted upon the formulation of the performance preparation regime trialled in the following phase. The outcomes of the practice-led research conducted in this second part of the project demonstrated how MAS development had impacted upon my performance experience, creative practices and artistic output.

## 1.5 Situating my Performance Approach and my Previous Approach to Performance Preparation

The creative focus of the improvisations in this project was not musical discourse and interaction between the ensemble members. Rather, it was the creation of narrative driven improvisations by a single soloist; the role of the ensemble in this approach is to provide rhythmic and harmonic support for the soloist while they are improvising. Proponents of this approach include Charlie Parker, Bud Powell and Dizzy Gillespie. Embracing this approach for this project provided me with greater opportunities to both demonstrate and explore the internally generated musical ideas that resulted from having developed my MAS; it enabled me to demonstrate the impacts of MAS development on how I construct and develop melodic lines in my improvisations.

My approach to improvisation prior to commencing this project relied on the sourcing and playing of motor-generated ideas (Hargreaves 2012, pp. 359-364) in order to build tension and bring the improvisation to a climax. Hargreaves (2012, pp. 359-364) States that these types of idea are not heard in the mind but are rather, sourced from procedural memory, what Chaffin, Logan & Begosh (2009, p. 562) have referred to as 'motor memory'<sup>4</sup>. This reliance on motor memory for melodic lines (as a vehicle for building tension in an improvisation) was a tendency of mine that I perceived to be a source of 'over-playing'<sup>5</sup>. Indeed, for many improvising musicians over-playing is viewed in a negative light, often

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<sup>4</sup> According to Chaffin, Logan & Begosh (2009, p. 256) motor memory is a type of unconscious, implicit memory. They state that playing the instrument is the only way that a musician can assure themselves that the knowledge stored in this type of memory is intact.

<sup>5</sup> For the great jazz saxophonist Lee Konitz, mitigating an over-reliance on the products of procedural knowledge (over-reliance on physical ability and technique) from his performance improvisations, and that of other ensemble members', is a central focus of his creative practices. See Ethan Iverson's interview with Lee Konitz in *JazzTimes* magazine 05/16/2011. Konitz and Iverson discuss processes used by Konitz and his band (namely vocalising solos) which are aimed at removing them from the influences of playing that is driven by 'muscle memory'. <http://jazztimes.com/articles/27721-lee-konitz-a-q-a-by-ethan-iverson>

perceived as a symptom of performance anxiety or inexperience with performance (Crook 2006, pp. 32-33; Werner 1996, p.54; see also Chaffin, Logan & Begosh p. 256). I intended to explore within this project whether MAS development during performance preparation alleviates this reliance on motor-generated ideas, by enabling me to source and exert greater control over audition-generated ideas during performance.

My previous approach to performance preparation was heavily influenced by the material I needed to learn for the various and varied ensembles in which I played. For example, more technically challenging material required that I spend more of my time during performance preparation physically playing and developing a motor memory of the piece. In the twelve years since completing my undergraduate degree, I have been looking for ways to economise the time spent learning new material and developing my improvisational skills during performance preparation<sup>6</sup>. As an improvising musician, I need to prepare and learn the pieces that I will perform. In addition to this, I also need to prepare for musical events that may be unforeseen, that may be experienced during a performance and are unique to that particular performance. Efficiency in performance preparation might be improved by exercising MAS, because it would very quickly clarify any deficiencies in my ability to generate and improvise music in my mind. As such I would be provided with an enhanced understanding of where to direct my attention during performance preparation.

Developing MAS, I hypothesized, could also be instrumental in helping me to achieve a greater sense of preparedness prior to performances. I believed that when applied in my own performance preparation regime, an improved understanding of the extent of my musical KSMR (how well I am able to exert control over these to generate auditory imagery) may have the additional benefit of rendering me more confident prior to performance. Thus, I sought to examine whether engaging MAS in my performance preparation may be an effective way of reassuring myself that I have a thorough understanding of the music I am to perform.

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<sup>6</sup> The amount of time that I have available to me to prepare for a performance has diminished from six hours a day during my undergraduate degree to between two to three hours prior to beginning this research project.

## 1.6 Key Terms

This project saw the engagement of several terms. These were of principal importance to how the aims and outcome of the project were understood. These terms will be discussed in this section.

### **Artistic Output**

For improvising musicians the term ‘artistic output’ can refer to the outcomes derived from the time spent engaged in their creative practices: these include; live and recorded performances and compositions. This project will narrow the definition ‘artistic output’ to refer to my recorded performance improvisations. This exegesis will provide a window through which the artistic output from this research project can be viewed and understood.

### **Audiation-Generated Ideas**

This is a term conceived by Hargreaves (2012, pp. 359-364) that describes musical ideas generated during performance improvisation that are clearly heard in the mind of the improviser.

### **Auditory Imagery**

Halpern (1992, p. 1) describes ‘auditory imagery’ as sound heard in the mind in the absence of an external sound source. Auditory imagery was understood in this project in line with this definition. It was discussed in relation to how musicians hear music in their minds. In this exegesis, auditory imagery was often discussed as having been ‘generated’. In this project ‘generating’ auditory imagery meant recalling previously encoded pitch information from memory.

### **Aural Scaffolding**

The term ‘aural scaffolding’ is introduced in Chapter Five and was adopted during the third phase of practice-led research. It describes the process of developing mental representations that depict and link pitch sounds and pitch locations, thus aiding MAS development. This process can be thought of as aural scaffolding because, like a scaffold, the process enables one move in any direction around and away from a specific pitch. Thus, creating a knowledge

of all pitch locations (on the instrument) and pitch sounds relating to the piece<sup>7</sup> being studied. Aural scaffolding involved improvising (slowly at first) over a piece and gradually attempting to sing all of the pitches related to the piece in the course of the improvisation.

### **Constructive Episodic Simulation**

According to Schacter, Addis & Buckner (2008, pp. 39-60; see also Anderson, Dewhurst & Nash 2012, p. 356), this term describes the aspect of long-term memory that enables humans to take mental imagery derived from memories of previous events, and recombine them so as to depict potential future situations.

### **Continuity via Motivic Development**

The term 'continuity' refers to the 'relatedness' (Crook 2006 pp. 37-38) between ideas introduced in the contents of the improvisation. 'Relatedness', according to Crook, results from the logical connection of one idea to the next. Crook applies this term in relation to motivic development in improvisation, and how it can be engaged in order to achieve continuity. Crook (2006, p. 33) describes a motive as a 'thematic unit of melody' between three to eight notes in length, that has either or both a strong rhythmic or melodic aspect to it. Motivic development according to Crook (ibid, p. 36) means: '...establishing, modifying, embellishing, or otherwise manipulating thematic material (i.e., original motives) for the purpose of creating continuity in the improvising'. Indeed Crook's definition of this term enables motivic development to be understood in a jazz improvisation context.

### **Creative Practices**

For this project this term refers to all processes that are intentionally engaged in preparation for generating artistic output. For improvising musicians, creative practices may be understood as those normally engaged as part of studio practice. For example, they include approaches for learning new material, learning new improvisational devices and studying transcriptions.

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<sup>7</sup> Aural scaffolding could be thought of as developing a schema for all of the pitches and their locations on the instrument for a given piece of music. According to Plant and Stanton (2013, p. 2) a schema is a type of knowledge structure made up of interconnected units of information. Thus, thinking of one particular unit of information will inadvertently bring to mind other associated units of information. For example, the word restaurant may bring to mind words like: waiter, fork, bill, dessert, napkin, wine and lunch.

### **Explicit Memory and Explicit Knowledge**

Explicit Memory refers to the type of long term memory that is in operation (and is therefore experienced) when conscious recall of information is required (Groome et al. 2014, pp.181-183). Explicit knowledge, recalled from explicit memory is done so, often with a degree of effort (Ibid p. 185). This is in contrast to implicit memory: knowledge stored as implicit memory is not consciously retrieved and unlike explicit knowledge, individuals are unable to verbalise the processes associated with its retrieval (Ibid pp.181-183). When the term 'explicit' is used in this project, it will be employed in relation to explicit memory: the conscious, effortful retrieval of information from long term memory.

### **Interpolated Melodic Lines**

This term is introduced in Chapter Five and was invented for this project to describe improvised melodic lines that are placed at specific moments between different developments of one motive in an improvisation. They were observed in my improvisations characterised as being melodic lines that occur between different statements of the same motive and that melodic content of which are not derived from any previously stated motives.

### **Knowledge Structures and Mental Representations (KSMR)**

For this project 'knowledge structures' will be understood as the systems within long-term memory, such as schemata that house a musician's musical knowledge, and may be engaged for generating auditory imagery (see Covington 2005, pp. 33-35; Janata 2001, pp. 28-30; Keller 2012, p. 207). As mental representations other than auditory imagery have been discussed in the relevant literature as being potentially important in auditory imagery generation also (see Godoy 2010, p. 55), the two terms have been coupled together; 'Knowledge Structures and Mental Representations' (KSMR) are thus understood as being the sources of auditory imagery generation.

### **Manipulative Aural Skills**

'Manipulative Aural Skills' (MAS) is a term that was invented for this project in order to describe the ability that enables one to improvise (and compose) music in the mind while away from the instrument. This ability is referred to in this project as an aural skill, because (I contend) as with other types of aural skills, it is reliant on a musician's knowledge structures

and mental representations (KSMR) that are responsible for generating musical auditory imagery.

### **Mental Practice**

For this project, mental practice was understood in two ways. First, as an activity that is specifically undertaken in order to develop mental representations relating to a given task. Second, as an approach to practice that takes place while musicians are away from their instruments: During such events the musician would be solely reliant on his or her KSMR to generate auditory imagery associated with the music they are hearing in their minds. These two understandings of mental practice are derived from those provided by Bernard et al. (2013a, p. 275) and Driskell, Copper & Moran (1994 p. 481). A more in depth examination of their definitions and how they relate to this project are provided in the literature review.

### **Mental Practice Only (MPO)**

This term describes one of three practice conditions under which the research was carried out in this project. In this condition all efforts were directed towards the creation of mental representations that aid in mental improvisation. Under this condition, there was no contact with, or playing of the instrument.

### **Mental Practice plus Physical Practice (MP+PP)**

This term describes another of the three practice conditions engaged for this project. This practice condition is similar to the MPO condition, however it also allowed for physical contact with and playing of the instrument.

### **Miming**

Miming is a term used to describe the process of physically playing an instrument, but not producing any sound through the instrument. It has been discussed by Freymuth (1999 p. 48, p. 74) as an approach for generating auditory imagery during mental practice. This term will be discussed again in Chapter two (the literature review), and later in Chapter five.

### **Motor-Generated Ideas**

This is another term invented by Hargreaves (2012, pp. 362-363) describing musical ideas generated during performance improvisation. She states that “Motor-generated ideas are manifested in actions of the body to produce musical output... Here positioning or movement

is the primary, unconscious trigger”. According to Hargreaves (2012, p. 362), they are not clearly heard in the musician’s mind prior to their execution.

### **Musical Imagery**

The term ‘musical imagery’ refers to all the different types of mental imagery experienced in the mind that relate to music (Keller 2012, p. 206; Godoy & Jorgensen 2001, pp. 3-4). For example, musical imagery may be experienced as mentally hearing music in the mind (auditory imagery), while concurrently seeing notation (visual imagery) and having the imagined sensation of touch associated with a particular instrument (haptic imagery).

### **Musical Improvisation**

For this project musical Improvisation will be understood as the generation of new musical material during the course of a jazz music performance. For this project, musical improvisation was understood as involving the real-time selection and novel recombination of previously heard or learnt rhythmic, harmonic and melodic materials. This understanding of musical improvisation is in line with ideas previously presented by Berkowitz (2010 pp. 61-63) and Johnson-Laird (2002 pp. 423-424). From this understanding we can therefore extrapolate that, at a fundamental level, a musical improvisation would involve the piecing together (of previously learnt) of intervals in a novel way. We could additionally extrapolate that the improviser may select and insert whole rhythmic and melodic phrases that they have previously learnt or played. At moments such as these the musician improvises when they will insert such phrases. This project did not focus on improvisation as it is understood in aleatoric music.

### **Perception**

In this project, this term corresponds with the definition provided by Groome et al. (2013, p. 25) who define perception as: ‘The subjective experience of sensory information after having been subjected to cognitive processing.’ The term ‘perception’ in relation to the concept of perceptive aural skills is understood to involve both the receiving and making sense of musical information.

## **Performance Preparation**

The term 'performance preparation' has been employed in this research project in place of the more general term 'practice'. The term 'performance preparation' is more direct than the term 'practice' in portraying studio practice (where performance preparation takes place) as a goal-oriented process<sup>8</sup>.

## **Physical Practice Only (PPO)**

This is one of three performance preparation conditions engaged for this project. Under this condition, no attempts were made to intentionally develop mental representations that might aid in mental improvisation. Therefore, this performance preparation condition did not engage any types of mental practice.

## **Strategy-Generated Ideas**

This is a term invented by Hargreaves (2012, pp. 359-364) that describes one of three types of musical ideas sourced during performance improvisation. Strategy-generated ideas are not clearly heard in the mind prior to their execution. Rather, they are the product of musicians engaging their knowledge of musical structures and concepts to play something that they know will fit the requirements of the improvisation at that particular moment.

## **Subvocalization**

Subvocalization is the experience of generating an inner voice for singing and speaking, while not producing any external sound (Brodsky et al. 2003, p. 602). It is believed to also involve inadvertent movement in the throat mouth and/or larynx while imagining singing or speaking (Smith, Reisberg & Wilson 1992 p. 110).

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<sup>8</sup> Not all aspects of studio practice may be explicitly directed towards the successful execution of an up-coming performance; Smith & Dean (2009, p. 23) believe that creative practices can be classed as either process-driven or goal-oriented, and as they point out, the lines distinguishing the two can be sometimes blurry. For an apt example of how studio practice can be categorised along the two lines presented by Smith & Dean, see Williamson (2014, pp. 15-20).

## CHAPTER 2 – LITERATURE REVIEW

### 2.1 Chapter Introduction

There have been many contributions made to the literature on improvisation in music. Key texts that articulate the creative processes behind the study and performance of jazz improvisation, include those by Berliner (1994), Monson (1996) Corbett (2015) and Bailey (1980). Bailey (ibid, pp. 1-48) not only discusses the process behind the study and creation of jazz improvisation, but also outlines key aspects of improvisation in different genres of music and musical heritages (for example, Indian classical music, Flamenco, Baroque and Rock). Outside the jazz genre, Dean (2011, pp. 133-148) has also made significant contributions by articulating the processes behind improvisation in computer music. Additionally, Rasch (2011) has compiled essays outlining key features of improvisation in western music of the eighteenth and nineteenth centuries. A further addition to the literature on improvisation outside the jazz genre, is the work by Nettl & Russel (1998). Nettl and Russel have compiled essays describing the creative processes at work during improvisation in the performance of Javanese gamelan, Latin American dance music, Cantonese opera, Hindustani classical music and Arabic music.

This literature review centred its focus on the literature relating to developing MAS, and how MAS may be applied in the study and performance of jazz improvisation. In order to achieve this, the Chapter is separated into five parts. In the first (section 2.2 to 2.2.3), the Chapter begins by examining literature that lends support to the concept of Manipulative Aural Skills (MAS). This is done for two reasons, firstly, to demonstrate how MAS can be understood as a type of aural skill. Secondly, it highlights the lack of pedagogical methods that are explicitly aimed at developing or fine tuning MAS in practitioners. Additionally, it points out the lack of methods that view the development of this skill as a vehicle for artistic development.

The literature review suggested that the key element in the engagement of MAS (and other types of aural skills) is the generation of musical auditory imagery. Therefore the second part of this Chapter (section 2.3 to 2.3.4) examines clues as to how the generation of musical auditory imagery could be rendered less effortful. It did this by examining the literature that explored how mental imagery depicting musical information is experienced.

The third part of this review (section 2.4 to 2.4.2) examines musical pedagogical methods, and elements from within these methods that could be called upon to help develop MAS. As the main method for developing MAS was via mental practice, the fourth part of this project review looks at the literature relating to the concept of mental practice. The Chapter will then conclude in the fifth part, with the summary of the implications of this review for the project.

## 2.2 Literature Supporting the Concept of Manipulative Aural Skills

### 2.2.1 Aural Skills as Auditory Imagery Generation

Literature relating to aural skill development was examined in order to clearly understand what aural skills are. Several authors associated the development and engagement of aural skills with the ability to successfully generate musical auditory imagery (Butler 1997 pp. 46-47; Klonoski 2000, para. 20; Schneider & Godoy 2001, pp. 22-23). As auditory imagery generation was therefore understood to be important to aural skills, the next step in this review was to survey the literature for the mechanisms behind auditory imagery generation. Several authors suggested that it is a musician's musical KSMR that are responsible for generating this musical auditory imagery (Keller 2012, p. 207; Godoy 2010, p. 55; Covington 2005, pp. 33-35; Janata 2001, pp. 28-30). Based on the reviewed literature presented here, it was therefore possible to develop a definition of aural skills as being the cognitive faculties that enable musicians to exert control over their KSMR that are responsible for generating musical auditory imagery. Thus, if a musician is said to have 'good aural skills', then this would mean that he or she is good at generating the required and correct musical auditory imagery needed for a given, music related task.

#### 2.2.1.1 Auditory Imagery Generation and Perceptive Aural Skills

Certain authors have indicated that generating musical auditory imagery is a mechanism driven by two processes: it is generated while musicians are deliberately imagining music, or while they are perceiving music in their environment (Keller 2012, p. 207; Janata 2001, pp. 28-29). The cognitive processes around the active perception of music were discussed in the literature. These authors suggested that during the perception of unfamiliar musical information, auditory imagery is indeed generated for comparison and then recognition (Hanson 2005, p.6; Klonoski 2000, para. 20; Bergan 1965, cited by Covington 2005, p. 34).

We could therefore apply the term ‘perceptive aural skills’ to the aural-skill type that is engaged for perception. For example, a musician’s KSMR might be acted upon to generate the auditory image of a certain pitch, in order to recognise a pitch that is being played on an instrument in his or her environment. During such an event, comparisons would be made between that auditory image, and the pitch being played. The speed at which musicians are able to generate the correct auditory imagery in order to make an accurate comparison, would be an indication of the level of their perceptive aural skills.

#### 2.2.1.2 Auditory Imagery and Practicing Music in the Mind: Reconstructive Mental Practice

As auditory imagery was also discussed in the literature as being generated while imagining music away from the instrument, it was therefore necessary to review the literature relating to mental practice and mental rehearsal of music. Covington (2005, pp 35-38) has explored how mental practice might be best developed more explicitly, and Freymuth (1999) and McAllister (2012) have produced mental practice methods that seek to develop and streamline this skill in practitioners<sup>9</sup>. Much of the reviewed research into mental practice (of music) focused on examining its efficacy as an approach to the study and memorisation of music and how, as an approach, it might be improved<sup>10</sup> (see Bernardi et al. 2013a, p. 275; Highben & Palmer 2004, p. 58; Theiler & Lippman 1995, p. 329; Coffman 1990). In all of the cited resources and studies so far introduced in this section, the mental practice centred on musicians learning and then remembering and replaying, either parts of a piece, or whole pieces in their minds. Thus, the music being imagined by the participants in the previously cited studies was not improvised, it was pre-learnt or pre-heard, and the participants were required to remember and replay it in their minds.

On the cognitive process of remembering, Chaffin Logan & Begosh (2008 p. 354) state that memories are: “...reconstructed, at each remembering on the basis of schematic knowledge representing generic moments”. Thus, we can extrapolate that when we remember and replay a pre-learnt or pre-heard piece in the mind, we are reconstructing it: we are acting on our KSMR to generate the auditory imagery for all the melodic passages of the piece we are mentally rehearsing, and then piece these together. Indeed, Covington (2005, p. 34) states:

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<sup>9</sup> For other notable approaches for developing this skill, see: Klickstein, 2009 pp. 47-48 and Lieberman, 1991 pp. 57-66

<sup>10</sup> For example, several of these studies looked at the involvement of motor interactions and how the presence or absence of these affected musicians’ recall.

‘The act of mentally hearing a score with no sound present is a re-constructive or re-assembly process – we assemble bits of pieces of sounds of the score before us that are already represented in memory and construct the sound on the score before us’. Mental practice involving the remembering and then replaying of a pre-learnt or pre-heard piece of music might be more accurately called reconstructive mental practice. Further, as the process also involves the generation of auditory imagery, then accordingly, the skills governing our ability to engage in reconstructive mental practice could be aptly referred to as reconstructive aural skills.

### 2.2.2 Manipulative Mental Practice, Constructive Episodic Simulation and Manipulative Aural Skills

In order to differentiate mental improvisation from reconstructive mental practice (discussed in the previous section), the review sought to examine literature for cognitive models describing mental improvisation. Models of the cognitive processes at work during jazz improvisation in performance were relatively easy to find (see Johnson-Laird 1991 pp. 291-326, and Pressing 1988 pp. 129-178). Discussions and examinations of the cognitive processes at work during mental improvisation (while away from the instrument) were not as prevalent. However, one is provided by Janata (2001, p. 30) who describes musical auditory images experienced away from an external sound source, as ‘non-expectant’ auditory images. He states that improvising while away from the instrument is governed by cognitive processes<sup>11</sup> that are solely reliant on a musician’s KSMR to generate the required auditory imagery. Janata (ibid p. 30) discusses non-expectant imagery, stating:

*‘This type of imagery we engage in when we imagine a melody in our mind. Similarly, we might mentally improvise melodies that we have never heard before but are able to compose based on knowledge, either explicit or implicit, of tonal sequences, etc. Thus, this type of imagery relies on long-term memories we have of specific musical material, or on a more abstract knowledge of musical structure, e.g. the tonal relationships in western tonal music’.*

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<sup>11</sup> Janata refers to this type of cognitive processing as being ‘top-down’. In ‘top-down’ processing, information is processed and made-sense-of, via the use of higher cortical structures where schemata are stored. The opposite of this is ‘bottom up processing’ whereby external stimuli drive the cognitive processing (see Groome et al. 2014, p. 9).

While the model provided by Janata is important, it does not provide further detail on how mental musical improvisation might take place. Therefore, literature relating to the cognitive processes involved in overt performance improvising were examined for clues.

Overt jazz improvisation requires not only recall and remembering of previously learnt musical material, but also the active, real-time selection and recombination of this material (Berkowitz 2014, pp. 61-63; Johnson-Laird 2002, pp. 423-424): Jazz musicians are able to source and then insert into an improvisation, musical material that they may have played in the past, that has since been stored in long term memory. We can assume that when a musician is improvising in their mind, away from the instrument, that the previous statement holds true for this process also. Mental improvisation would involve the generation and recombination of auditory images for various musical elements such as intervals, scales, or melodic lines that have previously been committed to memory.

Literature relating to the human memory system was examined for possible cognitive mechanisms that might be behind the recombination of mental imagery, and therefore mental improvisation. Recombining and modifying the components of episodic memories, such as mental imagery (and therefore auditory imagery), in novel ways, is central to the concept of Constructive Episodic Simulation, as discussed by Schacter, Addis & Buckner (2008, pp. 39-60; see also Anderson, Dewhurst & Nash 2012, p. 356). Schacter, Addis & Buckner describe Constructive Episodic Simulation as a cognitive mechanism that allows individuals to manipulate and recombine mental images, derived from episodic memories of past events, in order to construct novel future scenarios<sup>1213</sup>. Thus, Constructive Episodic Simulation may indeed be a cognitive mechanism that is behind mental improvisation. Regardless of whether or not this is the case, a consideration of the literature discussed in this section suggests that mental improvisation requires cognitive processes other than just the remembering and reconstructing of previously heard or learnt information. From this, we may view a second type of mental practice that does not focus on the remembering and replaying of pre-learnt

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<sup>12</sup> In describing this concept, Schacter, Addis & Buckner (2008, p. 40) provide an example that demonstrates how memories, and the related mental images related to those memories, are manipulated and recombined to create a potential future event.

<sup>13</sup> In order to experience Constructive Episodic Simulation, imagine driving home from work. This is something you have done many times. Now, imagine that the police are blocking the road. You may have seen a police road block once or twice in your life, and so you will draw from these visual images stored in long-term memory of these past events in order to facilitate this simulation.

or pre-heard pieces, but on mental improvisation. As this type centres on the manipulation and novel recombination of auditory imagery, it could be referred to as manipulative mental practice. The skills that govern one's ability to generate the required auditory imagery during this type of mental practice could therefore be called Manipulative Aural Skills (MAS).

This review was able to find two authors who have discussed the experience of improvising music away from the instrument (either hearing music in the mind, or externalising it by singing), without auditory feedback from the instrument, as an approach to performance preparation. Sudnow (2001, pp. 138-139) has provided an ethnographic account of his experience with this phenomenon, and Shim (2007, pp. 157-158) has discussed the great jazz pianist Lennie Tristano's experience of this phenomenon in relation to jazz pedagogy. Though these authors do not provide a blueprint for a comprehensive approach for developing MAS, the ways that Sudnow's and Shim's research could help yield results for this project is detailed at later stages in this Chapter (in section 2.4.2).

### 2.2.3 Audiation-Generated Ideas

One of the aims of this project was understanding how one might be better able to realise and execute the music that is improvised and heard in the mind during performance. Therefore, it was necessary to review literature that discussed the concept of music that is heard in the mind during performance. Several authors have examined and discussed the internal generation of and mental hearing of improvised music during performance (with the instrument), a concept in line with what Hargreaves (2012, pp. 360-362) has termed audiation-generated ideas (as discussed in Chapter 1). Pressing (1988, p. 150) briefly alludes to this phenomenon in relation to designing artificial intelligence that can carry out real-time musical improvisation. The concept put forward by Pike of 'tonal imagery' (1974 p. 88), is described (by Pike) as being manifested in two ways. The first he calls 'reproductive imagery', these comprise of ideas that have been previously played and are sourced from long term memory. The second kind termed 'productive images' (ibid pp. 88-89), are formed by manipulating the musical information previously stored in long term memory.

If we understand audiation-generated ideas as being those musical ideas that are heard clearly in the mind of the musician while improvising, then we may also view all musical ideas, heard when the musician is improvising in his or her mind while away from the instrument,

as being audiation-generated. Thus, MAS may be viewed as a mechanism for generating audiation-generated ideas. Strengthening this ability (MAS) may be a way of strengthening the author's ability to generate audiation-generated ideas during performance.

#### 2.2.4 Toward a New Aural Skills Model

This section examined the literature showing how musicians' aural skills can be understood as their ability to exert control over their KSMR responsible for generating musical auditory imagery. These same musical KSMR can be acted upon to generate auditory imagery, while the musician is away from the instrument, engaged in either reconstructive or manipulative mental practice. If the musicians are improvising in their mind, while away from the instrument, then they will be engaged in manipulative mental practice and the generation of auditory imagery would be governed by their MAS.

In concluding this section it needs to be stated that it is not the aim of this project to provide a comprehensive description of such a model. Rather, to suggest and briefly show that aural skills can be thought of as a much broader set of skills. Indeed there were no aural skills training courses reviewed that contained any focus on teaching or fostering mental improvisation<sup>14</sup>. Covington (2005, pp. 27-28) adds that many aural skills training methods often incorrectly assume that developing sight-singing skills and perceptive aural skills will incidentally result in musicians developing the ability to practice music in the mind. Covington argues that this assumption is incorrect, that the mental practicing of music is a skill that needs to be developed in-and-of itself.

### 2.3 Musical imagery, Musical Gesture and Manipulative Aural Skills

The importance of musical auditory imagery generation to aural skills development, and thus the development of MAS led to the examination of literature looking at how musicians experience musical auditory imagery, and how its generation could be made easier. During the course of this research, the concepts of musical imagery, musical gestures and subvocalization were introduced. Reviewing these concepts provided clues as to how auditory

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<sup>14</sup> Some of the key ear training/aural skill development courses reviewed for this project include: Lars Edlund: *Modus Vetus*, Gary Karpinski: *Manual for ear Training and Sight Singing*, and Authur Gottschalk & Phillip Kloeckner: *Functional Hearing*.

imagery associated with MAS might be more easily generated or triggered. Such insights also provide a theoretical basis for the development of research questions posed during the qualitative study in Chapter 4.

### 2.3.1 Literature on Musical Imagery and Musical Gesture

Keller (2012, p. 206) states that musical imagery is the result of ‘...a multimodal<sup>15</sup> process by which an individual generates the mental experience of auditory features of musical sounds, and/or visual, proprioceptive, kinaesthetic, and tactile properties of music related movements, that are not (or not yet) necessarily present in the physical world’ (see also Godoy 2001, p. 239-241; Godoy & Jorgensen 2001, pp. 3-4 and Saintilan 2008, p. 161). Brodsky et al. (2008, p. 427) state that musical imagery may be experienced during a performance, imagined performance, notational audiation or while listening to music.

Reducing the effort associated with the generation of musical auditory imagery during MAS development, may require the engagement of mental imagery from other sensory modalities (namely vision and touch) that are involved in music making. The results of several scientific enquiries have suggested that musical auditory imagery may be more easily generated when actions, both physical and imagined, are involved in the triggering of musical auditory imagery. Research carried out by Mikumo (1994, pp. 175-197) has demonstrated that musical auditory imagery, can be maintained and recalled via the performance of the motor actions, or gestures that are associated with the original performance of pitch sounds or melodic fragments. Mikumo (1998 cited by Godoy 2001, p. 244) has also shown that imagining the action which gave rise to the initial pitch sound (via kinaesthetic imagery and visual imagery) can also activate the musical auditory imagery for that sound. In line with the findings of Mikumo, Kalakoski (2006, p. 75) has observed that musicians use multiple strategies for maintaining musical auditory imagery such as visualising the locations of notes on the instrument and also imagining the motor actions involved in producing the musical sequence. Thus, overt and imagined movements (experienced via visual or kinaesthetic imagery), may be beneficial to the generation of musical auditory imagery. On this, Godoy (2010a p. 55)

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<sup>15</sup> The terms multimodal and cross-modal are employed by different authors to mean the same thing. For a more in depth discussion of this concept and the subtleties in the different terms, see Spence & Deroy (2013).

states: ‘...if you want to create a mental image of the sound, imagine that you are producing the sound or making some movement to the sound’.

Godoy and Leman (2010, p.1) have stated that musical experiences and sensations of movement are indivisible. Overt gestures such as those mentioned in the previous paragraph in relation to Mikumo’s (1994) study, have been referred to by several authors as ‘sound-producing’ gestures (Jensenius 2010, p. 13; Dahl et. Al. 2010, p. 37; Godoy, 2010b p. 110). Godoy (2010b, p. 106) points out that the phenomenon of people enacting sound-producing gestures can be observed via (what he refers to as) the performance of ‘air instruments’. D’Alessandro et al. (2014 p. 3601) have found that Chironomy, another form of gesture, and visual feedback of the associated gesture, positively influence the ability of individuals to pitch intervals and correctly sing intervallic relationships. Chironomy is engaged by vocalists and uses the hands to indicate the pitch direction of a melodic fragment or line (D’Alessandro et al. 2014 p. 3601). This finding suggests that musical gestures may enhance a musician’s capacity to think about music, when no instrument is present. From this we can therefore view musical gestures as being an element that may help to support one’s ability to imagine music in the mind, and may indeed help to develop and engage MAS.

Sound-producing gestures, those akin to playing one’s instrument, as well as generating mental imagery related to music, from sensory modalities other than audition may therefore be helpful in minimizing the effort involved in the generation of musical auditory imagery. It may be beneficial, to include such elements into approaches for developing MAS.

### 2.3.2 Literature on Subvocalization

Another type of physical action (or gesture) subvocalisation, may also hold promise for rendering the generation of auditory imagery less effortful, thus helping to streamline the development of MAS. Subvocalization is described by Brodsky et al. (2003, p. 602 see also Aleman & Wout 2004, pp. 228-231 and Smith, Wilson & Reisberg 1995, pp. 1433-1454) as: ‘The experience of an inner voice without vocal output or environmental input’, there may be conscious and/or subconscious movement or sensation in the mouth or vocal chords, but no sound is produced. In a musical context, this means carrying out physical actions normally associated with singing, without producing audible sound. Subvocalization is a physical action

initiated by the phonatory system, and is implicated in the machinations of working memory (see Henry 2012).

Smith, Reisberg & Wilson (1992 p. 110) suggest that movements in the vocal apparatus (associated with subvocalization) serve to prime the auditory cortex and in doing so, trigger or aid the recall and generation of musical auditory imagery. Indeed, we could extrapolate that this is the process at play when other forms of gesture associated with music making trigger, or facilitate the recall of musical auditory images. Thus, subvocalizing my improvisations during performance preparation may be helpful for generating auditory imagery, and may facilitate the development of MAS.

### 2.3.3 Literature on the Experience of Musical Imagery

The literature discussed in this section is mostly sourced from research that examines the experiences of classically trained musicians. At the time of writing, the experience of improvising musicians in relation to this subject was less well known. Two studies were uncovered that investigated how classical musicians experience musical imagery have provided clues as to how auditory imagery might be more easily generated during mental improvisation. Both studies suggest the significant involvement of subvocalisation.

Saintilan (2008, p. 211) states that the way musical imagery is manifested and experienced by an individual is unique to that individual. Although the finer details of the experience may vary, researchers in this field have nevertheless been able to create classifications into which the experiences can be generalized. Saintilan (ibid, pp. 75-77) discusses how her findings suggest that musical auditory imagery can be divided into two types: 'inner singing' and 'sound imaging'. The description of inner singing given by Saintilan is in line with the previously discussed concept of subvocalization. The other category outlined by Saintilan, sound imaging, encompasses all other sounds both musical and non-musical that may be imaged in the mind. These may include environmental sounds as well musical sounds such as chords or even passages played by whole orchestras.

Kalakoski (2001, p. 52), divides the auditory musical imagery mechanisms involved in working memory (WM) tasks into two main groups; 'acoustic imagery' and 'sub-vocal rehearsal'. This distinction echoes the findings of Saintilan and is in line with her concept of 'inner singing'. As Kalakoski suggests, subvocalization is closely involved with melody related tasks.

### 2.3.4 Literature on Musical Imagery during Performance Improvisation

White (2011, pp. 103-111) has cast light on the experiences of high level improvising musicians experience musical imagery during performance, showing how they experience, and make use of visual imagery during performance. Saintilan (2006, pp 173-176) has also reported that some musicians experience visual imagery while engaging in overt musical improvisation.

In the previous sections, the literature that points to how auditory imagery may be more readily generated was reviewed. The involvement of mental imagery from other sensory modalities (visual imagery and kinaesthetic imagery), as well as movement in the form of subvocalization and gesture as though playing a given instrument, appear to play an important role. This information was called upon to formulate approaches to developing MAS when aiding the generation of auditory imagery. In the following section, pedagogical methods and other potentially important factors coming from these methods of significance to the development of MAS, are reviewed.

## 2.4 Developing Manipulative Aural Skills during Performance Preparation

A review of performance preparation methods and instructional texts for jazz musicians was conducted in order to investigate resources that might instruct on MAS development. There were few resources that emerged from this review that embraced mental practice as a central vehicle for studying jazz improvisation. The review showed that most performance preparation resources could be divided into two groups. The first can be described as resources that instruct musicians on *what to practice*<sup>16</sup>, and the second are resources that instruct musicians on *how to practice*<sup>17</sup>, it needs to be acknowledged that there is a certain

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<sup>16</sup> Approaches in this category instruct the musician on developing musical elements important to executing an improvisation. These include learning specific scales, arpeggios and approaches to improvisation such as motivic development. Some of the key texts reviewed for this project that fall into this first category include: Inside Improvisation Series (Vol. 1 Melodic Structures, Vol. 2 Pentatonics, Vol. 3 Jazz Line, Vol. 4 Melodic Rhythms): Jerry Bergonzi; Beyond Time and Changes, How to Improvise: Hal Crook, and, The Serious Jazz Practice Book: Barry Finnerty.

<sup>17</sup> Some of the key texts reviewed for this project that fall into this second category instruct on how to allocate time for practice. Key text that were reviewed include: Jazz Practice Ideas with Your Real Book: Andy McWain, The Musician's Way: Gerald Klickstein.

degree of overlap that exists between these two categories. A third group was also identified and can be summarised as resources that instruct musicians on how to achieve a mental and emotional state that is conducive to improvisation and/or creativity<sup>18</sup>. This section of the literature review only focuses on parts of the reviewed literature that were found to have direct implications for developing MAS.

It was hypothesised that an approach to performance preparation that seeks to develop MAS via mental practice, could subsume certain elements from the resources in each of the three categories previously outlined. Such an approach could be viewed as an alternative way for approaching the same material in these resources. For example, exercises that seek to build technical/mechanical proficiency could be engaged via mental practice as a novel approach for generating musical auditory imagery and expanding my vocabulary of audiation-generated ideas.

The dearth of specific information for professional improvising musicians seeking to develop MAS, is in contrast to that available to classically trained musicians who would be seeking to develop their reconstructive aural skills. For example, classical musician practitioners can go to Freymuth's method (1999). This method instructs musician practitioners how to develop the ability to practice pre-learned/heard music in the mind. It is a resource primarily aimed at classically trained musicians and does not have focus on developing the ability to improvise in the mind. Freymuth's (Ibid, pp. 21-55) method focuses on developing mental representations and mental practice skills. It provides concise information on how to proceed in order to develop visual, auditory and kinaesthetic mental representations (Ibid, pp. 21-55), important for developing greater familiarity with the instrument. For improvising musician practitioners there are no known similar resources.

As such, a practitioner hoping to develop this skill has to look for information in multiple, different sources. Examining these sources for clues on how to develop MAS is the focus of the next section.

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<sup>18</sup> Some of the key texts reviewed for this project that fall into this third category include: *The Inner Game of Music*: Barry Green, *The Inner Game of Tennis*: Timothy Gallwey, *Effortless Mastery*: Kenny Werner, *The Mind's Ear*: Bruce Adolphe, and *Zen in the Art of Archery*: Eugen Herrigel.

### 2.4.1 Music Learning Theory and Audiation

Gordon (2012) has developed a sequential explanation of how music is (and should be) learnt called Music Learning Theory (ibid p. 25). According to Gordon, central to music learning is the development of what Gordon terms 'audiation' (ibid, pp. 3-10). Individuals audiate when they hear the sound of the music either externally or in their minds, and have concurrent knowledge/understanding of what it is they are hearing (ibid p. 3). From this, we can infer that acquiring the ability to audiate means acquiring an internal understanding of music that does not rely on the presence of an instrument or external musical aid. For Gordon (ibid, p. ix) 'audiation' is thinking in music, and on this he states: 'audiation is to music what thought is to language'. Accordingly, music should be learnt in the same way that language is learnt (ibid p. ix, p. 26)<sup>19</sup>, and as with language acquisition, a major outcome of this is improvisation (ibid p. ix). Thus, it can be extrapolated that after comprehensive adherence to the approaches to learning music put forward by Gordon, students could or should develop the ability to mentally improvise.

Azzara's & Grunow's method (2006) also makes links between language cognition and music cognition, and from this teaches music students how to improvise in a similar way that one learns language (ibid pp. iv-v). This method provides instruction for music students on how to develop the ability to improvise, and significantly, how to vocalise these improvisations. This method therefore aims to teach students how to acquire an internal understanding of music theory, to a sufficient degree that they are able to vocally improvise while away from their instrument.

The approaches of Gordon (ibid) and Azzara & Grunow (ibid) are predominantly aimed at children and amateurs<sup>20</sup>. For adult practitioners who have already acquired a great deal of musical knowledge, know-how to improvise, and have acquired this knowledge via multiple and often unrelated routes, developing the ability to mentally improvise (or in some cases, accentuating an already existing skill) may not require absorbing a whole method. Rather,

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<sup>19</sup> Gordon (2012 p. 5) is at pains to stress that music is language-like and not a language. Throughout this text, Gordon (2012) draws comparisons between aspects of language perception, cognition and language acquisition, and what he believes are ideal approaches for teaching and learning music. For examples, see pages 3, 4, 5, 7 and 14.

<sup>20</sup> Gordon claims that aspects of Music Learning Theory can be incorporated into music education from early childhood through to undergraduate music education. See 'what kinds of teachers can use music learning theory' <http://giml.org/faq/#whatmusteach>

what may be required is an approach that facilitates the development, or accentuation of musical mental representations (such as, auditory imagery and/or visual imagery) that are analogous to a musician's external experience of music making. Doing so may be a way to help make mental improvisation an experience that is as close as possible, in sensory terms, to what is experienced when they are physically with their instrument.

Important elements can be taken from Azzara's & Grunow's method that could be applied by practitioners for developing MAS. Central to their approach is committing to memory the sounds of different permutations of arpeggios, groups of chord tones and rhythmic figures. Such elements could then be recalled from memory in order to piece together a musical improvisation. Thus singing (therefore externalising these elements), appears to be an important part of this process as it clearly demonstrates to the student whether they have thoroughly committed the previously discussed information to memory.

#### 2.4.2 Literature Relating to the Development of Mental Improvisation

The primary focus of the e-book 'Visualisation for Jazz Improvisation' (2015) available via the website [www.Jazzadvice.com](http://www.Jazzadvice.com), is to enable improvising musicians to generate the auditory imagery associated with chord progressions commonly found in the jazz standards repertoire (for example, II-V-I, III-VI-II-V-I). It also aims to do the same for the chord tones related to the chords in those progressions, and the musical language (well-known licks and melodic phrases) associated with these progressions. The intent behind this method is to enable improvising musicians to develop the ability to generate auditory imagery associated with information they might see on a lead sheet. Bergonzi (1994, pp. 31-32) presents an approach similar to this, for internalising the harmonic structure of a piece, aimed at helping musicians to develop auditory imagery associated with how a piece's harmonic structure sounds. Covington (2005, pp 35-38) has also suggested that developing the ability to hear and rehearse music in the mind is aided by developing mental representations of a piece's harmonic structure.

Hargreaves (2012 pp. 363-364) provides suggestions on how educators might foster this ability to internally-hear, and therefore internally generate musical ideas. While she does not provide comprehensive instruction on how this may be achieved, she suggests that this ability might be approached by transcribing the improvisations of well-known improvisers. She also

suggests repeating a motif through all twelve keys, stating that repetitious musical activities are integral in encoding information in the memories of musicians (a suggestion that is in line with the previously discussed aims for the Azzara & Grunow [2006] method).

These approaches do not specifically look at developing the ability to mentally improvise as a skill in itself, and do not discuss it as an approach that may provide avenues for artistic exploration. Ideas on how best to develop MAS, especially via mental practice, can be acquired by going to historical and ethnographic sources, and in particular interviews and biographies on great improvising musicians and their approaches. In Shim's (2007, pp. 157-158) biography on the great improvising musician (pianist, composer and teacher) Lennie Tristano, he discusses how Tristano frequently employed mental practice techniques: 'Practicing away from the instrument meant practicing in the head through visualizing the instrument or the music'. Shim provides accounts given by some of Tristano's students who state that he used to practice both by visualizing the notation or the keys on the piano keyboard and sometimes he would play on a silent keyboard. The account given by Shim indicates that for Tristano, the generation of auditory imagery was a cross-modal event as it involved the interaction of kinaesthetic elements also. On this, Shim states (ibid, p. 157): 'Tristano often stressed the connection between the senses, such as hearing, feeling, and seeing, which would enable students to experience the musical process as a whole'. Shim makes the point that for Tristano, mental practice was a major aspect of his study and a focus of his teaching.

Sudnow (2001) provides an ethnographic account of learning to play jazz piano. Out of this account come clues as to how generating the auditory imagery associated with mental improvisation might be done with greater ease. Specifically, Sudnow talks about how hearing the pitches in his minds was easier, and the tuning pitches themselves was more accurately achieved when vocally improvising while simultaneously playing on a silent keyboard (2001, pp. 138-139). Freymuth (1999 p. 48) has termed this approach (playing on a silent instrument for the purpose of generating auditory imagery) 'miming'. For Sudnow the connection to the instrument was paramount; out of three approaches in which he sang improvisations, best results were achieved while miming and worst when gesturing in the air as though playing the instrument. Thus miming was viewed as a potentially important component of approaches for developing MAS.

## 2.5 Mental Practice

This exegesis argues that MAS are best exhibited while away from the instrument. Therefore, practice involving MAS, and efforts directed towards developing MAS, required engaging in some type of mental practice. In this project, an understanding of what mental practice is, was derived from two different, yet key definitions. The first of these definitions describes mental practice as the imagining of a task, absent any physical movement associated with that task (Driskell, Copper & Moran 1994 p. 481). This definition provides an understanding of mental practice as being something that is purely mental, and could indeed be called ‘pure’ mental practice. From this definition we may derive another way of understanding mental practice, one that is implicit in the previously stated definition: Mental practice is as an activity that is carried out away from external sensory stimuli normally associated with a given task, and is therefore completely reliant on the individual’s KSMR to generate the relevant mental images for that task. For musicians who are away from their instrument, this would mean that the only way they would be able to hear the music they are practicing, is if they were to generate musical auditory imagery in their mind.

As this literature review has previously shown (in section 2.3.1), gestures associated with playing the instrument have been intimately linked with generating musical auditory imagery. Thus, it can be argued that a pure approach to mental practice should embrace some kind of sound-producing gestures (Godoy 2010a) if it is to be in any way effective. Indeed, Godoy (2010a, p. 55) attaches the importance of the human body to music cognition via the concept of embodied cognition, describing it as a notion that intimately links cognition with sensations of bodily movement. According to Godoy (*ibid*, pp. 55-56), musical sounds have throughout history been mostly generated via bodily movements. He explains that our understanding of musical sound is often tied to our knowledge of sound production and how it has been instigated by the human body (such as, striking a piano key or strumming guitar strings) (*ibid*, pp. 55-56). If we understand the importance of mind and body interactions in cognition in line with ideas previously discussed by Godoy, then simply imagining improvisations (without any form of movement) may indeed limit one’s capacity to think. Therefore, for this project, pure mental practice embraced the inclusion of gestures associated with playing the instrument and other sound-producing gestures (Godoy 2010a).

A second definition of mental practice describes it as a practice event that is specifically aimed at developing musical mental representations. Proponents of this definition include Bernardi et al. (2013a, p. 275) who define mental practice as: "...a technique by which someone with the intent to practice creates a mental representation of a pre-conceived idea or action in order to enhance performance". Other proponents of this view include Jorgensen (2004, p. 92) and Wollner & Williamon (2007, p. 14). The focus in the definition provided by Bernardi et al., is on the development of mental representations required to enhance performance. Mental practice defined in this second way enables the inclusion of practice events that may include overt physical elements including the playing of the musician's given instrument. It could be best referred to as hybrid mental practice. Any efforts directed towards developing MAS, may therefore benefit from trialling and comparing the effectiveness of a pure approach (outlined in the previous paragraph), and a hybrid approach (to mental practice) for developing MAS.

Finally, an important factor that deserves consideration is that mental practice is effortful, as it requires focus and concentration (McAllister 2012, p. 197). As a way of mitigating this constraint, Driskel Copper & Moran (1994, p. 488) suggest limiting mental practice sessions to twenty minutes at a time.

## 2.6 Chapter Conclusion and Implications for this Project

The review of aural skills literature and mental imagery literature (including musical imagery literature) found that there were no resources directed towards professional improvising musicians seeking to exclusively develop the ability to improvise in the mind. Similarly, no musical pedagogical literature was discovered that viewed such a skill as a potential vehicle for artistic development. The literature review did uncover information showing that an important aspect to hearing music in the mind, generating auditory imagery, could be aided in several ways. These included, subvocalization, gesture as though playing the instrument, drawing upon concurrent mental imagery.

The literature review showed that a better understanding of the skills associated with mental improvisation is needed. Specifically, how auditory imagery associated with MAS might be

more readily generated. Further to this, more needs to be understood in terms of how MAS is developed and how its application may be streamlined. Such an understanding would provide insights into the specific needs that improvising musicians may have in relation to developing this skill. Importantly, a better understanding of MAS and how they are experienced by improvising musicians would enable clear hypotheses to be formulated predicting what the impact of MAS on creative practices and artistic output might be. A way that this may be achieved is by attaining an understanding of how a large group of professional high-level improvising musicians experience the phenomenon of MAS. Doing so would enable the collating of frequently occurring themes that point to how MAS can be most effectively developed and engaged for performance preparation.

## CHAPTER 3 – METHODOLOGY

### 3.1 Chapter Introduction

The central concern of this Chapter is to describe how the methodologies outlined in the introduction were applied in this project. A challenge confronting this project was quantifying the impact of MAS on my performance. A large part of the section dealing with the application of Practice-led research methods expounds on how this challenge was met. This Chapter will begin by examining how research was conducted in the first part of this project via qualitative interviews.

### 3.2 Research-Led Practice.

Research-Led practice is a research method that allows artist researchers to investigate or develop the tools or materials they require in order to make art (Smith and Dean Smith & Dean 2009, pp. 7-9; Borgdorff 2007, p.4). Borgdorff (2007, p.4) refers to this research method as 'research for the arts', he states that it: '...delivers, as it were, the tools and the knowledge of materials that are needed during the creative process or in the artistic product'. An important aspect of research-led practice is that it allows artist/researchers to draw from and engage research methods normally associated with other disciplines (Bordorff 2012, p. 211). Bordorff (ibid p. 211) reminds us that this is only possible, when research takes place both in and through artistic practice. This project similarly engaged methods that are not normally associated with artistic research.

The main method for obtaining data in the first part of this project was a qualitative semi-structured interviews. Seventeen high level professional improvising musicians were interviewed in order to understand their experiences of MAS. The key reason for conducting this enquiry was to systematically obtain data (from this group of musicians) on how MAS are experienced, and to look for clues as to how its engagement may be streamlined. The enquiry looked into how MAS have been applied during their respective performance preparation regimes for the purpose of improving their creative practices and artistic output.

A key focus of this enquiry was to look for ways that a cohort of professional improvising instrumentalists have found to reduce the effort associated with the generation of auditory imagery during mental improvisation. Observations made during this study brought to light additional factors that aid this process. Additional factors may include an increased reliance on other types of mental imagery coming from different sensory modalities, and gestures that are associated with playing a given instrument. It also enabled me to observe whether these additional factors were perceived by musicians to augment their ability to lucidly generate musical auditory imagery. Any frequently occurring themes could then be collated and included in an approach to performance preparation. Such themes and potential approaches were then be trialled during performance preparation to ascertain their effectiveness.

### 3.2.1 Methodological Considerations

Analysis of the verbally reported data took place via both nomothetic and ideographic means. Blandford (2013, p. 13) discusses the distinction between nomothetic and ideographic analysis. According to Blandford, the former produces more generalizable results that are often derived from quantitative methods, whereas the latter produces results that are often derived from gaining an understanding of the individual's experience. Thus, idiographic analysis is normally associated with qualitative approaches. However, Blandford (2013, pp. 1-2) believes that it is important to reject dogmatic views on how data is collected and interpreted. Accordingly, Searle (1999, p. 120; see also Creswell 2013, p. 76) argues that there is a very necessary place for numerical analysis of data within qualitative research: by employing a nomothetic analysis within a qualitative research project, the reader thus has a different perspective with which to understand the subject under investigation.

The findings of this study were viewed from nomothetic and ideographic angles for two reasons. The reviewed literature has shown that there were several key themes implicated in the generation of musical auditory imagery (such as subvocalisation, gesture and concurrent mental imagery). Thus, a nomothetic analysis of the findings allowed for an appreciation of the statistical frequency to which these themes were reported by the group of participants. The frequency of the various themes emerging from the interviews has been presented as percentages of the total group of participants (represented in tables and charts as total %). From this it was then be possible to apply an ideographic analysis which permitted me to look

at how these broad factors were experienced on an individual level across the pool of participants. Thus, was able to report on the involvement of key overarching themes and then aimed to understand how the experience of these themes, varies from musician to musician. The data resulting from this study helped point to approaches for my performance preparation. It will enabled me to know the different ways and degrees to which these key overarching themes might be employed during performance preparation, and the expectations I was able to place on their potential as effective learning devices.

### 3.2.2 Design/Materials

The semi-structured interview format involves the participants being asked a series of broad, open ended questions, which are then followed-up by a series of probing questions that are intended to more clearly illuminate their experiences (Blandford 2013, pp. 23-25). Galletta & Cross (2012, p. 45) suggest that formulating questions for a semi-structured interview needs to be carried out in accordance with any empirical and theoretical constructs that might be related to the topic under examination. As there has already been considerable research conducted into how classically trained musicians experience mental practice, there thus exists robust empirical and theoretical constructs in relation to the topic under investigation. These did indeed influence the formulation of research questions, and these questions are detailed and discussed in the following Chapter.

Data was coded and analysed using *NVivo version 10* qualitative data analysis software. This project adhered to Blandford's (2013 pp. 40-42) suggestions as to how the veracity of both the interpretation of the interviews, and how they were analysed, can be achieved. Firstly, a summary of participants' experiences was given to the respective participants for them to read and confirm whether my interpretation was indeed a true account of their experience. Secondly, the manner in which the interviews have been coded, and the data has been derived from the interviews, was verified through the process of checking inter-rater agreement. A second person was asked to code selected excerpts from the interviews in order to see if they produce the same codes as the researcher. The second rater was briefed on the coding criteria and was asked to code samples from the interviews that represent a diverse range of responses to the research questions. The degree to which the second rater and the primary researcher have indeed identified the same units of data (within the interviews) was

be represented by generating a Kappa statistic. The Kappa statistic provides a numerical value that points to the degree to which agreement between two raters has been achieved. This project adhered to the Kappa statistic values prescribed by Landis & Koch (1977, p. 165) who regard a Kappa statistic value of 0.00-0.20 as slight agreement, 0.21-0.40 as fair, 0.41-0.60 as moderate, 0.61-0.80 as substantial and 0.81-1.00 as almost perfect agreement. Thus, this number was used to indicate the degree to which different people coding the same interview transcript, arrive at the same conclusions based on the coding criteria. The Kappa statistic for this enquiry is presented in the following Chapter.

### 3.2.3 Participants

The interview participants were drawn from a pool of high level professional improvising instrumentalists, from Canberra, Melbourne and Sydney. Interview participants had to meet the criteria that they were indeed improvising musician performers who have established performing careers. Participants had to satisfy two out of three of the following criteria: they have completed an undergraduate degree in music five or more years ago; they have albums which feature original improvised/jazz music that are commercially released (distributed-by or licenced-to a record label) or, they are artists that are featured on commercially released albums; the participants either are, or have been featured performers at jazz and other improvised music venues and national or international jazz festivals.

The study did not focus on the experience of drummers because a central concern of the study was how pitch information is represented in the mind. It is possible that drummers do hear pitch, however I sought to understand the experiences of instrumentalists where pitch is understood in unambiguous terms. Interviews will be carried out from mid-March through to mid-June 2015.

The various themes that emerge from this enquiry, pointing to how the auditory imagery associated with mental improvisation could be more easily generated, was then collated. Following this, the project yielded results via practice-led research, whereby these themes were applied to my creative practices for developing MAS, during performance preparation.

### 3.3 Practice-led Research

Iterative and reflective processes were central to research in the second part of the project. Processes such as these, have been discussed by Smith & Dean (2009, pp. 19-22) as being 'fundamental' to creativity and research. In relation to how such processes operate in research they state: '...the researcher/practitioner decides which are the best and most useful realisations derived from the task, and discards or temporarily puts to one side the others' (ibid p. 22). Brown and Sorensen (2009, pp. 162-163) state that reflection on artistic output is a central factor in their creative practices, especially when an iterative process is involved. Thus reflection and iteration are intertwined. Brown and Sorensen (Ibid) are also proponents of the view originally put forward by Schon (1983) that reflection can help convert implicit knowledge, to knowledge that can be clearly articulated (see also Vaughn 2009, p. 169). Reflections recorded in the exegesis carried out a similar purpose: reflections articulated the non-verbal knowledge that was displayed in my improvisations.

Research carried out for this project engaged the concepts of reflection-in-action and reflection-on-action, developed by Schon (1983). Schon (Ibid, p. 50-51) states that when expert practitioners engage their expertise during a given task, they often exercise a tacit knowledge that does not require any pre-thought or planning for engaging with that task. While engaging in a task that draws from his or her expertise, the practitioner will encounter anomalies that yield surprises, calling for the practitioner to momentarily reflect on how they might alter the application of their skills. Schon (Ibid p. 280) refers to these moments as reflection-in action. Schon argues that while engaging in reflection-in-action, doing and thinking are complementary, and so the practitioner avoids regressive reflection that would normally interfere with carrying out the task at hand. A related concept of Shon's is 'reflection-on-action' (Ibid pp. 276-278). This term refers to reflection and analyses carried out by the practitioner, outside the time when the practitioner is engaging in a task that calls on their expertise. Shon infers that practitioners engage in this type of reflective analysis for the purpose of generating insights that may positively impact upon future engagements of their expertise.

Accordingly, research insights gained during reflection-in-action and then recorded post-performance, as well as post-performance analysis and reflection (reflection-on-action)

generated research outcomes for this project. The fact that a major part of the research involved recordings, meant that this project was uniquely placed to engage reflection-in-action as a means for collecting information. Insights gained from reflection-in-action could be reported verbally and recorded in the studio, immediately after a performance, capturing insights and observations while they were still clear in the mind of researcher. Such research outcomes were conveyed in written form in the exegesis, and in practical form via the performance recordings.

The reasoning behind my choice of research methods was to try to reduce the degree of subjectivity in my enquiry. This being said, I was aware that reflective analysis plays a large and valuable role in my project, and this could be viewed as being highly subjective. Therefore, for this project, reflection-on-action (post-performance analysis) involved developing specific approaches for analysing my improvisations that generated quantitative data and diminished subjectivity. Doing so enabled me to accurately demonstrate the degree to which my MAS were developed, the impact of doing so on my performance, and the analytical processes that were involved in generating these findings. Practice-led research carried out in the second half of the project therefore involved the development of 'distinctive methodological approaches' (Smith and Dean 2009 p. 5). These approaches are the focus of the following sections.

### 3.3.1 Two Streams of Enquiry

Research in the second part of the project was carried out in two streams. The first examined how MAS are developed and streamlined. The second investigated how developing MAS has impacted upon my creative practices and artistic output.

To address the first stream, I ascertained the impact of various approaches for developing and engaging MAS, by recording myself scat-singing improvisations unaccompanied, over jazz standards. Singing my improvisations was the only way available to me to externalise what I am hearing internally, in my mind. Pfordresher & Halpern (2013 pp.747-754) have shown that prior to singing, pitching a note correctly requires the generation of an accurate auditory image of that pitch. From this we can infer that in order to sing a musical idea, a clear auditory image of that idea needs to be generated first also. Singing my improvisations was therefore viewed as an accurate way to observe and measure my ability to generate and manipulate

musical auditory imagery. As my vocal chords are untrained, I believe that there were few, or no ideas expressed in the improvisations that result from muscle memory. The scat-sung improvisations are therefore be an accurate externalisation of what I am hearing in my mind. By singing my improvisations, it was possible to observe whether engaging the themes derived from the qualitative interviews made the process of generating musical auditory imagery easier. Analysis of the MAS solos, as well as reflections made during and after performance preparation, helped point to which of the trialled themes and elements are best for aiding the generation of musical auditory imagery, associated with mental improvisation. In this exegesis the recordings of the scat-sung improvisations are referred to as the 'MAS recordings', and the improvisations themselves were referred to as the 'MAS solos'.

The second stream of enquiry examined the impact of MAS development on my creative practices and artistic output. The degree to which this impact could be heard and observed, was ascertained via the analysis of improvisations coming from a different set of recordings. These recordings are called the 'performance recordings', and the improvisations are referred to as the 'performance solos'. The same standards performed and recorded for the MAS recordings, were performed and recorded on my instrument, accompanied by an ensemble consisting of drums and acoustic bass. The performance recordings were made first, and the MAS recordings were made three to five days after the performance recordings. They were carried out in this order so that the improvisations recorded during the MAS recordings do not unintentionally influence the outcome of the performance recordings.

Performance recordings were made at the end of each phase of performance preparation, in order to observe gradual changes or impacts that may have resulted from MAS development in that phase. Among these performance recordings, the two standards, *My Funny Valentine* and *Green Dolphin Street*, were recorded both at the beginning and also at the end of the project. At the conclusion of the project there was therefore two performance versions of each of these pieces (one version recorded at the beginning, and one recorded at the end). Comparisons were then be made between the two performance versions of each of these standards. This was done in order to provide clearer indications of how MAS development over the entire project impacted upon my artistic output. The project was able to therefore observe any incremental changes as they emerged from one phase to the next, as well as

changes that are more pronounced, resulting from the culmination of all the approaches applied in this project.

### 3.3.2 Observation of Idea Generation in Performance solos and Continuity via Motivic Development in MAS solos

Observing the development of MAS in my MAS solos, and ascertaining how the development of MAS affected my creative practices and artistic output, as heard in my performance solos, required specific types of analysis to be developed for this project. These systems of analysis will draw on two important concepts. Crook's concept of continuity (2006 pp. 37-38) and Hargreaves' concept of idea generation in jazz improvisation (2012, pp. 359-364). The former was most<sup>21</sup> applicable to the analysis of the MAS solos, while the latter was important for the analyses directed towards ascertaining the impact of MAS on my artistic output.

#### 3.3.2.1 Ascertaining Improvements in MAS development via the MAS solos: Analysis of Continuity via Motivic Development

Achieving continuity through motivic development in my MAS solos was the central way of observing and measuring my MAS development. This approach was based on a key premise: improving the ability to generate and then develop motives while scat-singing, could be aided by improving my ability to generate and manipulate musical auditory imagery. I therefore investigated whether the application of the themes acquired from the qualitative interviews could help me to more readily generate and manipulate auditory imagery, as is needed when a motive is being developed in a real time, scat-sung improvisation. Therefore, when analysing my MAS solos, I was ascertaining and measuring whether I have increased command over the auditory images I am generating. I looked at whether this increased command did indeed permit me to develop motives, rather than simply outlining the harmony of the jazz standard.

In analysing my MAS solos, I looked for moments when motives are created and developed. An increase in the presence of motivic development in my MAS solos indicated an improved ability to exert control over the generation and manipulation of auditory images, and therefore improvement in my MAS.

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<sup>21</sup> If motives were being developed in my performance solos then continuity analysis was also used in the performance solos also.

The analyses of motivic development in my MAS solos adhered to the definitions provided by Crook. Crook (ibid, pp. 41-48) identifies six central ways of developing and manipulating motives during improvising. The six motive development techniques identified by Crook are displayed in Table 1. For the analyses in this project, a phrase was only be considered to have undergone motivic development when it was played more than twice.

**Table 1: Types of Motive Development**

<b>Motive Development Techniques According To Crook (2006, pp. 41-48).</b>		
<b>Type</b>	<b>Abbreviation (As seen in the analyses)</b>	<b>Description</b>
<b>Variation</b>	<b>V</b>	The rhythm of the original motive is maintained and repeated, while the notes of the new phrase may vary from the original.
<b>Fragmentation</b>	<b>F</b>	A fragment of the original motive (or a variation on this original melodic fragment) is played.
<b>Rhythmic Displacement</b>	<b>RD</b>	The same rhythmic or melodic (pitch content can be different) motive is repeated, but the new development starts on a different beat or subdivision in the bar.
<b>Augmentation</b>	<b>A</b>	The quantity of notes is maintained (and usually, but not always, the same notes are maintained), however the values of the notes are augmented.
<b>Diminution</b>	<b>D</b>	The quantity of notes is maintained (and usually, but not always, the same notes are maintained), however the values of the notes are contracted.
<b>Extension</b>	<b>E</b>	New material is added to the beginning or end of the original motive, or similar variations on the original motive.

The different ways of developing a motive can be combined, and new material can be sourced from the changes, resulting in further developments. In the table, seen in Figure 1 (pg. 43), Crook provides a demonstration of how an initial motive or idea can be developed and the different types of development hybridized. The table seen in Figure 1 also provides a model

for classifying motive developments through the different stages of development. For example, a motive may undergo a variation (V), which is then fragmented (VF) and which then may undergo diminution (VFD). This system enabled me to clearly track the development of motives in my own improvisations, and point to moments where continuity had been achieved.

The analysis of continuity via motivic development involved calculating the percentage of bars in which a motive was developed, out of total number of bars in the improvisation in which notes are sung. Whole bar rests, as well as passages in improvisations in which motivic development was not the central creative focus, were not included in the figures presented in results showing the percentage of bars dedicated to developing motives.

It must be stressed that the focus of this project was not to develop my ability to improvise with motives. Indeed, while the focus of the MAS solos was to achieve increasing degrees of continuity via motivic development, none of the performance preparation sessions specifically focused on developing this approach to improvisation in a systematic way. Continuity via motivic development achieved in the MAS solos was therefore understood as the result of MAS development, stemming from an improved ability to exert control over musical auditory images, in real time.

In addition to this last point, no case is being put forward proclaiming that the approaches presented in this project are superior methods for developing the ability to improvise with motives. Rather, the focus on continuity via motivic development was viewed as a way to illustrate the development of an increased command over my ability to generate and manipulate my musical auditory imagery.

The MAS solos were not intended as vehicles for artistic expression. In this project, they were mediums for demonstrating the degree to which I was able to manipulate musical auditory imagery in my mind. I attempted to continuously develop and then maintain motives throughout the MAS solos. Counting the number of bars in which motives were being developed helped to demonstrate whether MAS development enabled me to have greater control over the music I hear in my mind. My MAS were not sufficiently developed at the outset of this project to even attempt to create solos that I would consider artistically pleasing. I hypothesized that the approach of analysing my MAS solos this way would be

effective only up until a certain point: the moment when I had attained enough control over my MAS that a greater array of artistic devices (for example, the use of space) could be injected into the solos. At this point, measuring the development of my MAS would be difficult because the analysis would then have to involve subjective judgements in relation to these artistic elements. Conversely, if this happened, it might also be viewed as the moment when (via the actions taken to develop my MAS in this project), my MAS had been developed to a significantly high degree.

**LEGEND FOR CHART:**  
V = Variation (includes transposition, inversion, etc.)  
F = Fragmentation  
R = Rhythmic Displacement  
A = Augmentation  
D = Diminution  
AD = Augmentation/Diminution  
E = Extension

ORIGINAL MOTIVE																	
(Read chart downward then across from left to right)																	
V					F					R			A	D	AD	E	
R		A	D	AD	E	R		A	D	AD	E	A	D	AD	E	E	E
A	D	AD	E	E	E	E	A	D	AD	E	E	E	E	E	E		
E	E	E				E	E	E									

The above 47 treatments of an original motive are further clarified and listed below in abbreviated form (also see corresponding musical examples):

- **VARIATION** – V, VR, VA, VD, VAD, VE, VRA, VRD, VRAD, VRE, VAE, VDE, VADE, VRAE, VRDE, VRADE.
- **FRAGMENTATION** – F, FR, FA, FD, FAD, FE, FRA, FRD, FRAD, FRE, FAE, FDE, FADE, FRAE, FRDE, FRADE.
- **RHYTHMIC DISPLACEMENT** – R, RA, RD, RAD, RE, RAE, RDE, RADE.
- **AUGMENTATION** – A, AE.
- **DIMINUTION** – D, DE.
- **AUGMENTATION/DIMINUTION** – AD, ADE.
- **EXTENSION** – E.

**Figure 1: Further motivic development (Crook 2006, p. 49)**

Although the focus while recording the MAS solos will be the continuous development of motives, we can hypothesize that idiosyncratic traits in my approach to improvisation will also make their way into these solos. For example, these traits may include the sustained presence

of certain groups of intervals, rhythmic groupings or even melodic phrases. As such, identifying these traits will be important for illuminating the impact of MAS development on my performance solos. Demonstrating the increased presence and influence of MAS in the analyses of the performance solos requires the introduction of a second concept: identifying different sources of idea generation in my performance improvisations.

### 3.3.2.2 Analysing the Impact of MAS development on Performance via the Analyses of Idea Generation in the Performance solos

The concept of idea generation was important to this project for enabling the observation of the influence of MAS on performance improvisations. Hargreaves (2012, pp. 359-364) puts forward the notion that ideas in improvisation are drawn from three different sources: audiation-generated ideas, strategy-generated ideas and motor-generated ideas. According to Hargreaves, motor-generated ideas are driven by muscle memory (procedural memory) and are characterised by musicians being seemingly unaware, of the melodic intricacies of what they, or their hands, are playing (ibid, p. 362). The second type of idea generation put forward by Hargreaves (2006, pp. 359-360) are called strategy-generated ideas. According to Hargreaves, strategy-generated ideas do not require that the musician hears the idea internally (or what they are about to play) prior to or during their execution. Hargreaves (ibid, p. 359) states that strategy-generated ideas “...provide a specific plan for behaviour as a means of solving the compositional demand of improvisation”. The third type, audiation-generated ideas (Ibid pp. 360-362), has already been introduced and discussed in this exegesis. In Hargreaves opinion, musical ideas that are audiation-generated are those heard clearly in the mind, both when the instrument is absent and during performance (ibid, p. 360). Thus, in the paradigm of this exegesis, audiation-generated ideas can be thought of as fruits of the same cognitive mechanisms that are engaged during the exercising of MAS. The improvisations that make up the MAS solos are therefore entirely sourced from audiation-generated ideas. Identifying how MAS are manifested in my MAS solos, via the identification of various idiosyncratic traits within the MAS solos, enabled the identification of audiation-generated ideas in my performance solos.

Reflection-in-action and reflection-on-action during and after performance preparation and performances was called upon for identifying strategy and motor-generated ideas in my performance solos. The ways these different types of ideas were manifested in my playing is

documented and presented in Appendix H1 and H2. Post-performance analysis of the performance solo transcriptions was carried out in order to identify audiation-generated ideas. Table 2 shows how analysis will take place. Step one (in orange) involved recording the MAS and performance solos, step two (in yellow) saw the examination of the MAS solos for frequently occurring traits. Doing so enabled the examination of the performance solos for the same kinds of traits (as seen in red). The presence of the same (or very similar) traits in my performance solos, suggested that they had been generated by the same idea source. For example: if tri-tone substitutions were present in my performance solos, but not in my MAS solos, then it was probable that when tri-tone substitutions appeared in the performance solos, they were not the result of audiation-generated ideas, and therefore did not result from development of my MAS. Observing an increase in the instances of audiation-generated ideas was used as a way of pointing to the increased influence of MAS development on my improvising.

**Table 2: Identifying Presence of MAS/Audiation-Generated Ideas in Performance Solos**

1	Make MAS recordings & Performance recordings
↓	
2	Examine MAS solos for frequently occurring, Idiosyncratic traits
↓	
3	Compile a list of these traits
↓	
4	Examine performance solos for the presence of the same (or similar) traits

A numerical analysis of idea generation in the performance solos was generated and this analysis will involve five steps. The first involved calculating the percentage number of mixed bars, in which there are lines sourced from more than one type of idea generation<sup>22</sup>. The second step involved calculating the percentage number of bars consisting of whole note

<sup>22</sup> In such a bar for example, a line sourced from one type of idea generation might end and a line sourced from another type of idea generation might begin.

rests. Mixed bars and whole-note rest bars were treated as entities unto themselves, doing so will provided clearly defined blocks within the performance solos, in which examples of lines coming from the three sources of idea generation could be observed. The third, fourth and fifth steps involved calculating the percentage number of bars containing lines sourced from each type of idea generation (audiation, motor and strategy). Percentages were calculated by multiplying the number of bars containing either whole-note rests, mixed sources of idea generation or the different sources of idea generation by one hundred, and then dividing that figure by the total number of bars in the solo. These findings were then represented in stacked column graphs showing the composition of each of the solos (the data within these is discussed in Chapter Six).

### 3.3.3 Three Approaches to Performance Preparation

This project ascertained whether clear differences were discernible in the MAS and performance solos coming from the pieces studied via three different approaches to performance preparation. The project looked at whether MAS development is best achieved by either pure mental practice, a hybrid mental and physical practice, or physical practice only. These different conditions are summarised in Table 3.

By engaging in different types of performance preparation, I created conditions that allowed comparisons to be made between the solos resulting from the three types of performance preparation (MPO, PPO & MP+PP). Such comparisons indicated observable differences in the outcomes of these preparation approaches on my MAS development and on my artistic output. Each of the different approaches saw the various elements and themes derived from the qualitative study engaged in different ways. For example, in the MP+PP condition miming (playing a muted instrument) could be engaged, while in the MPO condition, it could not. In the MPO there is no contact with the instrument. Therefore the recordings of the pieces studied under this condition documented the first time that they were played on the instrument. In the PPO none of the themes acquired from the study were be engaged. The continuity analyses of the MAS solos indicated which of these conditions provided the better conditions, and allowed for the inclusion of better approaches for developing MAS.

A focus on these different performance preparation approaches also allowed judgments to be made as to which approach had a greater positive influence on the performance

experience. For example, one approach may yield superior results in developing MAS, but may also result in greater levels of performance anxiety, during a performance. Decisions were therefore made post-performance as to which performance preparation approach was better suited for the demands of performance.

**Table 3: Types of Performance Preparation Approaches**

Type of Approach	Abbreviation	Description
Mental practice only	<b>MPO</b>	<p>This approach involves creating mental representations of the music and any other part of the music making process needed to improvise.</p> <p>This may mean visualising the lead sheet and/or visualising the neck of the guitar and where the relevant notes fall on the guitar. It may also mean either singing or sub-vocal singing in order to generate the auditory imagery. Another important theme that may be employed is gesturing as though playing the guitar.</p> <p>All information relating to the piece comes from my own KSMR and the instrument is not played or referred to at any point.</p>
Physical practice only	<b>PPO</b>	<p>Involves playing the instrument and no deliberate attempt is made to develop mental representations.</p> <p>Memorising the piece takes place on the instrument and all aspects of playing over the standard's chord changes are learnt with the guitar present.</p>
Composite of mental practice and physical practice	<b>MP+PP</b>	<p>This type of approach will mix the two previously discussed approaches.</p> <p>In this approach the instrument may be engaged for developing mental representations</p>

### 3.3.4 The Iterative Process

At the conclusion of each of the recording sessions, the findings of the different streams of analyses were examined in order to develop the performance preparation regimes in the following phase. Appendix L shows how the iterative process in this project operated. The example provided in in Appendix L demonstrates how the findings from the first phase of MAS and performance recordings, as well as the findings from the qualitative interviews exerted

influence on the make-up of the performance preparation conditions in the second phase. Based on the analysis from the first phase, decisions were made as to which of the various elements (such as subvocalization or gesture) would be included in the MPO and MP+PP performance preparation conditions in the second phase of performance preparation. At the end of the period of performance preparation, MAS and performance recordings were then made.

As seen in Appendix L, immediately following the recordings (depicted in the green and yellow boxes), insights from reflection-in-action were documented. Post-performance analyses of both recordings and the recording session (the performance) will then take place. On analysing the MAS recordings I was ascertaining whether my MAS had improved. I ascertained which performance preparation condition (MPO, PPO or MP+PP) generated the MAS solo with the most continuity. Additionally, I also revisited my reflections-in-action to ascertain which of the elements (such as subvocalization or gesture) had the most influence over the successful engagement of MAS.

Also seen in Appendix L is that the analysis of the performance recordings and solos looked into whether MAS development had an impact on my performance, and whether these impacts were experiential or overt, or both. Similarly, I judged which of the performance solos over the standards, studied within the three different performance preparation conditions (MPO, PPO or MP+PP) more successfully achieved my artistic aims.

Several sources suggest that there are clear criteria that the listener may refer to in order to judge whether an improvisation is objectively successful. For example, Berliner (1994, pp. 243-285) has shown how jazz musicians strive to achieve the presence of several key elements within their improvisations during performance. It can therefore be extrapolated that the inclusion of such elements in one's improvisation would in turn point to an increasingly successful solo of artistic depth. These elements include; a sense of groove and achievement of rhythmic drive and forward motion (ibid, pp. 244-247); a discernible connectedness between musical ideas (ibid, pp. 247-250); an awareness of how the harmonic structure over which the musician is improvising dictates note choice and an understanding of how to manipulate certain notes within this harmonic structure for artistic/emotional ends (ibid, 205-252). Additionally, Backman and Dahlstedt (2008, p. 371) state that a good improvisation should have a certain shape. It should build to a point of climax, and after the climax, the

intensity of the solo should taper off. However, the success of any solo is arguably highly subjective. Within this research, all of the previous discussed criteria were taken into consideration. Most significantly for this project however, judgements made in relation to the artistic success of my performance solos (the performances made with the ensemble) centred on whether I have been able to execute more audition-generated ideas within that solo.

Appendix L shows that Identifying successful solos in line with this criteria would lead to an investigation of the conditions and aspects of MAS development that gave rise to the more successful solos. Evaluations such as these resulted in a change to the make-up of the performance preparation regimes in the following phase. This meant altering the degree to which certain themes and elements are engaged, or whether their engagement are discontinued in the following phase all together. This process, carried out after four separate recordings resulted in the collation of specific elements found to be beneficial to the development of my MAS.

### 3.4 Chapter Summary

In summary, research-led practice formed the overarching methodological framework for the project, whereby information derived from qualitative semi-structured interviews informed approaches taken to develop my creative practices and subsequent artistic output. The final stage of the project involved reflection upon different approaches to performance preparation and how they affected MAS development and my artistic output. It thus required the application of practice-led research methods, whereby different iterations of approaches were assessed, based on their perceived efficacy in yielding the desired outcomes. Each iteration was an improvement on the previous one, and improvements were yielded via reflective analyses, as well as other specific systems of analysis developed for this project.

## CHAPTER 4 – QUALITATIVE STUDY

### 4.1 Chapter Introduction

A key focus of this study was to look for ways that the instrumentalist participants had found to lessen the effort associated with the generation of auditory imagery during mental improvisation. A snowballing method was used for gathering interview participants, the final group consisted of 17 musicians: three guitarists, five saxophonists, two trombonists, one trumpeter, two pianists, three bass players and one 'cellist. Seven of these musicians were female, the remainder were male. The names of the participants have been omitted so as to maintain their privacy and anonymity. In examining the data, I was looking for frequently occurring themes that were presented across the group of participants. The appearance of the same theme in the responses of multiple participants indicated its potential importance to engaging and developing Manipulative Aural Skills (MAS). I looked for elements common to all the participants that may be implemented in my own performance preparation regime. To begin the study, I first had to establish research questions, and then out of these, interview questions that would enable me to answer the research questions. This study (Project number: CF15/282 2015000140) was approved by Monash University Human Ethics Committee, and all participants gave written informed consent for the use of the data they provided via the interviews, for this project's purposes.

### 4.2 Propositions

Examining the literature relating to mental imagery, musical imagery and mental practice enabled me to establish several propositions upon which sound research questions could be developed and suitable interview questions were formulated in order to answer these research questions. The first of these propositions is that musicians are capable of imagining music in their minds away from the instrument and this is indeed an established approach to performance preparation (Bernardi et al. 2013a, p. 275; Jorgensen 2004, p. 92). It is predominantly referred to in the literature as mental practice<sup>23</sup> and most of the empirical research carried out on this subject has focussed on the experiences of classically trained

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<sup>23</sup> See key terms for a definition of 'mental practice'.

musicians; the experiences of western improvising musicians has received much less attention.

The second proposition is that musical imagery is a cross-modal/multisensory phenomenon (Keller 2012, p. 206, Godoy 2010). Therefore, if a musician does improvise in his or her mind, the associated generation of auditory imagery may be influenced by motor information that is derived from parts of the body other than the brain, as well as mental imagery coming from sensory modalities other than audition. This means that for some musicians, imagining improvising may also involve the experience of movement and therefore sensory-motor feedback from the hands or arms as well as the mouth, throat and larynx.

### 4.3 Research Questions

The research questions presented in this section were derived from the propositions discussed in the previous section. This study had four primary questions that it sought to answer.

#### **Research Question 1**

The first question (RQ1) asked was:

*Do improvising musicians improvise in their minds away from their instruments?*

This question sought to find out whether this is indeed a phenomenon experienced by, and is relatively common among musicians other than myself. An affirmative response to this question would provide evidence that improvising music in the mind away from the instrument is a phenomenon that is experienced by improvising musicians, consistent with the proposed concept of MAS. The question addresses the idea that improvised music can be heard in the mind, and all of the information needed for this to happen is stored in the musician's own knowledge structures. It also takes in responses that relate to composing in the mind, as composition is a process which (in some cases) draws initially upon improvisation in order to generate melodies and other musical ideas. A majority of affirmative responses to this question will also mean that attempting to develop this skill set, to a level where it can

be engaged as an agent for artistic development, is possible. A majority of responses provides a precedence for developing this skill set.

On attaining a positive or negative response to this question, further primary questions can be put forward. Follow-up questions have been formulated in response to the insights gained from the literature review and are aimed at attaining a clear understanding of the nature and character of the musical imagery, and other potential influential factors which accompany mental musical improvisations in improvising musicians.

### **Research Question 2**

The second research question (RQ2) is in two parts and it addresses the issue of the aforementioned additional themes. Both parts of this question are presented below and they ask:

*Do improvising musicians experience more than one type of mental imagery (in addition to auditory imagery) while imaging novel<sup>24</sup> musical improvisations? Are there accompanying physical responses or interactions during this process?*

### **Research Question 3**

The third research question (RQ3) directly relates to the second question:

*Are these additional factors perceived by musicians to be beneficial to this process?*

Research questions 2 and 3 go to the heart of this research project as they seek to obtain data that is implicated in the formulation approaches for my own performance preparation regime. The credibility of a given theme as being beneficial is augmented when it is experienced by multiple musicians. The frequent occurrence of such themes across the pool of participants may suggest that they are effective in rendering the generation of auditory imagery less effortful. In addition to this, its credibility is amplified when it is perceived by the

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<sup>24</sup> The word 'novel' is used to make it clear that the question asks if the musician is imagining an improvisation that they are creating themselves, in their mind in real time, and not simply remembering an improvisation that they have previously been exposed to.

musicians to be beneficial. Thus the exploration of such a theme as a potential approach to performance preparation is warranted<sup>25</sup>.

#### **Research Question 4**

The fourth research question (RQ4) follows on from the previous two as it aims to find out whether or not the process of improvising in the mind via mental practice is a form of performance preparation that is, or has been employed by the participants, and whether this approach is perceived to be beneficial. The question asked:

*Is improvising in the mind, away from the instrument, a skill that is intentionally developed? Is this skill-set perceived by the improvising musicians to be beneficial?*

Responses to this question will hopefully enable me to gain an understanding of how musicians make use of the ability to improvise in their minds for their own creative practices and artistic development. Any frequently occurring themes or concepts may then be compiled and trialled as approaches in the development of my own performance preparation regime.

## **4.4 Overview of Interview Questions**

Problems associated with the contamination of results due to the involvement (even inadvertent involvement) of the researcher (Intons-Peterson 1983 pp. 394-412) was a central consideration in formulating the interview questions. In order to avoid unwittingly influencing the responses, it was therefore necessary to pose the questions in such a way so as to enable the participant to present and discuss any emergent themes volitionally with minimal prompting by the interviewer. There were times during the interviews that some of the questions were not put to the participants. This happened when it was perceived that the participant had already answered the question inadvertently while responding to a different question, and in doing so had provided sufficient information about that question. Affirmation by the participant of having experienced the phenomenon that the question sought to address, meant that several probing questions could then be presented to gain a

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<sup>25</sup> The ideal next step would be to quantitatively test the influence of any additional factors on the generation of musical auditory imagery across a large pool of participants, and thus generate generalizable results that could be drawn upon by all students and practitioners.

clearer picture of how it is manifested. These probing questions were posed to the participants in order to understand whether, in addition to the sounds of the notes heard in the mind, there might be other factors at play.

### **Interview Questions 1a & 1b**

Questions 1a & 1b were presented to the participants and sought to ascertain whether musicians improvise music in their minds away from their instrument, and were thus directly aimed at answering RQ1. Subjects were firstly asked interview question 1a:

*How do you imagine single line music away from the instrument?*

Posing this question enabled the subjects to immediately reflect on their experience of imagining music. It was hoped that the interview participants would either assume that the question referred to mental improvisation, or that they would indeed pose questions back to the interviewer asking whether this was the true intended meaning for the original question. If this question failed to produce the result whereby the musicians talked freely about the experience of improvising in their minds, the second part of question one, question 1b was posed:

*As an improvising musician can you please talk about how you use this type of imagination for practice or deliberate thinking about music?*

The participants responded in different ways to these questions. The intention behind posing this second questions was that, in talking about the nature of the music heard in their minds, the musicians might divulge that they do in fact improvise in their minds. I was also looking for responses that pointed to whether there were additional factors experienced in concurrence with the auditory imagery heard in their mental improvisations. The literature reviewed as part of this project makes it clear that this is a possibility, and so I was looking for factors such as concurrent mental imagery or motor responses generated in addition to the auditory experience. Probing questions of the kind previously mentioned were employed following all four of the core questions.

### **Interview Question 2**

Question 2 enabled further investigation of multisensory interactions in this process. It provided the participants with the opportunity to give more explicit details about the timbre of the notes they were hearing, and in doing so point, to certain motor responses and interactions. This question focussed on the timbre of the notes heard in the participant's mental improvisations. The question that was posed was:

*Can you describe the timbre of the notes heard in your mental improvisations?*

One of the aims of this question was that of uncovering whether the participants had a strong vocal connection with their mental improvisations, which may be reflected in the timbre of the notes they heard in their minds. This vocal connection may be reflected in the felt movements of the larynx and/or mouth. Saintilan (2006, p. 75) has shown that classically trained musicians experience several different types of timbre ranging from the sound of their instrument to the sound of the musician's own voice, to something akin to a pure tone. Attaining clear data on how high level improvising musicians experience timbre during mental improvisations would enable me to set clear and achievable goals in relation to how lucidly I aim to experience the timbre of the notes heard in my mind and how vivid I *could* expect them to be.

### **Interview Question 3**

Questions 3 was designed to allow for the participants to voluntarily provide accounts of triggers or cues for musical auditory imagery resulting from the movements of hands or arms. Question three asked:

*Can you talk about any occasions when you have been able to hear music in your mind that has resulted from seeing or doing something music related though not actually playing your instrument?*

Responses to question 3 could thus be directly included as potential approaches for generating musical imagery and thus render mental practice less effortful.

#### **Interview Question 4**

This question directly sought answers to RQ3 and it asked the participants:

*Is improvising in your mind away from your instrument an intentionally developed skill?*

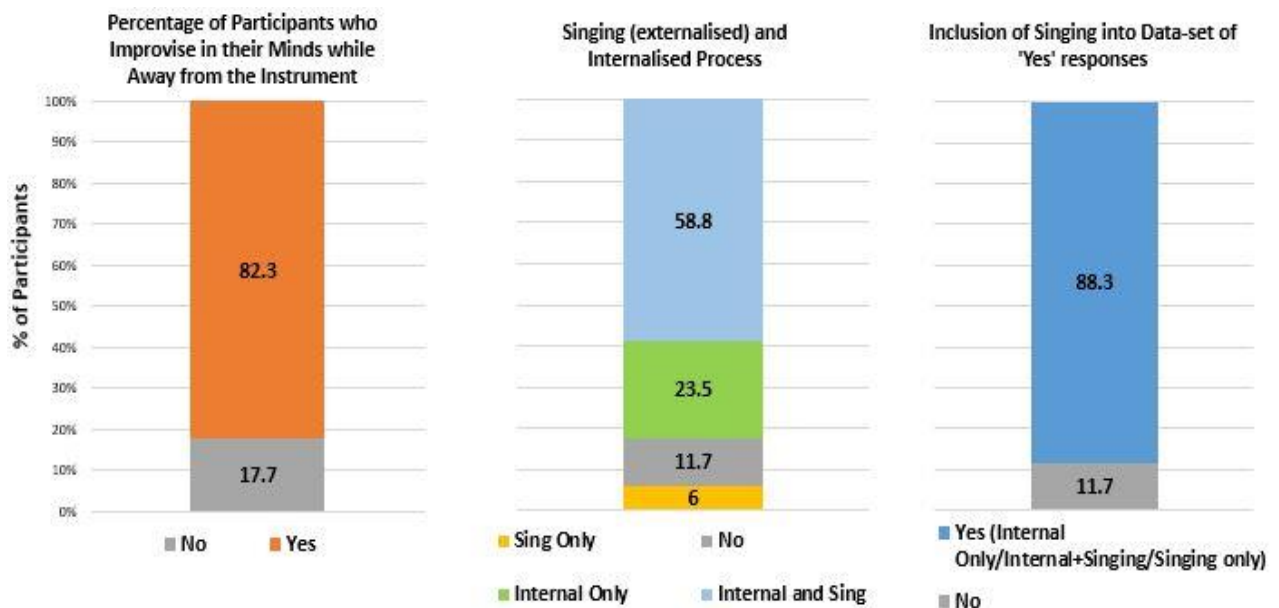
This question was put to the participants only when it was clearly apparent that they do improvise in their minds away from their instrument. It sought to address the question of whether the intentional development of the ability to improvise in the mind is something that high level musicians do out of a realisation that by doing so, it could improve their creative practices and artistic output. It was intended as follow-up question from question 1b. This is the only research question that was directly presented to the participants. For this reason, the responses to this question will be discussed in the following section.

### **4.5 Results**

The results of these interviews will be discussed in relation to how the participants' responses addressed and provided answers to the research questions. This section will begin by examining how the participants provided responses to the research questions in responding to the interview questions. Following this, a nomothetic analysis of the results will be provided and discussed, thus looking at how frequently certain themes were reported across the group of participants. Doing so will permit me to discuss key aspects of the phenomenon that were shared by the participants. After the primary nomothetic analysis, I will provide an ideographic analysis aimed at showing the individual differences between the participants and how the broader themes discussed in the nomothetic analysis were experienced on an individual level.

#### **4.5.1 Responses to Research Question One**

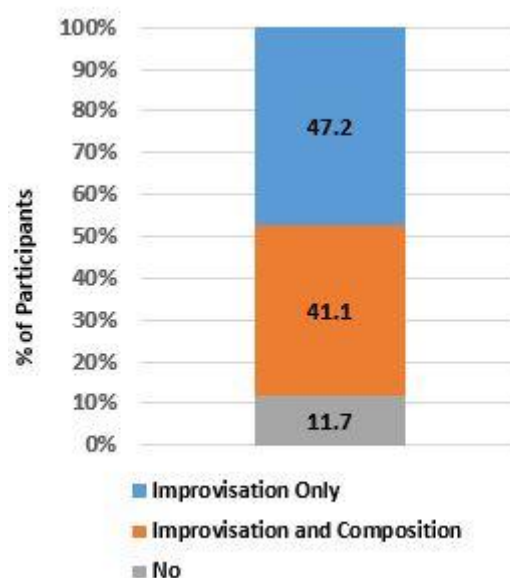
The first graph in Figure 2 (on left), shows the percentage of participants who spontaneously reported improvising in their minds while away from their given instrument. This study found that 82.3% of participants had experienced the phenomenon. Examples of responses that provided the data presented in Figure 2 can be found in Appendix C2.



**Figure 2: Percentage of Participants who improvise in their Minds**

During the course of the interviews, many of the participants freely associated scat-singing, vocalising their improvisations, with the concept of improvising in their mind, away from the instrument. The middle graph in Figure 2 shows that a majority (58.8%, seen in the light blue band) of the participants both improvise in their minds, and externalise the process by scat-singing. Indeed, a much smaller percentage of participants (23.5%, seen in the green band) reported that mental improvisation is only experienced as an internal phenomenon. This graph also shows that 6% of participants reported only externalising (singing) the process (seen in the yellow band). The fact that so many of the participants freely and spontaneously associated the concept of improvising in their minds with scat-singing, suggests that vocalising improvisations is a different manifestation of the same skill. Indeed, scat-singing may be an externalisation of the same process. Thus the middle graph in Figure 2 shows that there appears to be two extremes that can be seen in these results: on one extreme the participants only talked about experiencing this phenomenon internally in their minds, and at the other extreme it was only talked about as being experienced as a result of externalising the process, singing. A middle-ground appears where participants discussed both approaches. Therefore, when the group 'Singing Only' is added to the 'Yes' data set (as seen in the third graph in Figure 2), it brings the total number of musicians who reported improvising in their minds, away from their instruments up to 88.3%.

These results suggest that improvising in the mind, manifested as internally produced musical imagery, or externally produced scat-singing, while away from the musician's given instrument, is a phenomenon that most improvising musicians report having experienced. A notable observation is the perceived importance, and involvement of scat-singing in this process, or the vocalisation of the musicians' internal improvisations. It is important to reiterate that these results are based solely on the responses spontaneously provided by the participants. This means that, for example, those participants who did not mention that they scat-sing their solos were not included in that particular data set, even though scat-singing may be part of their creative practice. It could therefore be assumed that the numbers may in fact be higher than those presented here.

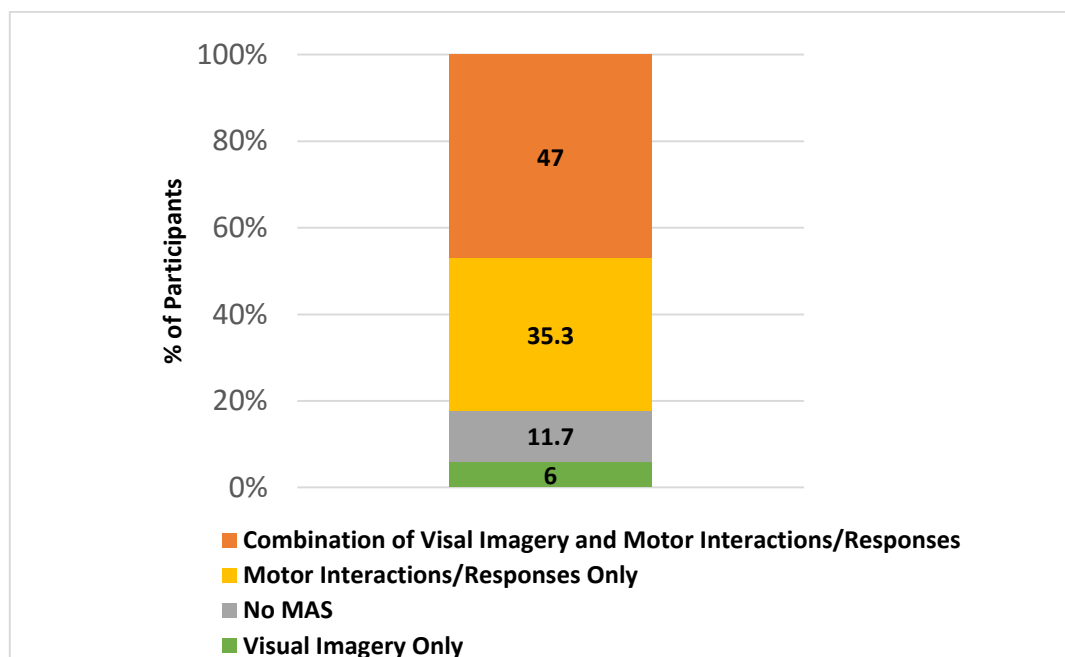


**Figure 3: Number of Participants who reported using this Skill to Practice Improvising and Composing**

Figure 3 shows the percentage of responses pointing to the different reasons for the participants improvising music in their minds. While 47.2% of participants (seen in the blue band) talked about engaging this skill for the purpose of practicing musical improvisation, 41.1% of participants (seen in the orange band) also discussed how improvising music in their minds was done for the purposes of composition. This skill-set is experienced by 88.3% of the participants and is engaged as a vehicle for improvising in the mind, and 41.1% of these musicians employ this skill-set as a vehicle for composing.

### 4.5.2 Responses to Research Question Two

Several key themes emerged from the analysis of these interviews as to how musical information is experienced in the mind, and body during the process of mental improvisation. Most of the participants reported experiencing concurrent motor responses/interactions. Figure 4 shows the percentage of participants who reported experiencing these themes concurrently while mentally improvising.



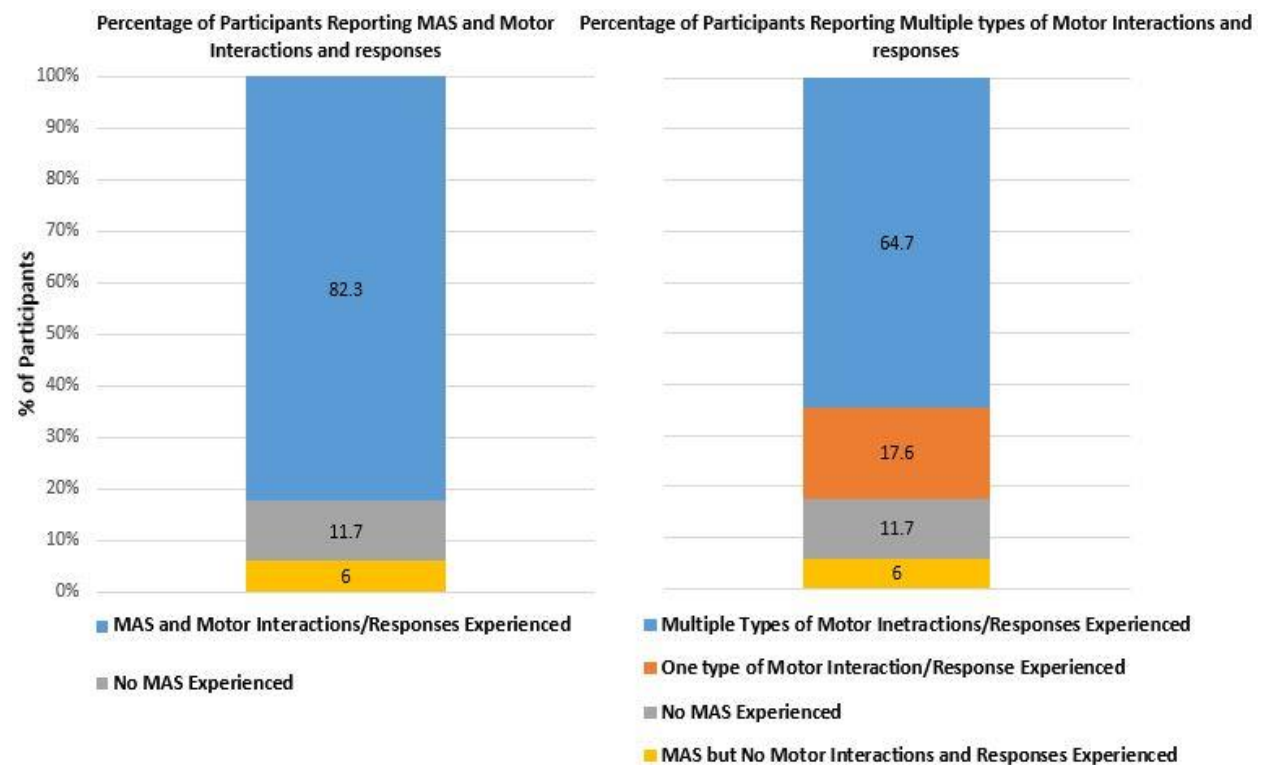
**Figure 4: Concurrent Visual Imagery and Motor Interactions/Responses in those Participants who Use this Skill**

The graph in Figure 4 shows that a majority of musicians who improvise in their minds, away from the instrument (seen in the orange band), reported that they experience both concurrent visual imagery as well as motor interactions/responses along with the auditory imagery associated with the musical improvisation. Figure 4 shows that the second most frequently reported theme was the activation of motor responses/interactions.

#### 4.5.2.1 Concurrent Motor Interactions/Responses

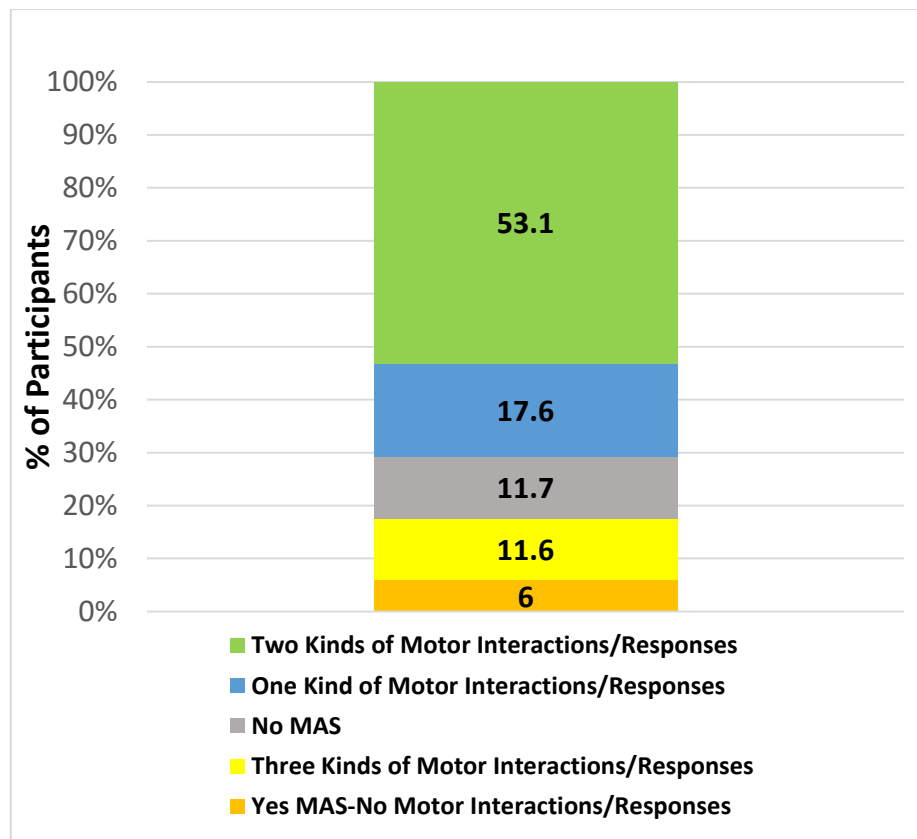
The first graph (on left) in Figure 5 shows the high percentage of participants (82.3) who experienced concurrent motor interactions and responses while mentally improvising. The

second graph in Figure 5 (right) shows that, for a majority participants (64.7), mental improvisation was accompanied by multiple types of interactions and responses.



**Figure 5: Percentage of Participants Reporting Motor Interactions and Responses**

Appendix B1 shows the four different themes (seen in the middle four columns in dark blue), or manifestations of different types of motor interactions and responses, reported to have been experienced by the participants during mental improvisation. The themes are titled as follows: Association with the Instrument, best described as sound-producing gestures such as movement or gesture associated with playing the instrument; Throat Mouth & Larynx which refers to movement in these parts of body; Singing; and Body Movement, moving the body in time with a continuous pulse. It is also possible to observe in this appendix that many of the participants experienced multiple types of motor interactions/responses. One can observe this by scanning each row horizontally from the left to right to see when multiple themes were reported by each participant, or by looking at the final column (on right in light blue) where this is specifically shown. This is also further reflected in the graph in Figure 6 which shows the percentage of participants who experienced multiple, different themes.



**Figure 6: Participants who Experienced Different and Multiple types of Motor Interactions and Responses**

Appendix B1 shows that the most commonly reported of these themes was ‘singing’, a majority of participants talked about this as a being significant overt bodily movement that they associated with mental improvisation. The second most significant theme was ‘association with the instrument’. This theme grouped together all reported movements and gestures that were associated with playing the musicians’ given instruments. Trumpet 1 reported playing his trumpet with a special mouthpiece that has two holes cut into each side. When used, the trumpet doesn’t produce sound, however it does permit him to maintain all of the kinaesthetic properties of trumpet playing, which he believes to be beneficial in aiding him to generate musical auditory imagery (without producing external sound). This mouthpiece is presented in Figure 7. The approach of miming on a silent instrument, described by Trumpet 1, is one that has also been engaged and articulated by Sudnow (2001 p. 138). Thus miming on a silent instrument appears to be an important and beneficial element in rendering the generation of auditory imagery associated with MAS, less effortful.



***Figure 7: Trumpet 1's special mouthpiece***

Several of the participants discussed other types of gesture. Indeed the third most commonly reported theme the participants experienced was movement in the throat, mouth or larynx of some kind while improvising in the mind. Often these movements were reported to be interactions and responses that were related to movements in the throat mouth or larynx associated with playing a wind instrument, or with singing. Finally, two participants talked about how moving their body in time with the pulse or groove was also significant part of their experience of improvising in the mind.

Observing Appendix B1 enables the reader to begin to acquire an appreciation for the differences between individuals, in how the phenomenon of improvising in the mind, away from the instrument, is reportedly manifested and experienced. This can be observed in the category 'Throat, Mouth and Larynx'. While Saxophone 1, Sax 4 and Saxophone 5 all talked about how they experienced motor responses/interactions in the hands and arms associated with playing their instrument, Sax 1 also mentioned that he experiences such responses/interactions in the mouth, throat and larynx<sup>26</sup>.

Bass 3 talked about how the musical improvisations heard in her mind could be separated into two categories; those that are melody driven and vocal, and those that are more groove driven. For Bass 3, groove driven music heard in the mind would manifest itself as movement in the mouth, throat and larynx<sup>27</sup>. Piano 1 and Piano 2 both talked about how they experience

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<sup>26</sup> The response by Saxophone 1 that provided this insight is given in Appendix A, example number 2.

<sup>27</sup> The response by Bass 3 that provided this insight is given in Appendix A, example number 3.

movements in the mouth, throat and larynx associated with singing whilst improvising in the mind. Piano 1 explained that for him, this happens when he is engaged in improvisation and specifically when the timbre heard in his mind is akin to the sound of his own voice<sup>28</sup>. For Piano 2, this theme is only experienced when she is engaged in the process of composition<sup>29</sup>.

The experience of Trombone 2 shows how the differences between individuals can often be difficult to explain. Trombone 2 talked about how her ability to externalise improvisations via singing is dramatically aided if she gestures, as though playing the piano, and not the trombone. The piano is Trombone 2's second instrument and she was insistent on its importance for her in generating auditory images for pitches<sup>30</sup>. While many of the participants talked about the motor responses/interactions that they experience, only one of the participants, Guitar 3 talked about how, while imagining improvising she experiences somesthetic mental imagery, the imagined of sensation touch (Gallace 2013 pp. 29-76)<sup>31</sup>.

#### 4.5.2.2 Concurrent Visual Imagery

The musicians interviewed also reported experiencing concurrent visual imagery while improvising in the minds, away from the instrument. The first graph (on the left) in Figure 8 shows that just over half of the participants (53.1%) reported experiencing concurrent visual images. The second graph shows that almost a quarter of participants (23.6%) reported experiencing more than one type of visual imagery while mentally improvising.

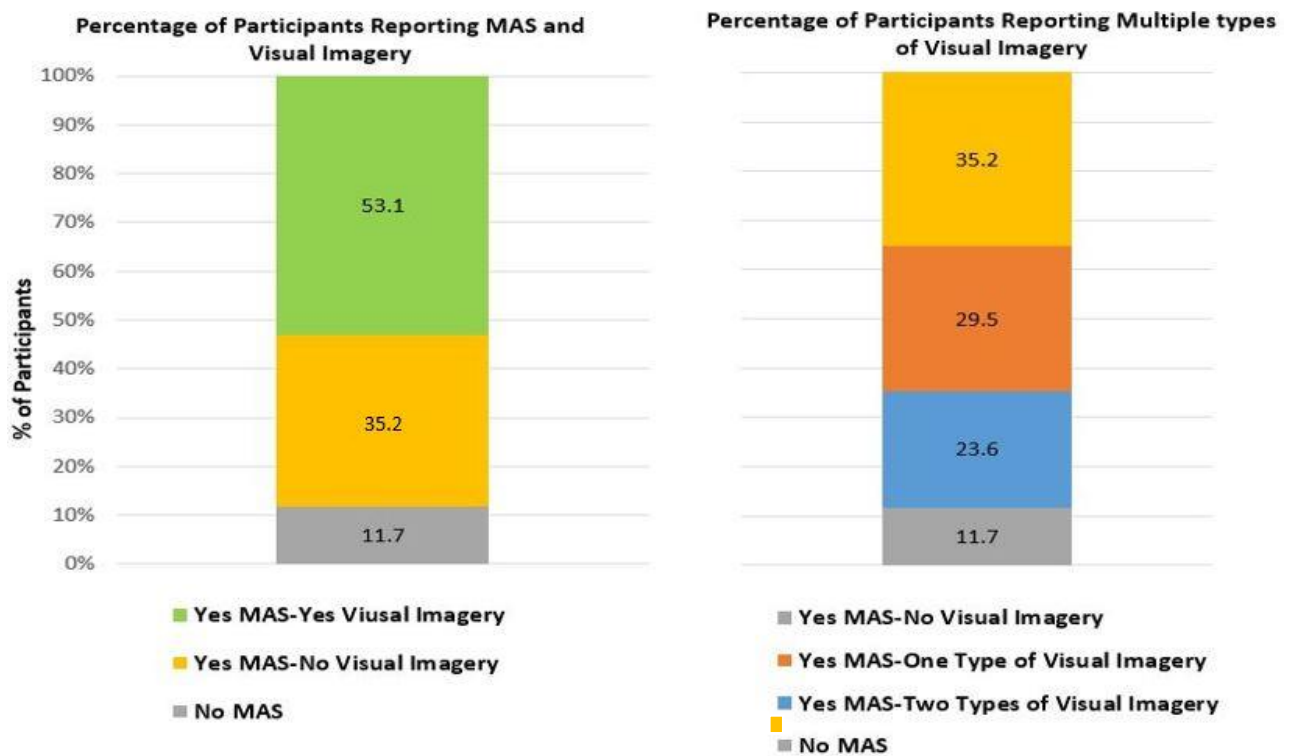
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<sup>28</sup> The response by Piano 1 that provided this insight is given in Appendix A, example number 4.

<sup>29</sup> The response by Piano 2 that provided this insight is given in Appendix A, example number 5.

<sup>30</sup> The response by Trombone 2 that provided this insight is given in Appendix A, example number 6.

<sup>31</sup> The response by Guitar 3 that provided this insight is given in Appendix A, example number 7.



**Figure 8: Percentage of Participants who reported Visual Imagery**

Appendix B2 shows all the themes that were reported by the participants. Although the ways the imagery manifested itself was specific to each individual, their experiences could be classified into three groups: *Association with the Instrument*, *Musical Information Made Visual*, and *Association with the Body* (presented in Appendix B2 in the blue columns). The most common theme to emerge from the responses are described by the term ‘Musical Information Made Visual’. This term refers to visual imagery which depicts more explicit types of musical information. The participants spoke of three different types: notation, lead-sheets/chord-charts and peaks and troughs. These three types are shown in Appendix B2 in orange. Saxophone 1, Saxophone 2 and Trombone 1 all experienced visual imagery that represents or conveys the information relating to the music they are improvising over in their minds. Saxophone 1 talked about how he visualises both notation as well as the lead-sheet of a given piece of music, over which he is improvising. According to Saxophone 1 the imagined lead-sheet contains the factual information required for the improvising musician to improvise<sup>32</sup>.

<sup>32</sup> The response by Saxophone 1 that provided this insight is given in Appendix A, example number 8.

For Saxophone 2, improvising in his mind, away from the instrument, has become a central vehicle for his practice. On improvising a melodic phrase in his mind, this phrase will be immediately converted into notation. Saxophone 2 then commits this phrase to memory for a time when he is able to practice with his instrument. Trombone 1 discussed his visual imagery as being difficult to accurately describe. He provided the analogy of visual contours, highs and lows where one note would lead to the next<sup>33</sup>. Piano 2 described a similar experience<sup>34</sup>.

The category 'Association with the Instrument' was the second most commonly reported theme. This theme encapsulates all responses in which participants reported experiencing visual imagery depicting either how the music they were imagining is laid out on their given instrument, or physical/bodily movements associated with playing their instrument. The third main theme that emerged is that of 'Association with Body'. This type of visual imagery is employed by Saxophone 5 and it depicts a hand engaged in a specific type of counting found in Indian classical music, whereby beats are counted on the different parts of each of the fingers<sup>35</sup>.

#### 4.5.3 Responses to Research Question Three

Just over half the participants who gave affirmative responses to RQ1 (58.8%) talked about how they perceived the additional information (discussed in the results for RQ2), experienced in the form of visual imagery and/or motor responses/interactions, to be beneficial. This question was often put to the participants as a probing question in order to allow them to directly convey to their experiences. Examples of the responses are given in Appendix 4. During the course of the interviews it was often possible to directly obtain a response to this research question. It was then presented to the participants as a probing question shortly after they had given a response stating that they do experience either (or both) motor responses/interactions and visual imagery. There were times when the opportunity to present this question to the participants did not present itself and additionally, there were also times when participants gave responses that were ambiguous and difficult to code as a

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<sup>33</sup> The response by Trombone 1 that provided this insight is given in Appendix A, example number 9.

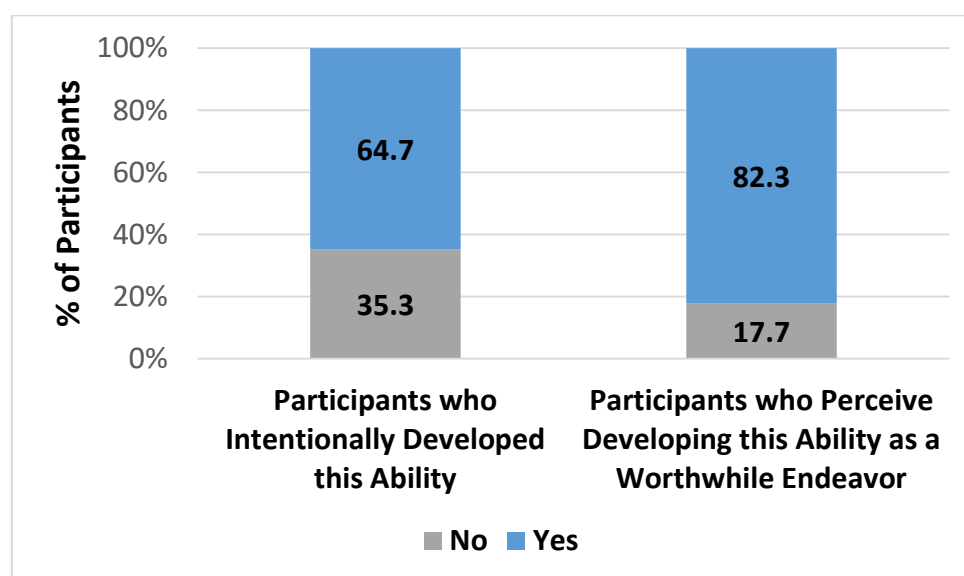
<sup>34</sup> The response by Piano 2 that provided this insight is given in Appendix A, example number 10.

<sup>35</sup> The response by Saxophone 5 that provided this insight is given in Appendix A, example number 11.

tangible unit of data. Sometimes responses to this question were also obtained inadvertently<sup>36</sup>.

#### 4.5.4 Responses to Research Question Four

Almost two thirds of the participants (64.7% Total), indicated that the ability to improvise in their minds, away from their given instruments, is a skill that they had intentionally developed over the years. Examples of responses that contributed to the data-set presented in the graph in Figure 9 as ‘Yes’, can be found in Appendix C.5.



**Figure 9: The Intentional Development of MAS**

Responses which provided tangible data answering this research question (presented in the column ‘Yes’ in Figure 9), were recorded when the participant either spoke specifically about exercising this skill as part of their creative practice or they spoke specifically about intentionally developing this skill-set. Responses were also recorded as data when participants spoke about using aspects of the skill set, such as scat singing, as pedagogical vehicles. The term, ‘intentionally developed’ implies that the participant discussed actively working on being able to engage this skill. This theme emerged from participants’ responses

<sup>36</sup> An example of such a response that provided this insight was given by Saxophone 5 seen in Appendix A, example number 13.

when they talked about how they realised the potential of this skill as a learning device and had integrated it into their performance preparation regime<sup>37</sup>.

Several of the participants talked about their motives for developing this skill as being a way to connect their minds' ears with their given instrument. Saxophone 4 stated that he believed that scat-singing is integral to this process, helping him develop a better sense of connectedness with his instrument<sup>38</sup>. This desire to achieve a better connection between the brain and the instrument was a theme that was shared by Piano 1 also, who believed that it is a skill that is intentionally developed over time<sup>39</sup>. This was also a sentiment shared by Trumpet 1; developing this skill has been a major focus of Trumpet 1's practice regime to the extent that he has had a special mouth-piece made to aid in this process (seen in Figure 7).

An even larger group talked about how they perceived the ability to improvise in the mind as being beneficial, and a skill set worth attaining. Data which make up this theme comes from responses by those participants who are included in the 'Yes' category, as well as those who stated that they had not adopted this skill or that they did not feel that they had fully explored its potential, but that they believed that they should, and that it would be beneficial to do so. These results are reflected in the second graph (left) in Figure 9, and examples of how the themes are derived from the data can be found in Appendix V.

## 4.6 Validity of Findings and Limitations

It was difficult for some of the participants to find concrete words that would enable them to accurately describe the internally experienced phenomenon<sup>40</sup>. Great deal of care was therefore taken to make sure that the way the interviews were coded, accurately reflected and correlated with the participants' experiences. Following the transcription, coding and analyses of the interviews, the participants were sent a summary of how they experienced the phenomenon of improvising in the mind while away from the instrument, via email. They

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<sup>37</sup> An example of how data came to be included in the data set can be seen in the excerpt from the interview with Trombone 2. She talks about how scat-singing is for her, a pedagogical vehicle. The response by Trombone 2 that provided this insight is given in Appendix A, example number 14.

<sup>38</sup> The response by Saxophone 4 that provided this insight is given in Appendix A, example number 15.

<sup>39</sup> The response by Piano 1 that provided this insight is given in Appendix A, example number 16.

<sup>40</sup> An example of such a response that provided this insight was given by Saxophone 1 seen in Appendix A, example number 12.

were requested to advise whether I had correctly understood their experience, and therefore if the description I had given them accurately described this. None of the participants reported that my interpretation of their experience was incorrect or inaccurate.

A second person was briefed on the coding criteria and asked to code a selection of excerpts from a diverse range of interviews in which responses were provided in different ways<sup>41</sup>. This person was blind to the ratings of the first coder (myself) so as to ensure independence in the ratings. Following this, a Kappa statistic was generated to show the degree to which the two raters (the external second rater and myself) observed the same units of information within the interviews. A kappa statistic of 0.98 was generated showing a very high level of agreement between the two raters<sup>42</sup> and therefore indicating a high level of validity in the way the interviews had been interpreted and coded by the researcher. The Kappa statistic generated for this project, is based on the coding of explicit statements of themes. While implicit information was conveyed to the researcher, only explicit statements were included in the data-set.

Like many research projects, the time that is available to acquire data and the time that is needed seldom match. The time period available for this study to take place was over a span of six months. As I became more profoundly involved in analysing the interviews, questions emerged, that if answered, would have facilitated the analysis of data. Unfortunately, time constraints placed on this project did not permit further follow-up discussions with the musicians.

In addition to this, the busy lives of the musicians involved also presented problems. Organising the times for interviews was difficult as musicians tend to work unconventional hours; most of those interviewed teach during the day, and due to their busy performing schedule, their availability was also limited at night. Thus, even if I had had more time to do follow-up interviews, the busy schedules of the participants may not have permitted it.

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<sup>41</sup> For example, one of the excerpts contained a probing question that was aimed at obtaining a specific piece of data, however the participant's response inadvertently provided an answer for a separate research question. Both I and the second rater viewed the response in the same way, as a code for a separate research question.

<sup>42</sup> According to Landis & Koch (1977, p. 165) any number between 0.80 and 1.00 is an almost perfect score.

## 4.7 Discussion of Results

The study provided the necessary information that enabled this project to proceed. In this section, the findings of the study will be discussed in terms of how they relate to the research questions put forward at the beginning of this Chapter<sup>43</sup>. Following on, I examined the key elements derived from the study that formed the basis of the various approaches in the next part of this project; I discuss their relevance to the next part of the project and talk about why they have been included.

The first research question (RQ1), asking whether or not improvising musicians improvise in their minds away from their given instruments, was given an affirmative response by the majority of participants. This suggests that this is a frequently occurring phenomenon in improvising musicians. In relation to RQ2, many of the participants also experienced accompanying phenomena such as visual imagery and/or motor interactions, suggesting that they play a potentially important role in the generation of the auditory imagery while engaging MAS. In addition to this, many of the participants who experience this additional information believe that it is a beneficial component in the process, thus answering RQ3.

This study indicated that developing the ability, to improvise in the mind away from one's given instrument, may be therefore aided by developing and then engaging multimodal mental representations. Doing so could provide additional beneficial information for triggering musical auditory imagery. This may mean for example, developing the ability to lucidly hear the desired pitch in the mind and at the same time see where that pitch is located on the instrument. Externalising aspects of these mental representations may also be a way of rendering the exercising of this skill less effortful: Vocalising the improvisations may be just as effective as trying to generate the sound in the mind. Indeed, vocalising may permit one to bypass the effort involved in generating auditory imagery by simply externalising the process. Additionally, the process of lucidly generating the auditory information may be aided by enacting the gestures associated with playing my given instrument, the guitar. Miming on the instrument may produce similar or results.

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<sup>43</sup> A discussion of the results and how they relate to existing literature can be found in Appendix D.

When the participants discussed mental improvisation, the phenomenon appeared to be manifested in a way that was similar to their original, overt music-making, or music-learning experience. This means that when the musicians engaged their MAS, they were re-creating either the music-making/music-learning experience, or drawing upon elements of this (original experience) in order to generate the required auditory imagery. It therefore appears that an important factor in generating auditory imagery during mental improvisation, is drawing from one's own music-making/learning experience. For some musicians, notation played an important role, and therefore improvising in the mind required the visualisation of notation. For others, it meant gesturing as though playing their given instrument. Thus, it would seem that developing a strategy for building MAS in my performance preparation would mean investigating how I experience the above listed themes in relation to my own music-making/learning.

Responses to the final research question (RQ4) showed that over half of the participants have intentionally developed the ability to improvise in the mind away from the instrument. The degree to which this phenomenon is experienced and is made use of as an auto-didactic vehicle, varied from musician to musician. This study found that developing this skill was perceived by many of the participants as a potentially beneficial endeavour, as many of the musicians who reported experiencing this skill believe it to be an important part of their creative practices. Additionally, almost all of those interviewed perceived the skill to be one that would be worthwhile developing, even if they had not done so themselves. At one end of an imaginary scale, some of the musicians (Bass 1, Trombone 2) may draw upon aspects of MAS, such as scat-singing, as a pedagogical vehicle during practice. For the musicians at the other end (Saxophones 1, 2, 4, 5, Guitar 3, Trumpet 1), a large amount of effort had been directed towards developing this skill, and it represented a major part of their creative practices and performance preparation.

There are several implications that can be taken from this last finding. Firstly, many high-level musicians have arrived at the conclusion that developing and putting into service MAS may potentially be an effective way of advancing their improvising abilities. This points to a precedence for the development of this mind skill and as such, a second implication of these findings is that it points to it being a potentially worthwhile endeavour for others, including myself, in which to engage. This study showed that improvising in the mind away from the

instrument (MAS), is a phenomenon that is reported to have been experienced by most of the improvising musicians interviewed for this study. This study also showed that the participants do so to different degrees. For some it represents a small part of their creative practice and for others it represents a major focus of their creative practice. For those of whom MAS instrument represents a major part, they have invested a lot of time in developing it. This points to the notion that this is a skill like any other, it can be developed with time and effort.

In the following Chapter, a series of performance preparation regimes, in which MAS development is the central focus, are presented and discussed. These approaches made use of the two overarching themes that emerged from this study, shown in Table 4. The themes, *visual imagery and motor responses/interactions*, emerged from the interviews as being potential beneficial additional factors in aiding the generation of auditory imagery during mental improvisation. The next Chapter discusses the trialling-of, to varying degrees, the sub-types of these two categories seen in Table 4, as part of the process of refining performance preparation strategies that develop MAS. The following chapter examines the application of the data derived from the study discussed in this chapter, to my creative practices.

**Table 4: Concurrent Motor Interactions/Responses and Visual Imagery with Auditory Imagery**

Motor Response/Interaction ↓	Visual Imagery ↓
Singing	Pitch Location on Instrument
Sub-vocal Singing	Notation
Gestures Associated with Playing the Instrument	Lead Sheet
Association with the Body	Peaks & Troughs
	Association with the Body

## CHAPTER 5 – DEVELOPING MANIPULATIVE AURAL SKILLS

### 5.1 Chapter Introduction

In the previous chapter, several themes emerged from the qualitative interviews pointing to how auditory imagery associated with mental improvisation might be more easily generated. This Chapter will focus on the practice-based phases of the project that trialled these themes. Themes such as ‘gesture associated with instrument’, ‘visualising the lead sheet’ and ‘singing’, became the elemental components of the performance preparation regimes that were trialled. During the four phases of performance preparation, improvements were made in the way these elements were applied.

The chapter will begin by discussing the analyses of continuity via motivic development in the Manipulative Aural Skills (MAS) solos, from the first three phases of performance preparation. Through this, I will be able to show which of the three performance preparation conditions (MPO, MP+PP or PPO) led to the better results. The discussion will outline which of the three approaches, enabled the better application of the various elements, and therefore enabled me to exert greater degrees of control over what I was hearing in my mind.

The second part of this chapter will look more closely at the processes behind developing MAS. It will do this via an examination of the more successful elements that were engaged within the performance preparation conditions. These will be discussed in terms of how their engagement improved my ability to mentally hear my improvisations, and have a better understanding of the music I was performing. The processes around identifying where improvements could be made, and then, how these improvements were implemented, will also be detailed in this second part.

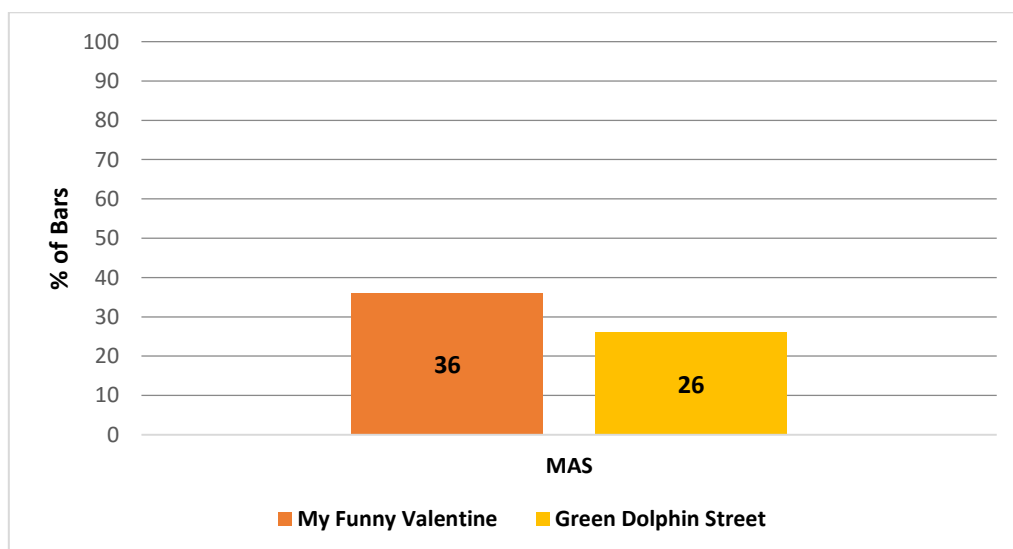
The third part of this chapter will address the final (fourth) phase of performance preparation. This particular phase differed significantly from the rest, as the focus shifted from purely developing MAS to transferring and applying MAS to performance.

## 5.2 Analysis of Continuity via Motivic Development

### 5.2.1 First Phase Results

In the following sections (5.2 to 5.2.4), I will discuss the findings of continuity analyses of the MAS solos. These analyses provided clear indications as to which performance preparation regime was superior, in providing the conditions that supported my MAS development.

The first phase of recordings was carried out in order to determine my MAS before I had incorporated any specific preparation approaches. Against this base-level, results from all other phases could then be compared. Motives were created and developed in the two MAS solos recorded in the first phase, but they were not developed beyond a maximum of eight consecutive bars at any given time. Continuity analyses of the first phase MAS solos indicate that, despite the fact that the main objective of the improvisations was to generate motives and develop them, there were few moments when this was achieved. Figure 10 shows that just over a third of bars in the MAS solo from *My Funny Valentine* were dedicated to developing motives, and only twenty-six percent were occupied for this reason in *Green Dolphin Street*.



**Figure 10: Percentage of bars in first phase MAS solos dedicated to continuity via motive development**

Additionally, examples in Figures 11 and 12 show that the ways motives were developed were often limited to sequencing ideas and moving them through a scale. The motives shown in these examples are not sustained (or developed further) through the solo beyond the moments shown in the examples.

Motive 1 - M1      M1-2 V/RD      M1-3 V/RD      M1-4 V/RD/E-----

10      Cm      G<sup>7</sup>(b9)      Cm<sup>7</sup>      F<sup>7</sup>

Motive 2 - M2--      M2-2 F -----      M2-2 V/E -----

14      A<sup>b</sup>maj<sup>7</sup>      Fm<sup>7</sup>      Cm<sup>7</sup>      Fm<sup>7</sup>      B<sup>b</sup>7

The figure shows two staves of musical notation. The first staff, starting at measure 10, contains Motive 1 (M1) and its variations: M1-2 (V/RD), M1-3 (V/RD), and M1-4 (V/RD/E). The second staff, starting at measure 14, contains Motive 2 (M2) and its variations: M2-2 (F) and M2-2 (V/E). Chord progressions are indicated above the notes: Cm, G<sup>7</sup>(b9), Cm<sup>7</sup>, F<sup>7</sup>, A<sup>b</sup>maj<sup>7</sup>, Fm<sup>7</sup>, Cm<sup>7</sup>, Fm<sup>7</sup>, and B<sup>b</sup>7.

Key: V = Variation, F = Fragmentation, RD = Rhythmic Displacement, E = Extension

**Figure 11: Continuity in My Funny Valentine 1<sup>st</sup> phase MAS solo**

Motive 6 - M6 --      M5-2 V//RD/E -----      M5-2 V/E -----

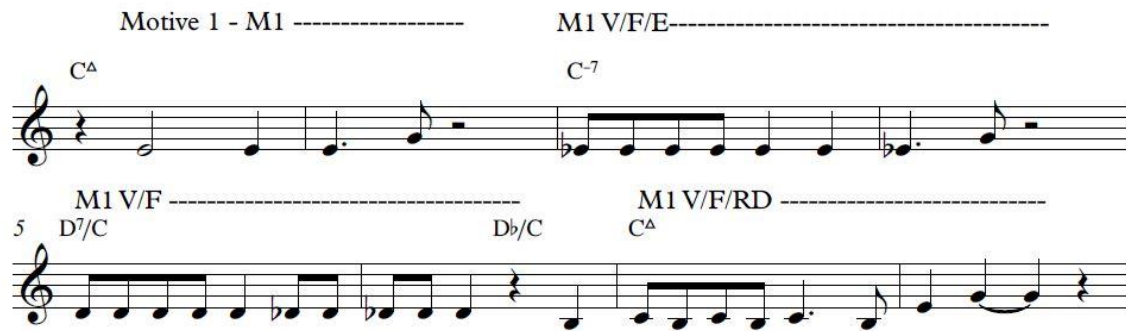
54      E<sup>b</sup>maj<sup>7</sup>      Fm<sup>7</sup>      Gm<sup>7</sup>      Fm<sup>7</sup>      E<sup>b</sup>maj<sup>7</sup>      Fm<sup>7</sup>      Gm<sup>7</sup>      Fm<sup>7</sup>

The figure shows a single staff of musical notation starting at measure 54. It contains Motive 6 (M6) and its variations: M5-2 (V//RD/E) and M5-2 (V/E). Chord progressions are indicated above the notes: E<sup>b</sup>maj<sup>7</sup>, Fm<sup>7</sup>, Gm<sup>7</sup>, Fm<sup>7</sup>, E<sup>b</sup>maj<sup>7</sup>, Fm<sup>7</sup>, Gm<sup>7</sup>, and Fm<sup>7</sup>.

Key: V = Variation, F = Fragmentation, RD = Rhythmic Displacement, E = Extension

**Figure 12: Continuity in My Funny Valentine 1<sup>st</sup> phase MAS solo 2**

Further examples found in the MAS solo from *Green Dolphin Street* also demonstrate that the extent to which motives were developed was often limited. In Figure 13, a fragment of the original motive is maintained (the E<sup>b</sup> going to the G in bar 4), while additional new material is added to the beginning of the fragment. However, the motive is not developed any further in the solo, beyond the moments shown in Figure 13.



Key: V = Variation, F = Fragmentation, RD = Rhythmic Displacement, E = Extension

**Figure 13: Motive development in Green Dolphin Street MAS solo**

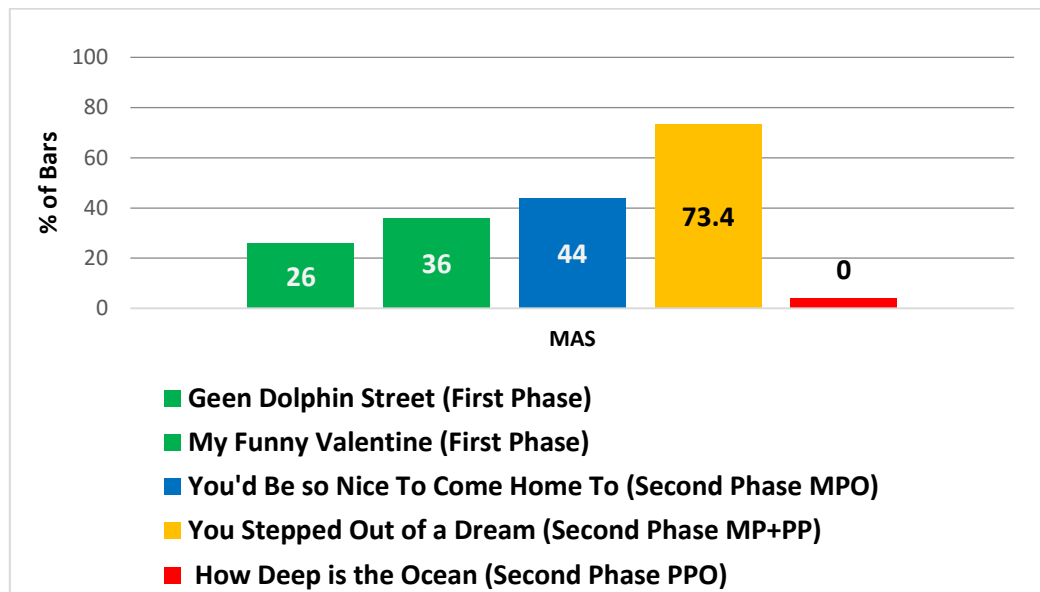
### 5.2.2 Second Phase Results

The results from the first phase indicated that my MAS had a great deal of scope for improvement. In the second phase, the MAS solos over the standards studied under MPO and MP+PP conditions were found to contain more continuity. Additionally, the motives in these solos are developed for longer durations compared to those from the first phase<sup>44</sup>. Figure 14 shows that the two mental practice conditions (MPO and MP+PP) from this phase produced solos with significantly greater amounts of continuity than were present in the first phase recordings. Results for the piece studied under the MP+PP condition are seen in the yellow column and those for the MPO condition are seen in the blue column. Results for the first phase recordings are also presented in this graph to facilitate the reader in comparing results from the first and second phases, these are shown in the green columns.

The improvisation performed on *How deep is the Ocean*, studied under the PPO condition (presented in the graph in Figure 14 as a zero) produced no moments where continuity via motivic development was achieved. Indeed, while recording this solo, it was difficult to generate ideas that might form a tangible motive. Reflection-in-action revealed that when an idea did present itself, I was unable to generate a clear mental visual image of the locations of where the pitches I was hearing in my mind, were situated on the guitar. This uncertainty can be heard at bar fifteen of the MAS solo over this piece. Post-performance investigations

<sup>44</sup> Detailed analyses of improvisations from this phase of recording can be found in Appendix K.

showed that the culmination of this uncertainty, and the resulting distraction it caused, led me to drop two beats in bar fifty of the solo.



**Figure 14: Comparison of the Percentage of bars in First Phase and Second Phase MAS solos dedicated to continuity via motive development**

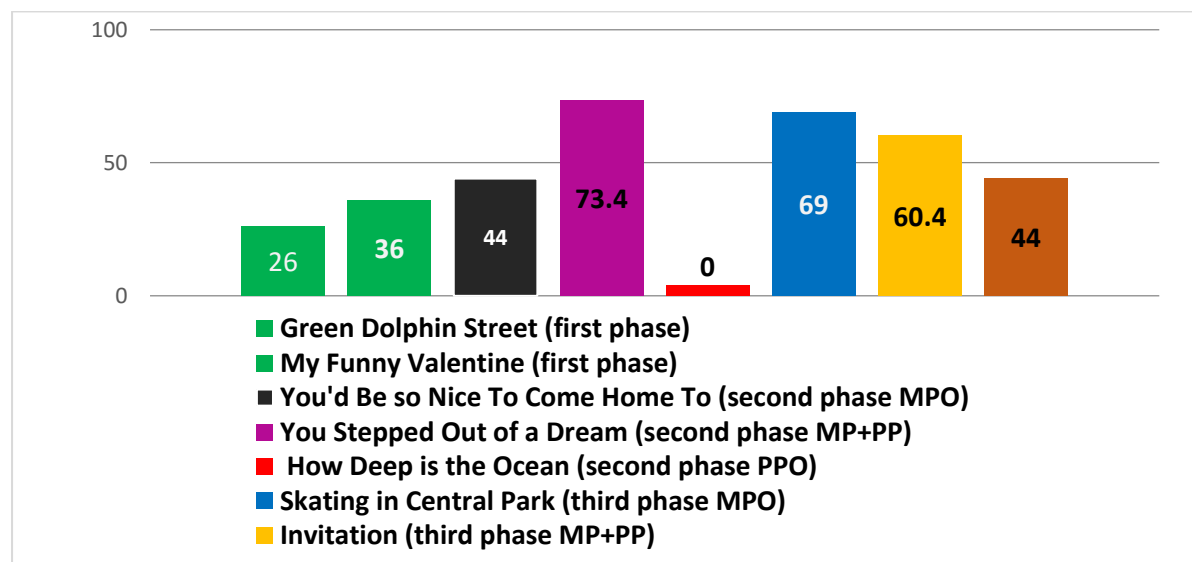
The improvisation on *You'd Be So Nice To Come Home To* (studied under the MPO condition) features four different motives that were developed throughout the course of the solo. The longest of these was developed over thirteen bars, from bar thirty-three to bar forty-four. The motives generated in this solo were developed over more consecutive bars than those found in *My Funny Valentine* and *Green Dolphin Street* from the first phase of MAS recordings. While this overall improvement is significant, Figure 14 shows that a large percentage (fifty-six percent) of the MAS solo on *You'd Be So Nice To Come Home To* was not the development of motives. Therefore, there was still significant room for improvement.

The results for *You Stepped Out Of A Dream* exceeded my expectations however. This piece was studied under the MP+PP condition. Three motives were developed in this improvisation, the longest of these is M1, developed over the entire A-section and half of the B-section. It was reintroduced during the second time through the form at bar 37, punctuating the development of M3. In this improvisation, the creative focus of the entire solo was the development of motives.

In the second phase, the MP+PP condition therefore emerged as the best of the three approaches for developing MAS. This was demonstrated in this section by showing how greater degrees of continuity were achieved in the solos on the standards studied under the MP+PP condition. Greater degrees of continuity via motivic development suggest an improved ability to exert control over the generation of auditory imagery.

### 5.2.3 Third Phase Results

In the third phase three more standards were studied and recorded. The graph in Figure 15 shows that all three MAS solos from this phase (seen in the blue, yellow and brown columns) contained moments of continuity. The MAS recordings of the pieces studied under the mental practice conditions, *Skating in Central Park* (studied under the MPO, seen in the blue column) and *Invitation* (studied under the MP+PP, seen in the blue column) exhibited greater amounts of continuity than *Yesterdays*, which had been studied under the PPO condition (seen in the brown column). Although the MAS solo on *Invitation* contained a lower percentage of bars dedicated to continuity than that on *Skating in Central Park*, the *Invitation* improvisation contained the development of one motive right through the entire improvisation.



**Figure 15: Comparison of the Percentage of bars in Second Phase, First Phase and Base-level MAS solos dedicated to continuity via motive development**

#### 5.2.3.1 Achieving the Ability to sing more Artistically Pleasing MAS solos: Arrival at the Limitations of Continuity Analysis

Analyses of MAS solos from the third phase led to the realisation that certain advancements in my MAS could not be accurately conveyed via the system of analysis that I had been engaging prior to this phase. My MAS had been developed to a point where I was able to engage improvisational devices (such as space). For example, I could incorporate artistic elements that accentuated the impact of the motives I was developing. My MAS had been developed to a degree where it was possible to apply them to achieve more complex artistic outcomes (some of these outcomes will be discussed at a later stage in this Chapter in section 5.3.3.3). Thus, the method for measuring MAS development employed in this project had reached its limit. Once MAS were developed to a point where a greater array of improvisational devices could be easily engaged, obtaining clear objective data would be difficult, and further any judgements of improvement would become highly subjective.

This means however, that efforts to streamline the development of my MAS, particularly via the MP+PP approach had been successful. In a relatively short amount of time I had been able to develop my MAS to point where I had sufficient control over my MAS to begin creating artistically satisfying vocalised improvisations.

A final observation of the data reflected in Figure 15, is the gradual improvement in levels of continuity in the improvisation over the piece studied under the PPO condition (seen in the brown column). This improvement suggests two things. Firstly, that my MAS can be developed via physical practice, even though, as has been demonstrated, its development is accelerated under the MP+PP condition. Second, it is possible that MAS are transferable. It may be that MAS developed under mental practice conditions improve to a point, where mental representations of chord progressions, intervals and scales may be easily transferred from one piece to another, while improvising. This explanation is supported by the data presented in Figure 15, where a rapid improvement in continuity between the improvisations on the pieces studied under PPO conditions in the first and second phase can be seen (presented as a zero for the second phase, and in the brown column for the third phase).

### 5.2.4 Summary findings from Continuity Analyses across the First Three Phases

The continuity analyses carried out over the first three phases produced several clear findings in relation to the development of my MAS. First, the mental practice conditions (MPO and MP+PP) were found to be preferable for developing my MAS; greater degrees of improvement were achieved under the MP+PP condition. The MP+PP condition was found to be the one that best facilitated MAS development because it allowed for the inclusion of more elements and approaches that were favourable to MAS development. These will be discussed in more detail in the following sections. The second clear finding to emerge was that, developing strong mental representations depicting a pieces form was highly beneficial for MAS development. The most significant improvements took place once such mental representations had been developed. In the following section, the application of the various themes and elements, derived from the interviews and the literature review, will be outlined and discussed. Those that emerged through the different phases as being beneficial to my MAS development will be singled out and discussed in depth.

## 5.3 Developing MAS

Table 5 summarises the elements that were trialled in this part of the project. It details whether they were ascertained via the literature review or whether they were obtained through the qualitative interviews. Insights from reflection-in-action produced several key insights into how MAS might be best developed. As the previous section has shown, the MP+PP condition was found to be the most effective for developing my MAS. Therefore, in this section, significant observations relating to how these approaches and elements were engaged within the MP+PP condition will be discussed.

### 5.3.1 Reflections on the MAS Recordings from the First Phase

Observations from reflection-in-action were written down almost immediately after the MAS recording had finished. The first of the two MAS recordings made was *Green Dolphin Street*. On beginning to improvise, I intuitively began imagining the neck of the guitar, visualising where the notes being sung were located. The importance of these visual images to facilitating mental improvisation quickly became apparent.

While improvising over both *Green Dolphin Street* and *My Funny Valentine* there were moments when I was not able to maintain these visual images. I would internally hear the notes that I wanted to sing, but wasn't able to identify what the pitches were, or where they were located on the guitar. One such moment when this occurred can be heard on the Green Dolphin Street MAS recording, at 01:06-01:09mins. Thus, at that early stage in the project, strong visual representations that corresponded with the pitches I was hearing in my mind appeared to aid my ability to mentally improvise.

**Table 5: Elements Derived from the Literature Review & Qualitative Interviews**

Element/Theme	Obtained from Literature Review or Qualitative Interviews		Description
Motor Interactions & Responses	Qualitative Interviews		Movements and gestures associated with playing the musicians' given instruments emerged as a theme of major significance in relation to rendering mental improvisation less effortful.
Visual Imagery	Qualitative Interviews		Many of those interviewed believed that this additional information rendered the generation of auditory imagery less effortful.
Memorising the Harmonic Structure	Literature Review		Developing the ability to generate the auditory imagery for the chord tones, associated scales or modes and root movements inside the piece of music.
Maximising the Impact of Mental Practice Sessions	Literature Review		The review of mental practice literature suggests that mental practice can be optimised when it is conducted for twenty minute sessions.
Memory	Literature Review		Several authors have suggested that creating a repository of rhythms, melodic patterns and lines is integral to being able to improvise in the mind.
Gesture, Visual & Kinaesthetic Imagery and Subvocalization	Literature Review	Qualitative Interviews	These elements were all examined in the literature review and mentioned in the qualitative interviews in relation to ways that the generation of auditory imagery might be rendered less effortful

### 5.3.2 MAS Development during Performance Preparation: Second Phase

Key findings from this second phase are grouped and discussed under five headings: (1) Visual Imagery; (2) Gesture; (3) Singing, Sub-vocalisation and Auditory Imagery; (4) Mental Practice and finally, (5) Memory. Though they are discussed separately, the point must be stressed that during performance preparation they were seldom explored in isolation. For example, developing visual images of pitch location on the instrument also meant singing or subvocalizing the sounds of the pitches.

#### 5.3.2.1 Visual Imagery

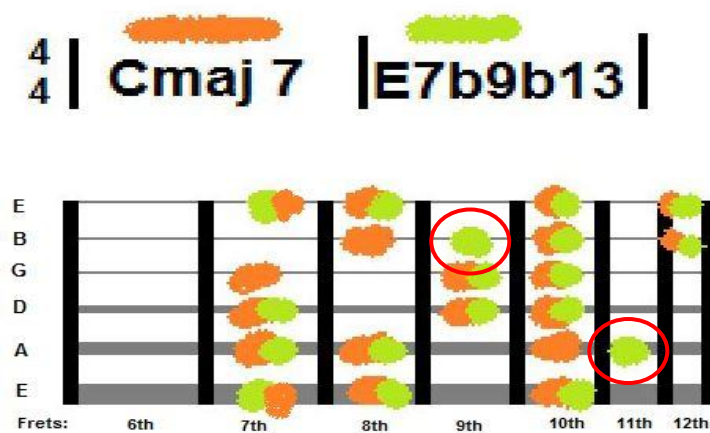
Two different types of visual imagery were developed and engaged during the course of performance preparation in this phase. The first of these was visual images depicting the lead sheet, more specifically how the chord changes, appearing as chord symbols, appear on the page. The process to create these types of visual images began by writing the chord changes down on paper, and then trying to visualize each four bar system as a block of information, such an example can be seen in Figure 16. Reflection-in-action revealed that the way these visual images manifested themselves in my mind was similar to how they are seen during perception. Figure 16 provides an analogy of my experience, showing that while engaging MAS, I was able to focus on one bar at a time, while also having a peripheral awareness of preceding bars, and the bars to follow. The example in Figure 16 shows how the Cmaj7 appeared during a II-7/V7/Imaj7 progression. The bar being performed appears in greater clarity, yet those before it and following it are visible, but with less definition. Eventually, by the end of the four-and-a-half-week period it was possible to see sixteen bar blocks in this way.



**Figure 16: Visual image of a four bar II-7/V7/Imaj7 progression**

The second type of visual image developed during this phase of performance preparation depicts pitch location on the instrument. It corresponded closely with the type previously discussed; it provided a visual manifestation of how information contained in the chord chart is realised on the instrument. Further insights from reflection-in-action revealed that this type of visual imagery was manifested in two ways. The first way consisted of seeing blocks or shapes on the guitar that depict the various modes relating to the chord that is both being played, as well as that which follows. In Figure 17, the chord being played is a Cmaj7, the notes relating to this chord are depicted in orange. The following chord, an E7b9b13 (fifth mode of the ascending A harmonic minor scale) and its related notes are shown in green.

This approach of visualizing how the notes are laid out across the instrument was useful for comprehending the differences between the two chords. The difference between the two modes in this example is a G-sharp (seen inside the red circles).



**Figure 17: Visual image of a four bar II-7/V7/Imaj7 progression**

The other type of visual imagery that was developed, depicts my hand playing the notes on the guitar. It is visual imagery that is therefore similar to that previously discussed and seen in Figure 17, however it more closely resembles what might be seen on one or two strings. Thus it is more focussed. Reflective analysis showed that while engaging MAS, I experienced

a rapid switching between these two types of visual imagery. This switching seemed to take place while anticipating changes in the harmonic progression.

Developing the visual images discussed in this section was almost always done while singing or subvocalizing the pitches being visualised. Additionally, it was always done while gesturing, as though playing the guitar (as was the case in the MPO condition), and/or miming on the guitar (as was the case in the MP+PP condition). This was done in an attempt to couple the sound of the pitch with a physical location on the instrument.

### 5.3.2.2 Gesture

While studying *You'd Be So Nice to Come Home To* (studied under the MPO condition), gesture was revealed to be of great importance in helping me to mentally hear pitches while improvising in my mind. Additionally, gesture also enabled me to more accurately pitch the required intervals when I was singing.

Moving my left hand (the fretting hand) as though playing the notes on the guitar appeared to help generate auditory images of the pitches. I often began by singing the pitches of the chord tones whilst simultaneously gesturing as though fingering the pitches with my left hand. Interestingly, gesturing as though I was picking the notes, in a manner that is normally associated with playing the guitar, seemed to be detrimental. A reason for this could be, movements associated with picking a string did not provide one with the impression that there was any attack on the note<sup>45</sup>. This problem was overcome during the third week. I discovered that, by moving my picking hand as though I was playing a snare drum (with a drum stick) in front of my face (It could also appear as though I was activating/moving a trombone slide), I could achieve the sensation of attack on the note. This approach greatly improved the generation of auditory imagery. Images showing the modified picking gesture are shown in Figure 18.

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<sup>45</sup> Sudnow (2001 pp. 138-139) has previously talked about the lack of sensation associated with pitch production experienced when gesturing in the air, as being the reason for uncertainty while improvising away from the instrument.



**Figure 18: Unusual Picking Gesture**

*You Stepped out of a Dream* was studied under the MP+PP condition, and therefore it was possible to use both the same gestures as were engaged for the study of *You'd be so Nice to Come Home to*, as well as miming. Miming significantly rendered the generation of auditory imagery less effortful, and when singing, it was noticeably easier to correctly pitch notes. It was observed that alternating between gesturing and miming on the guitar during the same session also appeared to stave off mental fatigue.

#### 5.3.2.3 Singing, Subvocalization and Auditory Imagery

For both of the standards learnt via the mental practice conditions, it was easier at the beginning stages to sing the information rather than try to internally generate the sound of the pitches in my mind. Vocalising was easiest when done at slow tempos, thus the physical limitations of singing with an untrained voice could be overcome. Whistling softly, singing softly and subvocalization also appeared to be good ways of overcoming the limitations of an untrained voice box.

At first, the main problem I encountered with overt singing, was that the focus of my attention would often switch to making sure my intonation was correct, rather than staying focused on the musical ideas I was trying to develop. I was able to hear musical ideas that were more dextrous than I was able to execute while singing. Generating the auditory imagery internally became easier as the practice sessions progressed. In the later stages of the second phase, I found that the most effective way to generate auditory imagery was via subvocalization.

Singing in the earlier stages of performance preparation appeared to be a good way of committing the sounds of the pitches to memory. It seems that at later stages, the auditory images of these pitch sounds could therefore be triggered via subvocalization.

An approach gradually emerged during the second phase, whereby singing/whistling first and then softly singing/whistling seemed to eventually give way to sub-vocalization in the final performance preparation sessions. This structure was implemented in the third phase of the performance preparation regime. Singing appeared to be an effective way to commit the musical information to memory, and subvocalization was in turn an effective way for recalling it. My experience of this during the second phase of performance preparation, pointed to it being an important factor in creating and establishing the cognitive faculties that enabled me to more readily generate musical auditory imagery.

#### 5.3.2.4 Mental Practice

The efficacy of the mental practice seemed to diminish after twenty minutes. At the beginning, I had allocated one hour of practice for each of the pieces. Initially, this was broken into either two shorter sessions lasting twenty-five minutes, with a five-minute break in between.

Towards the end of the first twenty-five-minute session, I began to notice myself losing concentration. After the second performance preparation session in the second phase, I decided to limit the mental practice sessions to twenty minutes with a ten-minute break in between. Around the third week it became easier to concentrate for longer periods, and so the length of the mental practice sessions returned to lasting twenty-five minutes long, with a five-minute break in between.

#### 5.3.2.5 Memory

There appeared to be two aspects of long-term memory that were integral to learning the pieces. The first of these, which could be referred to as a long-term acoustic memory of the piece, was memory for how the piece sounded, best described as the ability to remember a recording of the piece. Additionally, it could also be an auditory memory of the piece that was encoded while physically playing it during performance preparation. This type of memory was important because, once successfully encoded, it served as a reliable reference point from which I could make decisions about which intervals I wanted to generate while mentally

improvising. Insights from reflection-in-action suggested that if at any point during an improvisation I was unsure of how a certain passage in the piece sounded (how the chords sounded and related to each other), recalling the long-term acoustic memory enabled the improvisation to continue.

The second aspect of long term memory seemed to draw more from my semantic (factual) memory of intervals and chord structures. More specifically, remembering the intervallic structure of a chord, and how the notes from this chord (and its related chord-scale) sound, and then change in relation to the following chord in a given progression. The process often centred around pivoting on a pitch found in one chord (and its chord-scale), to one that was shared by the following chord in a given progression. In cases where there were no shared notes between two neighbouring chords, this process involved finding, and then leaping from an interval in one chord (and its related chord-scale), to one in the following chord that was intervallically very close<sup>46</sup>. Reflections on this process revealed that my experience of it was mostly visual. I didn't think about note names or notation, rather, the intervals were imagined as modal shapes as they appear on the guitar. Clues as to how to engage this approach, were sourced from a response provided by one of the interview participants, Saxophone 1, who talked about a similar approach that he had utilized in order to memorise the harmonic structure of a piece<sup>47</sup>.

Engaging this process was useful when I had difficulty remembering how the harmonic structure of a piece sounded, and when the long-term acoustic memory of the piece was not reliable. However, while engaging in this process, post-performance analysis showed that singing one wrong note (or even one note that is slightly out of tune) would completely alter the harmonic structure of the piece. During performance preparation, discrepancies in tuning and intonation were remedied by playing the first note of the improvisation on the guitar at the beginning of the vocalised improvisation. At the beginning of the second chorus, the same note was played on the guitar and compared against the sung note. Deviations in tuning

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<sup>46</sup> Consider an example of pivoting on the first two chords in *You Stepped Out of a Dream*. The first chord-scale is Cmaj7-Ionian and this chord shares the note C with the following chord-scale Dbmaj7-Lydian (C is the major 7 in Dmaj7). Therefore, I would focus on this common note C, and then try to remember how a minor second interval sounds so as to pivot onto a Db. This movement involves mentally re-contextualising intervallic value of the note. In the previous example the harmonic context of the C is changed from the root (as it is in a Cmaj7 chord) to a major 7 (as it is in a Dbmaj7 chord), thus pivoting onto the new chord.

<sup>47</sup> The response by Saxophone 1 that provided this insight can be seen in Appendix A, example number 17.

pointed to miss-pitching of intervals during the process of pivoting. Developing the two aspects of memory discussed in this section, provided stable mental representations, enabling mental improvisation to comfortably take place (via my MAS): when it was difficult to call upon one of these aspects of memory, it was found that the other could be successfully sourced, in order to attain the information needed to enable the improvisation to move forward.

### 5.3.3 MAS Development during Performance Preparation: The Third Phase

#### 5.3.3.1 Varying the Application of Elements in the MPO & MP+PP Conditions

During the third phase of performance preparation further variations to the application of the themes and elements (presented in Table 5, p. 81) emerged. These variations, appeared to significantly maximise the potential of the performance preparation sessions. One such variation was discovered at the beginning of the second week. It consisted of moving from singing or whistling, to soft singing (or soft whistling) and then to subvocalizing within the same performance preparation session.

The effect of doing so was augmented when it was coupled with moving between gesturing as though playing the guitar, and miming on the guitar. The MP+PP approach allowed for all of the variations discussed above. Varying the preparation approaches within each session in this way, helped me to maintain concentration and alleviated fatigue, resulting in an improvement in the quality of performance preparation.

#### 5.3.3.2 Matching Pitch Sounds with Pitch Locations

Mid-way through the first week of the third phase, I trialled beginning each session by singing through the root movement and chord tones, and then vocally improvising on the pieces at slow tempos. I would then improvise melodic lines over the piece that were very simple at first, often drawing upon the root movement or the intervals of thirds and fifths of the piece's harmonic structure. Gradually, I was able to incorporate other notes into these improvisations. Central to this process was improvisation: engaging this process meant simultaneously creating mental representations depicting pitch sound and pitch location and all the while improvising and developing one's ability to improvise.

This process could be thought of as aural scaffolding because, like a scaffold, the process eventually enabled me move in any direction around, and away from a specific pitch. This

then created a knowledge of all pitch locations (on the instrument) and pitch sounds relating to the piece being studied. Aural scaffolding involved improvising (slowly at first) over a piece and gradually attempting to sing all of the pitches related to the piece in the course of the improvisation.

In trying to generate the auditory imagery or encode the sounds of the pitches and intervals I could not hear, each of the two mental practice conditions brought different solutions. Under the MPO condition I would try to generate the sounds of notes by accentuating the gestures associated with playing those notes, and working on the process of pivoting (discussed in the first phase results). While this was also done in the MP+PP condition, under this condition I also tried to hear new pitches both before and after physically playing the note on the guitar<sup>48</sup>. In this way, the MP+PP condition provided a greater array of possibilities during performance preparation. The value of this approach in developing my MAS cannot be understated.

#### 5.3.3.3 Mental Representations Depicting Musical Form

Efforts were made under each of the mental practice conditions to develop mental representations depicting musical form. Several approaches were trialled that included visualising the lead sheet and visualising how the chord changes are realised across the fretboard. As my understanding of a piece improved, I began to visualise the piece as a series of interconnected three dimensional shapes. Each individual shape was associated with a specific chord, and it was similar in shape to how the mode associated with that chord was realised on the guitar. As I improvised through the progression, I visualised moving through the three dimensional shapes, as though I was moving through the interior of a house, from one room to the next. I was able to both, zoom-out to see the whole form, and zoom-in to see my position within it.

It must be stressed that the previously discussed images relating to form, were not the only type of visual imagery I experienced while engaging MAS. This type of visual image appeared to be one of several types experienced while engaging MAS (other types have been described in section 5.3.2.1). Switching between the different types occurred constantly, and a different

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<sup>48</sup> This is an approach extrapolated from one suggested by Freymuth (1999, p. 53) that she calls 'mental leadership'. In Freymuth's method, this relates to developing the ability to mentally hear the notes in a score. For Improvising this might mean trying to hear the next note in an improvisation, and then playing the note after it is clearly sounded in the mind

type was generated when it provided new information required at a particular point in the improvisation.

Reflections on the findings from this phase led to the realisation that the sustained development of the one motive in *Invitation* was the result of the form having been internalised more thoroughly. A more comprehensive understanding of the form meant that the majority of mental effort exerted while improvising, could be directed towards the development of this single motive. Another outcome of the improved internalisation of form was that improvisational devices, such as space, could be employed as a way of creating tension. The use of space can be seen and heard from bar 51 to 53 and again at the end of bar 57 through to the middle of bar 59. In the previous phases, while vocalising my improvisation, the urge to continue improvising and thus not leave any space, was very strong; continuing to sing and improvise provided a sense of security as doing so maintained a connection with the form and my place in that form.

Another outcome believed to be attributed to the improved internalisation of form in this phase, was observed to be the strategic insertion of interpolated melodic lines (IML). Post-performance analysis, as well as reflection-in-action helped to describe IML as melodic lines that provided moments of melodic contrast during the development of a single motive. These were identified throughout the MAS solos on *Invitation*. An example is presented in Figure 19 (circled) and it shows different treatments of the motive M1 prior to the IML at bar 23, and following it, at bar 31<sup>49</sup>. The restating of the original motive (M1) in *Invitation*, following the IML (as seen in Figure 19), suggests that the original motive had been successfully maintained in short-term/working memory. Reflection-in-action highlighted that concentration was not compromised by the need to recall details about the form, and therefore my creative focus could stay with the original motive. Thus, a more thorough understanding of the form, achieved via MAS development, enabled more of my mental focus to be directed towards achieving artistic outcomes while improvising.

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<sup>49</sup> Further examples can be observed in the transcription of this solo at bars 49 to 51 and bar 74 through to bar 80.



Thus, a major finding of this phase was that, of the three pieces studied in this phase of recordings, the form for *Invitation* was most successfully internalised. In *Invitation*, one motive was maintained throughout the entire solo suggesting that there were no moments when my attention was compromised; there were no moments when I had to shift my attention to remembering how the form sounds, and thus interrupt the development of the motive.

## 5.4 Fourth Phase of Recordings: A Shift in Focus

The fourth phase of performance preparation and recording saw a shift in focus. It was decided that the fourth phase should focus on how MAS might be best applied, so as to bring their influence to prominence during performance. With this in mind, the findings from research conducted into this aspect of MAS development (from this phase) are better considered in the following Chapter.

However, one important development did arise during performance preparation in the fourth phase that relates more directly to the other findings discussed in this Chapter. During the fourth phase, It became clear that MAS had developed to a point where miming on the instrument was no longer necessary. In fact, engaging MAS seemed to be easier when away from the instrument. Whereas, during the second and third phases miming seemed to be a more reliable way to trigger auditory imagery of pitches, in the fourth phase, gesturing and singing seemed to be the more effective approach. The urge to regularly check pitch accuracy by playing notes on the instrument, as had been done in the first, second and third phases (under the MP+PP condition), seemed to pull concentration away from engaging MAS. Instead, engaging MAS during the fourth phase meant combining gesturing and singing only. At the beginning of each chorus I would then check that pitch accuracy had been maintained by playing one to three notes on the guitar.

## 5.5 Summary of Findings and Chapter Conclusion

MAS solos performed on pieces studied under the three performance preparation conditions, all exhibited different degrees of continuity. However, the conditions provided by the MP+PP approach to performance preparation, enabled the fastest development of these skills. Singing and gesture associated with playing the instrument, as well as miming on a silent

instrument, were found to be effective ways of helping me to hear the music in my mind more clearly. Additionally, alternating between these elements during performance preparation was found to be an effective way of mitigating fatigue and maintaining concentration. Singing was also found to be an effective way of encoding pitch information; encoding information this way meant that it could be later reliably recalled by subvocalizing. This was done in correlation with visualising pitch location on the instrument in an effort to create strong visual connections between the sounds of notes and their physical locations. It was found that when no visual image depicting pitch location was present during improvisation, there was less certainty when pitching the notes while singing.

The ability to develop visual images, depicting a piece's form, was developed at later stages of this part of the project. Developing this aspect of MAS provided a greater degree of control when improvising. It was experienced most profoundly while studying *Invitation* under the MP+PP condition, during the third phase. Within the MP+PP condition, developing MAS was accelerated by aural scaffolding. Improvisation was found to be the central vehicle in this process. Improvisation allowed me to gradually acquire knowledge of where new pitches relating to the pieces harmony and form were found on the instrument.

Developing MAS over the four phases of performance preparation made it possible to have a more intimate connection with the music I was studying. The experience of generating music directly from my body, from my voice-box when singing, or by internally generated auditory imagery, was a profoundly different experience to that of making music with an instrument. After I had reached a point during the performance preparation sessions, when I was able to comfortably improvise over the standards I had been working on, the desire to keep singing and practicing seemed to be intoxicating and all consuming. Performance preparation sessions became profoundly more enriching experiences.

The view put forward in this project, is that the performance is the context in which the success of preparation can ultimately be measured: for the improvising musician, it is the moment where all of their knowledge (implicit and explicit) is laid bare and any or all of the actions taken prior to that performance can be consciously and sub-consciously drawn upon in the execution of a musical improvisation. As such, all actions taken by the improvising musician during performance preparation, whether intentionally directed towards an upcoming performance or not, will affect future performances. Thus, while MAS development

may have provided a more enriching performance preparation, I believed that ascertaining how MAS development affected my performance and artistic output was a more important goal. Indeed, this will be the central focus of the following Chapter.

## CHAPTER 6 – IMPACT OF MANIPULATIVE AURAL SKILL DEVELOPMENT IN RELATION TO PERFORMANCE

### 6.1 Chapter Introduction

This Chapter examines and articulates how Manipulative Aural Skills (MAS) development has impacted upon my artistic output. Specifically, it looks at how it has impacted upon my approach to improvisation, and the performance experience. This Chapter provides the reader with an appreciation of the various levels of complexity that may be heard in the performance component. In addition to this, it will provide insights into the processes that gave rise to these levels of complexity. In understanding the impacts of MAS development on my artistic output, the reader may therefore gain a greater appreciation of the performance component, and a more valuable listening experience.

Following this, the Chapter then examines how the focus of the project was able to shift in the fourth phase. The discussion will outline how the focus moved from purely developing MAS and observing the influence of doing so on my performance, to trialling different approaches that might accentuate the engaging of MAS during performance.

The impacts of MAS development in relation to performance is discussed in the third part of this Chapter. The various impacts can be divided into two groups. In the first are the ways in which MAS development impacted upon how I experience performance. Reflections on this outcome revealed that it was undoubtedly the most important, and for this reason it will be discussed first. The second group discusses the overt impacts on performance that can be heard in my playing and observed via the examination of transcriptions. Such impacts include an increase in the sourcing of audiation-generated ideas and changes in tone and timbre.

## 6.2 An Overview of How the Project Unfolded

In the first phase, two pieces were recorded, *My Funny Valentine* and *Green Dolphin Street*. In the lead up to the MAS and Performance recordings, I did not practice these pieces. Insights from reflection-in-action, documented during the recordings of these pieces, as well as post-performance analysis (reflection-on-action) determined the make-up of the performance preparation regimes that followed in the second phase. Thus, these insights shaped the nature and make-up of the performance preparation regimes in the second phase.

In the second and third phases, a similar process took place. *How Deep Is The Ocean* was studied under the PPO condition, *You'd Be So Nice To Come Home To* was studied under the MPO condition and *You Stepped Out Of A Dream* was studied under the MP+PP condition. During performance preparation, the focus of the research centred on developing MAS. Insights gained from reflection-in-action during the recording of these pieces (from both the MAS and performance recordings), and findings from post-performance analysis determined the make-up of the third phase performance preparation regimes. For example, approaches that were uncovered during the second phase that were found to improve my ability to engage MAS during performance preparation, and performance, were taken into the third phase.

In the third phase, *Skating In Central Park* was studied under the MPO condition, *Invitation* was studied under the MP+PP condition and *Yesterdays* was studied under the PPO condition. The recordings of the pieces studied under the MPO conditions, from both the second and third phases captures the first times at these pieces were played on the instrument.

Reflections on performance, as well as post-performance analysis carried out at the end of the third phase, indicated that greater benefit would be attained by investigating how MAS could be more directly integrated into my performance. This revelation changed the nature of the research in the fourth phase. Prior to the fourth phase, investigations into the impact of MAS development on my performance were more passive: MAS were developed during performance preparation, and then I observed the impact of this on performance. In the fourth phase, the focus shifted: MAS were developed, but in close contact with the instrument, and with the intent of examining how their influence could be made more prominent during performance.

### 6.3 Transferring MAS to the Instrument in the Fourth Phase.

Observations made during reflection-in-action highlighted that, generating and manipulating auditory imagery while improvising was, at times, subject to negative interference that resulted from the multiple demands on my attention<sup>50</sup>. During post-performance reflection and analysis (reflection-on-action), I therefore began investigating how to develop the ability to exert more direct control over where I sourced my ideas during performance. Insights recorded from reflection-in-action suggested that at many points during a performance, the ability to switch between motor, strategy and audiation-generated ideas was governed by implicit processes. I wanted to have greater control over the sourcing of my ideas (strategy, motor or audiation), and also, greater agency in this process. As well as this, I wanted to find ways of assuring myself that audiation-generated ideas were not being influenced by other sources of idea generation. In the fourth phase, I therefore wanted to find ways of engaging MAS in an “as-pure-as-possible” state during performance. One that was less affected or influenced by external musical information, or internal factors such as strategic and/or motor-generated ideas.

To achieve this, three approaches were trialled. These included: (1) singing my improvisations while playing them on the guitar, (2) singing my improvisations while playing the guitar very softly, and (3) singing while improvising and leaving pauses between phrases.

The first approach of singing while playing the guitar did not allow for clear observations of the source of the musical idea; this approach did not allow me to clearly observe whether the musical idea was motor or audiation-generated. Reflections made on this process highlighted that many times while practicing improvising this way, I was able to realise everything I was hearing in my mind on the guitar. However, after engaging this approach for five minutes, it became difficult to differentiate whether I was singing and playing what I was hearing in my mind, or whether my singing was following what I was playing on the guitar. This differentiation problem was further exacerbated when mental fatigue set in, often occurring

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<sup>50</sup> Indeed, several researchers have shown that there are degrees of compromise existing between the cognitive processes involved in perception and the generation of mental imagery, whereby auditory perception can interfere with auditory imagery generation (in some cases it can have the reverse effect), see: Okada & Matsuoka 1992, pp. 443-448 and Segal & Fusella 1970. For further information, see Hubbard 2010 pp. 319-320, who reviews the research into the interference/benefit trade-offs between auditory perception and auditory imagery generation.

at later stages of the performance preparation session. I persevered with this approach for three weeks, anticipating that it may improve, but this did not happen.

The second approach trialled was very similar to that previously discussed, except the volume on the guitar was kept very low. One drawback of this approach was that it limited my guitar playing. In order to engage this process, I had to play the guitar in a way that does not correspond with how I play it during performance. Reflection-on-action after the performance preparation sessions led to the conclusion that fully developing this approach would entail fundamentally altering the way I approach playing the guitar. This was not a desirable outcome.

A third approach trialled also involved singing and playing but included the insertions of short spaces prior to the beginning of each phrase, thus providing sufficient time for my MAS to generate a new melodic idea. Insights from reflection-in-action suggested that this extra space enabled me to have sufficient time to hear a new idea, and also reflect on its source. In this way, I could check whether it was a melody that I was hearing in my mind, or something that was the product of motor-generated ideas. The success of this approach permitted me to trial combining and engaging additional elements in concurrence with that previously discussed. The most significant among these was closing my eyes and visualising the fret-board while playing. Doing this while playing the guitar enabled me to establish a deeper connection with the notes I was hearing in my mind. It meant that the notes heard in my mind were experienced as loudly as those coming from the guitar; there was a greater degree of parity between the volume of the notes heard in my mind and those produced by the guitar. This was the approach that was taken into the fourth phase performance recording. It generated significant experiential outcomes, as well as outcomes that may be clearly heard in my improvising. In the following sections the outcomes from the research conducted in all four phases will be discussed.

## 6.4 Experiential Impacts

The development of MAS had a profoundly positive impact on how I experienced performance. While signs of this may be difficult to discern in my performance solos, this particular impact of MAS development is never-the-less of utmost importance to my creative practices and therefore, of paramount significance to the project.

Reflections on the experiential impacts of MAS development were documented, both during the recording sessions and immediately after. This was done during the second, third and fourth recording sessions. In taking advantage of the recording studio, I was able to verbally comment on how I had experienced the performance immediately after the piece had finished, thus capturing the most immediate thoughts in relation to the performance experience. Other observations were made in a reflective audio journal following recording sessions, when the memories of the performance were still fresh in my mind, and accurate reflections could thus be made.

#### 6.4.1 Greater Preparedness and Diminished Performance Anxiety Resulting from the MP+PP condition

The MP+PP condition emerged as the one that best satisfied my needs prior to performance; this condition both enabled the development of MAS, and provided enough physical contact with the instrument, so that prior to performance, I felt physically prepared. The MPO condition was effective in developing MAS, but when it came time to perform, the lack of physical contact with the instrument led to noticeable feelings of performance anxiety. The PPO condition was also an inadequate approach for performance preparation, and also led to feelings of anxiety prior to and during performance. In this case, anxiety primarily stemmed from feeling as though I had not attained a sufficient understanding of the form in order to perform confidently. In contrast, the MP+PP approach seemed to provide opportunities to capitalise on the best aspects of the PPO and MPO approaches.

MAS development via the MP+PP approach, allowed me to arrive at performances with assuredness that I had a sound set of skills that would enable me to successfully improvise over the piece of music I had been learning. As has been demonstrated in the previous Chapter, MAS development improved my ability to generate in my mind, and then sing an improvisation, when there was no instrument present. Being able to do this with minimal concentration during performance preparation, served to assure me that I did indeed have the minimum sufficient knowledge to carry out a successful performance. Confidence was thus affirmed prior to a performance by being able to create an improvisation while away from the instrument.

#### 6.4.1.1 Improved Ability to Source Audiation-Generated Ideas and an Improved Understanding of the Three Types of Idea Generation in my Improvising

The enhanced ability to source audiation-generated ideas during performance, resulting from MAS development, in turn led to increased levels of confidence prior to and during performance<sup>51</sup>. Greater self-confidence was found to result from the improved capacity for self-expression and the reduction in mental fatigue that had previously been associated with sourcing audiation-generated ideas. In this section, I will discuss how the development of the skills that permitted this increase (developing MAS), impacted upon the performance experience.

Audiation-generated ideas were often manifested as the playing and developing of motives in my performance solos. Generating motives and then developing these motives was difficult at the beginning of the project. Figure 21 shows the opening bars of the first phase performance solo on *Green Dolphin Street*. The motive generated in the first bar of this example is carried through to bar fifty-eight. It is not revisited at any other point in this improvisation. The inability to maintain, develop or revisit a melodic idea in my performance soloing was a source of frustration at the outset of this project. Not only was it a source of frustration, but also a source of mental fatigue. Constantly bringing new ideas into the improvisation meant placing heavy demands on my cognitive and creative abilities, often resulting in fatigue during a performance, and dissatisfaction with the performance more broadly.



**Figure 21: Opening Bars of *Green Dolphin Street***

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<sup>51</sup> Transcriptions and analyses of idea generation can be found in Appendix J.

Post-performance reflections from the first and fourth phases revealed that mitigation of mental fatigue was achieved via the playing of motor and strategy-generated ideas. Analyses of the performance solos from *My Funny Valentine* and *Green Dolphin Street*, from the first and fourth phases, showed that as the ability to source audiation-generated ideas improved, motor and strategy-generated ideas were drawn-upon less frequently. Motor and strategy-generated ideas were thus required less and less for alleviating fatigue.

During the second phase performance recording, the importance of strategy and motor-generated ideas, in mitigating fatigue, became clearly apparent while improvising on *You'd Be So Nice To Come Home To*. Indeed, as this piece was studied under the MPO condition, the performance heard on the recording is the first time I had performed this piece on my instrument. Observations made during reflection-in-action highlighted that while recording this piece, half-way through the solo I became mentally exhausted. A manifestation of this exhaustion can be at 01min21sec on this recording, where there is space for three bars<sup>52</sup>. Reflections on the recording process, such as that discussed in this section, led to the realisation that trying to produce improvisations in which all the lines are sourced from audiation-generated ideas may not be practical, and indeed it may not be in my best interest to try and achieve such an outcome.

The better understanding of how the different types of idea-generation operate in my approach to improvisation (resulting from MAS development), as well as the improved ability to source audiation-generated ideas, meant that I was able to exert greater control over my melodic ideas during performance. Doing so without experiencing significant fatigue, resulted in a further striving within my performance soloing to achieve creative goals, leading in-turn to greater feelings of satisfaction with the performances.

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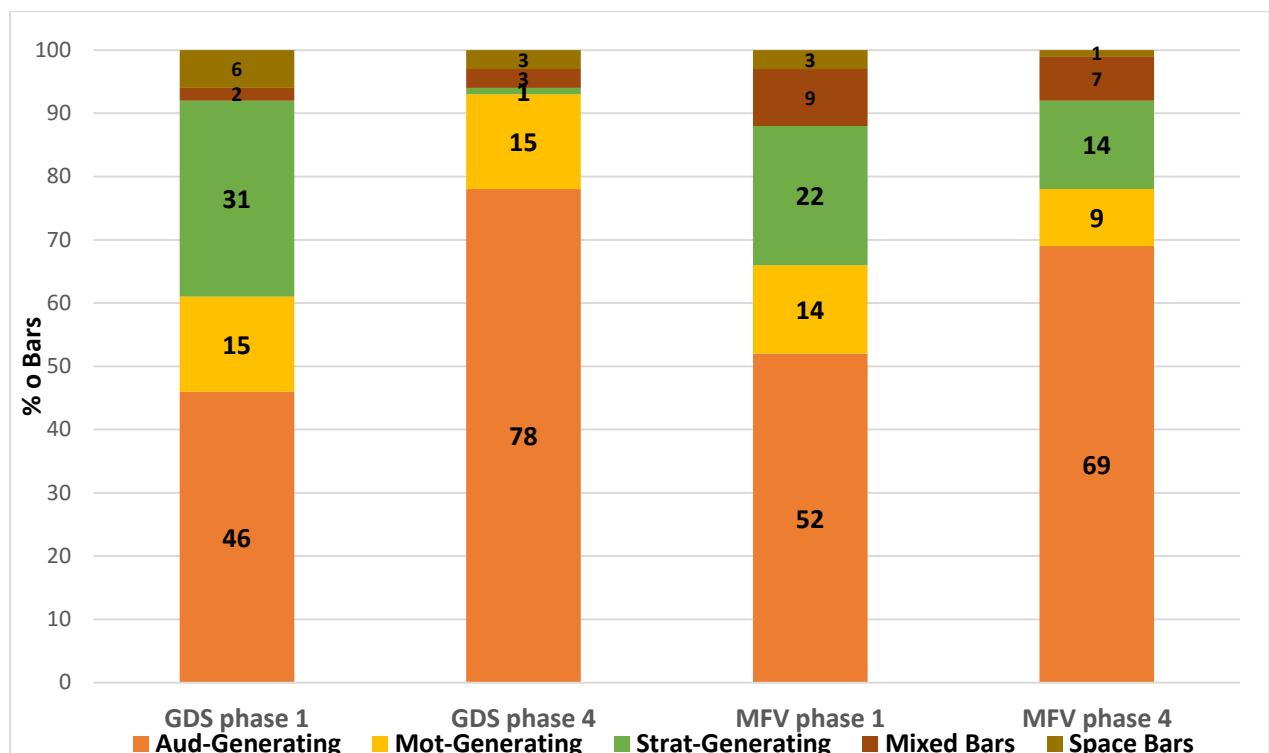
<sup>52</sup> The exhaustion experienced during this recording is further manifested at the playing of the final head of the piece. It can be heard that I was having difficulty executing the melody, and this was indeed the result of mental fatigue.

## 6.5 Impacts on Artistic Output

In this section, the measurable impacts on my improvising from developing MAS during performance preparation will be examined and discussed. These impacts will be discussed in three subsections: increase in audiation-generated ideas, increase in motivic development and the effect of MAS development on my tone. Commentary in this section will centre on comparisons made between the two performance versions of the standards, *My Funny Valentine* and *Green Dolphin Street*. When they are pertinent, relevant examples from other recordings will also be cited and discussed.

### 6.5.1 Increase in Audiation-Generated Ideas

Between the first and fourth phase recordings of *My Funny Valentine* and *Green Dolphin Street* (four recordings in total), there is an increase in the number of audiation-generated ideas heard in these recordings. The columns in Figure 22 show the percentage number of bars in the improvisations over *Green Dolphin Street* and *My Funny Valentine*, which were dedicated to the three different types of idea generation. The first phase results relating to each of these pieces, are shown in the first and third columns, and the fourth phase results are shown in the second and fourth columns. Comparisons between the two versions of *Green Dolphin Street* seen in Figure 25, show quite dramatic results: Between the two phases, there is a thirty-two percent increase in the number of audiation-generated ideas, from forty-six percent in the first phase to seventy-eight percent in the fourth phase, while strategy-generated ideas decrease from thirty-one percent in the first phase, to one percent in the fourth phase.



**Figure 22: Percentage of bars in which lines are sourced from different Types of idea Generation in the Two Versions of Green Dolphin Street (GDS) and My Funny Valentine (MFV)**

#### 6.5.1.1 Identification of the Characteristics of Audiation-Generated Ideas in my Improvisations

Reflections on how the three types of idea generation were manifested in my playing, were carried out during performance preparation, and post-performance via examination of transcriptions of my improvisations and repeated listening<sup>53</sup>. During studio practice, a reflective analysis of this kind required an awareness of these types of idea generation while improvising with the instrument and a maintaining of awareness of when they were engaged. Doing so enabled me to identify when the different types of idea generation emerged in my improvising, and how they were expressed.

The examples discussed in Appendix G show some of the similarities in melodic ideas found in the MAS solo versions and performance solos versions of the same pieces<sup>54</sup>. The

<sup>53</sup> See Appendix H1 and H2 for a review of the characteristics of the different types of idea generation in my improvising.

<sup>54</sup> Examples of all three types of idea generation and a discussion of their characteristics can be seen in Appendix H1 and H2.

observation of these moments in my MAS solos and then the discovery of the same features in my performance solos, suggest that the lines were coming from the same place - from my MAS. Identifying these moments in my MAS and performance solos enabled the identification of audiation-generated ideas in all my performance solos.

The first of these moments was exhibited when the melodic and/or the rhythmic content of the lines from the MAS and performance solos were the same or very similar (seen in the blue rows). Examples of these can be found in Appendix G, in examples 1a through to 1f.

Examples of the second observed characteristic can also be seen in Appendix G (seen in the orange rows). These examples show similarities between the two versions of improvisations in the ways that ideas are delivered. Examples can be observed at example 2a through to example 2j. In this group of characteristics, an idea is stated twice (with little or no variation on the second statement) with the third phrase or idea being a significantly different variation on the first two.

The third category seen in Appendix G was made up of all the lines in which hemiolas (lines that contain repeated rhythmic groupings) were played (seen in green rows). Hemiolas containing 3/2, 3/4, 3/8 featured prominently in my MAS solos and were also observed in my performance solos.

The fourth way that audiation-generated ideas were manifested, as shown in Appendix G, were as non-motivic improvised-lines. These lines (seen in example 4a and 4b) were observed as a bookending device that enabled the smooth transition into and out of the development of a motive. Further examples of these types of lines can be observed in Appendix D, and examples from my performance solos can be seen in example 1 through to example 8, and examples from my MAS solos can be seen in example 8 to 12<sup>55</sup>.

The fifth and final way that audiation-generated ideas were manifested was via the playing of motives. The abundance of examples of motivic development in my MAS solos meant that, when motives appeared in my performance solos, they were viewed as coming from the same idea source.

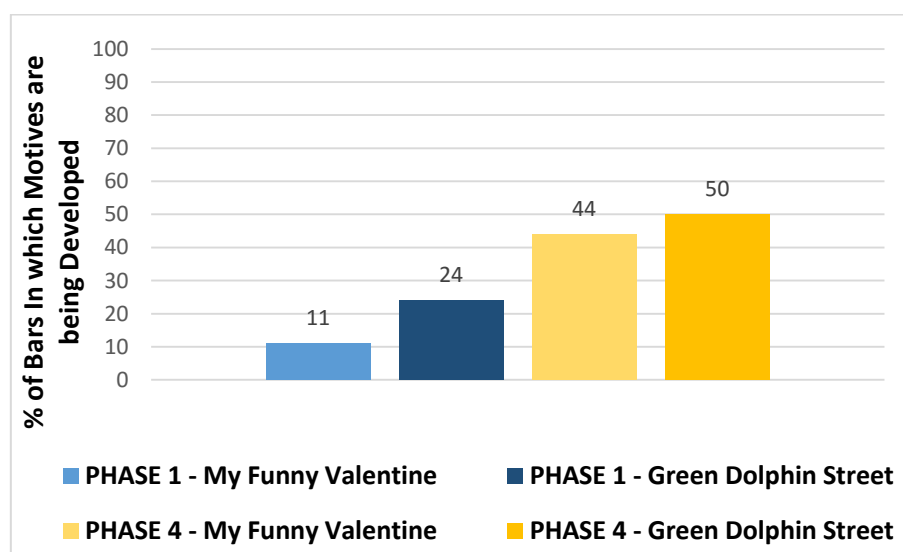
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<sup>55</sup> A more detailed examination of Non-Motivic Improvised Lines is provided in the following section (6.6.2.1).

### 6.5.2 Increase in motivic development

Additionally, and most significantly, developing motives as an approach to improvisation was not systematically worked on during performance preparation. The only time this approach to improvisation was engaged intentionally, was (while improvising) during the MAS recordings. It was engaged as a way of generating measurable data that could be used to point to potential improvements in my MAS.

As a device and an approach to improvisation, motivic development was found to be increasingly present in the performance solos. The increase in engagement of this device is best demonstrated when comparing the two versions of *My Funny Valentine* and *Green Dolphin Street*. The coloured columns in Figure 23 show the percentage of bars in my performance solos, from the two versions of each of the aforementioned pieces, in which motives are being developed. The blue columns are from the first phase and the yellow, the fourth phase.



**Figure 23: Increase in the Number of Bars in which Motives are Developed Between the 1st and 4th Phase Versions of *My Funny Valentine* and *Green Dolphin Street*.**

The increase in the engagement of motivic development between the two phases seen in Figure 23 is significant. In the first phase (shown in the blue columns), motivic development accounts for, at best, almost a quarter of the bars in the solos. By the fourth phase (shown in the yellow columns), motivic development is the creative focus in approximately half the bars in both solos. In *My Funny Valentine*, there is a thirty-three percent increase between the two phases (from eleven to forty-four percent), and in *Green Dolphin Street* the increase is by twenty-six percentage points (from twenty-four to fifty percent).

Motivic development was also a significant component, appearing in the improvisations from the other four pieces recorded in the fourth phase (*All or Nothing at All*, *Nica's Dream*, *Night Dreamer* and *Lazy Bird*). The sustained presence of motivic development in these four solos from the fourth phase, suggests that it had become a default approach to improvisation. As a default approach, it was thus engaged during pressured situations, such as recordings and important performances.

Table 6 illustrates the frequency of motivic development use at the beginning of the performance solos. Reflections on its use at the opening of solos, led to the realisation that it is engaged unconsciously, and that this device is engaged for two important reasons. First, motivic development focused my concentration: As has been discussed in the previous Chapter, engaging MAS when generating and manipulating motifs, required large amounts of focus and concentration. Doing this at the beginning of an improvisation had the effect of immediately focussing my attention. The second purpose it served was to generate material that the other members of the ensemble and the audience could easily engage with.

**Table 6: Motivic development in the beginning of solos**

Piece	From Bar-To Bar
All or Nothing at All	1-18
<b>Lazy Bird</b>	<b>1-25</b>
Nica's Dream	1-14
<b>Night Dreamer</b>	<b>7-16</b>

The performance solos on *My Funny Valentine* and *Green Dolphin Street* from the fourth phase, show that motivic development had come to constitute a regular and beneficial approach within my improvisations. MAS development had given me the capacity to engage

this improvisational device, exert control over it, and thus manipulate motives in real time with an improved degree of ease.

#### 6.5.2.1 Increase in Motivic Development: Implications for Non-Motivic Improvised Lines.

Non-motivic improvised lines were observed to be an important element in my improvisations, even in light of the increase in the engagement of motivic development as an improvisational device. Indeed, the overall increase in motivic development in my performance solos, meant that this type of line played a more distinct and specific role in my improvisations.

Non-motivic improvised lines were observed as being manifested in two ways in my performance solos. The first way has been addressed previously in this Chapter (in section 6.5.1.1.). Examples of the second way that non-motivic improvised lines are manifested in my improvising from the first and fourth phase performance solos, can be observed in the Appendix F (non-motivic improvised lines 2). The lines in these examples are all played in the upper register of the guitar, as sustained notes of durations mostly longer than eighth-notes. In this way they are very similar to lines that I have produced in the MAS solos, especially over the pieces performed at faster tempos. They often overlap to give the impression that one is listening to double-stops being played, thus they are lines that are being played where the notes are momentarily sustained. It is the same effect that may be achieved on a piano by holding down the sustain pedal for a brief period after the notes are played.

This type of line was often observed as a point of climax in the improvisations. The emphasis on motivic development in the performance solos required a contrasting improvisational device. Thus, these manifestations of non-motivic improvised lines appear to have been an approach to improvisation that was unconsciously engaged as a way to bring a contrasting element (something that does not involve the development of motives) to my improvisations.

#### 6.5.3 Tone

Achieving a tone that better enabled MAS to be realised in my improvising was a central preoccupation during performance preparation. For example, the successful execution of non-motivic improvised-lines discussed in the previous section, was dependant on my being able to achieve a tone on the guitar that would facilitate the playing of sustained notes, similar to those heard in my mind. It could be said that changes in tone are not the result of MAS

development, but rather simply the result of aesthetic choices made by the researcher. Indeed, it is difficult to deny that certain decisions made in relation to tone, do involve aesthetic considerations. However, this section will carefully outline the processes and decisions, arising from the need to better accommodate MAS during performance that led to changes in tone production. Thus, it will articulate how it was indeed MAS development, and the desire to accommodate MAS in performance that resulted in this outcome.

Changes in tone were developed gradually over the four phases; an overdrive pedal was engaged in the second phase in an attempt to give the notes more body. The eventual development of a more distorted/saturated tone by the fourth phase led to what could be considered secondary outcomes of MAS development: changing tone that better accommodated MAS, led to other outcomes that are not directly the result of MAS development, but rather, the result of changes in tone.

#### 6.5.3.1 Changes in Tone Accommodating MAS in Performance

Many of the lines generated during performance, believed to be the product of MAS, were found to require greater sustain. More sustain was required because it enabled me to match the sustain on notes played on the guitar, to that which can be achieved when notes are sung. An example of the similarities between lines that are heard in the mind via MAS and reproduced when singing, and those that are heard in the mind via MAS, and transferred to the guitar can be seen in Figure 24.

Figure 24 shows excerpts from the MAS solo and the performance solo on *Lazy Bird*. It is my belief that both sections draw upon MAS for the generation of the lines seen in these examples. The similarities between the two lines can be immediately seen in the first two bars of each example, as they both begin with the same rhythmic figure. Both sections are mostly comprised of quarter-notes and half-notes. In my MAS solos this is because it is difficult for me to sing, and indeed generate melodic lines in my mind, that consist of consecutive eighth-notes, beyond tempos of 270 beats per minute. More sustain on the guitar therefore allowed me to transfer such lines to the guitar, without feeling exposed as more sustain on the guitar allows me to comfortably fill the sonic space. Longer rhythmic values on notes played on the guitar (similar to those seen in the example from the MAS solo on *Lazy Bird* in Figure 24) were thus supported by a more distorted tone.

Lazy Bird MAS solo

77 Eb<sup>Δ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup>

81 B<sup>-7</sup> E<sup>7</sup> A<sup>Δ</sup> Bb<sup>-7</sup> Eb<sup>7</sup>

Lazy Bird Perf. solo

77 (8) Eb<sup>Δ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup>

81 (8) B<sup>-7</sup> E<sup>7</sup> A<sup>Δ</sup> Bb<sup>-7</sup> Eb<sup>7</sup>

**Figure 24: Similarity between vocally produced lines and those played on the guitar resulting from MAS**

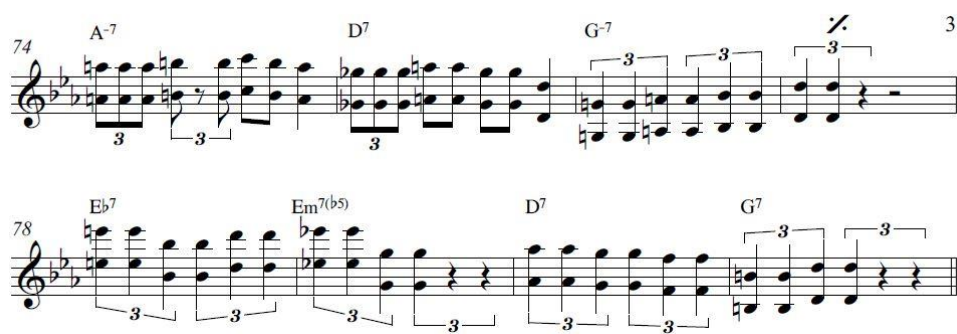
#### 6.5.3.2 Characteristics of New Tone

The change in tone production between the first phase and the fourth phase can be clearly heard in the two versions of *My Funny Valentine* and *Green Dolphin Street*. This change in tone can be perceived as an increase in the amount of distortion, generated by an overdrive effect pedal. In the first phase of recording, there is slight distortion. This effect was achieved by overdriving the master-volume on the amplifier. This same setting on the amplifier was maintained through all following phases, however an overdrive pedal was added in the second phase recording and I experimented with this pedal during the second, third and fourth phases of performance preparation.

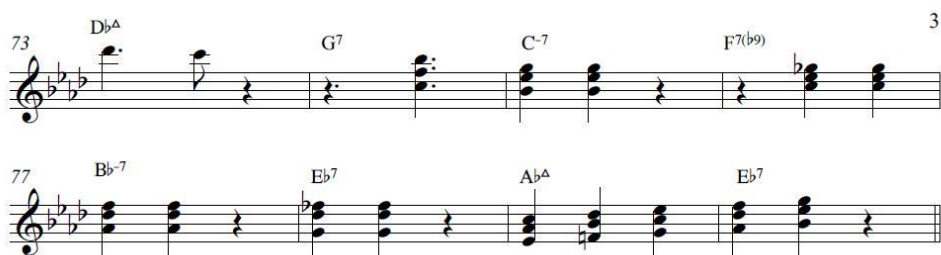
In the first phase recordings, the distortion can be recognised as a sound that is akin to slight static or interference that accompanies the note/s. Final results of experimentation with the overdrive pedal can be heard in *My Funny Valentine* (at 02:40mins) and *Green Dolphin Street* (at 01:46mins) from the fourth phase. The tone on the fourth phase recordings is more saturated, especially on *Green Dolphin Street*. Indeed the opening phrases in this solo have a

fuzzy sound. In *My Funny Valentine*, from the fourth phase, the volume control on the guitar was rolled down to decrease the effect of the overdrive pedal, providing a cleaner tone. However, when more sustain was required, the volume on the guitar was turned up. A more saturated/distorted tone became the central approach for giving pitches greater body and sustain.

Other approaches for doing this were explored during performance. Particularly pertinent examples can be found in the performance recordings from the third phase. These approaches centred on playing octaves, as heard in *Invitation* at 02:41 and chordal playing in *Skating in Central Park* at 02:35. Notated examples of these are provided in Figures 25 and 26.



**Figure 25: Octaves in Invitation**



**Figure 26: Chordal Soloing in Skating in Central Park**

### 6.5.3.3 The Influence of MAS on Tone, Timbre and Chordal Playing

A better understanding of how to integrate the sonic implications of more distortion into my improvisations was achieved during performance preparation in the fourth phase. A noticeable result of this is the lack of octaves and chordal soloing. Changes in tone thus led to what can be considered a secondary outcome of MAS development: A decrease in the playing of chords (chordal soloing and self-comping) in my improvising.

More distortion can have some undesirable implications especially when playing chords. One of these is that certain intervals within chords often stand out more prominently. Intervals of perfect fifths and perfect fourths are very stable when distortion is being used, whereas seconds, sevenths, minor thirds, and major thirds can sometimes sound more dissonant than they might otherwise be when no distortion is used. A negative implication of increased distortion is that I was less at ease when playing chords, and this apprehension around playing chords simply resulted in me not playing them. There was therefore a trade-off between achieving a tone that better accommodated MAS in performance, and improvising with chords.

## 6.6 Chapter Summary

In this Chapter, I have presented the impacts that MAS development during performance preparation has had on my creative practices and artistic output. The development of MAS during performance preparation has resulted in several overt changes to my approach to improvisation. These include an increase in the engagement of motivic development in my improvisations, a more distorted/saturated tone and an increase in the sourcing of audiation-generated ideas while improvising. MAS development via the MP+PP approach was found to be an excellent approach for achieving a deeper understanding of the music I was to perform. As an approach to performance preparation, it led to greater confidence and better feelings of preparedness both prior-to and during a performance. Outcomes such as these are highly valued, and point to the beneficial impact of MAS development on my creative practices and artistic output

On listening to the recordings, these changes to my artistic output may be perceived as subtle. However, the details of changes discussed in this Chapter represent a significant alteration to my artistic output and creative practice. This is an alteration that has augmented my capacity

for self-expression and improved my performance experience. The impacts on artistic output can be understood as overt manifestations of how MAS development has improved my capacity for self-expression. Developing and improving MAS, and then exploring how it could be best applied during performance allowed me to have greater control over the music I was hearing in my mind during performance. For example, this improved control meant that I was able to develop motives for longer, and in a greater variety of ways. It also meant that I had an improved awareness of where my ideas were being sourced from, and how these sources of idea generation might be engaged so as to complement each other and stave-off fatigue.

Developing MAS via the MP+PP approach enabled the streamlining of my performance preparation. Streamlining required constant reflection on how I could improve the processes and approaches that were engaged during each phase of performance preparation (under the MP+PP condition). Improvements in my performance preparation became evident prior to and during the recordings in the fourth phase: I felt prepared and as though I had a sufficient understanding of the music that would allow me to engage in a pleasurable and artistically satisfying performance.

This section has articulated how developing MAS during performance preparation can be viewed as one way of embracing the ethos of the particular artistic social group that places a great deal of value on the playing of audiation-generated ideas during performance. The processes discussed in this section have described the different layers of complexity that exist in the performance recordings. This Chapter has thus pointed to where the reader may be able to acquire a greater appreciation of the levels of complexity to be found in the recordings/performance component. It is hoped that this will provide the reader and listener with a more valuable experience, and imbue the recordings with greater artistic value.

## CHAPTER 7 – CONCLUSION

### 7.1 Summary of the Project

This project sought to obtain information that could be engaged to develop Manipulative Aural Skills (MAS) as a vehicle for performance preparation. This project found that developing MAS did indeed improve my improvisational skills and performance preparation.

At the beginning of this exegesis, mental improvisation MAS was discussed as a type of aural skill, and efforts were made to show how it can be considered as such. The lack of focus on developing MAS in aural skills training methods was highlighted. Further to this, the paucity of methods available to professional improvising musicians seeking to develop MAS, was also demonstrated. Highlighting these deficiencies allowed me to show how this research could contribute towards filling the existing gaps in the body of knowledge. Accordingly, the project began by identifying the need for a new model representing aural skills and then, put forward such a model, based on current cognitive neuroscientific and cognitive psychological literature.

The literature review identified and examined possible elements that could aid MAS development. However, this information was sourced primarily from studies that have looked at how classically trained musicians experience the music that is heard in their minds. The literature review argued that mental rehearsal of music (as is carried out by classical musicians) and mental improvisation of music may be reliant on different cognitive functions. Therefore, it was decided that a qualitative enquiry into how professional improvising musicians experience this skill was needed, in order for this project to move forward. The literature review singled out information suggesting that the generation of auditory imagery was of central importance to the successful engagement of mental improvisation (and therefore MAS). Therefore, the qualitative enquiry sought to understand how the group of high level professional improvising musicians streamlined the generation of auditory imagery, and with this their ability to engage MAS.

The data acquired from this enquiry, as well as relevant information drawn from the literature review, were collated and applied in approaches to develop MAS. Development of these approaches was iterative. Each phase therefore brought improvements and the approach was

gradually refined. This project has collated important approaches and elements that are important for developing my MAS, and which also allow me to feel sufficiently prepared for a performance.

## 7.2 Important Elements for Developing my MAS

This project found that it is preferable to build on existing elements constituting MAS (for example, different types of mental imagery), that one may already possess, rather than attempt to create new elements. Reflecting on the types of mental imagery and motor interactions/responses that are generated when first trying to engage MAS provides clues as to what these may be. For me, visualising how the notes fell across the fretboard seemed to provide stability when generating auditory imagery during my first attempts at engaging MAS. Gesture associated with playing the instrument and subvocalization were also found to be highly beneficial in generating auditory imagery.

A regime lasting five weeks was found to be the optimum length of time needed to develop MAS and still successfully prepare for performance. This timescale could vary depending on the difficulty of the pieces that were to be performed. Five weeks was found to be a sufficient amount of time needed to learn a short repertoire of jazz standards. Within the performance preparation sessions, mental practice was found to be most effective when engaged for blocks of no longer than twenty-five minutes, with breaks of five to ten minutes interspersed between each block.

Engaging MAS required focused concentration. Varying approaches within performance preparation sessions was found to help stave off mental fatigue and maintain focus and concentration. This was facilitated by combining physical practice and mental practice during performance preparation. Mental Fatigue resulting from focussed concentration, consistent with mental improvisation, was found to be alleviated by interspersing the session with physical practice. Additionally, within a performance preparation session, best results were achieved by moving from gesturing as though playing the instrument, to trying to generate the sounds of the pitches in the mind. Another type of variation that was beneficial was moving between the first combination of miming and imagining the pitches, and the second, miming and singing the pitches. Moving from these previous two approaches to gesturing as though playing the instrument was also found to be highly beneficial.

MAS development was found to be best achieved when I improvised as much as possible. When singing simple material such as root movements, an improvisation was maintained by manipulating rhythms. Developing a durable long term acoustic memory of the piece was found to be highly beneficial. This was achieved through listening repeatedly to the pieces and playing them on the instrument during performance preparation sessions. Developing a thorough knowledge of how the piece is structured, knowing the root movement of the piece and knowing the intervallic composition of all the chords in the piece was also highly beneficial. This semantic knowledge was found to enable one to piece together the sound of the piece when the long term acoustic memory failed.

While improvising on the instrument, it was found that short pauses were required between melodic phrases, so that MAS could generate new lines. It was found that short pauses provided sufficient opportunity for MAS to generate new material. Best results were achieved when all the physical practice involving improvising embraced this approach. This approach enabled MAS to be transferred to performance, taking it from being a skill primarily experienced in the practice studio, to having a clear influence on the experience of performance and my artistic output. While, these outcomes are not generalizable, they can nonetheless be viewed as results that might be drawn-upon to instigate further research aiming to generate more generalizable results.

### 7.3 Synthesis of Research Outcomes to my Artistic Output

MAS development has resulted in an approach to improvisation in which there is a significant emphasis on the generating and playing of audiation-generated ideas. MAS development during performance preparation via the MP+PP approach, was indeed found to be an effective way of improving my ability to source and manipulate musical ideas heard in my mind during performance. MAS development did therefore improve my improvisational abilities. The number of audiation-generated ideas played in the performance solos, gradually increased over the course of the project. Implicit in this result is an outcome that is difficult to demonstrate, but can nonetheless be verbally conveyed: MAS development has enabled me to have a better understanding of how the three different types of idea generation are manifested during performance. Further, during performance I became aware of when I

engage the ideas coming from the different sources and how to exert control over when and how I engage them.

A noticeable difference between the first and fourth phase recordings are changes in my tone production. In the previous chapter, this was shown to be the outcome of efforts to better accommodate MAS during performance. In order to more comfortably engage MAS during performance, I needed to change my tone to one that was more saturated and distorted. This change in tone gave the pitches more body and greater sustain, closer to that achieved when singing. Importantly this does not mean that I will be fixed in one place in terms of tone, that when I play, this is how I will always sound. Rather, it means that from this research, I have a broader range of tonal opportunities at my disposal. As a result of this research project, I have thus developed the capacity to express myself through several different tonal colours. The fourth phase performance solos on *Green Dolphin Street* and *My Funny Valentine* demonstrate this: The tone in the former is more heavily distorted, whereas the tone in the latter is cleaner and greater distortion is introduced when playing in the higher register of the guitar.

Consideration of how MAS development resulted in me playing fewer chords while improvising can be understood as a secondary outcome. Playing fewer (or no) chords while improvising was the result of both negative and positive implications from changes to my tone, and a direct impact of MAS development. Future practice-led research may be needed, exploring ways of accommodating MAS in performance, and ways to opening up more possibilities for chordal improvising to take place. This could mean, for example, engaging different technologies during performance that would allow for greater control over volume or the amount of saturation that is needed to provide sustain.

The value of MAS development during performance preparation became more apparent as the project unfolded. Within the MP+PP condition, engaging MAS enabled very thorough performance preparation; it allowed me to develop mental representations depicting all aspects of the pieces I performed and I then developed a thorough physical understanding of the piece. It has thus allowed me to arrive at performances feeling fully prepared, leading to more enriching performance experiences. Therefore, MAS development during performance preparation was found to be a successful approach for streamlining and improving my performance preparation.

## 7.4 Implications of this Research

The findings of this research project will continue to influence the way I conduct performance preparation in the future. The outcomes of this project also have significance for those involved in the study and teaching (practitioners, educators and researchers) of jazz and improvised music. These findings, and the methods of analyses developed for this project may be considered by others in developing new, or refining existing, creative practices.

This research project led to a complete transformation in the way I conducted my creative practices. In this exegesis I have demonstrated the significant impacts that MAS development has had on the way I improvise and on how I experience performance. The capacity of this approach to performance preparation, to effect such positive outcomes, means that it will be an approach that I will continue to engage into the future. By adopting the approach to performance preparation developed in this project, I have created a focused, systematic and time-efficient method of effecting my artistic output. Thus my creative practices have become accordingly more systematic, more focused and more time efficient.

The qualitative enquiry showed that MAS were highly valued by the high level musicians who engaged them. A significant percentage of the musicians interviewed had developed MAS on their own and had done so after reflecting on ways of improving their creative practices. Many of these musicians saw the development of this skill as an important tool in helping them to yield better artistic outcomes. In addition to this, almost all interviewees shared the view that MAS is a skill that they would like to either develop and engage, or engage more thoroughly during studio practice. These findings force us to interrogate aural skills training programs, and re-examine whether they truly address the needs of aspiring creative musicians. Undeniably, such training programs need to help students develop high level perceptive aural skills. However, the findings of the qualitative enquiry suggest that mental improvisation (and composition), described in this exegesis as MAS, are also a skill that high level musicians require, and as yet there is no clear guidance in the form of pedagogical methods on how they may best develop this skill.

The approach to performance preparation developed in this project, provides ideas for other practitioners, on ways of preparing for performance that minimize the risk of injuries that may result from over-use. It also provides an approach to musical study for musicians who

are currently nurturing such injuries; Approaches examined in this exegesis may be viewed by musicians who have such injuries, as potential approaches that could enable them to continue to engage in studio practice, and explore their creative pursuits.

Smith & Dean (2009 p. 5) have stated that, ‘...the unique combination of creative practice and research can sometimes result in distinctive methodological approaches’. This statement rings true for this project. Distinctive methodological approaches have arisen from this project via the embracing of multiple, different research methods, as well as via the measures taken to meet the challenges inherently posed by the subject of enquiry. This project has generated methods that may enable practitioners and researchers to measure the development of their MAS, and examine the degree to which they engage MAS during performance (and how MAS may be manifested during performance). A major challenge that was overcome in this project was documenting and measuring the development of a skill that is primarily experienced in one’s mind. Measuring the development of this internally experienced phenomenon, and measuring its impact on my performance was an equally difficult challenge that needed to be met. By producing vocalised improvisations, and thus externalising MAS (as heard in the MAS solos), I was able to examine these improvisations for idiosyncratic traits. On identifying these traits, I could then look for the same traits in the performance solos. The presence of these traits in the performance solos enabled the identification of moments in my performance solos when MAS were being engaged. Further to this, it enabled me to identify the parts of my improvisations when audiation-generated ideas being engaged. Thus, while the performance outcomes resulting from MAS development are important for myself, the methods developed in this project for measuring the development of MAS, and its impact on performance may be engaged by all.

The notion put forward by Hargreaves (2012, pp. 359-364) that ideas in jazz improvisation can be classified into three types, audiation, strategy and motor-generated ideas was further explored and advanced in this exegesis. One of the contentions put forward in this project was that audiation-generated ideas are the manifestation of MAS during performance. The analysis described in the previous paragraph enabled the identification of MAS in my performance solos. Thus, it enabled the identification of moments in my improvisations when audiation-generated ideas were the main source of idea generation. Via reflective analysis, I was able to categorise all the lines in my performance solos under the three different

classifications described by Hargreaves. This project has thus provided a method for quantifying and measuring the degree to which MAS are engaged in my improvisations, and the degree to which audiation-generated ideas constitute my performance solos.

## 7.5 Reflections on Research Methods Employed in this Project

Lack of clarity on topics important to my creative practice in the past, impeded the making of art. Uncertainty resulting from this meant that, in the past, time was wasted in seeking clarity. Research-led practice was the ideal overarching research method for this project because it allowed me to both seek answers to the questions around MAS development, and apply the findings in a systematic, methodical manner. As an overarching method, research-led practice allowed for the subsuming of other research methods into it in order for accurate research to be conducted. In this project, this meant undertaking a qualitative enquiry in order to gain insights as to how auditory imagery associated with MAS, may be more easily generated. In the later stages of the project, practice-led research proved to be an ideal method for ascertaining optimum application of the findings, sourced from the qualitative enquiry, to my creative practices, and then refining them.

Reflective analyses of creative practices and artistic output that took place as part of the Practice-Led Research component of this project was invaluable. Schon's (1983) two concepts of reflection-in-action and reflection-on-action proved to be very important to the generating of research findings. They enabled me to accurately determine which of the different approaches to performance preparation (and the elements engaged within them) would both enable the development of MAS, and sufficiently prepare one for performance.

## 7.6 Final Thoughts

This project has investigated and documented the development of a skill that is primarily experienced in the mind. In meeting the inherent challenges that such a project posed, future avenues for related complementary research have arisen. Future research could follow up on the concept triggers for auditory imagery, especially in relation to improvisation. Such research should seek to empirically measure the degree to which such triggers, (such as the use of concurrent mental imagery, sound producing gesture and sub-vocalization) act on the generation of auditory imagery in improvising musicians. Greater understanding of such

mechanisms would significantly aid the development of any future approaches seeking to develop MAS. Future research also needs to look at how the three types of idea generation are manifested in the improvisations of high level musicians. An empirical study with a large sample of musicians would provide student musicians with a better understanding of the potential of their aural skills, and a clearer comprehension of what they can expect from these three types of idea generation. Further research on developing MAS during performance preparation needs to take place across a larger group of musicians. Doing so would enable the generation of research outcomes pointing to more generalizable aspects of MAS development.

As has been discussed previously in this exegesis, there exists a corps of musicians that place a great deal of value on the sourcing and playing of audition-generated ideas in their improvisations. The body of recordings, the performance component of this research, can thus be understood and appreciated as a body of work that exemplifying this ethos; artistic value can be ascribed to these recordings when they are viewed in this light. On close examination of the recordings, the listener will perceive the various degrees to which this ethos has been successfully conveyed within the improvisations. A close reading of the exegesis will highlight where this ethos has been realised more clearly.

Finally, the findings of this research project and the artistic output, heard in the recordings and articulated in this exegesis, point to the substantial artistic gains that can be achieved from developing MAS during performance preparation. The significant impacts upon my creative practices and artistic output resulting from this research should encourage others to begin developing MAS.

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## APPENDICES

## APPENDIX A – Interview Examples in Chapter Four Section 4.4, Results

Example Number	Speaker	Example
1	Guitar 2: :	...sometimes in my car... For a while I was putting on Jamie Abersold play-along records on in the car ...and I'd just, like, scat sing...
2	Sax 1:	I mean, there's also the whole... this is just a sax-centric thing, but there's all sorts of shit that you do in your throat and mouth cavity that is associated with certain pitches, and I find that when I'm doing this (gestures as though playing his saxophone) my throat starts to follow as well. So if I'm playing up in the upper register my throat will go into an upper register shape – certain notes have different... slightly different positions for the embouchure, for the lip ...
3	Bass 3:	It's funny when you think about it. I just do it sometimes without even really being conscious of it. It's usually in the back of the throat like I'm just making a rhythmical sound. There's probably a little bit of sound but it's not like with the mouth kind of open, projecting sound.
4	TIM: Pno 1:	<i>Are there any physical sensations that accompany that process?</i> Yeah. I reckon, If I'm singing a melody in my head, you know, you can feel it from my voice-box
5	TIM: Pno2:	<i>This thing that happens for you with the throat and mouth, that's more related to composing than to improvising, in your mind?</i> Yeah. I think so. I think it's because when you are composing a melody, you really need it to ... This is going to be the melody that's going to be attached to this composition forever. With that in mind, I guess the value of it, the purchase that you want that melody to have, is a lot greater than the melody improvised, that's just appearing within the moment. Maybe, with that compositional hat on, I'm probably more likely to adopt that singleness.
6	Tbn 2:  TIM  Tbn 2:	There's a really big difference, I don't know if this is interesting, so stop me if not, but there's a really big difference when I play and sing with the piano, to when I'm playing in my band where I don't play an instrument, I just sing. Its way harder to just sing and not have any connection to the stuff that's going on underneath it. It's way harder to pitch and improvise when I don't have this in front of me.  <i>If you pitch and improvise, say if you're singing and you have the trombone in your hand, is that correct? Is that what you mean?</i>  No, that's also insane, but I mean if I'm playing piano and playing jazz tunes, or my tunes, it's way easier for me to hear the stuff when I have this ( <i>Gestures as though playing the piano</i> ). I think it's partly a visual thing and partly a kinaesthetic thing. I also played the guitar, but I don't play guitar or piano in my rock band, I just sing. It's way harder, I realized, as soon as I have the instrument gone, it's way harder and I am not so confident or something.

<b>6</b>  <b>(cont'd)</b>	<i>TIM</i>  Tbn 2:	<i>Right, so, for example, if you had the trombone in your hands and you made the movement associated with the specific notes you're trying to sing, you would find it easier to sing those notes than if you didn't have it all? Is that what you mean?</i>  Yeah, but with the piano, not with the trombone
<b>7</b>	Guit 3:	Yes, when I'm thinking about playing, there's not really any clefs going on in my mind, but I do have quite a strong sense of the tactile experience of playing guitar actually. I actually can feel in my left hand what the strings feel like under my fingers...
<b>8</b>	Sax 1:	So I might be visualising ... if I go slowly I can sort of visualise dots and think of how they would connect on manuscript but if I am moving faster than a ballad tempo then I'm not going to think about dots at all – I'm really thinking about seeing the chords as they would appear in a lead sheet.
<b>9</b>	Tbn 1:	I guess the visual part of those lines, I think there's contour... There's contour in the lines. There's things that are (sings)... those kind of lines, like (sings)... it's kind of, there's note that's kind of top (sings). There's kind of lines that are like, it's like that Schenkerian thing where you've got the top note, you know, and then the bottom note... kind of... it's those highlighted notes and, and there's a shape (sings) umm, (sings). Yeah. You can kind of, I can, yeah (pause) there is definitely a shape there.
<b>10</b>	Pno 2:	...almost like a line. I think, when I teach improvisation to someone, or composing, I often talk about that sort of ... I would describe it like a line graph, or a little spiral going outwards. I guess that line based thing, so yeah, literally like a pencil drawing type of thing is probably what I am visualizing.
<b>11</b>	Sax 5:	An interesting one is since I've been studying Indian music, I've gotten used to keeping tala with my hand. That is now starting to be at the point where I don't actually have to move my hand, but I can see it in my mind's eye, which has been very, very helpful, especially for playing more complex rhythms and trying to work out where I am in relation to a rhythmic cycle.
<b>12</b>	Sax 1:	I guess because I am, umm, just thinking about the chords so if I'm really to get into what it would look like. It's hard because it's a semi vivid image, so it's not like photographically replicating the lead sheet, but I'm sort of, like, imagining the layout of a page of music, usually 4 bars to a line, the melody is sort of blurred out as in it's not important what I am visually vividly remembering is the changes.
<b>13</b>	Sax 5:	When you were talking about improvisation, one thing that I found like this has not so much to do with specific pitches and specific rhythms, but overall structure. Visualization, I found really, really helpful with that. Imagining solos, and contours, and even things like how you might want to make your way through the form, that sort of thing, so lines that trace the form and overlap with the start of a chorus, and that sort of thing, and more as a practice device. Not something I consciously do at a gig, but very useful as a practice tool.
<b>14</b>	Tbn 2	Singing thing's funny, because I use it to try and improve my aural skills for my trombone playing I think, to be able to hear different structures in here, different ideas that are, when I play the trombone that really helps that. I notice it in other people who've been really well trained as singers. They might not necessarily do it professionally, but they had an early start with that sort of thing. It's amazing, I feel like they have better skills in certain areas sometimes, and that's really amazing to me. I feel like I'm catching up with that a little bit, but I feel like actually I worked even harder on it in the last two years, and I noticed, that may be in conjunction with some other practice things, but I notice that I hear better. I can hear things when I improvise on trombone better than I used to.

<p><b>15</b></p>	<p><i>TIM:</i></p> <p>Sax 4:</p> <p><i>TIM:</i></p> <p>Sax 4:</p> <p><i>TIM:</i></p> <p>Sax 4:</p>	<p><i>And was singing ever a part of this process as practising?</i></p> <p>Out loud? ...Yeah.</p> <p><i>A big part or small part or ...?</i></p> <p>I would say a small part...</p> <p><i>A small part.</i></p> <p>...but it's certainly been a necessary part, and, ah, it's been a necessary (pause) link between my brain and my instrument as well.</p>
<p><b>16</b></p>	<p>Pno 1:</p>	<p>Yeah, I'd say it's something you do over time and you purposefully develop it and, umm, I mean it's just that, ah, there's just that distance between improvising in your head and kind of knowing it as shapes and sound and music... and then knowing exactly what the pitch, the pitch is...and, umm, and, you know, I think you need to develop that sense to go from, there to there (<i>gestures from the head to the table</i>).</p>
<p><b>17</b></p>	<p>Sax 1:</p>	<p>...when I use it for improvising it's usually also connected and memorising the tune... It's a way of trying to remember the changes off the instrument and so I will improvise through the changes, not so much as a way of working on my improvising, but as a way of memorising the changes and connecting the changes together through the muscle memory again... It's not systematic. It's not like I'm playing, you know, all of the instrument. Not like I'm playing roots, through the change in thirds and arpeggiating, I'm just thinking of lines that go through those changes and connect the chord tones. That's how my brain thinks when I'm improvising so that's how I then try to memorise the changes for the purpose of improvising.</p>

## APPENDIX B1 – Concurrent Motor responses/interactions Experienced by Participants while improvising in their minds

The tables in this appendix, and Appendix B2 show the different emergent themes at the top in the blue row. The column on the right shows all the participants and the ys indicate, which of the emergent themes they experienced

Participant	Motor Response Yes (y) or no (-)	Assoc. w/Playing Inst. (hands & Arms) Yes (y) or no (-)	Throat, Mouth, Larynx Yes (y) or no (-)	Singing Yes (y) or no (-)	Body movement Yes (y) or no (-)	Multiple Int/Resp. Yes (y) or no (-)	Motor
Guit 1	y	-	-	y	-	-	
Guit 2	y	y	-	y	-	Y	
Guit 3	y	y	-	y	-	Y	
Bass 1	y	y	-	y	-	Y	
Bass 2	y	-	-	-	y	-	
Bass 3	y	-	y	y	y	Y	
Sax 1	y	y	y	-	-	Y	
Sax 2	y	y	-	y	-	-	
Sax 3	No MAS	No MAS	No MAS	No MAS	No MAS	No MAS	
Sax 4	-	n/a	n/a	n/a	n/a	n/a	
Sax 5	y	y	-	y	-	Y	
Str 1	No MAS	No MAS	No MAS	No MAS	No MAS	No MAS	
Tpt 1	y	y	y	y	-	Y	
Tbn 1	y	y	-	y	-	Y	
Tbn 2	y	y	-	y	-	y	
Pno 1	y	-	y	-	-	y	
Pno 2	y	-	y	y	-	y	

## APPENDIX B2 – Concurrent Visual Imagery Experienced by Participants

Participant	VI Active	Association With Instrument. (+ Hands on Inst.)	musical information made visual			Assoc. w/body	Multiple VI
			Peaks & Troughs	Notation	Chord Changes		
Guit 1	-	-	-	-	-	-	-
Guit 2	-	-	-	-	-	-	-
Guit 3	Y	y	-	-	-	-	-
Bass 1	-	-	-	-	-	-	-
Bass 2	Y	y	-	-	-	-	-
Bass 3	y	y	-	y	-	-	y
Sax 1	Y	-	-	y	y	-	y
Sax 2	Y	y	-	y	-	-	y
Sax 3	No MAS	No MAS	No MAS	No MAS	No MAS	No Mas	No MAS
Sax 4	-	-	-	-	-	-	-
Sax 5	Y	-	y	-	y	y	y
Str. 1	No MAS	No MAS	No MAS	No MAS	No MAS	No Mas	No MAS
Tpt 1	-	-	-	-	-	-	-
Tbn 1	Y	-	y	-	-	-	-
Tbn 2	-	-	-	-	-	-	-
Pno 1	Y	y	-	-	-	-	-
Pno 2	Y	-	y	-	-	-	-

## APPENDIX C1 – How Responses were Coded

In this appendix I seek to demonstrate how the participants provided answers to the research questions; to show the interview questions provided opportunities for the participants to give responses that answers to the research questions. An example of how one particular participant responded to Interview question 1a, and in doing so provided answers to research question 1 is provided below in an excerpt from the transcription of the interview with Trombone 1 (Tbn 1).

TBN 1: ... yeah, yeah, I think, umm, single line melodies – I guess I, it's based on maybe if I'm singing, if, if I'm vocalising ideas I guess it's my history, my background is based on, umm, is pretty strongly rooted in like a be-bop, post-pop kind of tradition, so when I'm, if I'm, it depends on I guess, what music I'm thinking about that is, that I'm imagining I'm playing over.

*TIM: So ...what music(s) do you think about?*

TBN 1: (pause) I guess that can be stimulated by something I've just heard or something that might pop into my head I've been rehearsing. Umm, if it's more of a, umm, based on changes, you know, more kind of tonal jazz kind of chord progression based things I'll be thinking more, umm, I'll be thinking really, aah, I'll be thinking of the contour of the lines of be-bop, you know, (sings) I'll be kind of singing those.

*TIM: So, so you'd be hearing improvisations?*

TBN 1: I will be, yeah. I'll be kind of hearing those changes and I guess I'm hearing, aah, what I would envisage myself playing over that kind of given chord progression say if it's a rhythm changes thing, I might be thinking of, umm, specific lines. It might be influenced by, you know, maybe more famous solos, Lester Young solos, things like that.

Key phrases provided by the participant such as (those in the first paragraph of his response) 'vocalising ideas' and 'imagining I'm playing over' are phrases that are associated with the practice of jazz improvisation and thus led me to believe that I could safely pose a more explicit probing question aimed at directly answering to RQ1. This particular response also provides an example of how participants inadvertently provided information relating to motor responses and interactions that take place when they are imagining improvising, and therefore provided a response for RQ2 also. This can be seen in the first paragraph of Tbn 1's

response when he talks about singing and vocalising his ideas. The way in which Saxophone 1 (Sax1) responded to interview question 1 was similar to that of Tbn 1 in that he provided answers to RQ1 and RQ2 inadvertently. In this excerpt Sax 1 describes how he both improvises in his mind and also how this can involve the employment of concurrent visual imagery. An example is given below.

SAX 1: OK. So, when I'm imagining music, whether it's written music I'm trying to memorise or working on improvising ...it's always connected to my fingers, the way I kinetically play the instrument. So if I...They're the two main reasons why I use it. It's if I'm memorising something and not on my instrument, then I'll pretend to play the instrument – doesn't even have to be like that, umm, you know, doing the saxophone pose. You know I can do it sitting on a train or somewhere, you know, my hands are by my side but still with the fingers going through the motions of playing those phrases. So that's thinking of memorising something that's written, learning tunes and that sort of thing. Umm, improvising through things – a little bit of mental visual imagery comes into it thinking of how the changes might look on the chart...

In responding to interview question 2, Piano 1 talked about how the timbre of the notes he hears in his mind are sometimes difficult to describe and at other times as being like 'singing in my head'. This prompted the following probe question:

*TIM: Are there any physical sensations that accompany that process?*

Pno 1: Yeah. I reckon, if I'm singing melody in my head, you know, you can feel it from my voice-box.

## APPENDIX C2 – Examples of Responses to Research Questions: Themes, Definition of Themes and Examples

THEME	DEFINITION	EXAMPLE
<b>YES</b>	The participant talks about experiencing the phenomenon of improvising in his or her mind	<p><i>TIM:</i> ...is this idea about thinking about music when you're away from the instrument - is this something that you do often?</p> <p>Pno 1: Yeah. As a form of practise you mean when I'm away from my instrument?</p> <p><i>TIM:</i> Yeah</p> <p>Pno 1: Yeah, for sure. Yep, umm, <u>like practising stuff in my head and developing stuff in my head</u> away from the instrument?</p> <p><i>TIM:</i> Yeah and when you say developing stuff in your head, does that mean that you're, aah, composing or improvising?</p> <p>Pno 1: Yeah, yeah, <u>definitely improvising.</u></p>
		<p>Sax 2: ...I'll improvise a line but then I'll remember it pretty much exactly, you know, I mean, obviously sometimes I'll mess it up, but if I decided to remember it, I'd spend a lot of time going over it in my head outside of class so I'd sing the line and I would imagine myself playing it from the outside looking at myself.</p>
		<p><i>TIM:</i> ...imagining single line music.</p> <p>Sax 4: Right. <u>Usually, in that case, if it's a compositional activity, you know, or even an improvisational one as well,</u></p>
<b>YES + SINGING</b>	This column presented in the <b>Chart 1</b> shows the addition of those participants who reported only singing their improvisations	<b>N/A</b>
<b>NO</b>	The participant reported not improvising in his or her mind.	<p>String 1: ...do I improvise in my head? <u>I don't think so. No, I think I probably only do that at the instrument or an instrument.</u> No, I think my mind would be blank. There's nothing there.</p>

		<p>Sax 3: <u>I wouldn't, I wouldn't often, like, freely improvise away from the instrument like that,...</u></p> <p><i>TIM:</i> <i>Yep</i></p> <p>Sax 3: ...you know, I'm only kind of, would do something quite repetitive.</p>
<b>INTERNAL ONLY</b>	The participant's responses only referred to hearing their improvisations in their minds; they didn't at any point in the interview mention that they externalise their improvisations while away from the instrument by singing.	<p>Sax 2: ... I try and internalise a line in my head and then I convert it to notations so I'll put it up on a staff and then when I get to my horn I can remember what the line is and then sight read. <u>So it's sort of like having a blank stave in front of your brain, I guess, and you can just sight read what you've come up with and – I can actually see the notes.</u></p>
		<p>Pno 1: ...I'm thinking about it in a linear way which is saying the obvious, umm, and I'm thinking, I'm thinking about the chord structure passing by and all the linear structure and being aware of, of the sound of the tradition of lateral chords, <u>...umm, and then, and then kind of hearing that in my mind's eye and I guess kind of internally singing a melody over those chord changes.</u></p>
		<p>Guit 3: <u>...when I'm thinking about playing, there's not really any clefs going on in my mind, but I do have quite a strong sense of the tactile experience of playing guitar actually.</u> I actually can feel in my left hand what the strings feel like under my fingers and a sense of trying to control what I'm feeling with my entire body, in terms of pulse and what's being fed back to me from a band. I suppose that's probably an important thing too is, I immediately have a very strong sense of others playing with me.</p>
<b>SINGING ONLY</b>	The participant didn't report improvising in their mind away from their instrument, however they did report vocalising their improvisations away from their instruments.	<p>Guit 2: ...sometimes in my car... (Laughter)... for a while I was putting on Jamie Abersold play-alongs on in the car...</p> <p><i>TIM:</i> <i>Yep.</i></p> <p>Guit 2: ...and <u>I'd just, like, scat sing...</u></p>

<b>SING INTERNAL</b>	Participants talked about both experiencing improvising in their mind and vocalising these improvisations away from their instruments.	Bass 3: <u>...I usually imagine single line ideas or melodies or bass lines usually in a singable sense. I usually imagine a melody or think of a melody and usually just sing it.</u>
		Sax 3: <u>...and I've always felt that I compose better when I, aah, use what I would sing, and it comes from what I would sing in my head. So if I can hear it in my head then it's usually stronger.</u>
		Bass 2: <u>...something that I do a lot, which I'm sure you do a lot, have a little chord sequence running in my head that I'm imaginatively soloing over for my own entertainment. It might be, it often happens hearing a snatch of a chord progression from somewhere that then kind of ticks over and I'm entertaining myself by singing or imagining, or quietly humming an improvised solo to myself.</u>
<b>FOR IMPROV</b>	The improvisations in the mind take place purely for the purpose of improvisation. The participants did not talk about doing so for any other purposes. This category is presented in <b>Chart 1</b> to contrast 'For Composition' category.	See examples in 'Yes' category.
<b>FOR COMPOSITION</b>	The improvisations in the mind take place for the purpose of composition	<p>Tim: <i>This thing that happens for you with the throat and mouth, that's more related to composing than to improvising, in your mind?</i></p> <p>Piano2: <u>Yeah. I think so. I think it's because when you are composing a melody, you really need it to ... This is going to be the melody that's going to be attached to this composition forever. With that in mind, I guess the value of it, the purchase that you want that melody to have, is a lot greater than the melody improvised, that's disappearing within the moment. Maybe, with that compositional hat on, I'm probably more likely to adopt that singableness.</u></p>

		<p>Tbn 2: <u>It's usually like a small motif or something, because I think, "Ah, that." I sometimes don't know why, but it's there, and then I think, "We'll explore that a little bit." It's usually how I compose I guess, it's kind of connected with that, this thing will happen and then I'll sort of work with that, and then if I like it I'll keep recalling it so that I remember it. "Okay, from the start, okay, go again." Then add or change something.</u></p>
		<p>Guit 1: <u>in those situations I tend to sort of think about my own compositions on things that I'm writing ...</u></p> <p><i>TIM:</i> <i>Yep</i></p> <p>Guit 1: ...and how they could be...</p> <p><i>TIM:</i> <i>Mmm.</i></p> <p>Guit 1: <u>...or settings for them, how I could change them around or sing them in my head...</u></p>

## APPENDIX D – Discussion of Results from Qualitative Enquiry and how they relate to Existing Literature

The findings of this study give further weight to the claim that the encoding of musical information is a multi-sensory activity, and that the successful recall and retrieval of musical information is somewhat reliant upon (or at the very least, partially aided by) information coming from parts of the body other than the brain, consistent with the concept of ‘embodied cognition’ (Wilson & Foglia 2011; Godoy 2010). If different factors are involved in encoding the information, for example there is concurrent auditory input, kinaesthetic input and visual input, then we can extrapolate that the different types of information will be recalled together. Processes that lead to the embodiment of musical information are by no means new. Such concepts have been previously adopted by western pedagogues; Butler (1997, p. 44) examines the pedagogical methods of Orff, Kodaly and Jacques-Delacroze and points out that they all employ corporal movement as a way to help students achieve more vivid musical imagery. Gordon (2012, p. 190) suggests too utilising movement, specifically in order to provide the student with mental temporal representations.

Embodiment of musical information has been a central element in musical study and performance practices in the Indian sub-continent (India, Pakistan, Bangladesh, Sri-Lanka), the Middle-East and Europe for centuries, musical cultures that have a central emphasis on improvisation also. Rowell (2001, pp. 289-302) discusses the music of India and discusses the use of hand gestures in representing meter (Ibid p. 294) and the centrality of the human voice (Ibid p. 290; p. 294) to the study and performance of Hindustani classical music. Levin (1968, p. 59) discusses the concept of Chironomy, the use of hand gestures which indicate the pitch direction of a melodic fragment. He notes its use in European Gregorian chant music as well as its centrality to Jewish religious practices involving music (see also D’Alessandro et al. 2014 p. 3601). Embodiment of musical information has been largely ignored by institutions that teach western/jazz improvisation. Responses to the research questions put forward in this study clearly show however, that many improvising musicians arrived at the conclusion that their creative practices would be augmented by embracing concepts of embodiment.

These results help us to think differently about the concept of mental practice. Mental Practice has previously been defined as focussed imagining of movements associated with a given task absent any external movement or activity normally associated with that task (Driskell, Copper & Moran 1994, p. 481). However, if cognition that takes place for musical information involves information coming from parts of the body other than the brain, (described as embodied cognition), then clearly engaging in practice that does not permit the body to interact with mental cognition will diminish the efficacy of the cognition. The results from this study show that such interactions are common and indeed many of those who experience them believe that they are beneficial in aiding the generation of the required auditory imagery. Therefore, if we think of cognition as being embodied, then previous notions of what mental practice is do not fit. What is needed is a redefining of what mental practice is, and in doing so enabling the incorporating of extra-bodily interactions which may, indeed be vital for cognition.

Several prominent themes emerged out of this study that may be beneficial in streamlining MAS in my performance preparation. The first to emerge in this study was the frequency with which improvising musicians reported singing their improvisations. Smith, Reisberg & Wilson (1992 p. 110) hypothesize that sub-vocal singing acts to prime the auditory cortex and thus aid in producing an auditory image, we can extrapolate from this information that actual overt singing would thus be a continuation of this process. In situations outside a laboratory we could expect that the effortful nature of generating the music in the mind would logically lead to some musicians externalising this process via singing, bringing with it all the beneficial factors of increased concentration etc. Indeed it appears that many of the participants' bypass the idea of sub-vocalisation and simply vocalise.

Many of the participants talked about, or eluded to how there are multiple ways that the improvisations heard in their minds could be manifested. For many, the focus of their attention could shift; some stated that improvisations at a low attention state were akin to daydreams, and at a high attention state the participants reported more visual and motor related details and information accompanying their improvisations. This detail was reported to have come in the form of visual imagery depicting pitch location and more involved motor responses/interaction. Several participants talked about how the focus was more intense while composing melodies, in this state there was a greater reported reliance on vocalisation

and sub-vocalisation. Thus, in engaging MAS during my performance preparation vocalisation, sub-vocalisation, visual imagery and motor interactions may be employed to engage MAS with greater efficacy.

In this study participants reported the involvement of cross-modal mental imagery in agreement with what has been suggested by Godoy & Jorgensen (2001, pp. 3-4; see also Saintilan 2006, pp. 197-199). It also found that there is a relationship that exists between the generation of music in the mind and overt physical gestures and bodily movements associated with playing a given instrument, in agreement with points made by Godoy (2010, p. 55). This finding is in line with research that shows how the triggering of auditory imagery in musicians has often been associated with sound-producing gestures (Mikumo 1998, cited by Godoy 2001, p. 244; Mikumo 1994, pp. 175-197; see also Galvao & Kemp 1999, p. 134 who discuss this process) or strategies that have been taken by musicians to develop overt physical gestural representations of the pitch information (See D'Alessandro et al. 2014 p. 3601 for a discussion research into the effects of Chironomy). Additionally, findings generated from this study give weight to the rationale for employing the term 'musical imagery' as proposed by Godoy & Jorgensen (2001, pp. 3-4) when discussing how music is experienced in the mind: this study has shown that improvising musicians do report experiencing both additional, concurrent mental imagery coming from sensory modalities other than audition as well as the interaction/interplay of bodily movements and gestures associated with playing a given instrument.



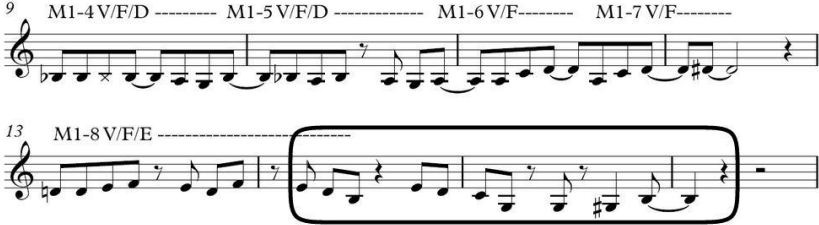
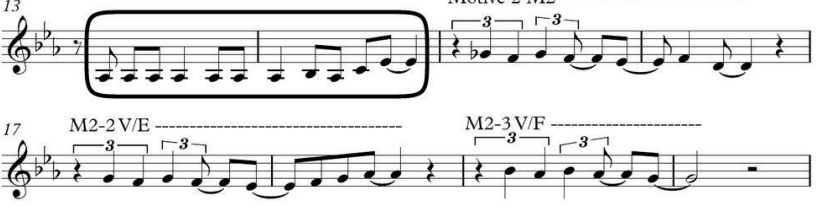
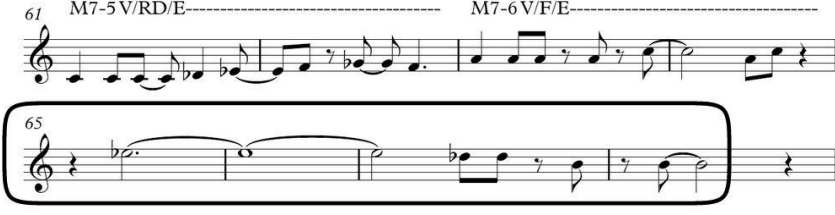
Several of the participants reported sensations in their mouth, throat and larynx which were akin to singing, though without producing any sound. Such findings are consistent with research that has been carried out into the concept of sub-vocalisation (Brodsky et al. 2003, p. 602). These finding thus additionally show how physical bodily movements are implicated in the generating of musical auditory imagery.

Like Bernardi et al. (2013) this study found that for musicians, mental practice will often be carried out in conjunction with physical practice, or in conjunction with overt physical movements associated with physical performance. Real world applications of these skills (as opposed to the controlled application which takes place in an empirical laboratory setting) mean that musicians will often draw upon all possible sources to render the tasks less effortful.

## APPENDIX E - Non-Motivic Improvised Lines 1

4 <sup>th</sup> PHASE PERFORMANC E SOLO Before/After	BAR	EXAMPLES FROM PERFORMANCE SOLOS
1 Green Dolphin Street Before	28-30	<p>Motive 4 - M4 ---- M4-2 V ----- M4-3 V/A/E -----</p>
2 Green Dolphin Street Before	19-23	<p>Motive 3 - M3 ---- M3-2 V/RD ----- M3-2 V -----</p>
3 My Funny Valentine After	43-46	<p>M2-5 E/V/RD -----</p>

<p>4</p> <p>My Funny Valentine</p> <p>After</p>	<p>21-24</p>	
<p>5</p> <p>All or Nothing at All</p> <p>After</p>	<p>62-63</p>	
<p>6</p> <p>Lazy Bird</p> <p>Before</p>	<p>51-52</p>	
<p>7</p> <p>Nica's Dream</p> <p>After</p>	<p>15-18</p>	

<p>8</p> <p>Night Dreamer</p> <p>After</p>	<p>25-27</p>	<p>--- (cont.) --- M2-2 ----- M2-3 V----- M2-4 V-----</p> <p>21 G<sup>Δ</sup> F<sup>-7</sup> E<sup>b</sup>Δ D<sup>7</sup> E<sup>b</sup>-7 A<sup>b</sup>7</p> 
		<p>EXAMPLES FROM MAS SOLOS</p>
<p>9</p> <p>All or Nothing at All</p> <p>After</p>	<p>25-58</p>	<p>Motive 2 - M2 ----- M2-2 D/E ----- M2-3 V/D/E ----- M2-4 V/F/A ----</p> <p>21</p> 
<p>10</p> <p>All or Nothing at All</p> <p>After</p>	<p>14-16</p>	<p>9 M1-4 V/F/D ----- M1-5 V/F/D ----- M1-6 V/F----- M1-7 V/F-----</p> <p>13 M1-8 V/F/E -----</p> 
<p>11</p> <p>My Funny Valentine</p> <p>Before</p>	<p>13-15</p>	<p>13 Motive 2 M2 -----</p> <p>17 M2-2 V/E ----- M2-3 V/F -----</p> 
<p>12</p> <p>Nica's Dream</p> <p>After</p>	<p>65-68</p>	<p>61 M7-5 V/RD/E----- M7-6 V/F/E-----</p> <p>65</p> 



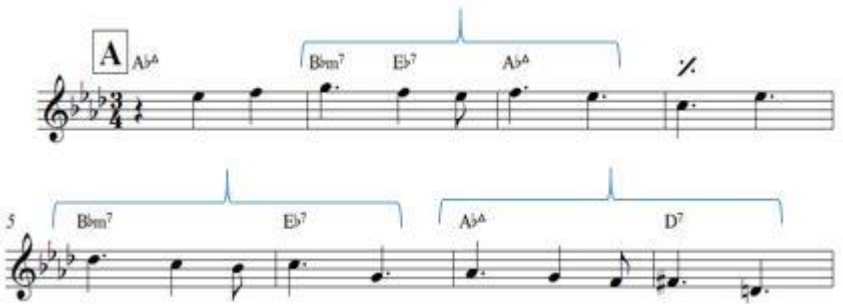
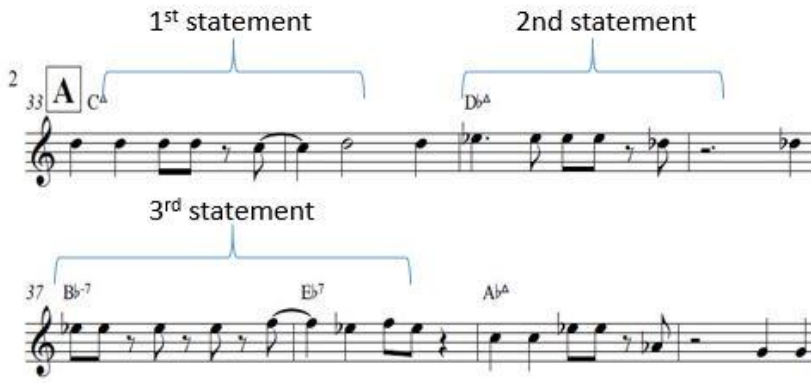
## APPENDIX F – Non-Motivic Improvised-Lines 2




4 <sup>th</sup> PHASE PERFORMANC E SOLO	BAR	EXAMPLE
1  All or Nothing at All	42-49	
2  All or Nothing at All	52-55	
3  Green Dolphin Street	74-77	
4  Lazy Bird	79-84	

<p><b>5</b></p> <p><b>My Funny Valentine (4<sup>th</sup> phase)</b></p>	<p><b>66-72</b></p>	
<p><b>6</b></p> <p><b>Nica's Dream</b></p>	<p><b>53-57</b></p>	
<p><b>7</b></p> <p><b>Nica's Dream</b></p>	<p><b>86-92</b></p>	
<p><b>8</b></p> <p><b>Night Dreamer</b></p>	<p><b>57-64</b></p>	

## APPENDIX G – Examples of Similarities between MAS solos and Performance solos

Example No. Element	Bar no./ Count	EXAMPLES	DESCRIPTION
Example 1a  Similar type of line	Bar 17	<p><b>MAS Solo : You Stepped Out Of A Dream</b></p>	<p>The motives presented in these two examples are rhythmically very similar. This example shows the influence of MAS development on my performance soloing. <b>Blue Arrows</b> point out the specific phrases that are almost rhythmically identical.</p>
Example 1b  Similar type of line	Bar 9	<p><b>Perf. Solo: You Stepped Out Of A Dream</b></p>	
Example 1c  Similar type of line		<p><b>MAS solo: You'd Be So Nice To Come Home To</b></p>	

<p><b>Example 1d</b></p> <p>Similar type of line</p>	<p>Perf. Solo: <b>You'd Be So Nice To Come Home To</b></p> 	
<p><b>Example 1e</b></p> <p>Similar Rhythmic Phrasing in MAS &amp; Perf. Solos</p>	<p>MAS Solo : <b>Skating in Central Park</b></p> 	<p>In <b>examples 1e and 1f</b> rhythmically similar phrases can be seen coming from the MAS and performance solos in the opening bars of solos on Skating in Central Park. These have been singled out by the blue brackets.</p>
<p><b>Example 1f</b></p> <p>Similar Rhythmic Phrasing in MAS &amp; Perf. Solos</p>	<p>Perf. Solo: <b>Skating in Central Park</b></p> 	
<p><b>Example 2a</b></p> <p>Phrasing</p>	<p>MAS Solo: <b>You Stepped Out Of A Dream</b></p> 	<p>The phrasing in the two examples is similar. The motive is presented, followed by a slight variation and the third treatment of</p>

<p><b>Example 2b</b></p> <p>Phrasing</p>	<p><b>Perf Solo: You Stepped Out Of A Dream</b></p> <p>1<sup>st</sup> statement      2<sup>nd</sup> statement</p>  <p>3<sup>rd</sup> statement</p>	<p>the motive is more dramatic. Another example of this type of phrasing can be found at bar 33 in the MAS solo.</p>
<p><b>Example 2c</b></p> <p>Phrasing</p>	<p><b>MAS Solo: You'd Be So Nice To Come Home To</b></p> <p>A</p>  <p>1<sup>st</sup> statement      2<sup>nd</sup> statement</p> <p>3<sup>rd</sup> statement</p>	
<p><b>Example 2d</b></p> <p>Phrasing</p>	<p><b>Perf. Solo: You'd Be So Nice To Come Home To</b></p> <p>1<sup>st</sup> statement      2<sup>nd</sup> statement</p>  <p>3<sup>rd</sup> statement</p>	

## APPENDIX H1 – Examples of Different Types of Idea Generation

This Appendix is intended to be considered alongside Appendix D2. For this project, the lines that make up the performance solos were divided into three groups, auditaion-generated ideas, strategy-generated ideas and motor-generated ideas. According to Hargreaves (2012, pp. 359-364), these are three sources of idea generation that an improvising musician will draw from during performance. I contend that audiation-generated are the result of the exertion of MAS during performance. This project looks at how focussed development of MAS during performance preparation impacts upon the three sources of idea-generation are accessed during performance.

In order to analyse my performance solos along these three lines, it was first necessary for me to be able to clearly distinguish between the sources of idea generation these solos. The second part of this appendix provides examples of how the different types of idea generation are manifested in my improvising. The examples are taken from *My Funny Valentine* and *Green Dolphin Street* from the first and fourth phase of recordings.

### **Motor-Generated Ideas: Examples 1 to 8**

In my improvisations, the lines that stem from motor-generated ideas are characterised as being an uninterrupted melodic line that stretches over one to four bars. When I am playing at faster tempos (260 beats per minute or faster), as in the case of on *Green Dolphin Street*, they are manifested as continuous eighth notes. Examples of these lines from the two versions of *Green Dolphin Street* can be seen in examples one to four. On pieces with a sixteenth-note feel performed at faster tempos, lines that stem from this source of idea generation are played as triplets, as seen examples five to eight.

The initial idea for these types of lines is often experienced as an urge to physically play something that I know will sound correct over that particular moment in the improvisation. In this way, my experience of motor-generated ideas is that they are very similar to strategy-generated ideas, in that they are played in order to satisfy the compositional requirements of the piece I am improvising over. The difference between the two is that the lines that result from motor-generated ideas, require physical effort for their execution.

## Strategy-Generated Ideas

In my performance solos, strategy-generated ideas are manifested both as single note lines and as chords. On choosing to play a line sourced from this type of idea generation, I am not fully aware of the fine details of how it will sound, rather I know that it will work based on my knowledge of music. For me, lines sourced from strategy generated ideas enable me to take a mental break while playing. Additionally, they enable me to play something that provides opportunities for other members in the ensemble to respond to something that I may have played before. A case in point is **example 9**, in this example I didn't have a clear auditory image of how this would sound, rather I played a chord shape that I had played before, knew would work in the improvisation at that point.

**Example 10** shows a single note line sourced from a strategy generated idea. Here I am playing repeated eighth-notes on beats one and three, descending down G mixolydian-mode and then a Bb Mixolydian. Again, playing something that I know will fit the improvisation at that moment, without needing to pre-hear the idea. In this case the idea is based on my knowledge of chord-scale relationships.

**Examples 12 and 13** show chords being played as rhythmic devices. In these examples I am playing learnt shapes; I am playing shapes that I know work over the chord that I am improvising over, details of how the chord sounds are not the central concern, as I know that they will sound correct<sup>56</sup>.

**Examples 11, 14 and 15** are from improvisations on later versions of *My Funny Valentine* and *Green Dolphin Street*. These three examples are of chords being played as a comping device in my improvisations.

## Audiation-Generated Ideas

Examples of audiation generated Ideas can be seen from **example 16** through to **example 23**. All are examples of motives being repeated and/or developed. Lines that stem from this source of idea generation are either heard in my mind moments prior to being played, or are heard while playing and are the result of focussed concentration. The latter case describes

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<sup>56</sup> I know that the notes on the chord will correspond with the chord/scale.

my experience of developing motives during performance. Audiation-generated ideas are also manifested in my playing as non-motivic improvised-lines.

Repeated examination of transcriptions and listening to the performance solos enabled me to reflect on what I played during these improvisations. By doing this I was able to identify moments in the improvisations when I had

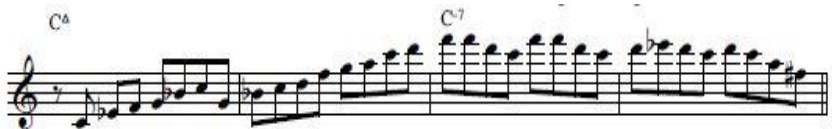

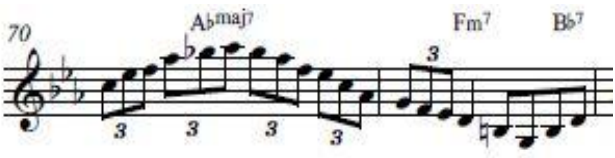
Strategy-generated ideas are manifested in my improvisations in two ways. The first way is by my approach to chords, played when I am comping myself. Such cases are presented in the appendices (Examples of Idea Generation), in examples nine, eleven, fourteen and fifteen. On reflection, I found that while improvising, the chords I play as comping devices are not clearly heard in my mind. Rather, they are physical shapes that have been learnt over the course of many years of practice, and are engaged in my improvisations because the notes found in these chord-shapes aptly fit with the harmony at a particular moment in the piece. The second way that strategy-generated ideas are manifested is both via chordal-soloing and in single-note lines. Cases of this second way can be found in Appendix D2 (number?), in examples ten, twelve and thirteen. In these examples the melodic line often follows (or very closely follows) a segment of an ascending or descending scale or arpeggio<sup>57</sup> via a repeated rhythmic figure.






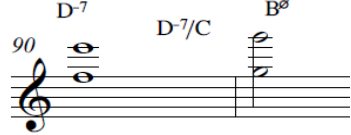
Motor-generated ideas were manifested in my playing as lines that were one to four bars long, and consisted of a string of notes of the same rhythmic value. Examples one to eight in appendix (number?) show these ideas being manifested as either eighth-notes, played at fast tempos (280 beats per minute) or as triplets. When improvising, ideas like these are inserted into my improvisations in order to become more closely aligned with the groove, or to provide a point of climax in the line. They are identified as being unconsciously generated, that is they do not require any conscious, effortful engagement. In my experience, it is as though I momentarily let my fingers lead the improvisation.

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<sup>57</sup> A case in point is example ten, here the line follows first a descending G mixolydian (from bar 89 to 92) and then a Bb mixolydian (from bar 93 to 95).

## APPENDIX H2 – Examples of Different Types of Idea Generation

Example No.	Idea Generation Type:	Examples
Piece/ PHASE	Motor (MG) - red	
Bar No.	Strategy (SG) - blue Audiation (AG) - green	
<b>Example 1</b>		
Green Dolphin Street/ <b>PHASE 1</b>	MG	
Bar 145-149		
<b>Example 2</b>		
Green Dolphin Street/ <b>PHASE 1</b>	MG	
Bar 193-195		
<b>Example 3</b>		
Green Dolphin Street/ <b>PHASE 2</b>	MG	
Bar 68-69		
<b>Example 4</b>		
Green Dolphin Street/ <b>PHASE 2</b>	MG	
Bar 78-80		
<b>Example 5</b>		
My Funny Valentine/ <b>PHASE 1</b>	MG	
Bar 70-71		

<p><b>Example 6</b></p> <p>My Funny Valentine/ <b>PHASE 1</b></p> <p>Bar 83-86</p>	<p>MG</p>	
<p><b>Example 7</b></p> <p>My Funny Valentine/ <b>PHASE 2</b></p> <p>Bar 77-80</p>	<p>MG</p>	
<p><b>Example 8</b></p> <p>My Funny Valentine/ <b>PHASE 2</b></p> <p>Bar 57-59</p>	<p>MG</p>	
<p><b>Example 9</b></p> <p>Green Dolphin Street/<b>PHASE 1</b></p> <p>Bar 81-88</p>	<p>SG</p>	
<p><b>Example 10</b></p> <p>Green Dolphin Street/<b>PHASE 1</b></p> <p>Bar 89-95</p>	<p>SG</p>	
<p><b>Example 11</b></p> <p>Green Dolphin Street/<b>PHASE 2</b></p> <p>Bar 90-91</p>	<p>SG</p>	

<p><b>Example 12</b></p> <p>My Funny Valentine/ PHASE 1</p> <p>Bar 30-32</p>	<p>SG</p>	
<p><b>Example 13</b></p> <p>My Funny Valentine/ PHASE 1</p> <p>Bar 53-60</p>	<p>SG</p>	
<p><b>Example 14</b></p> <p>My Funny Valentine/ PHASE 2</p> <p>Bar 30-32</p>	<p>SG</p>	
<p><b>Example 15</b></p> <p>My Funny Valentine/ PHASE 2</p> <p>Bar 30-32</p>	<p>SG</p>	
<p><b>Example 16</b></p> <p>Green Dolphin Street/PHASE 1</p> <p>Bar 49-60</p>	<p>AG</p>	
<p><b>Example 17</b></p> <p>Green Dolphin Street/PHASE 1</p> <p>Bar 121-124</p>	<p>AG</p>	

### Example 18

Green Dolphin  
Street/**PHASE 4**

Bar 34-40

AG



### Example 19

Green Dolphin  
Street/**PHASE 4**

Bar 34-40

AG



### Example 20

My Funny  
Valentine/  
**PHASE 1**

Bar 74-77

AG

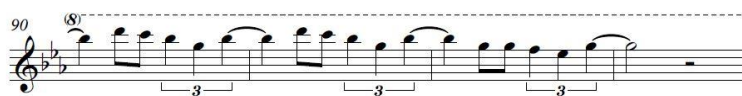


### Example 21

My Funny  
Valentine/  
**PHASE 1**

Bar 51-60

AG



### Example 22

My Funny  
Valentine/  
**PHASE 4**

Bar 1-8

AG



### Example 23

My Funny  
Valentine/  
**PHASE 4**

Bar 51-60

AG



## APPENDIX I – Performance Solos Motivic Development/ Continuity

This written analysis of continuity via motivic development, in the 1st phase performance solo on

**Green Dolphin Street** provides a description of how the different statements of the original motives

(M1, M2 etc....) have been interpreted by the researcher. It is hoped that this description will provide explanations of how the different statements of the motives were understood and thus enable readers to extrapolate from this written description further interpretations of motive developments in other solos.

### Motivic Development – 1st Phase Green Dolphin Street

#### M1

M1 is introduced in bar 1 on 4+. The following two restatements of this motive, M1-2 and M1-3 see the motive fragmented, whereby the first note is omitted. M1-2 also undergoes a rhythmic displacement, beginning on beat three instead of 4+.

M1-4 sees only the second and third notes of the motive played down the octave, thus it is a fragmentation of M1.

M1 undergoes a variation to become M1-5, A similar rhythm is maintained but different notes are played. This similar rhythm is maintained in the first three notes of the motive. This motive contains an augmentation in that the rhythmic value of the third and fourth notes have been enlarged from eighth notes to quarter notes. M1-6 is a restatement and variation on M1-5.

M1-7 sees the conclusion of this motive, it is stated with a variation. The rhythmic value of the last note is diminished, reducing it from a half note to a quarter note. Additionally this statement of the motive is fragmented, in that the very first note has been omitted.

#### M2

M2 begins in Bar 18 on 4+, the playing of the A twice on beats 3 and 3+ is the characteristic aspect of this motive. This part of the motive is prominent in all the developments of this

**motive. The following restatements of this, M2-2, M2-3, M2-4 and M2-5 are a repetition of the second half of the motive. Thus in these restatement M2 has been fragmented.**

**M2-6 sees the fragment of M2 (seen in M2-2), restated and rhythmically displaced, beginning on beat two instead of 1 or 3. Additional material is added to the beginning of the motive in the form of an extra quarter-note. M2-7 begins the same as M2-6, again the element in this development that links it back to M2 is the playing of the two as quarter-notes, in this case on beats 2 and 2+. M2-7 the last two notes in the motive are augmented, enlarging them from eighth notes to quarter-notes. Finally extra material is added to the end of the motive in bar 24 extending the motive.**

#### **M3-M4-M5**

**M3 is stated in bar 74. It is followed by M3-2 which sees the motive undergo a variation. M3-3 the motive is again stated with a variation and additional material is added to the end of the motive.**

**M4 is stated in bar 106 and is derived from the phrase in the bars 108-9. M4-2 and M4-3 are variations on M4, the same rhythmic figure is played with different pitches. M4-4 sees the motive again undergo a variation with the addition of extra material to the end of the motive extending it by a quarter-note.**

**M5 is stated in bar 126, M5-2 and M5-3 are variations on M5 and M5-3 has extra material added to its extending it by a bar , concluding in bar 131.**

# Performance Solo on Green Dolphin Street Phase 1- Motivic Development/Continuity

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...RD	
Augmentation.....	A
Diminution.....	D
Extension.....	E

Motive 1 - M1 ----- M1-2 F/V/RD ----- M1-3 F/V -----

E<sup>-7</sup> A<sup>7</sup> C<sup>Δ</sup> C<sup>-7</sup>

6 D<sup>7</sup>/C M1-4 F ----- D<sup>b</sup>/C M1-5 V/F/A ----- M1-6 V/F/A -----

C<sup>Δ</sup>

10 M1-7 F/V/D ----- D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup>

14 F<sup>-7</sup> B<sup>b</sup><sup>7</sup> E<sup>b</sup><sup>Δ</sup> G<sup>7</sup>

Motive 2 - M2 ----- M2-2 F/V ----- M2-3 F/V ----- M2-4 Fv ----- M2-5 Fv -----

18 C<sup>Δ</sup> C<sup>-7</sup>

M2-6 F/RD/V/E ----- M2-7 F/A/E -----

22 D<sup>7</sup>/C D<sup>b</sup>/C C<sup>Δ</sup>

26 D<sup>-7</sup> D<sup>-7</sup>/C B<sup>ø</sup> E<sup>7</sup> A<sup>-7</sup> A<sup>-7</sup>/G F<sup>#</sup> B<sup>7</sup>

30 E<sup>-7</sup> A<sup>-7</sup> D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>-7</sup> gliss. G<sup>7</sup>

34 C<sup>Δ</sup> C<sup>-7</sup>

38  $D^7/C$   $D^b/C$   $C^\Delta$

42  $D^{-7}$   $G^7$   $C^\Delta$

46  $F^{-7}$   $B^b7$   $E^b\Delta$   $G^7$

50  $C^\Delta$   $C^{-7}$

54  $D^7/C$   $D^b/C$   $C^\Delta$

58  $D^{-7}$   $D^{-7}/C$   $B^\emptyset$   $E^7$   $A^{-7}$   $A^{-7}/G$   $F^\#^\emptyset$   $B^7$

62  $E^{-7}$   $A^{-7}$   $D^{-7}$   $G^7$   $C^\Delta$   $D^{-7}$   $G^7$

66  $C^\Delta$   $C^{-7}$

70  $D^7/C$   $D^b/C$   $C^\Delta$

Motive 3 - M3 --- M3-2 V ----- M3-3 V/E -----

74  $D^{-7}$   $G^7$   $C^\Delta$

78  $F^{-7}$   $B^b7$   $E^b\Delta$   $G^7$

82  $C^\Delta$   $C^{-7}$

86  $D^7/C$   $D\flat/C$   $C^\Delta$

90  $D^{-7}$   $D^{-7}/C$   $B^\emptyset$   $E^7$   $A^{-7}$   $A^{-7}/G$   $F^\sharp\emptyset$   $B^7$

94  $E^{-7}$   $A^{-7}$   $D^{-7}$   $G^7$   $C^\Delta$   $D^{-7}$   $G^7$

98  $C^\Delta$   $C^{-7}$

102  $D^7/C$   $D\flat/C$   $C^\Delta$   $8^{va}$

Motive 4 - M4 ----- M4-2 V -----

106  $D^{-7}$   $G^7$   $C^\Delta$

M4-3 V ----- M4-4 V/E -----

110  $F^{-7}$   $B\flat^7$   $E\flat^\Delta$   $G^7$

114  $C^\Delta$   $C^{-7}$

118  $D^7/C$   $D^{-7}$   $D^{-7}/C$   $B^\emptyset$   $E^7$   $A^{-7}$   $A^{-7}/G$   $F^\sharp\emptyset$   $B^7$

122  $8^{va}$

Motive 5 - M5 ----- M5-2 V ----- M5-3 V/E -----

126 E<sup>-7</sup> A<sup>-7</sup> D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup>

130 C<sup>Δ</sup> C<sup>-7</sup>

134 D<sup>7</sup>/C D<sup>b</sup>/C C<sup>Δ</sup>

138 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> G<sup>7</sup>

142 F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup> G<sup>7</sup>

146 C<sup>Δ</sup> C<sup>-7</sup>

Motive 6 - M6 -- M6-2 V/E ----- M6-3 V/E ----- M6-4 V/A -----

150 D<sup>7</sup>/C D<sup>b</sup>/C C<sup>Δ</sup>

154 D<sup>-7</sup> D<sup>-7</sup>/C B<sup>∅</sup> E<sup>7</sup> A<sup>-7</sup> A<sup>-7</sup>/G F<sup>#∅</sup> B<sup>7</sup>

158 E<sup>-7</sup> A<sup>-7</sup> D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup>

162 C<sup>Δ</sup> C<sup>-7</sup>

D<sup>-7</sup>

Performance Solo on Green Dolphin Street Phase 4 - Motivic Development/Continuity

Variation.....V  
 Fragmentation.....F  
 Rhythmic Displacement...RD  
 Augmentation.....A  
 Diminution.....D  
 Extension.....E

Motive 1 - M1 ----- M1-2 V -----

**A** C<sup>Δ</sup>

M1-3 V/F/A -----

D<sup>7</sup>/C D<sup>b</sup>Δ/C

Motive 2 - M2 -- C<sup>Δ</sup> M2-2 V ----- C<sup>Δ</sup>

M2-3 V ----- M2-4 V ----- M2-5 V ----- M2-6 V -----

D<sup>7</sup> G<sup>7</sup> C<sup>Δ</sup> C<sup>Δ</sup>

M2-7 V ----- M2-8 V ----- M2-9 V -----

15 F<sup>7</sup> B<sup>b</sup>7 E<sup>b</sup>Δ G<sup>7</sup>

**B**

19 C<sup>Δ</sup> C<sup>7</sup>

Motive 3 - M3 ---- M3-2 V/RD ----- M3-2 V -----

23 D<sup>7</sup>/C D<sup>b</sup>Δ/C C<sup>Δ</sup>

27 D<sup>7</sup> D<sup>7</sup>/C B<sup>ø</sup> E<sup>7</sup> A<sup>7</sup> A<sup>7</sup>/G F<sup>#</sup> B<sup>7</sup>

Motive 4 - M4 ---- M4-2 V ----- M4-3 V/A/E -----

31 E<sup>7</sup> A<sup>7</sup> D<sup>7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>7</sup> G<sup>7</sup>

M4-4 V/E ----- M4-5 F/V/E -----

35 **A** C<sup>Δ</sup> C<sup>-7</sup>

M4-6 V ----- M4-7 V ----- M4-8 V ----- M4-9 F/V M4-10 F/V --

39 D<sup>7</sup>/C D<sup>bΔ</sup>/C C<sup>Δ</sup> C<sup>Δ</sup>

M4-11 V -- M4-12 V -- M4-13 V -- M4-14 V -----

43 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> C<sup>Δ</sup>

Motive 5 can be thought of as a variation on Motive 4. It can be viewed as the last fragment of M4 played backwards.

Motive 5 - M5 M5-2 ---

47 F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup> G<sup>7</sup>

M5-3 V/RD --- M5-4 V --- M5-6 V/RD --- M5-7 V/RD/E --- M5-8 V/RD/E -

51 **B** C<sup>Δ</sup> C<sup>-7</sup>

D<sup>7</sup>/C D<sup>bΔ</sup>/C C<sup>Δ</sup>

55

59 D<sup>-7</sup> D<sup>-7</sup>/C B<sup>∅</sup> E<sup>7</sup> A<sup>-7</sup> A<sup>-7</sup>/G F<sup>#∅</sup> B<sup>7</sup>

Motive 6 - M6 M6-2 V/RD M6-3 V/RD M6-4 V/RD M6-5 V -----

63 E<sup>-7</sup> A<sup>7</sup> D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>-7</sup> G<sup>7</sup>

67 **A** C<sup>Δ</sup> C<sup>-7</sup> 8<sup>va</sup>

71 (8) D<sup>7</sup>/C D<sup>bΔ</sup>/C C<sup>Δ</sup>

75 (8) D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> C<sup>Δ</sup>

79 (8) F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup> G<sup>7</sup>

**B**

83 C<sup>Δ</sup> Motive 7 - M7 ----- M7-2 -----

M7-2 V/E -----

87 D<sup>7/C</sup> D<sup>bΔ/C</sup> C<sup>Δ</sup>

91 D<sup>-7</sup> D<sup>-7/C</sup> B<sup>ø</sup> E<sup>7</sup> A<sup>-7</sup> A<sup>-7/G</sup> F<sup>#ø</sup> B<sup>7</sup>

95 E<sup>-7</sup> A<sup>7</sup> D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>-7</sup> G<sup>7</sup>

**A**

99 C<sup>Δ</sup>

# Performance Solo on My Funny Valentine Phase 1 - Motivic Development

Variation.....V  
 Fragmentation.....F  
 Rhythmic Displacement...RD  
 Augmentation.....A  
 Diminution.....D  
 Extension.....E

The musical score is written in 4/4 time with a key signature of two flats (Bb and Eb). It consists of nine staves of music, each with a measure number at the beginning. The notes are primarily eighth and sixteenth notes, often grouped in triplets. Chord symbols are placed above the staff at various points, indicating the harmonic structure. The score includes various musical notations such as slurs, ties, and dynamic markings.

Measure numbers: 6, 10, 14, 18, 22, 26, 30, 34, 38.

Chord symbols: Cm, Cm(maj7), Cm7, Cm6, Abmaj7, Fm7, Dm7(b5), G7(b9), Ebmaj7, Gm7, Bb7, Dm7(b9), G7(b9), Cm7, Fm7, Gm7, Ebmaj7, Cm7, Abmaj7, Dm7(b5), G7(b9), Cm7, Fm7, Bb7, Ebmaj7, Dm7(b5), G7(b9), Cm7, Cm6.

Motive 1 - M1 - M1-2 V/RD - M1-3 V/RD - M1-4 V/RD -

42  $A\flat\text{maj}7$   $Fm7$   $Dm7(b5)$   $G7(b9)$

46  $Cm$   $Cm(maj7)$   $Cm7$   $Cm^6$

50  $A\flat\text{maj}7$   $Fm7$   $Cm7$   $Fm7$   $B\flat7$

54  $E\flat\text{maj}7$   $Fm7$   $Fm7$   $E\flat\text{maj}7$   $Gm7$   $Fm7$

58  $E\flat\text{maj}7$   $G7$   $Cm7$   $A\flat\text{maj}7$   $Dm7(b5)$   $G7(b9)$

62  $Cm$   $Cm(maj7)$   $Cm7$   $Cm^6$

66  $A\flat\text{maj}7$   $Dm7(b5)$   $G7(b9)$   $Cm7$

70  $A\flat\text{maj}7$   $Fm7$   $B\flat7$   $E\flat\text{maj}7$   $Dm7(b5)$   $G7(b9)$

Motive 2 - M2 ----

M2-2 V/F ---

M2 -3 V/E/RD -----

74  $Cm$   $Cm(maj7)$   $Cm7$   $Cm^6$

78  $A\flat\text{maj}7$   $Fm7$   $Dm7(b5)$   $G7(b9)$

82  $Cm$   $Cm(maj7)$   $Cm7$   $Cm^6$

86  $A\flat\text{maj}7$   $Fm7$   $Cm7$  Motive 3 - M3 -----  
 $Fm7$   $B\flat7$   $8^{va}$  3

M3-2 ----- M2-3 ----- M2-4 V -----  
 90  $E\flat\text{maj}7$   $Fm7$   $Gm7$   $Fm7$   $E\flat\text{maj}7$   $Fm7$   $Gm7$   $Fm7$  3 3 3

94  $E\flat\text{maj}7$   $G7$   $Cm7$   $A\flat\text{maj}7$   $Dm7(b5)$   $G7(b9)$  3 3 3

98  $Cm$   $Cm(maj7)$   $Cm7$   $Cm6$

102  $A\flat\text{maj}7$   $Dm7(b5)$   $G7(b9)$   $Cm7$

106  $A\flat\text{maj}7$   $Fm7$   $B\flat7$   $E\flat\text{maj}7$   $Dm7(b5)$   $G7(b9)$

110

# Performance Solo on My Funny Valentine Phase 4 - Motivic Development

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...RD	
Augmentation.....	A
Diminution.....	D
Extension.....	E

Motive 1 - M1 ----- M1-2 ----- M1-3 A/E----- M1- 4 V/A/E-

**A** C- C-<sup>Δ</sup>/B C-<sup>7</sup>/B<sup>b</sup> C-<sup>7</sup>/A

--- (cont.)- M1-5 V/RD/F --- M1-5 V/F/E -----

5 A<sup>b</sup>Δ F-<sup>7</sup> D<sup>∅</sup> G<sup>7</sup>

M1-6 F/V/E ----- M1-7 F/V/E -----

9 C- C-<sup>Δ</sup>/B C-<sup>7</sup>/B<sup>b</sup> C-<sup>7</sup>/A

M1- 8 V/A/E -----

13 A<sup>b</sup>Δ F-<sup>7</sup> F<sup>∅</sup> B<sup>b</sup>7

**B** M1- 9 F/E----- M1- 10 F/E/V ----- M1- 10 F/E/V -----

17 E<sup>b</sup>Δ F-<sup>7</sup> G-<sup>7</sup> F-<sup>7</sup> E<sup>b</sup>Δ F-<sup>7</sup> G-<sup>7</sup> F-<sup>7</sup>

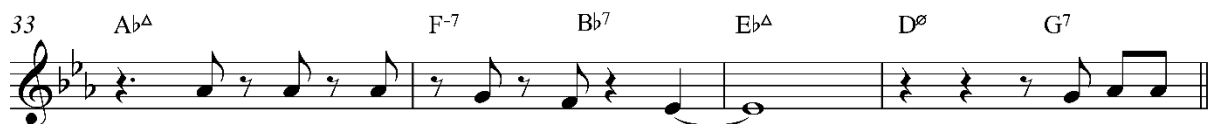
21 E<sup>b</sup>Δ D<sup>∅</sup> G<sup>7</sup> A<sup>b</sup>Δ D<sup>∅</sup> G<sup>7</sup>

**C** 8<sup>va</sup>-----

25 C- C-<sup>Δ</sup>/B C-<sup>7</sup>/B<sup>b</sup> C-<sup>7</sup>/A

29 A<sup>b</sup>Δ D<sup>∅</sup> G<sup>7</sup> C-<sup>7</sup> B-<sup>7</sup> B<sup>b</sup>-<sup>7</sup> A-<sup>7</sup>

Motive 2 - M3 ---



---- (cont) M2 ----- M2-2 F/RD ----- M2-3 F/RD ----- M2-4 F/RD/V ---



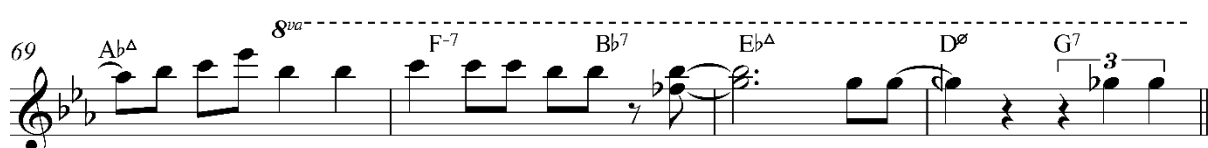
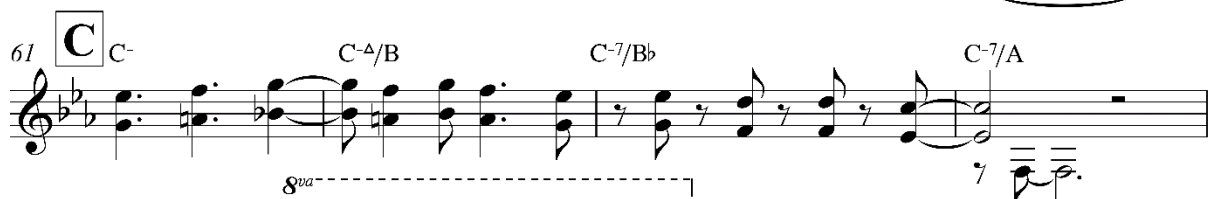
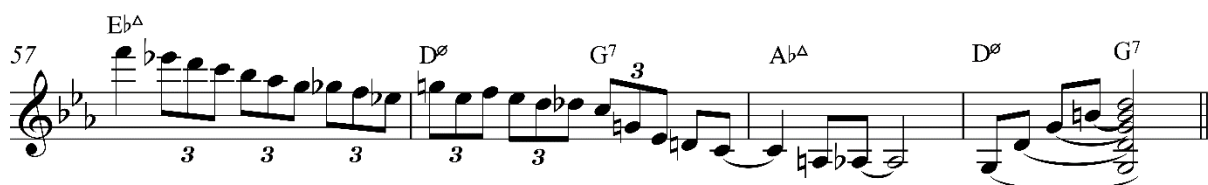
M2-5 E/V/RD -----



Motive 3 - M3 --- M3-2 V ----- M3-3 V/E -----



**B** Motive 4 - M4 --- M4-2 V ----- M4-3 V -----



73 **A** (8)  $8^{va}$

C- C-<sup>Δ</sup>/B F-7 D<sup>∅</sup> C-7/B<sup>b</sup> C-7/A G7

77 (8) A<sup>b</sup>Δ

Motive 5 - M5 ---- M5-2 RD/A ----- M5-3 RD/E -----

81 C- C-<sup>Δ</sup>/B C-7/B<sup>b</sup> 3 C-7/A

Motive 6 - M6 ----

85 A<sup>b</sup>Δ F-7 F<sup>∅</sup> B<sup>b</sup>7  $8^{va}$  3

--- (cont) M6--- M6-2 ----- M6-3 ----- M6-4 ----- M6-4 V/A/E -----

89 **B**  $8^{va}$

E<sup>b</sup>Δ F-7 G-7 F-7 E<sup>b</sup>Δ F-7 G-7 F-7

93  $8^{va}$

E<sup>b</sup>Δ D<sup>∅</sup> G7 A<sup>b</sup>Δ D<sup>∅</sup> G7

97 **C** C- C-<sup>Δ</sup>/B C-7/B<sup>b</sup> C-7/A

Motive 7 - M7 ---- M7-2 V ----- M7-3 V/D ----- M7-4 V/RD/D-

101 A<sup>b</sup>Δ D<sup>∅</sup> G7 C-7 B-7 B<sup>b</sup>-7 A-7

--- (cont) --- M7-5 V/RD/D -- M-6 V/RD/D - M7-7 V -----

105 A<sup>b</sup>Δ F-7 B<sup>b</sup>7 E<sup>b</sup>Δ D<sup>∅</sup> G7

109 **A** C-7

# APPENDIX 5 - Performance Solo on You'd Be So Nice to Come Home To - Motivic Development

Variation.....V
Fragmentation.....F
Rhythmic Displacement...RD
Augmentation.....A
Diminution.....D
Extension.....E

**A** G<sup>-7</sup> A<sup>ø7</sup> D<sup>7</sup> G<sup>-7</sup> G<sup>-7</sup>

Motive 1 - M1----- M1 V/E -----

5 F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup>

M1 V/E ----- M1 V/E -----

9 A<sup>ø7</sup> D<sup>7</sup> A<sup>ø7</sup> D<sup>7</sup> G<sup>-7</sup> G<sup>-7</sup>/F

M1 V/D ----- M1 V/A -----

13 E<sup>ø</sup> E<sup>b7</sup> A<sup>b7</sup> A<sup>ø</sup> D<sup>7</sup>

**B** M1 V/A ----- M1 V/A -----

17 G<sup>-7</sup> A<sup>ø7</sup> D<sup>7</sup> G<sup>-7</sup> G<sup>-7</sup>

M1\* A/V ----- M1\* A/V -----

21 F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup>

M1\* A/V ----- M1\* A/V -----

25 E<sup>ø</sup> B<sup>b7</sup> A<sup>ø7</sup> D<sup>7</sup> G<sup>-7</sup>

29 C<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> B<sup>bΔ</sup> A<sup>ø</sup> D<sup>7</sup>

**C** Motive 2 - M1-- M2 V/RD -----

33 G<sup>-7</sup> A<sup>ø7</sup> D<sup>7</sup> G<sup>-7</sup> G<sup>-7</sup>

\*Variation on five note groupings in bars 9, 11 and 15

M2 V/RD (cont.) -----

37 F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup> 3 3 3 3

41 A<sup>-7</sup> D<sup>7</sup> 3 3 A<sup>ø7</sup> D<sup>7</sup> G<sup>-7</sup> G<sup>-7/F</sup>

45 E<sup>ø</sup> E<sup>b7</sup> A<sup>b7</sup> A<sup>ø</sup> D<sup>7</sup>

**D**

Motive 3 - M3--

M3 - V -----

M3 - V/E -----

49 G<sup>-7</sup> D<sup>7</sup> G<sup>-7</sup> G<sup>-7</sup>

M3 - V/E -----

M3 - V/RD/E -----

53 F<sup>-7</sup> B<sup>bΔ</sup> E<sup>bΔ</sup>

57 E<sup>ø</sup> B<sup>b7</sup> A<sup>ø7</sup> D<sup>7</sup> G<sup>-7</sup> 8<sup>va</sup>

61 C<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> B<sup>bΔ</sup> A<sup>ø</sup> D<sup>7</sup>

**E**

65 G<sup>-7</sup> A<sup>ø7</sup> D<sup>7</sup> G<sup>-7</sup> G<sup>-7</sup> 8<sup>va</sup>

69 F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup> E<sup>bΔ</sup>

73 A<sup>-7</sup> D<sup>7</sup> A<sup>ø7</sup> D<sup>7</sup> G<sup>-7</sup> G<sup>-7/F</sup>

77 E<sup>ø</sup> E<sup>b7</sup> A<sup>b7</sup> A<sup>ø</sup> D<sup>7</sup>

81  $G^{-7}$  **F**  $D^7$   $G^{-7}$   $G^{-7}$

85  $F^{-7}$   $Bb^{\Delta}$   $Eb^{\Delta}$   $Eb^{\Delta}$

89  $E^{\circ}$   $Bbmaj7$   $A^{\circ 7}$   $D^7$   $G^{-7}$

93  $C^7$   $C^{-7}$   $F^7$   $Bb^{\Delta}$   $A^{\circ}$   $D^7$

97 **G**  $G^{-7}$   $A^{\circ 7}$   $D^7$   $G^{-7}$   $G^{-7}$

101  $F^{-7}$   $Bb^7$   $Eb^{\Delta}$   $Eb^{\Delta}$

105  $A^{-7}$   $D^7$   $A^{\circ 7}$   $D^7$   $G^{-7}$   $G^{-7}/F$

109  $E^{\circ}$   $Ebm^7$   $Ab^7$   $A^{\circ}$   $D^7$

113  $G^{-7}$   $D^7$   $G^{-7}$   $G^{-7}$

117  $F^{-7}$   $Bb^{\Delta}$   $Eb^{\Delta}$   $Eb^{\Delta}$

121  $E^{\circ}$   $Bbmaj7$   $A^{\circ 7}$   $D^7$   $G^{-7}$

(8) -----|

125 C<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> B<sup>b</sup>Δ A<sup>∅</sup> D<sup>7</sup>

# APPENDIX 4 - Performance Solo on You Stepped Out of a Dream - Motivic Development

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...	RD
Augmentation.....	A
Diminution.....	D
Extension.....	E

**A** Motive 1 - M1----- M1 - V/RD/E-----

5  $Bb^{-7}$   $Eb^7$   $Ab^{\Delta}$   $Db^{\Delta}$

M1 - F/D-----

9  $G^{-7}$   $C^7$   $F^{\Delta}$

M1 - F/V-----

13  $A^{-7}$   $D^7$   $Eb^{-7}$   $Ab^7$   $D^{-7}$   $G^7$

**B** Motive 2 - M2----- M2 - V/E/A-----

17  $C^{\Delta}$   $Db^{\Delta}$

21  $Bb^{-7}$   $Eb^7$   $Gb^7$   $F^7$

tremolo bar bend....

25  $D^{\circ 7}$   $G^7$   $E^{-7}$   $A^7$

Motive 3 - M3----- M3 F-----

29  $D^{-7}$   $G^7$   $C^{\Delta}$   $D^{-7}$   $G^7$

**C** M2 - V/E -----

33  $C^\Delta$   $D\flat^\Delta$

M2 - F -----

37  $B\flat^7$   $E\flat^7$   $A\flat^\Delta$

41  $G^7$   $C^7$   $F^\Delta$

45  $A^7$   $D^7$   $E\flat^7$   $A\flat^7$   $D^7$   $G^7$   $8^{va}$ -----

**D** M3 - V/E-----

49 (8)  $C^\Delta$   $D\flat^\Delta$

53 (8)  $B\flat^7$   $E\flat^7$   $G\flat^7$   $F^7$

Motive 4 - M4 ----- M4 - V ----- M4 - V -----

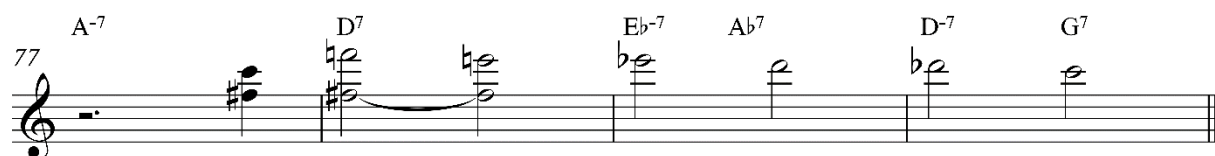
57  $D^{\circ 7}$   $G^7$   $E^7$   $A^7$

---- (cont.) M4 - V -----

61  $D^7$   $G^7$   $C^\Delta$   $D^7$   $G^7$

**E**  $C^\Delta$   $D\flat^\Delta$

65



109 A<sup>-7</sup> D<sup>7</sup> Eb<sup>-7</sup> Ab<sup>7</sup> D<sup>-7</sup> G<sup>7</sup>

113 **H** C<sup>Δ</sup> Db<sup>Δ</sup>

117 Bb<sup>-7</sup> Eb<sup>7</sup> Gb<sup>7</sup> F<sup>7</sup>

Motive 5 - M5 -----

121 D<sup>ø7</sup> G<sup>7</sup> E<sup>-7</sup> A<sup>7</sup>

M5 - V ----- M5 - V/E -----

125 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>-7</sup> G<sup>7</sup>

129 **I** M5 - F/V ----- C<sup>Δ</sup> Db<sup>Δ</sup>

133 Bb<sup>-7</sup> Eb<sup>7</sup> Ab<sup>Δ</sup>

137 G<sup>-7</sup> C<sup>7</sup> F<sup>Δ</sup>

141 A<sup>-7</sup> D<sup>7</sup> Eb<sup>-7</sup> Ab<sup>7</sup> D<sup>-7</sup> G<sup>7</sup>

145 C<sup>Δ</sup> **J** Db<sup>Δ</sup>

149 Bb<sup>-7</sup> Eb<sup>7</sup> Gb<sup>7</sup> F<sup>7</sup>

D<sup>ø7</sup>



# Performance Solo on Yesterdays - Motivic Development/Continuity

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...RD	
Augmentation.....	A
Diminution.....	D
Extension.....	E

**A** Motive 1 - M1----- M1 - V ----- M1 - V/E -----

D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup> D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup>

M1 - V/E ----- M1 - F -----

5 D<sup>-7</sup> D<sup>-7</sup>/C<sup>#</sup> D<sup>-7</sup>/C B<sup>∅</sup> 3 E<sup>7</sup>

**B** 9 A<sup>7</sup> D<sup>7</sup> G<sup>7</sup> C<sup>7</sup>

13 C<sup>-7</sup> F<sup>7</sup> B<sup>b</sup>A<sup>∆</sup> E<sup>b</sup>A<sup>∆</sup> E<sup>∅</sup> A<sup>7</sup>

**C** 17 D<sup>-7</sup> E<sup>∅</sup> 3 A<sup>7</sup> 3 D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup>

21 D<sup>-7</sup> D<sup>-7</sup>/C<sup>#</sup> D<sup>-7</sup>/C B<sup>∅</sup> E<sup>7</sup>

**D** 25 A<sup>7</sup> D<sup>7</sup> G<sup>7</sup> C<sup>7</sup> 3

29 C<sup>-7</sup> F<sup>7</sup> B<sup>b</sup>A<sup>∆</sup> 3 E<sup>b</sup>A<sup>∆</sup> E<sup>∅</sup> A<sup>7</sup>

33 D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup>

**E**

35 D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup> D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup>

**F**

39 D<sup>-7</sup> D<sup>-7</sup>/C<sup>#</sup> D<sup>-7</sup>/C E<sup>∅</sup> E<sup>7</sup>

Motive 2 - M2 ----- M2 - V/E -----

43 A<sup>7</sup> D<sup>7</sup> G<sup>7</sup> C<sup>7</sup>

M2 - V/F ----- M2 - V/F -----

47 C<sup>-7</sup> F<sup>7</sup> B<sup>b</sup>Δ E<sup>b</sup>Δ E<sup>∅</sup> A<sup>7</sup>

**G** D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup> D<sup>-7</sup> E<sup>∅</sup>

Motive 3 - M3 M3 - V/RD M3 - V/RD M3 - V ----- M3 - V M3 - V/RD M3 - V ----- A<sup>7</sup>

51

D<sup>-7</sup> D<sup>-7</sup>/C<sup>#</sup> D<sup>-7</sup>/C B<sup>∅</sup> E<sup>7</sup>

M3 - V/E M3 - V/E M3 - V

55

**H** A<sup>7</sup> D<sup>7</sup> G<sup>7</sup>

59

62 C<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> B<sup>b</sup>Δ E<sup>b</sup>Δ

65 E<sup>∅</sup> A<sup>7</sup>

67 D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup>

# I

69 D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup> D<sup>-7</sup> E<sup>∅</sup> A<sup>7</sup>

73 D<sup>-7</sup> D<sup>-7</sup> C<sup>#</sup> D<sup>-7</sup> C<sup>#</sup> B<sup>∅</sup> E<sup>7</sup>

# J

77 A<sup>7</sup> D<sup>7</sup> G<sup>7</sup> C<sup>7</sup>

81 C<sup>-7</sup> F<sup>7</sup> B<sup>b</sup>Δ E<sup>b</sup>Δ E<sup>∅</sup> A<sup>7</sup>

85 K D<sup>-7</sup> Bass Solo

# Performance Solo on Invitation Phase 3 - Motivic Development/Continuity

Variation.....V  
 Fragmentation.....F  
 Rhythmic Displacement...RD  
 Augmentation.....A  
 Diminution.....D  
 Extension.....E

**A**

Motive 1 - M1----- M1 - V-----

C<sup>-7</sup>

M1 - V/F/RD----- M1 - V/F/E-----

6 C<sup>-7</sup> F<sup>7</sup> B<sup>b</sup>7(b9)

10 E<sup>b</sup>-7

14 E<sup>b</sup>-7 A<sup>b</sup>7 D<sup>b</sup>7(b9)

**B**

Motive 2 - M2----- M2 - V-----

Db<sup>-7</sup> G<sup>b</sup>7 Bm<sup>7</sup>

M2 - V/F----- M2 - V-----

18 Bm<sup>7</sup> E<sup>7</sup> A<sup>-7</sup>

22 M2 - V/F/D M2 - V/F/D M2 - V/F/D M2 - V/F/D M2 - V/F/A M2 - V/F/A

26 A<sup>-7</sup> D<sup>7</sup> G<sup>-7</sup>

30 E<sup>b</sup>7 Em<sup>7</sup>(b5) D<sup>7</sup> G<sup>7</sup>

34 **C** C<sup>-7</sup>      /      /      /

Motive 3 - M3 ----- M3 - V/RD ----- M3 - V/RD ----- M3 - V/RD/E -----

38 C<sup>-7</sup> F<sup>7</sup> B<sup>b7(b9)</sup>      /

M3 - V/RD/E -----

42 E<sup>b-7</sup> B<sup>7</sup>      /

46 F<sup>ø</sup> B<sup>b7</sup> E<sup>b-Δ</sup> D<sup>ø</sup> G<sup>7</sup>

Motive 4 - M4- M4 - V ----- M4 - V ----- M4 - V ----- M4 - V/E -----

50 **D** C<sup>-7</sup>      /      /      /

M4 - V/E ----- M4 - F/E -----

54 F<sup>7</sup> B<sup>b7</sup>      /


Motive 5 - M5 ---- M5 - V/RD/E ----- M5 - V ----- M5 - V -----

58 E<sup>b-7</sup>      /      /      /

M5 ----- M5 - V ----- M5 - V ----- M5 - V -----

62 E<sup>b-7</sup> A<sup>b7</sup> D<sup>b7(b9)</sup>      /

**E**

66 

M5 - V/E ----- M5 - V/E -----

[illegible]

74 M5 - V/E ----- A<sup>-7</sup> M5 - V/E ----- D<sup>7</sup> M5 - V/E/A ----- G<sup>-7</sup>

M5 - V/E/A ----- M5 - V/E/A -----

78 Eb<sup>7</sup> Em<sup>7(b5)</sup> D<sup>7</sup> G<sup>7</sup>

3 3 3 3 3 3 3 3

**F**

M5 - V/E/A -----

M5 - V/E/A -----

The first system of the musical score for 'The Girl on the Train' is written on a single staff. It begins with a treble clef and a key signature of one flat (B-flat). The tempo is marked 'Moderato'. The first measure is a whole note chord of C7. This is followed by two measures of eighth notes, each beamed in groups of three. The third measure is a whole note chord of C7. The fourth measure is a whole note chord of C7. The fifth measure is a whole note chord of C7. The sixth measure is a whole note chord of C7. The seventh measure is a whole note chord of C7. The eighth measure is a whole note chord of C7. The ninth measure is a whole note chord of C7. The tenth measure is a whole note chord of C7. The system ends with a double bar line.

M5 - V/E/A -----

C-7 F7 Bb7(b9)

86



121  $\frac{3}{4}$  A<sup>-7</sup> D<sup>7</sup> G<sup>-7</sup>

125  $\frac{3}{4}$  Eb<sup>7</sup> Ebm<sup>7(b5)</sup> D<sup>7</sup> G<sup>7</sup>

**I**  
Motive 6 - M6 C<sup>-7</sup> M6 - V/RD --- M6 - V/RD/E ----- M6 - V/RD ---

130  $\frac{3}{4}$

M6 - V/RD/A/E ----- F<sup>7</sup> Bb<sup>7(b9)</sup> M6 - V/RD/A -----

134  $\frac{3}{4}$

M6 - V ----- Eb<sup>-7</sup> B<sup>7</sup>

138  $\frac{3}{4}$

142 F<sup>ø</sup> Bb<sup>7</sup> Eb<sup>-Δ</sup> D<sup>ø</sup> G<sup>7</sup> **J** C<sup>-7</sup> Into Bass Solo

# Performance Solo on Skating in Central Park Phase 3 - Motivic Development/Continuity

Variation.....V  
Fragmentation.....F  
Rhythmic Displacement...RD  
Augmentation.....A  
Diminution.....D  
Extension.....E

## Double Motive Phrase -----

**A**  $A\flat^{\Delta}$   $B\flat m^7$   $E\flat^7$   $A\flat^{\Delta}$   $\text{}/$

Motive 1 -M1 - V/F ----- M1 - V/F -----

5  $B\flat m^7$   $E\flat^7$   $A\flat^{\Delta}$   $D^7$

M1 - V/D/E----- M1 - F/E -----

9  $D\flat^{\Delta}$   $G^7$   $C^{-7}$   $F7(b9)$

---(M1 - F/E) -----

13  $B\flat^{-7}$   $E\flat^7$   $A\flat^{\Delta}$   $E\flat^7$

**B**

M1 - F ----- M1 - F ----- M1 - F -----

17  $A\flat^{\Delta}$   $B\flat m^7$   $E\flat^7$   $A\flat^{\Delta}$   $\text{}/$

M1 - V/F/E ----- M1 - V/F/E/RD -----

21  $B\flat m^7$   $E\flat^7$   $A\flat^{\Delta}$   $D^7$

M1 - F/V ----- M1 - F/V -----

25  $D\flat^{\Delta}$   $G^7$   $C^{-7}$   $F7(b9)$

29  $B\flat^{-7}$   $E\flat^7$   $A\flat^{\Delta}$   $\text{}/$

33  $\text{Db}^{-7}$  **C**  $\text{Db}^{-7}/\text{C}$   $\text{Dbm}^7/\text{B}$   $\text{Bb}^{\circ}$  ( $\text{Gb}^7$ )

37  $\text{B}^{\Delta}$   $\text{B}^{\Delta}/\text{A}^{\#}$   $\text{Bmaj}^7/\text{G}^{\#}$   $\text{Bmaj}^7/\text{F}^{\#}$

M1 - V/F/D ----- M1 - V/F/D -- M1 - V/F/D -----  
 Motive 2 - M2----- M2 - D ---- M2 - E -----

41  $\text{Fm}^7(\text{b}5)$   $\text{Bb}^7(\text{b}9)$

M2 - V ----- M2 - V/D ---- M2 - V/E -----

45  $\text{Db}^{-7}$   $\text{Dbm}^7/\text{B}$   $\text{Bb}^{\circ}$   $\text{Eb}^7$

M2 - V/D (repeated) -----

49 **D**  $\text{Ab}^{\Delta}$   $\text{Bbm}^7$   $\text{Eb}^7$   $\text{Ab}^{\Delta}$

M2 - V/D (repeated) ----- M2 - V/D (repeated) ---

53  $\text{Bbm}^7$   $\text{Eb}^7$   $\text{Ab}^{\Delta}$   $\text{D}^7$

57  $\text{Db}^{\Delta}$   $\text{G}^7$   $\text{C}^{-7}$   $\text{F}^7(\text{b}9)$

61  $\text{Bb}^{-7}$   $\text{Eb}^7$   $\text{Ab}^{\Delta}$   $\text{Eb}^7$

65  $\text{Ab}^{\Delta}$  **E**  $\text{Eb}^7$   $\text{Ab}^{\Delta}$

69  $Bbm^7$   $Eb^7$   $Ab^\Delta$   $D^7$

73  $Db^\Delta$   $G^7$   $C^{-7}$   $F^7(b9)$

77  $Bb^{-7}$   $Eb^7$   $Ab^\Delta$   $Eb^7$

81 **F**  $Ab^\Delta$   $Bbm^7$   $Eb^7$   $Ab^\Delta$   $\text{Coda}$

85  $Bbm^7$   $Eb^7$   $Ab^\Delta$   $D^7$

Motive 3 - M3-----

89  $Db^\Delta$   $G^7$   $C^{-7}$   $F^7(b9)$

M3 - V-----

93  $Bb^{-7}$   $Eb^7$   $Ab^\Delta$   $Ab^7$

M3 - F/V/E-----

Motive 4 - M4-----

97  $Db^{-7}$  **G**  $Db^{-7}/C$   $Db^{-7}/Cb$   $Bb^\emptyset$

M4 - V/F-----

101  $B^\Delta$   $B^\Delta/A^\sharp$   $Bmaj^7/G^\sharp$   $Bmaj^7/F^\sharp$

M4 - V/D-----

105  $Fm^7(b5)$   $\text{Coda}$   $Bb^7(b9)$   $\text{Coda}$

M4 - V/RD/F/E-----

M4 - V/RD/F/E -----

109  $D\flat m^7$   $D\flat m^7/B$   $B\flat\emptyset$   $E\flat^7$

Motive 5 - M5----- M5----- M5 - D/E-----

113 **H**  $A\flat^\Delta$   $B\flat m^7$   $E\flat^7$   $A\flat^\Delta$   $\text{‰}$

M5 - V/D/E-----

117  $B\flat m^7$   $E\flat^7$   $A\flat^\Delta$   $D^7$

121  $D\flat^\Delta$   $G^7$   $C^{-7}$   $F^7(b9)$

125  $B\flat^{-7}$   $E\flat^7$   $A\flat^\Delta$   $E\flat^7$

129 **I**  $A\flat^\Delta$   $B\flat m^7$   $E\flat^7$   $A\flat^\Delta$   $\text{‰}$

Motive 6 - M6----- M6----- M6 V/A/F-----

133  $B\flat m^7$   $E\flat^7$   $A\flat^\Delta$   $D^7$

M6 V/A/F----- M6 V/A/F/E-----

137  $D\flat^\Delta$   $G^7$   $C^{-7}$   $F^7(b9)$

141  $B\flat^{-7}$   $E\flat^7$   $A\flat^\Delta$   $E\flat^7$

145 **J**  $A\flat^\Delta$   $B\flat m^7$   $E\flat^7$   $A\flat^\Delta$   $\text{‰}$

149  $Bbm^7$   $Eb^7$   $Ab^\Delta$   $D^7$

153  $Db^\Delta$   $G^7$   $C^{-7}$   $F^7(b9)$

157  $Bb^{-7}$   $Eb^7$   $Ab^\Delta$   $Ab^7$

**K**

Motive 7 - M7 ----- M7 -----

161  $Db^{-7}$   $Db^{-7}/C$   $Db^{-7}/Cb$   $Bb^\emptyset$

M7 - V/E ----- M7 - V/E -----

165  $B^\Delta$   $B^\Delta/A^\sharp$   $Bmaj^7/G^\sharp$   $Bmaj^7/F^\sharp$

M7 - V/E ----- M7 - F/V/E -----

169  $Fm^7(b5)$   $\text{no symbol}$   $Bb^7(b9)$   $\text{no symbol}$

M7 - F/V/D ---- M7 - F/V/D ---- M7 - F/V/D ---- M7 - F/A/E -----

$Db^{-7}$   $Db^{-7}/Cb$   $Bbm^7(b5)$   $Eb^7$

173 3 3 3 3

**L** M7 - F/A/E -----

Motive 8 - M5 ----- M8 - V ----- M8 - V ----- M8 - V -----

$Ab^\Delta$   $Bbm^7$   $Eb^7$   $Ab^\Delta$   $\text{no symbol}$

177

M8 - V ----- M8 - V ----- M8 - V ----- M4 - V/E -----

$Bbm^7$   $Eb^7$   $Ab^\Delta$   $D^7$

181  $8^{va}$

--- (M8 - V) -----

185  $\text{Db}^\Delta$   $\text{G}^7$   $\text{C}^-7$   $\text{F}^7(\text{b}^9)$

189  $\text{Bb}^-7$   $\text{Eb}^7$   $\text{Ab}^\Delta$   $\text{Eb}^7$

193  $\text{Ab}^\Delta$  **M**  $\text{Eb}^7$  4 4

# Performance Solo on All or Nothing at All Phase 4 - Motivic Development

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...RD	
Augmentation.....	A
Diminution.....	D
Extension.....	E

Motive 1 - M1 ----- M1-2 V ----- M1-3 V/F ----- M1-4 V/A -----

A<sup>-</sup> A<sup>-Δ</sup> A<sup>-7</sup> A<sup>-6</sup>

M1-5 V/RD ----- M1-6 V/A/E -----

6 A<sup>-</sup> A<sup>-Δ</sup> A<sup>-7</sup> A<sup>-6</sup> B<sup>b7</sup> B<sup>b7</sup>

M1-7 V/E ----- M1-7 V/RD -----

10 G<sup>-7</sup> D<sup>-9</sup> E<sup>b°</sup>

M1-7 V/RD/A/E -----

14 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> B<sup>°</sup> E<sup>7</sup>

**A2**

--- (cont.) ---

18 A<sup>-</sup> A<sup>-Δ</sup> A<sup>-7</sup> A<sup>-6</sup>

22 A<sup>-</sup> A<sup>-Δ</sup> A<sup>-7</sup> A<sup>-6</sup> B<sup>b7</sup> B<sup>b7</sup>

26 G<sup>-7</sup> D<sup>-9</sup> E<sup>b°</sup>

30 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> E<sup>b7</sup>

34 **B**  $A^b$   $A^{b+}$   $A^{b6}$   $A^{b+}$   $A^b$   $A^{b+}$   $A^{b6}$   $E^b7$

38  $A^{b\Delta}$   $A/A^b$   $A^{b\Delta}$   $B^{b-7}$   $E^b7$   $8^{va}$

42 (8)  $B^{b-7}$   $E^b7$   $B^{b-7}$   $C^7$

46 (8)  $F^{-7}$   $D^b7$   $C^7$   $E^+$

50 **C**  $A^-$   $A^{-\Delta}$   $A^{-7}$   $A^{-6}$

54  $A^-$   $A^{-\Delta}$   $A^{-7}$   $A^{-6}$   $B^b7$   $B^b7$

58 Motive 2- M2 M2-2 V -- M2-3 V -- M2-4 V/E --  $G^{-7}$   $D^{-9}$   $E^7$

62 --- (cont.)--- M2-5 V/E  $A^{-7}$   $B^b9$   $C^{\Delta}$   $B^{\circ}$   $E^7$

66 **A**  $A^-$

# Performance Solo on Lazy Bird Phase 4 - Motivic Development/Continuity

Variation.....V  
 Fragmentation.....F  
 Rhythmic Displacement...RD  
 Augmentation.....A  
 Diminution.....D  
 Extension.....E

Motive 1 - M1 ----- M1-2 V/E -----

**A** A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

M1-3 V/E ----- M1-4 V/E ----- M1-5 V/E -----

6 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

M1-6 V/E ----- M1-7 V/RD/E ----- M1-7 V/RD/E ----- M1-8 V/RD/E -----

10 A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

----- M1-8 (cont.) -- M1-9 V/RD/E ----- M1-10 V/RD/E -----

14 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup>

Motive 2 - M2 ---- M2-2 V -----

18 **B** B<sup>-7</sup> E<sup>7</sup> A<sup>Δ</sup> B<sup>b-7</sup> E<sup>b7</sup>

M2-3 V ----- M2-4 V -----

22 A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

**A** A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

26 A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

30 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

34 **A** A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> <sup>8va</sup> F<sup>-7</sup> B<sup>b7</sup>

38 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

42 A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

46 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup>

50 **B** B<sup>-7</sup> E<sup>7</sup> A<sup>Δ</sup> B<sup>b-7</sup> E<sup>b7</sup> Motive 3 - M3 ----

54 M3-2 V ----- A<sup>-7</sup> M3-3 V ----- D<sup>7</sup> M3-4 V ----- G<sup>Δ</sup> M3- 5 V ----- A<sup>b-7</sup> D<sup>b7</sup>

58 **A** <sup>8va</sup> A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

(8)

62 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

**A**

(8)

66 A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

70 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

(8)

Motive 4 - M4 -----

M4-2 V/E -----

8<sup>va</sup>-----

74 A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

M4-3 V/E/F -----

Motive 5 - M5 ---

M5-2 -----

(8)-----

78 Eb<sup>Δ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup>

(8)-----

82 B<sup>-7</sup> E<sup>7</sup> A<sup>Δ</sup> B<sup>b7</sup> Eb<sup>7</sup>

M5-2 V -----

(8)-----

86 A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> Ab<sup>-7</sup> Db<sup>7</sup>

**A**

Motive 6 - M6 -----

M6-2 V/RD/E -----

(8)-----

90 A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

M6-3 V/RD/E -----

M6-3 V/RD/E -----

(8)-----

94 Eb<sup>Δ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> Ab<sup>-7</sup> Db<sup>7</sup>

**A**

(8)----- ]

98 A<sup>-7</sup> D<sup>7</sup>

# Performance Solo on Nica's Dream Phase 4 - Motivic Development

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...RD	
Augmentation.....	A
Diminution.....	D
Extension.....	E

**A** Motive 1 - M1 ----- M1-2 V/D -----  
 $Bb^{\Delta}$   $Ab^{\Delta}$

M1-3 V/D ----- M1-4 V/D/F ----- M1-5 V/F -  
 $Bb^{\Delta}$   $Eb^7$   $Ab^7$

5  
 -(cont)---- M1-6 V/F ---- M1-7 V/F ---- M1-8 V/F ---- M1-9 V/F ----  
 $Ab^7$   $Db^7$   $Gb^{\Delta}$   $Db^9$   $C^7$

9  
 M1-10 V/F -----  
 $C^{\circ}$   $F^7$   $Bb^{\Delta}$

13  
 $Bb^{\Delta}$   $Ab^{\Delta}$

17  
 Motive 2 - M2 ----- M2-2 F/V/E -  
 $Bb^{\Delta}$   $Eb^7$   $Ab^7$

21  
 -(cont)- M2-3 F/V/E - M2-3 F/V/E -----  
 $Ab^7$   $Db^7$   $Gb^{\Delta}$   $Db^9$   $C^7$

25  
 $C^{\circ}$   $F^7$   $Bb^{\Delta}$

29

33 **B** Eb<sup>-7</sup> Ab<sup>7</sup> Db<sup>Δ</sup> Bb<sup>7</sup>

37 Eb<sup>-7</sup> Ab<sup>7</sup> Db<sup>Δ</sup> Bb<sup>7</sup>

41 Eb<sup>7</sup> Eb<sup>-7</sup> Ab<sup>7</sup> Db<sup>Δ</sup> E<sup>-7</sup> A<sup>7</sup>

45 Eb<sup>-7</sup> Ab<sup>7</sup> Db<sup>Δ</sup> Bb<sup>7</sup>

49 **A** Bb<sup>-Δ</sup> Ab<sup>-Δ</sup>

53 Bb<sup>-Δ</sup> Eb<sup>-7</sup> Ab<sup>7</sup>

57 Ab<sup>-7</sup> Db<sup>7</sup> Gb<sup>Δ</sup> Db<sup>9</sup> C<sup>7</sup>

61 (8) C<sup>∅</sup> F<sup>7</sup> Bb<sup>-Δ</sup> F<sup>7</sup>

65 **A** Bb<sup>-Δ</sup> Ab<sup>-Δ</sup>

Motive 3 - M3 M3-2----- M3-3 V ---- M3-4 V ---- M3-5 V/E -----

M3-6 RD -- M3-7 RD ---- M3-8 RD -- M3-9 V/E -----

69 Bb<sup>-Δ</sup> Eb<sup>-7</sup> Ab<sup>7</sup>

73  $A\flat^7$   $D\flat^7$   $G\flat^\Delta$   $D\flat^9$   $C^7$

Motive 4 - M4 M4-2 V-- M4-3 V/E -----

77  $C^\emptyset$   $F^7$   $B\flat^\Delta$   $8^{va}$ -----

M4-4 V --- M4-5 V --- M4-6 V --- M4-7 V ----- M4- V/RD/E -----

81 **A**  $B\flat^\Delta$   $A\flat^\Delta$  (8)

-(cont)-----

85  $B\flat^\Delta$   $E\flat^7$   $A\flat^7$  (8)

89  $A\flat^7$   $D\flat^7$   $G\flat^\Delta$   $D\flat^9$   $C^7$  (8)

93  $C^\emptyset$   $F^7$   $B\flat^\Delta$  (8)

97 **B**  $E\flat^7$   $A\flat^7$   $D\flat^\Delta$   $B\flat^7$  (8)

101  $E\flat^7$   $A\flat^7$   $D\flat^\Delta$   $B\flat^7$

105  $E\flat^7$   $E\flat^7$   $A\flat^7$   $D\flat^\Delta$   $E^7$   $A^7$

109  $E\flat^7$   $A\flat^7$   $D\flat^\Delta$   $B\flat^7$

113 **A** B $\flat$ - $\Delta$  A $\flat$ - $\Delta$

117 B $\flat$ - $\Delta$  E $\flat$ -7 A $\flat$ 7

121 A $\flat$ -7 D $\flat$ 7 G $\flat$  $\Delta$  D $\flat$ 9 C7

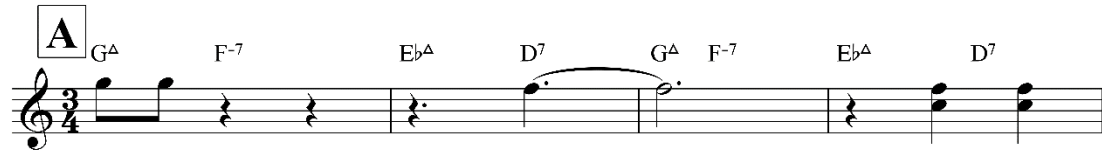
125 C $\emptyset$  F7 8va- B $\flat$ - $\Delta$  F7

(8)

129 **A** B $\flat$ - $\Delta$

# Performance Solo on Night Dreamer Phase 4 - Motivic Development

Variation.....V  
 Fragmentation.....F  
 Rhythmic Displacement...RD  
 Augmentation.....A  
 Diminution.....D  
 Extension.....E



Motive 1 - M1 -----



M1-2 F/V/D/A -----

M1-3 F/V/D/A -----



M1-4 V/RD/D -----

M1-5 V/E -----



**A**

Motive 2 - M2



--- (cont.) -----

M2-2 -----

M2-3 V-----

M2-4 V-----



25 E13(sus4)

F13(sus4)



29 G^A F-7 Eb^A D7 G^A F-7

Eb^A D7



**A**  $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$   $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$

33  $E^{13}(sus4)$   $F^{13}(sus4)$

37  $E^{\flat7}$   $A^{\flat7}$

41  $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$   $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$

**A**  $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$   $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$

45  $E^{13}(sus4)$   $F^{13}(sus4)$

49  $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$   $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$

53  $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$   $E^{\flat7}$   $A^{\flat7}$

57  $E^{13}(sus4)$   $F^{13}(sus4)$

61  $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$   $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$

65  $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$   $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$

69  $G^{\Delta}$   $F^{-7}$   $E^{\flat\Delta}$   $D^7$   $E^{\flat7}$   $A^{\flat7}$

73 E<sup>13</sup>(sus4) F<sup>13</sup>(sus4)

3 4 4

77 G<sup>Δ</sup> F<sup>-7</sup> E<sup>b</sup>Δ D<sup>7</sup> G<sup>Δ</sup> F<sup>-7</sup> E<sup>b</sup>Δ D<sup>7</sup>

A 3 3

81 G<sup>Δ</sup>

## APPENDIX J – Idea generation in Performance Solos

In this appendix is presented a selection of selection of idea generation analyses. First and fourth phase analyses of *My Funny Valentine* and *Green Dolphin Street* are presented first.

### Green Dolphin Street 1st Phase - Idea Generation

Key: Red = Motor Generated Ideas  
Blue = Strategy Generated Ideas  
Green = Audiation Generated Ideas

The musical score for the first phase of 'Green Dolphin Street' is presented in six staves, each containing measures 1 through 22. The score is written in treble clef and includes various chord changes and idea generation markers. The markers are color-coded: Red for Motor Generated Ideas, Blue for Strategy Generated Ideas, and Green for Audiation Generated Ideas. The score is divided into measures 1-5, 6-9, 10-13, 14-17, 18-21, and 22. The chords and markers are as follows:

- Measures 1-5: E<sup>-7</sup> A<sup>7</sup> (Red), C<sup>Δ</sup> (Green), C<sup>-7</sup> (Green).
- Measures 6-9: D<sup>7</sup>/C (Green), D<sup>b</sup>/C (Green), C<sup>Δ</sup> (Green).
- Measures 10-13: D<sup>-7</sup> (Green), G<sup>7</sup> (Green), C<sup>Δ</sup> (Green).
- Measures 14-17: F<sup>-7</sup> (Blue), B<sup>b</sup>7 (Blue), E<sup>b</sup>Δ (Blue), G<sup>7</sup> (Blue).
- Measures 18-21: C<sup>Δ</sup> (Green), C<sup>-7</sup> (Green).
- Measure 22: D<sup>7</sup>/C (Green), D<sup>b</sup>/C (Green), C<sup>Δ</sup> (Green).

26  $D^{-7}$   $D^{-7}/C$   $B^{\circ}$   $E^7$   $A^{-7}$   $A^{-7}/G$   $F^{\# \circ}$   $B^7$

30  $E^{-7}$   $A^{-7}$   $D^{-7}$   $G^7$   $C^{\Delta}$   $D^{-7}$  *gliss.*  $G^7$

34  $C^{\Delta}$   $C^{-7}$

38  $D^7/C$   $D^b/C$   $C^{\Delta}$

42  $D^{-7}$   $G^7$   $C^{\Delta}$

46  $F^{-7}$   $B^b7$   $E^b\Delta$   $G^7$

50  $C^{\Delta}$   $C^{-7}$

54  $D^7/C$   $D^b/C$   $C^{\Delta}$

58  $D^{-7}$   $D^{-7}/C$   $B^{\circ}$   $E^7$   $A^{-7}$   $A^{-7}/G$   $F^{\# \circ}$   $B^7$

62  $E^{-7}$   $A^{-7}$   $D^{-7}$   $G^7$   $C^{\Delta}$   $D^{-7}$   $G^7$

66  $C^\Delta$   $C^{-7}$

70  $D^7/C$   $D\flat/C$   $C^\Delta$

74  $D^{-7}$   $G^7$   $C^\Delta$

78  $F^{-7}$   $B\flat^7$   $E\flat^\Delta$   $G^7$

82  $C^\Delta$   $C^{-7}$

86  $D^7/C$   $D\flat/C$   $C^\Delta$

90  $D^{-7}$   $D^7/C$   $B^\circ$   $E^7$   $A^{-7}$   $A^{-7}/G$   $F^\sharp$   $B^7$

94  $E^{-7}$   $A^{-7}$   $D^{-7}$   $G^7$   $C^\Delta$   $D^{-7}$   $G^7$

98  $C^\Delta$   $C^{-7}$

102  $D^7/C$   $D\flat/C$   $C^\Delta$   $8^{va}$

106  $D^{-7}$   $G^7$   $C^\Delta$

110  $F^{-7}$   $Bb^7$   $Eb^{\Delta}$   $G^7$

114  $C^{\Delta}$   $C^{-7}$

118  $D^7/C$   $Db/C$   $C^{\Delta}$

122  $D^{-7}$   $D^{-7}/C$   $B^{\circ}$   $E^7$   $A^{-7}$   $A^{-7}/G$   $F^{\# \circ}$   $B^7$

126  $E^{-7}$   $A^{-7}$   $D^{-7}$   $G^7$   $C^{\Delta}$

130  $C^{\Delta}$   $C^{-7}$

134  $D^7/C$   $Db/C$   $C^{\Delta}$

138  $D^{-7}$   $G^7$   $C^{\Delta}$   $G^7$

142  $F^{-7}$   $Bb^7$   $Eb^{\Delta}$   $G^7$

146  $C^{\Delta}$   $C^{-7}$

150  $D^7/C$   $D\flat/C$   $C^\Delta$

154  $D^{-7}$   $D^{-7}/C$   $B^\circ$   $E^7$   $A^{-7}$   $A^{-7}/G$   $F^\sharp^\circ$   $B^7$

158  $E^{-7}$   $A^{-7}$   $D^{-7}$   $G^7$   $C^\Delta$

162  $C^\Delta$   $C^{-7}$

$D^{-7}$

# Green Dolphin Street 4th Phase - Idea Generation

Key: Red = Motor Generated Ideas  
 Blue = Strategy Generated Ideas  
 Green = Audiation Generated Ideas

**A**

6

10

14

**B**

18

22

26

30

34 **A** C<sup>Δ</sup> C<sup>-7</sup>

38 D<sup>7</sup>/C D<sup>b</sup>Δ/C C<sup>Δ</sup> C<sup>Δ</sup>

42 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> C<sup>Δ</sup>

46 F<sup>-7</sup> B<sup>b</sup>7 E<sup>b</sup>Δ G<sup>7</sup>

50 **B** C<sup>Δ</sup> C<sup>-7</sup>

54 D<sup>7</sup>/C D<sup>b</sup>Δ/C C<sup>Δ</sup>

58 D<sup>-7</sup> D<sup>-7</sup>/C B<sup>ø</sup> E<sup>7</sup> A<sup>-7</sup> A<sup>-7</sup>/G F<sup>#</sup> B<sup>7</sup>

62 E<sup>-7</sup> A<sup>7</sup> D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>-7</sup> G<sup>7</sup>

66 **A** C<sup>Δ</sup> C<sup>-7</sup> 8<sup>va</sup>

70 (8) D<sup>7</sup>/C D<sup>b</sup>Δ/C C<sup>Δ</sup>

74 (8) D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> C<sup>Δ</sup>

78 (8) F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup> G<sup>7</sup>

**B**

82 C<sup>Δ</sup> C<sup>-7</sup>

86 D<sup>7/C</sup> D<sup>bΔ/C</sup> C<sup>Δ</sup>

90 D<sup>-7</sup> D<sup>-7/C</sup> B<sup>ø</sup> E<sup>7</sup> A<sup>-7</sup> A<sup>-7/G</sup> F<sup>#ø</sup> B<sup>7</sup>

94 E<sup>-7</sup> A<sup>7</sup> D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>-7</sup> G<sup>7</sup>

**A** C<sup>Δ</sup>

98

# My Funny Valentine 1st Phase - Idea generation

Key: Red = Motor Generated Ideas  
 Blue = Strategy Generated Ideas  
 Green = Audiation Generated Ideas

Jazz Guitar

6  $A\flat\text{maj}7$   $Fm7$   $Dm7(b5)$   $G7(b9)$

10  $Cm$   $Cm(maj7)$   $Cm7$   $Cm6$

14  $A\flat\text{maj}7$   $Fm7$   $Cm7$   $Fm7$   $B\flat7$

18  $E\flat\text{maj}7$   $Fm7$   $Gm7$   $Fm7$   $E\flat\text{maj}7$   $Fm7$   $Gm7$   $Fm7$

22  $E\flat\text{maj}7$   $G7$   $Cm7$   $A\flat\text{maj}7$   $Dm7(b5)$   $G7(b9)$

26  $Cm$   $Cm(maj7)$   $Cm7$   $Cm6$   $A\flat\text{maj}7$

31  $Dm7(b5)$   $G7(b9)$   $Cm7$   $A\flat\text{maj}7$

35  $Fm7$   $B\flat7$   $E\flat\text{maj}7$   $Dm7(b5)$   $G7(b9)$

38  $Cm$   $Cm(maj7)$   $Cm7$   $Cm6$

42  $A\flat\text{maj}^7$   $Fm^7$   $Dm^7(b5)$   $G^7(b9)$   $Cm$

J. Gtr.

47  $Cm(maj^7)$   $Cm^7$   $Cm^6$   $A\flat\text{maj}^7$   $Fm^7$

J. Gtr.

52  $Cm^7$   $Fm^7$   $B\flat^7$   $E\flat\text{maj}^7$   $Fm^7$   $Fm^7$   $E\flat\text{maj}^7$

J. Gtr.

57  $Gm^7$   $Fm^7$   $E\flat\text{maj}^7$   $G^7$   $Cm^7$   $A\flat\text{maj}^7$

J. Gtr.

61  $Dm^7(b5)$   $G^7(b9)$   $Cm$   $Cm(maj^7)$   $Cm^7$   $Cm^6$

J. Gtr.

66  $A\flat\text{maj}^7$   $Dm^7(b5)$   $G^7(b9)$   $Cm^7$

J. Gtr.

70  $A\flat\text{maj}^7$   $Fm^7$   $B\flat^7$   $E\flat\text{maj}^7$   $Dm^7(b5)$   $G^7(b9)$

J. Gtr.

74  $Cm$   $Cm(maj^7)$   $Cm^7$   $Cm^6$

J. Gtr.

78  $A\flat\text{maj}^7$   $Fm^7$   $Dm^7(b5)$   $G^7(b9)$   $Cm$

J. Gtr.

83  $Cm(maj^7)$   $Cm^7$   $Cm^6$

J. Gtr.

86  $A\flat\text{maj}^7$   $Fm^7$   $Cm^7$   $Fm^7$   $B\flat^7$

J. Gtr.

8va

3

J. Gtr.

90  $\text{E}\flat\text{maj}7$   $\text{Fm}7$   $\text{Gm}7$   $\text{Fm}7$   $\text{E}\flat\text{maj}7$   $\text{Fm}7$   $\text{Gm}7$   $\text{Fm}7$

94  $\text{E}\flat\text{maj}7$   $\text{G}7$   $\text{Cm}7$   $\text{A}\flat\text{maj}7$   $\text{Dm}7(\text{b}5)$   $\text{G}7(\text{b}9)$

98  $\text{Cm}$   $\text{Cm}(\text{maj}7)$   $\text{Cm}7$   $\text{Cm}6$   $\text{A}\flat\text{maj}7$

103  $\text{Dm}7(\text{b}5)$   $\text{G}7(\text{b}9)$   $\text{Cm}7$

106  $\text{A}\flat\text{maj}7$   $\text{Fm}7$   $\text{B}\flat7$   $\text{E}\flat\text{maj}7$   $\text{Dm}7(\text{b}5)$   $\text{G}7(\text{b}9)$

110

# My Funny Valentine 4th Phase - Idea Generation

Key: Red = Motor Generated Ideas  
 Blue = Strategy Generated Ideas  
 Green = Audiation Generated Ideas

**A**

C- C-<sup>♭</sup>/B C-<sup>7</sup>/B<sup>♭</sup> C-<sup>7</sup>/A

5 A<sup>♭</sup>4 F-<sup>7</sup> D<sup>∅</sup> G<sup>7</sup>

9 C- C-<sup>♭</sup>/B C-<sup>7</sup>/B<sup>♭</sup> C-<sup>7</sup>/A

13 A<sup>♭</sup>4 F-<sup>7</sup> F<sup>∅</sup> B<sup>♭</sup>7

**B**

17 E<sup>♭</sup>4 F-<sup>7</sup> G-<sup>7</sup> F-<sup>7</sup> E<sup>♭</sup>4 F-<sup>7</sup> G-<sup>7</sup> F-<sup>7</sup>

21 E<sup>♭</sup>4 D<sup>∅</sup> G<sup>7</sup> A<sup>♭</sup>4 D<sup>∅</sup> G<sup>7</sup>

**C**

25 C- C-<sup>♭</sup>/B C-<sup>7</sup>/B<sup>♭</sup> C-<sup>7</sup>/A

29 A<sup>♭</sup>4 D<sup>∅</sup> G<sup>7</sup> C-<sup>7</sup> B-<sup>7</sup> B<sup>♭</sup>-<sup>7</sup> A-<sup>7</sup>

8va

3

33  $A\flat^{\Delta}$   $F^{-7}$   $B\flat^7$   $E\flat^{\Delta}$   $D^{\circ}$   $G^7$

37 **A**  $C^{-}$   $C^{-\Delta}/B$   $C^{-7}/B\flat$   $C^{-7}/A$

41  $A\flat^{\Delta}$   $F^{-7}$   $D^{\circ}$   $G^7$

45  $C^{-}$   $C^{-\Delta}/B$   $C^{-7}/B\flat$   $C^{-7}/A$

49  $A\flat^{\Delta}$   $F^{-7}$   $F^{\circ}$   $B\flat^7$

53 **B**  $E\flat^{\Delta}$   $F^{-7}$   $G^{-7}$   $F^{-7}$   $E\flat^{\Delta}$   $F^{-7}$   $G^{-7}$   $F^{-7}$

57  $E\flat^{\Delta}$   $D^{\circ}$   $G^7$   $A\flat^{\Delta}$   $D^{\circ}$   $G^7$

61 **C**  $C^{-}$   $C^{-\Delta}/B$   $C^{-7}/B\flat$   $C^{-7}/A$

65  $A\flat^{\Delta}$   $D^{\circ}$   $G^7$   $C^{-7}$   $B^{-7}$   $B\flat^{-7}$   $A^{-7}$

69  $A\flat^{\Delta}$   $F^{-7}$   $B\flat^7$   $E\flat^{\Delta}$   $D^{\circ}$   $G^7$



# All Or Nothing At All

Key: Red = Motor Generated Ideas  
 Blue = Strategy Generated Ideas  
 Green = Audiation Generated Ideas

**A**

1  $A^-$   $A^-$   $A^-$   $A^-$

6  $A^-$   $A^-$   $A^-$   $A^-$   $Bb^7$   $Bb^7$

10  $G^-$   $D^-9$   $Eb^o$

14  $D^-$   $G^7$   $C^A$   $B^o$   $E^7$

**A2**

18  $A^-$   $A^-$   $A^-$   $A^-$   $Bb^7$   $Bb^7$

22  $A^-$   $A^-$   $A^-$   $A^-$   $Bb^7$   $Bb^7$

26  $G^-$   $D^-9$   $Eb^o$

30  $D^-$   $G^7$   $C^A$   $Eb^7$

**B**  $A\flat$   $A\flat^+$   $A\flat^6$   $A\flat^+$   $A\flat$   $A\flat^+$   $A\flat^6$   $E\flat^7$

34  $A\flat^4$   $A/A\flat$   $A\flat^4$   $B\flat^7$   $E\flat^7$   $8^{va}$

38  $B\flat^7$   $E\flat^7$   $B\flat^7$   $C^7$

42  $F^7$   $D\flat^7$   $C^7$   $E^+$

**C**  $A^-$   $A^{-4}$   $A^{-7}$   $A^{-6}$

50  $A^-$   $A^{-4}$   $A^{-7}$   $A^{-6}$   $B\flat^7$

54  $G^{-7}$   $D^{-9}$   $E^7$

58  $A^{-7}$   $B\flat^9$   $C^4$   $B^\circ$   $E^7$

62  $A^-$

**A**

66

# How Deep is the Ocean

## Idea Generation

Key: Red = Motor Generated Ideas  
 Blue = Strategy Generated Ideas  
 Green = Audiation Generated Ideas

**A** C-7

6 G-7 A° D7 G-7 Fm7 Bb7

10 Ebmaj7 Ab7

14 C°7 F7 B7 Bb7 D° G7

**B** C-7 D° G7 C-7 A° D7

22 G-7 A° D7 Gm7 Fm7 Bb7

26 Ebmaj7 D°7 G7 Fm7 Db7(#10)

30 Ebmaj7 G7 Cm7 F7 Fm7 Bb7 Ebmaj7 G7

34 **A** C<sup>-7</sup> A<sup>ø</sup> D<sup>ø</sup> G<sup>7</sup> C<sup>-7</sup> A<sup>ø</sup> D<sup>7</sup>

38 G<sup>-7</sup> A<sup>ø</sup> D<sup>7</sup> G<sup>-7</sup> F<sup>-7</sup> B<sup>b7</sup>

42 E<sup>b</sup>maj<sup>7</sup> A<sup>b7</sup>

46 C<sup>ø7</sup> F<sup>7</sup> B<sup>7</sup> B<sup>b7</sup> D<sup>ø</sup> G<sup>7</sup> 3

50 **B** C<sup>-7</sup> A<sup>ø</sup> D<sup>ø</sup> G<sup>7</sup> C<sup>-7</sup> A<sup>ø</sup> D<sup>7</sup>

54 G<sup>-7</sup> A<sup>ø</sup> D<sup>7</sup> G<sup>m7</sup> F<sup>m7</sup> B<sup>b7</sup>

58 E<sup>b</sup>maj<sup>7</sup> D<sup>ø7</sup> G<sup>7</sup> F<sup>m7</sup> D<sup>b7</sup>(#11)

62 E<sup>maj7</sup> G<sup>7</sup> C<sup>m7</sup> F<sup>7</sup> F<sup>m7</sup> B<sup>b7</sup> E<sup>b</sup>maj<sup>7</sup> G<sup>7</sup>

66 **A** C<sup>-7</sup> A<sup>ø</sup> D<sup>ø</sup> G<sup>7</sup> C<sup>-7</sup> A<sup>ø</sup> D<sup>7</sup> 8<sup>va</sup>

70 G<sup>-7</sup> (8) A<sup>ø</sup> D<sup>7</sup> G<sup>m7</sup> F<sup>m7</sup> B<sup>b7</sup>

74  $E\flat^7$   $A\flat^7$

78  $C\emptyset^7$   $F^7$   $B^7$   $B\flat^7$   $D\emptyset$   $G^7$

82 **B**  $C^-7$   $A\emptyset$   $D\emptyset$   $G^7$   $C^-7$   $A\emptyset$   $D^7$

86  $G^-7$   $A\emptyset$   $D^7$   $Gm^7$   $Fm^7$   $B\flat^7$

90  $E\flat maj^7$   $D\emptyset^7$   $G^7$   $Fm^7$   $D\flat^7(\#11)$

94  $Emaj^7$   $G^7$   $Cm^7$   $F^7$   $Fm^7$   $B\flat^7$   $E\flat maj^7$   $G^7$

The musical score is written for guitar in a key with three flats (B-flat major or D-flat minor). It consists of six staves of music. The first staff (measures 74-77) features a long note in measure 74, followed by eighth notes in measure 75, and a quarter note in measure 76. The second staff (measures 78-81) continues with eighth notes and a quarter note. The third staff (measures 82-85) includes a section marked 'B' with eighth notes and a triplet of eighth notes in measure 84. The fourth staff (measures 86-89) features eighth notes and a quarter note. The fifth staff (measures 90-93) includes a half note and a quarter note. The sixth staff (measures 94-97) concludes with a half note and a quarter note. Chords are indicated above the notes, and some notes are highlighted in red or green. A triplet of eighth notes is marked in measure 84.

# Invitation - Idea Generation

Key: Red = Motor Generated Ideas  
 Blue = Strategy Generated Ideas  
 Green = Audiation Generated Ideas

**A**

C-7

3

3

3

3

3

3

6

C-7

F7

Bb7(b9)

3

3

3

3

3

3

10

Eb-7

3

3

3

14

Eb-7

Ab7

Db7(b9)

3

3

3

**B**

18

Db-7

Gb7

Bm7

3

3

3

3

3

3

22

Bm7

E7

A-7

3

3

3

3

3

26

A-7

D7

G-7

3

3

3

3

3

30

Eb7

Em7(b5)

D7

G7

3

3

3

3

3

3

34 **C** C<sup>-7</sup> / / /

38 C<sup>-7</sup> F<sup>7</sup> Bb<sup>7</sup>(b9) /

42 Eb<sup>-7</sup> B<sup>7</sup> /

46 F<sup>ø</sup> Bb<sup>7</sup> Eb<sup>-Δ</sup> D<sup>ø</sup> G<sup>7</sup>

50 **A** C<sup>-7</sup> / / /

54 C<sup>-7</sup> F<sup>7</sup> Bb<sup>7</sup> /

58 Eb<sup>-7</sup> Ab<sup>7</sup> Db<sup>7</sup>(b9) /

62 Eb<sup>-7</sup> Ab<sup>7</sup> Db<sup>7</sup>(b9) /

66 **B** Db<sup>-7</sup> Gb<sup>7</sup> Bm<sup>7</sup> /

70 Bm<sup>7</sup> E<sup>7</sup> A<sup>-7</sup> /

74 A-7 D7 G-7

78 Eb7 Em7(b5) D7 G7

A great deal of attention was put into the analysis of the section from bar 82 to 87. Here the ideas were very much a mix of strategy and audiation. The leading note was clearly heard in the mind, but the notes in the chord below it were added in a strategic way so as to provide tension. Thus this section represents a moment when there is a clear mix in idea generation types, in this instance between audiation generated ideas and strategy generated ideas.

82 C C-7 F7 Bb7(b9)

86 C-7 F7 Bb7(b9)

90 Eb-7 B7

94 Fø Bb7 Eb-Δ Dø G7

98 A C-7 F7 Bb7

102 C-7 F7 Bb7

8va



# Lazy Bird: Idea-Generation

Key: Red = Motor Generated Ideas  
 Blue = Strategy Generated Ideas  
 Green = Audiation Generated Ideas

The musical score for 'Lazy Bird' is presented in 4/4 time with a key signature of three flats (B-flat, E-flat, A-flat). The score is divided into sections based on idea generation:

- Section A (Measures 1-16):** This section is primarily composed of Audiation Generated Ideas (green notes). It begins with a box labeled 'A' above measure 1. The chords and notes are: A<sup>-7</sup>, D<sup>7</sup>, C<sup>-7</sup>, F<sup>7</sup>, F<sup>-7</sup>, and B<sup>b7</sup>. Measures 5, 9, 13, and 17 are marked with measure numbers.
- Section B (Measures 17-20):** This section is composed of Strategy Generated Ideas (blue notes). It begins with a box labeled 'B' above measure 17. The chords and notes are: B<sup>-7</sup>, E<sup>7</sup>, A<sup>Δ</sup>, B<sup>b-7</sup>, and E<sup>b7</sup>.
- Section A (Measures 21-32):** This section returns to Audiation Generated Ideas (green notes). It begins with a box labeled 'A' above measure 25. The chords and notes are: A<sup>-7</sup>, D<sup>7</sup>, C<sup>-7</sup>, F<sup>7</sup>, F<sup>-7</sup>, and B<sup>b7</sup>. Measures 25, 29, and 32 are marked with measure numbers.

33 **A** A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> <sup>8va</sup> F<sup>-7</sup> B<sup>b7</sup>

37 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

41 A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

45 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup>

49 **B** B<sup>-7</sup> E<sup>7</sup> A<sup>Δ</sup> B<sup>b-7</sup> E<sup>b7</sup>

53 A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

57 **A** <sup>8va</sup> A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

61 (8) E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

65 **A** (8) A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

69 (8) E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

8va-

73 A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

(8)

77 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup>

(8)

81 B<sup>-7</sup> E<sup>7</sup> A<sup>Δ</sup> B<sup>b-7</sup> E<sup>b7</sup>

(8)

85 A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

**A**

(8)

89 A<sup>-7</sup> D<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> F<sup>-7</sup> B<sup>b7</sup>

(8)

93 E<sup>bΔ</sup> A<sup>-7</sup> D<sup>7</sup> G<sup>Δ</sup> A<sup>b-7</sup> D<sup>b7</sup>

**A**

(8)

97 A<sup>-7</sup> D<sup>7</sup>

# Nica's Dream - Idea Generation

Key: Red = Motor Generated Ideas  
Blue = Strategy Generated Ideas  
Green = Audiation Generated Ideas

**A**  $Bb-\Delta$   $Ab-\Delta$

5  $Bb-\Delta$   $Eb-7$   $Ab7$

9  $Ab-7$   $Db7$   $Gb\Delta$   $Db9$   $C7$

13  $C\emptyset$   $F7$   $Bb-\Delta$

17  $Bb-\Delta$   $Ab-\Delta$

21  $Bb-\Delta$   $Eb-7$   $Ab7$

25  $Ab-7$   $Db7$   $Gb\Delta$   $Db9$   $C7$

29  $C\emptyset$   $F7$   $Bb-\Delta$

Detailed description: This musical score is for a piece titled 'Nica's Dream - Idea Generation'. It is written in 4/4 time with a key signature of three flats (Bb, Eb, Ab). The score consists of eight staves of music, each containing four measures. The notes are color-coded: red for Motor Generated Ideas, blue for Strategy Generated Ideas, and green for Audiation Generated Ideas. In this score, all notes are green. Above the staves, chord symbols are provided for each measure. Measure 1 is marked with a box containing the letter 'A'. Measure 13 contains a measure rest. Measure 29 contains a flat symbol (b) above the staff. The score ends with a double bar line at the end of the eighth staff.

33 **B** Eb-7 Ab7 DbΔ Bb7

37 Eb-7 Ab7 DbΔ Bb7

41 Eb7 Eb-7 Ab7 DbΔ E-7 A7

45 Eb-7 Ab7 DbΔ Bb7

49 **A** Bb-Δ Ab-Δ

53 Bb-Δ 8va Eb-7 Ab7

57 Ab-7 Db7 GbΔ Db9 C7

61 (8) C° F7 Bb-Δ F7

65 **A** Bb-Δ Ab-Δ

69 Bb-Δ Eb-7 Ab7

73  $A\flat^{-7}$   $D\flat^7$   $G\flat^\Delta$   $D\flat^9$   $C^7$   
 $C^\circ$   $F^7$   $B\flat^{-\Delta}$   $8^{va}$

77

81 **A**  $B\flat^{-\Delta}$   $A\flat^{-\Delta}$

85  $B\flat^{-\Delta}$   $E\flat^{-7}$   $A\flat^7$

89  $A\flat^{-7}$   $D\flat^7$   $G\flat^\Delta$   $D\flat^9$   $C^7$

93  $C^\circ$   $F^7$   $B\flat^{-\Delta}$

97 **B**  $E\flat^{-7}$   $A\flat^7$   $D\flat^\Delta$   $B\flat^7$

101  $E\flat^{-7}$   $A\flat^7$   $D\flat^\Delta$   $B\flat^7$

105  $E\flat^7$   $E\flat^{-7}$   $A\flat^7$   $D\flat^\Delta$   $E^{-7}$   $A^7$

109  $E\flat^{-7}$   $A\flat^7$   $D\flat^\Delta$   $B\flat^7$

113 **A** B $\flat$ - $\Delta$  A $\flat$ - $\Delta$

117 B $\flat$ - $\Delta$  E $\flat$ -7 A $\flat$ 7

121 A $\flat$ -7 D $\flat$ 7 G $\flat$  $\Delta$  D $\flat$ 9 C7

125 C $\emptyset$  F7 8<sup>va</sup>- B $\flat$ - $\Delta$  F7

129 **A** B $\flat$ - $\Delta$

## APPENDIX K – MAS Solos - Motivic Development/Continuity

This description provides explanations of how the different statements of the motives were understood in the MAS solo on Nica's Dream. Thus readers can extrapolate from this written description, further interpretations of motive developments in other solos.

**M1 to M2 – Here the initial idea is developed via a series of motivic developments, from M1 to M2. Motive 1 is introduced in Bar 1. It is a motive that is carried over two bars.**

**Bar 3, M1 undergoes a variation to become M1-2, different notes are played but a similar rhythm is maintained. It also undergoes an extension; an eighth note and a quarter note are added to the beginning of the motive. Quarter-note is on the 4+ and the quarter note is on beat**

**1.**

**In bar 5, M1-2 is the subject of the development, becoming M1-3. It undergoes variation; different notes are played but a similar rhythm is maintained. It also undergoes an augmentation; the first quarter-note is augmented by an eighth note. Finally it undergoes an extension, eighth notes are added, played on beat three of bar 5, and the 3+ in bar 6.**

**Bar 7 the third development of M1, M1-3 is the subject of development. Here the same opening rhythm in M1-3 is played with different notes added. This variation is sufficiently different from the original motive that it could be considered a new motive M2**

**In bar 9 M2 undergoes a Variation to become M2-2; a similar rhythm is played, significantly there is the characteristic eighth notes on 2+ 3, and 3+. The first note undergoes a diminution, it is reduced from a dotted quarter note to quarter note (starting on 1+). Finally the motive is extended, final note played in M2 is played on beat four and additional material is added to the motive in bar 10.**

**In bar 11 M2 undergoes another variation to become M2-3. The first note is diminished from a dotted quarter note to an eighth note beginning on 1+. Additional material is added beginning on 4+ of bar 11, this differs from the treatment in bar 9 where only a quarter note is played on beat 4.**

**In bar 13 we see the conclusion of this motive and the conclusion of the development of M1 being developed into M2 and all the variations in between. In bar 13 M2 undergoes a**

variation in that the first part of the motive is rhythmically similar, there is still the characteristic 2+,3,3+ aspect of the motive. The First note is however diminished, being reduced from a dotted quarter note to an eighth note. Finally extra material is added to the motive in bar 14.

### M3-M4-M5

M3 is stated through bars 17-18. In bar 19 M3 undergoes a development to become M3-2. A similar rhythm is played, especially at the end of the motive. The first note however is diminished, and extra notes are added, most noticeably on 2+, 3 and 4.

M3-3 has a similar rhythm to M3-2, however the notes are different. Additionally, it is extended by the addition of an eighth note at the beginning of the motive, beginning on 4+ in bar 20.

M3-4 sees an extra not added, differing from M3-3 by the addition of an eighth note on 3+. An Eighth note is taken away at the beginning of bar 24. This gives M3-4 the sense that it is responding to M3-4, by shifting the last notes in the motive to up beats.

M4 takes the rhythmic idea presented in the first part of M3-4. Different pitches are played and the second part of M3-4 is dropped. This new statement is sufficiently different form M3 that it can be considered a new motive and becomes M4.

M4-2 sees a variation, different pitches are played but the rhythm is maintained. In M4-3 the motive undergoes a variation, and beat four is augmented to become a quarter note, instead of a eighth note, as it was in M4 and M4-2. M4-3 is extended by the addition of material in bar 28.

M5 is a new motive that is derived from the opening rhythm of M4 (and could also be seen to be derived from the extension in M3-4, bar 28). M5-1 sees it undergo a variation, the rhythm stays the same but different pitches are played.

M5-2 sees the motive undergo a variation and a rhythmic displacement.

M5-3 also undergoes a variation a rhythmic displacement. Additional material is added to the end of M5-3.

M5 is stated again as M5-4, which sees it undergo a variation, in which the same rhythm is played but the pitches vary from the original.

## M6

M6 begins on 4+ of bar 40. M6-2 is a restatement of this motive however it undergoes a variation as the rhythm varies only slightly. It also undergoes a slight fragmentation as the phrase is begun on beat one, leaving off the pick-up on the 4+. M6-3 also undergoes a variation and additional material is added to the end of the motive, extending it.

## M7-M8-M9

M7 is stated in bar 49, a variation on this, M7-2, is played in bar 51 and here there is also a slight rhythmic displacement. The fifth note in M7 is displaced by an eighth note, starting on 4+. The change is very slight, but a change all the same. Motive in this new state is replayed with a variation in bar 53 as M7-3.

Beginning on 4+ in bar 54, M7 is augmented: the value of the first four notes in the motive is stretched from an eighth notes to a quarter note. A variation occurs also, in that different pitches are played. This statement of the motive pushes it to its limits, it is almost no longer recognisable as coming from M7. However I contend that, as in M7 there is a repetition of the first two notes then the following two notes, this is also the case in M7-4. Thus M7-4 maintains its connection to M7.

M7-5 is a restatement of M7 that is similar to M7—3 and M7-3, however in M7-5 new material

is added to the end of the motif.

M7- sees the motive undergo a variation. It is also fragmented, in that only the first four notes of the original motive are played (the pitches are different). After these first four notes new material is added to the motive beginning with an eighth note rest of beat 4.

M8 begins in bar 77 and begins similarly to M7 and its developments. The emphasis on upbeats after the third note in this motive give it a slightly different character to M7 and so it can be considered a new motive. M8-2 is a variation on M8 and the last two notes of the motive are omitted, fragmenting it, thus giving M8-2 its character. M8-3 is a variation on M8 with additional material added to the end of the motive.

M9 too begins in a similar way to M7 and M8. M9-2 undergoes a variation and additional material is added to the end of the motive.

In M9-3 the motive is fragmented: only the first three notes of the motive are stated. M9-4, M9-5, M9-6 and M9-7 see M9-3 undergo an augmentation: the rhythmic value of the first and third note is increased.

# MAS Solo on Nica's Dream 4th Phase - Motivic Development/Continuity

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...RD	
Augmentation.....	A
Diminution.....	D
Extension.....	E

Motive 1 - M1 ----- M1-2 V/E/-----

5 M1-3 V/A/E----- M1-4 V/A/E-----

Motive 2 - M2

9 M2-2 V/D/E----- M2-3 V/D/E-----

13 M2- V/D/E-----

17 Motive 3 - M3 ----- M3-2 - V/D/E ----- I-----

21 ----- M3-3 - V/E ----- M3- 4 - V/E -----

25 Motive 4 - M4 M4-2 - V ----- M4-3 - V/A/E -----

29 Motive 5 - M5 M5-1 - V ----- M5-2 - V/RD ----- M5-3 - V/RD/E -----

33 M5- 4 - V -----

37

41 Motive 6 - M6 ----- M6-2 V/F -----

45 M6-3 V/F/E -----

49 Motive 7 - M7 ----- M7-2 V/RD -----

53 M7-3 V/RD----- M7-4 V/RD/A -----

57

61 M7-5 V/RD/E----- M7-6 V/F/E-----

65

69

73

77 Motive 8 M8 -----

81 M8-2 V/F -----

85 M8-3 V/E -----

89

93

M8-4 V/F/E -----

97 Motive 9 M9 -----

101 M9-2 V/E -----

105

109

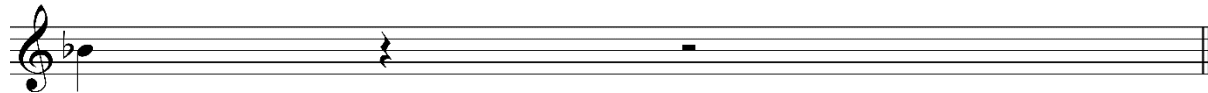
113 M9-3 V/F ---- M9-4 V/A ---- M9-5 V/A ----

117 M9-6 V/A ---- M9-7 V/A ----

121

125

129



# MAS Solo on Green Dolphin Street 1st Phase - Motivic Development/Continuity

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...	RD
Augmentation.....	A
Diminution.....	D
Extension.....	E

Motive 1 - M1 ----- M1 V/F/E-----

C<sup>Δ</sup> C<sup>-7</sup>

5 M1 V/F ----- M1 V/F/RD -----

D<sup>7</sup>/C D<sup>b</sup>/C C<sup>Δ</sup>

9 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup>

13 F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup> G<sup>7</sup>

17 C<sup>Δ</sup> C<sup>-7</sup>

Intonation: slightly flat -----

21 D<sup>7</sup>/C D<sup>b</sup>/C C<sup>Δ</sup>

Intonation: slightly flat -----

25 D<sup>-7</sup> D<sup>-7</sup>/C B<sup>∅</sup> E<sup>7</sup> A<sup>-7</sup> A<sup>-7</sup>/G F<sup>#∅</sup> B<sup>7</sup>

Intonation questionable: Slipped into key of B ----- Intonation: slightly flat -----

29 E<sup>-7</sup> A<sup>-7</sup> D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>-7</sup> G<sup>7</sup>

33 C<sup>Δ</sup> C<sup>-7</sup>

Motive 2 - M2 - M2V -----

37 D<sup>7</sup>/C D<sup>b</sup>/C C<sup>Δ</sup>

M2 V/E -----

41 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup>

45 F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup> G<sup>7</sup>

49 C<sup>Δ</sup> C<sup>-7</sup>

53 D<sup>7</sup>/C D<sup>b</sup>/C C<sup>Δ</sup>

Intonation questionable -----

57 D<sup>-7</sup> D<sup>-7</sup>/C B<sup>ø</sup> E<sup>7</sup> A<sup>-7</sup> A<sup>-7</sup>/G F<sup>#ø</sup> B<sup>7</sup>

61 E<sup>-7</sup> A<sup>-7</sup> D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>-7</sup> G<sup>7</sup>

65 C<sup>Δ</sup> C<sup>-7</sup>

Motive 2 - M2 -----

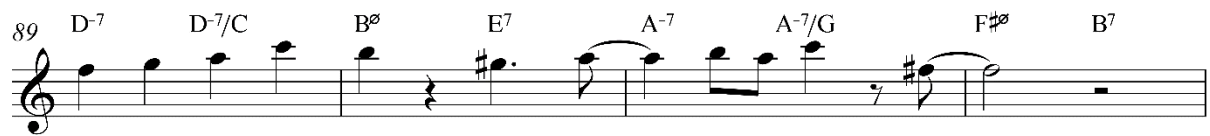
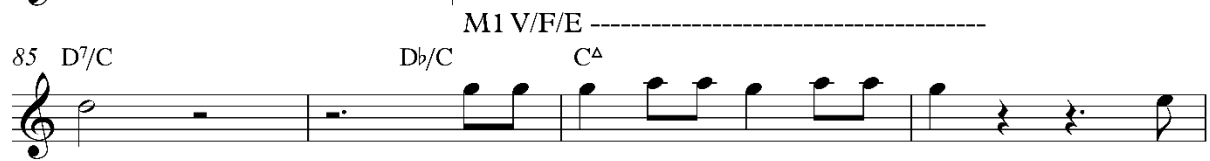
69 D<sup>7</sup>/C D<sup>b</sup>/C C<sup>Δ</sup>

M2 V ----- M2 V/F/E-----

73 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup>

77 F<sup>-7</sup> B<sup>b7</sup> E<sup>bΔ</sup> G<sup>7</sup>

Motive 3 - M3 ----- M3 V -----



# MAS Solo on My Funny Valentine 1st Phase - Motivic Development/Continuity

Variation.....V  
 Fragmentation..... F  
 Rhythmic Displacement...RD  
 Augmentation.....A  
 Diminution.....D  
 Extension.....E

Cm G7(b9) Cm7 F7

5 Abmaj7 Fm7 Dm7(b5) G7(b9)

Motive 1 - M1 M1-2 V/RD M1-3 V/RD M1-4 V/RD/E-----

9 Cm G7(b9) Cm7 F7

Motive 2 - M2-- M2-2 F ----- M2-2 V/E -----

13 Abmaj7 Fm7 Cm7 Fm7 Bb7

Motive 3 - M3 ----- M3-2 F/E -----

17 Ebmaj7 Fm7 Gm7 Fm7 Ebmaj7 Fm7 Gm7 Fm7

M3-3 F/A ----- M3-4 F/A/E -----

21 Ebmaj7 G7 Cm7 Abmaj7 Dm7(b5) G7(b9)

25 Cm G7(b9) Cm7 F7

29 Abmaj7 Dm7(b5) G7(b9) Cm7 Bbm7 A7 ---

--- Motive 4 - M1 M4-2 V/E --- M4-3 V/A/E -----

33 Abmaj7 Fm7 Bb7 Ebmaj7 Dm7(b5) G7(b9)

3

37 Cm G7(b9) Cm7 F7

-- Motive 5 - M5 M5-2 V/E ----- M5-3 V/E -----

41 A♭maj7 Fm7 Dm7(b5) G7(b9)

45 Cm G7(b9) Cm7 F7

49 A♭maj7 Fm7 Cm7 Fm7 B♭7

Motive 6 - M6 -- M5-2 V//RD/E ----- M5-2 V/E -----

53 E♭maj7 Fm7 Gm7 Fm7 E♭maj7 Fm7 Gm7 Fm7

57 E♭maj7 G7 Cm7 A♭maj7 Dm7(b5) G7(b9)

61 Cm G7(b9) Cm7 F7

65 A♭maj7 Dm7(b5) G7(b9) Cm7 B♭m A7

69 A♭maj7 Fm7 B♭7 E♭maj7 Dm7(b5) G7(b9)

# MAS Solo on Invitation Phase 3 - Motivic Development/Continuity

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...	RD
Augmentation.....	A
Diminution.....	D
Extension.....	E

Motive 1 - M1 ----- M1 V/E-----

Cm<sup>7</sup>

5 M1 - V ----- M1 - V ----- M1 - V -----

Cm<sup>7</sup> F<sup>7</sup> Bb<sup>7</sup>(b9)

9 M1 - V/E----- M1 - V/E-----

Ebm<sup>7</sup> Ebm<sup>7</sup>

13 M1 - V/F ----- M1 - V/E-----

Ebm<sup>7</sup> Ab<sup>7</sup> Db<sup>7</sup>

Motive 2 - M2 ----- M2 - RD/V -----

17 Dbm<sup>7</sup> Gb<sup>7</sup> Bm<sup>7</sup>

M2 - E/RD/V ----- M1 - V/E----- M1 - V/E-----

21 Bm<sup>7</sup> E<sup>7</sup> Cm<sup>7</sup>

25 Am<sup>7</sup> D<sup>7</sup> Gm<sup>7</sup>  $\text{‰}$

M1 - V/RD/A -----

29 Em<sup>7(b5)</sup> Eb<sup>7</sup> D<sup>7(b9)</sup> G<sup>7(b9)</sup>

M1 - V/E-----

33 Cm<sup>7</sup>  $\text{‰}$   $\text{‰}$   $\text{‰}$

M1 - V/E----- M1 - V----- M1 - V/E-----

37 Cm<sup>7</sup> F<sup>7</sup> Bb<sup>7(b9)</sup>  $\text{‰}$

M1 - V/E-----

41 Ebm<sup>7</sup>  $\text{‰}$  B<sup>7</sup>  $\text{‰}$

M1 - RD/V----- M1 - E/RD/V-----

45 D<sup>7(b9)</sup> Bb<sup>7(b9)</sup> D<sup>7(b9)</sup>  $\text{‰}$

49 Cm<sup>7</sup> Cm<sup>7</sup> Cm<sup>7</sup>  $\text{‰}$

M1 V/E----- M1 V/A-----

53 Cm<sup>7</sup> F<sup>7</sup> Bb<sup>7</sup>(b9) %

M1 V/D/RD-----

57 Ebm<sup>7</sup> % % %

--(cont.)-----

61 Ebm<sup>7</sup> Ab<sup>7</sup> Db<sup>7</sup> %

M1 - V/A----- M1 - V/A/E-----

65 Dbm<sup>7</sup> Gb<sup>7</sup> Bm<sup>7</sup> %

M1 - V/E----- M1 - V/E-----

69 Bm<sup>7</sup> E<sup>7</sup> Am<sup>7</sup> %

M1 - V/E-----

73 Am<sup>7</sup> D<sup>7</sup> Gm<sup>7</sup> %

77 Em<sup>7</sup>(b5) Eb<sup>7</sup> D<sup>7</sup>(b9) G<sup>7</sup>(b9)

M1 - V/A/E ----- M1 - V/A/E -----

81 Cm<sup>7</sup> / / /

M1 - V/E -----

85 Cm<sup>7</sup> F<sup>7</sup> Bb<sup>7</sup>(b9) /

M1 - V/F/A/E ----- M1 - V/E -----

89 Ebm<sup>7</sup> / B<sup>7</sup> /

M1 - V/E -----

93 Fm<sup>7</sup>(b5) Bb<sup>7</sup>(b9) Ebm(maj7) /

97 Cm<sup>7</sup>

# MAS Solo on Skating in Central Park Phase 3- Motivic Development/Continuity

Variation.....V  
 Fragmentation.....F  
 Rhythmic Displacement...RD  
 Augmentation.....A  
 Diminution.....D  
 Extension.....E

J. Lewis

Motive 1- M1 ----- M1 -----

$A\flat\text{maj}^7$   $\text{\textbackslash/}$   $\text{\textbackslash/}$   $\text{\textbackslash/}$

5 M1 - V/A/D ----- M1 - V -----

$B\flat\text{m}^7$   $E\flat^7$   $A\flat\text{maj}^7$   $D^7$

Motive 2 - M2 ----- M2 V/E -----

9  $D\flat\text{maj}^7$   $G^7(\flat 9)$   $C\text{m}^7$   $F^7(\flat 9)$

M2 V/E -----

13  $B\flat\text{m}^7$   $E\flat^7$   $A\flat\text{maj}^7$   $E\flat^7(\text{sus}4)$

M1 - A/D ----- M1 - RD/D -----

17  $A\flat\text{maj}^7$   $\text{\textbackslash/}$   $\text{\textbackslash/}$   $\text{\textbackslash/}$

M1 - V/F/E ----- M1 - V/F/E -----

21  $B\flat\text{m}^7$   $E\flat^7$   $A\flat\text{maj}^7$   $D^7$

Motive 3 - M3 ----- M3 - V/D -----

25  $D\flat\text{maj}^7$   $G^7(\flat 9)$   $C\text{m}^7$   $F^7(\flat 9)$

M3 - V/E -----

29 Bbm<sup>7</sup> Eb<sup>7</sup> A<sup>b</sup>maj<sup>7</sup>  $\text{‰}$

Motive 4 - M4 ----- M4 - V -----

33 Dbm<sup>7</sup> Dbm<sup>7</sup>/C Dbm<sup>7</sup>/B Dbm<sup>7</sup>/B<sup>b</sup>

M4 - V/RD -----

37 Bmaj<sup>7</sup> Bmaj<sup>7</sup>/A<sup>#</sup> Bmaj<sup>7</sup>/G<sup>#</sup> Bmaj<sup>7</sup>/F<sup>#</sup>

M4 - V/E ----- M4 - V/E ----- M4 - V/E -----

41 Fm<sup>7</sup>(b<sup>5</sup>)  $\text{‰}$  B<sup>b</sup>7(b<sup>9</sup>)  $\text{‰}$

45 Dbm<sup>7</sup>  $\text{‰}$  Eb<sup>7</sup>(b<sup>9</sup>) Eb<sup>7</sup>

M1 - E/D ----- M1 - RD/F/E -----

49 A<sup>b</sup>maj<sup>7</sup>  $\text{‰}$   $\text{‰}$   $\text{‰}$

M1 - V/F/E-----

53 Bbm<sup>7</sup> Eb<sup>7</sup> A<sup>b</sup>maj<sup>7</sup> D<sup>7</sup>

57 D<sup>b</sup>maj<sup>7</sup> G<sup>7</sup>(b<sup>9</sup>) Cm<sup>7</sup> F<sup>7</sup>(b<sup>9</sup>)

61 Bbm<sup>7</sup> Eb<sup>7</sup> Abmaj<sup>7</sup> Eb<sup>7</sup>(sus4)

M1 - V/RD -----

M1 - V/RD -----

65 Abmaj<sup>7</sup> / / /

M1 - V/D -----

M1 - F/RD/E -----

69 Bbm<sup>7</sup> Eb<sup>7</sup> Abmaj<sup>7</sup> D<sup>7</sup>

M1 - F/RD ---

M1 - F/V/RD -----

M1 - E/RD -----

73 Dbmaj<sup>7</sup> G<sup>7</sup>(b9) Cm<sup>7</sup> F<sup>7</sup>(b9)

----- (cont.) -----

77 Bbm<sup>7</sup> Eb<sup>7</sup> Abmaj<sup>7</sup> Eb<sup>7</sup>(sus4)

M1 - F/V/RD -----

M1 - F/V/RD -----

81 Abmaj<sup>7</sup> / / /

M1 - E/F/RD -----

85 Bbm<sup>7</sup> Eb<sup>7</sup> Abmaj<sup>7</sup> D<sup>7</sup>

Motive 5 - M5 -----

M5 - V/D -----

89 Dbmaj<sup>7</sup> G<sup>7</sup>(b9) Cm<sup>7</sup> F<sup>7</sup>(b9)

M5 - V/D ----- M5 - F/E -----

93 Bbm<sup>7</sup> Eb<sup>7</sup> Abmaj<sup>7</sup> /

Motive 6 - M6 ----- M6 - F -----

97 Dbm<sup>7</sup> Dbm<sup>7</sup>/C Dbm<sup>7</sup>/B Dbm<sup>7</sup>/Bb

M6 - F/V ----- M6 - V/E -----

101 Bmaj<sup>7</sup> Bmaj<sup>7</sup>/A Bmaj<sup>7</sup>/G Bmaj<sup>7</sup>/F

----- (cont.) ----- Motive 7 - M7 -----

105 Fm<sup>7</sup>(b5) / Bbm<sup>7</sup>(b9) /

M7 - V/D -----

109 Dbm<sup>7</sup> / Eb<sup>7</sup>(b9) Eb<sup>7</sup>

M7 - V/A ----- M7 - V/F ----- M7 - V/D -----

113 Abmaj<sup>7</sup> / / /

M1 - F/E/RD -----

117 Bbm<sup>7</sup> Eb<sup>7</sup> Abmaj<sup>7</sup> D<sup>7</sup>

121 Dbmaj<sup>7</sup> G<sup>7</sup>(b9) Cm<sup>7</sup> F<sup>7</sup>(b9)

125 Bbm<sup>7</sup> Eb<sup>7</sup> Abmaj<sup>7</sup> Eb<sup>7</sup>(sus4)

A musical staff in G-flat major (three flats) showing measures 125 through 128. The staff contains a series of chords: Bbm<sup>7</sup> (B-flat major 7th), Eb<sup>7</sup> (E-flat major 7th), Abmaj<sup>7</sup> (A-flat major 7th), and Eb<sup>7</sup>(sus4) (E-flat major 7th suspended 4th). The notes are written as half notes and quarter notes, mostly on the lower half of the staff.

129 Abmaj<sup>7</sup>

A musical staff in G-flat major (three flats) showing measure 129. The staff contains a single chord, Abmaj<sup>7</sup> (A-flat major 7th), written as a half note on the lower half of the staff. The staff ends with a double bar line.

# MAS Solo on You'd Be So Nice to Come Home To Phase 2- Motivic Development

Variation.....	V
Fragmentation.....	F
Rhythmic Displacement...RD	
Augmentation.....	A
Diminution.....	D
Extension.....	E

**A** Motive 1 - M1----- M1 - V -----

6 M1 - V/F ----- M1 - V/RD/F --- (first fragment of M1) M1 - V/F -----

10 M1 - V/F/D -----

14 E<sup>o</sup> Ebm<sup>7</sup> Ab<sup>7</sup> A<sup>o</sup> D<sup>7</sup>

**B** Motive 2 - M2----- M2 - E/D ----- M2 - E -----

18 G<sup>-7</sup> A<sup>o</sup> D<sup>7</sup> G<sup>-7</sup>

22 M2 - V/D -----

26 E<sup>o</sup> Bbmaj<sup>7</sup>/F A<sup>o</sup> D<sup>7</sup> G<sup>-7</sup>

Motive 3 - M3 -----

30 C<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> Bb<sup>Δ</sup> A<sup>o</sup> D<sup>7</sup>

34 **C** M3 (cont.) ----- M3 - F/E -----

G<sup>-7</sup> A<sup>∅</sup> D<sup>7</sup> G<sup>-7</sup>  $\frac{3}{4}$

38 M3 - V/F/E ----- M3 - V/F/E/RD ----- M3 - V/F -----

F<sup>-7</sup> Bb<sup>7</sup> Eb<sup>Δ</sup>

42 M3 - V/F ----- M3 - V/RD/E -----

A<sup>∅</sup> D<sup>7</sup> A<sup>∅</sup> D<sup>7</sup> G<sup>-7</sup> G<sup>-7</sup>/F

46 E<sup>∅</sup> Ebm<sup>7</sup> Ab<sup>7</sup> A<sup>∅</sup> D<sup>7</sup>

50 **D** M3 - V -----

G<sup>-7</sup> A<sup>∅</sup> D<sup>7</sup> G<sup>-7</sup>  $\frac{3}{4}$

54 F<sup>-7</sup> Bb<sup>Δ</sup> Eb<sup>Δ</sup>

58 Motive 4 - M4 ----- M4 - V -----

E<sup>∅</sup> Bbmaj<sup>7</sup>/F A<sup>∅</sup> D<sup>7</sup> G<sup>-7</sup>

62 C<sup>7</sup> C<sup>-7</sup> F<sup>7</sup> Bb<sup>Δ</sup> A<sup>∅</sup> D<sup>7</sup>

66 **E** G<sup>-7</sup>

# MAS Solo on Yesterdays Phase 3 - Motivic Development/Continuity

Variation.....V  
 Fragmentation.....F  
 Rhythmic Displacement...RD  
 Augmentation.....A  
 Diminution.....D  
 Extension.....E

J. Kern

Motive 1 - M1 ----- M1 - V/E -----

Dm<sup>7</sup> Em<sup>7</sup>(b5) A<sup>7</sup>(b9) //

6 M1 - F/V/E ----- M1 - F/V/E -----

Dm<sup>7</sup> Bm<sup>7</sup>(b5) E<sup>7</sup>(b9)

10 A<sup>7</sup> D<sup>7</sup> G<sup>7</sup> C<sup>7</sup>

14 Cm<sup>7</sup> F<sup>7</sup> Bbmaj<sup>7</sup> Ebmaj<sup>7</sup> Em<sup>7</sup>(b5) A<sup>7</sup>(b9)

Motive 2 - M2 ----- M2 - E -----

18 Dm<sup>7</sup> Em<sup>7</sup>(b5) A<sup>7</sup>(b9) //

M2 - V/F/E ----- M2 - V/F/E -----

22 Dm<sup>7</sup> Bm<sup>7</sup>(b5) E<sup>7</sup>(b9)

Motive 3 - M3 ----- M3 - V ----- M3 - V/F/E ----- M3 - V/F/E -----

26 A<sup>7</sup> D<sup>7</sup> G<sup>7</sup> C<sup>7</sup>

30 Cm<sup>7</sup> F<sup>7</sup> B<sup>b</sup>maj<sup>7</sup> E<sup>b</sup>maj<sup>7</sup> Em<sup>7</sup>(b<sup>5</sup>)

33 E<sup>b</sup>7 Dm<sup>7</sup> Em<sup>7</sup>(b<sup>5</sup>) A<sup>7</sup>(b<sup>9</sup>)

36 Dm<sup>7</sup> Em<sup>7</sup>(b<sup>5</sup>) A<sup>7</sup>(b<sup>9</sup>) //

Motive 4 - M4 ----

M4 V/RD -----

40 Dm<sup>7</sup> Bm<sup>7</sup>(b<sup>5</sup>) E<sup>7</sup>(b<sup>9</sup>)

Intonation slightly flat.....

M4 V/RD -----

M4 V/RD -----

M4 V/RD/D -----

44 A<sup>7</sup> D<sup>7</sup> G<sup>7</sup> C<sup>7</sup>

slips out of tune by a semi-tone

48 Cm<sup>7</sup> F<sup>7</sup> B<sup>b</sup>maj<sup>7</sup> E<sup>b</sup>maj<sup>7</sup> Em<sup>7</sup>(b<sup>5</sup>) A<sup>7</sup>(b<sup>9</sup>)

back in tune.....

52 Dm<sup>7</sup> Em<sup>7</sup>(b<sup>5</sup>) A<sup>7</sup>(b<sup>9</sup>) //

56 Dm<sup>7</sup> straight  $\text{V}$  Bm<sup>7</sup>(b5) E<sup>7</sup>(b9)

Motive 5 - M5 ----- M5 V/D -----

60 A<sup>7</sup> D<sup>7</sup> G<sup>7</sup> C<sup>7</sup>

64 Cm<sup>7</sup> F<sup>7</sup> B<sup>b</sup>maj<sup>7</sup> E<sup>b</sup>maj<sup>7</sup> Em<sup>7</sup>(b5)

67 E<sup>b</sup>7 Dm<sup>7</sup> Em<sup>7</sup>(b5) A<sup>7</sup>(b9)

# MAS Solo on You Stepped Out of a Dream Phase 2 - Motivic Development

Variation.....V  
 Fragmentation.....F  
 Rhythmic Displacement...RD  
 Augmentation.....A  
 Diminution.....D  
 Extension.....E

Motive 1 - M1-----

**A** C<sup>Δ</sup>

M1- F/D/RD ----- M1- F/E/V -----

5 Bb<sup>-7</sup> Eb<sup>7</sup> Ab<sup>Δ</sup>

M1- E/F/D/V -----

9 G<sup>-7</sup> C<sup>7</sup> F<sup>Δ</sup>

M1- V/A -----

13 A<sup>-7</sup> D<sup>7</sup> Eb<sup>-7</sup> Ab<sup>7</sup> D<sup>-7</sup> G<sup>7</sup>

**B** M1- V/D ----- M1- V/D ----- M1- V/RD/E -----

17 C<sup>Δ</sup> Db<sup>Δ</sup>

--- (cont.)--- M1- V/RD/E -----

21 Bb<sup>-7</sup> Eb<sup>7</sup> Gb<sup>7</sup> F<sup>7</sup>

Motive 2 - M2 ----- M2 - V/F -----

25 D<sup>ø7</sup> G<sup>7</sup> E<sup>-7</sup> A<sup>7</sup>

M2 - V ----- Motive 3 - M3 -----

29 D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup> D<sup>-7</sup> G<sup>7</sup>

33 **C** M3 - V/E ----- M3 - V -----  
C<sup>Δ</sup> D<sup>bΔ</sup>

37 M1 - V/E ----- M3 - V ----- M3 - V -----  
B<sup>b-7</sup> E<sup>b7</sup> A<sup>bΔ</sup>

41 --(cont.) - M3 - V/RD -- M3 - V ----- M3 - V/RD -----  
G<sup>-7</sup> C<sup>7</sup> F<sup>Δ</sup>

45 A<sup>-7</sup> D<sup>7</sup> E<sup>b-7</sup> A<sup>b7</sup> D<sup>-7</sup> G<sup>7</sup>

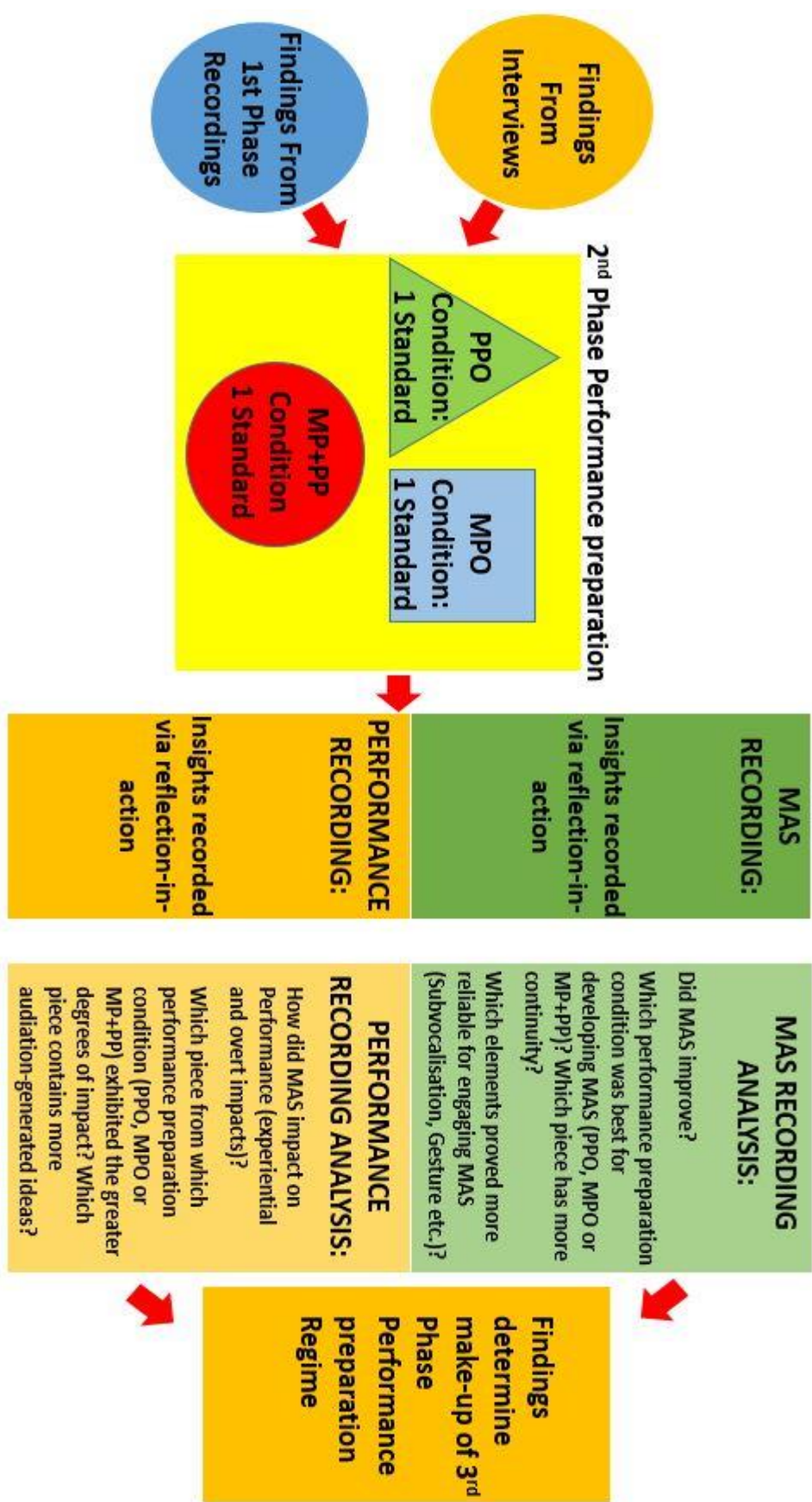
49 **D** M2 - V -----  
C<sup>Δ</sup> D<sup>bΔ</sup>

53 M2 - V ----- M2 - V/F/E -----  
B<sup>b-7</sup> E<sup>b7</sup> G<sup>7</sup> F<sup>7</sup>

57 M1 - V/E -----  
D<sup>ø7</sup> G<sup>7</sup> E<sup>-7</sup> A<sup>7</sup>

61 M2 - V/E -----  
D<sup>-7</sup> G<sup>7</sup> C<sup>Δ</sup>

APPENDIX L – The Iterative Process



## APPENDIX M – Manipulative Aural Skills Recordings

### Contents of Disk

Piece	Track Number	Composer	Approximate Duration (min:sec)
<b>Green Dolphin Street (1<sup>st</sup> Phase Recording)</b>	<b>1</b>	<b>Bronislaw Kaper</b>	<b>02:55</b>
<b>My Funny Valentine (1<sup>st</sup> Phase Recording)</b>	<b>2</b>	<b>Richard Rogers</b>	<b>02:48</b>
<b>You Stepped Out Of A Dream</b>	<b>3</b>	<b>George Shearing</b>	<b>01:53</b>
<b>You'd Be So Nice To Come Home To</b>	<b>4</b>	<b>Cole Porter</b>	<b>01:49</b>
<b>How Deep Is The Ocean</b>	<b>5</b>	<b>Irving Berlin</b>	<b>02:17</b>
<b>Skating in Central Park</b>	<b>6</b>	<b>John Lewis</b>	<b>02:34</b>
<b>Invitation</b>	<b>7</b>	<b>Bronislaw Kaper</b>	<b>02:31</b>
<b>Yesterdays</b>	<b>8</b>	<b>Jerome Kern</b>	<b>02:20</b>
<b>All Or Nothing AT All</b>	<b>9</b>	<b>Arthur Altman</b>	<b>02:02</b>
<b>Lazy Bird</b>	<b>10</b>	<b>John Coltrane</b>	<b>01:33</b>
<b>Nica's Dream</b>	<b>11</b>	<b>Horace Silver</b>	<b>02:46</b>
<b>Night Dreamer</b>	<b>12</b>	<b>Wayne Shorter</b>	<b>01:25</b>
<b>Green Dolphin Street (4<sup>th</sup> Phase Recording)</b>	<b>13</b>	<b>Bronislaw Kaper</b>	<b>01:46</b>
<b>My Funny Valentine (4<sup>th</sup> Phase Recording)</b>	<b>14</b>	<b>Richard Rogers</b>	<b>02:00</b>

