Learning to improvise as a Western classical musician: a psychological self-study

By

Jonathan Ayerst

Submitted in partial fulfilment of the requirements for the degree of

Doctor of Philosophy in the Department of Music

The University of Sheffield

2021

ABSTRACT

This thesis is an autoethnographic self-study of learning to improvise in classical styles. As a professional musician trained in interpretive performance, acquiring the skills of improvisation had been a long-term musical and artistic ambition; in addition I was intensely curious as to investigate the reasons why I, as a trained classical musician, felt unable to improvise. Over a period of three years I recorded, analysed and reflected on my progress from novice to expert (my first public improvisations in Baroque style), a process which provided me with detailed insights into the conscious experience of improvising at all stages of learning. Initially, I encountered difficulties in making musical decisions and felt unable to take creative ownership over the task. These cognitive and emotional barriers to improvising I traced to attitudes of *Werktreue* fidelity to the score and a sense of role in serving every detail of a written score - attitudes acquired through institutionalised training in interpretive performance. Through learning strategies and increasing agency I discovered a new way of perceiving musical texture and form, these new perceptions being based on a conceptual impression of underlying structural principles and relationships which could be realised in many different ways. Generating my own music increasingly through these conceptual mental representations I gained a better control over the task, allowing me to improvise imaginatively but within rule-bound systems. Throughout the thesis I compare and contrast the lived experience of my study with cognitive theories of improvised performance and learning to improvise. In addition I draw on a wider range of literature (outside of music cognition): theories of memory and attention, biological theories of consciousness, implicit learning, second language and adult learning, ideology and social philosophy to gain insights into all relevant aspects of my study experience. As a result this study offers a novel range of perspectives and insights into the cognitive processes of improvising throughout learning, while also articulating the cultural issues arising from a classically-trained musician learning to improvise in a predominantly non-improvising musical practice.

DEDICATION

To my wife, Steph

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Chapter 1

1.1 Introduction

The idea for this thesis emerged as I finished my masters (MA) dissertation, a short self-study of trying to improvise a Baroque-style Fugue. The experience of this short, ten-day study whetted my appetite for a more lengthy investigation as I realised the enormous potential of developing skills in improvisation through systematically observing and reflecting on one's own learning process. For many years I had wanted to improvise. Although I had achieved a busy career as a professional pianist, organist and choir director, I felt that something was missing from my musical experience. I felt 'locked out' of the music I performed and interpreted: I wanted to be more creative, to make up my own music, to feel more equal to the composer. Looking back on my earliest musical experiences I recalled long-forgotten attempts to compose and improvise music, but realised that I had dropped these interests as my interest in music intensified. To compose or improvise had played no part in my formal musical education, which was focused entirely on acquiring instrumental skills towards a career in interpretive performance. Just as this career path had opened up in front of me as the only viable goal worth aiming for, so had I entirely identified my musical ambitions with this goal. I'd worked exclusively towards technical perfection and professional-level interpretations of a canonic repertoire, neglecting any other branch of musical activity.

Years later, the vicissitudes of a musician's life unexpectedly brought me into sharp contact with improvisation. Taking a much-needed job as a dance pianist, I'd had to quickly acquire skills in improvisation in order to accompany the dancers in exercises which were created in the moment. For a while I'd also taught free improvisation to school children in Portugal as a general education in creative music making. However these skills left me still

frustrated. I could improvise for dance - a highly-stylised musical product - using a limited amount of musical material, but I couldn't develop or even control this improvising very well. I could also improvise in a contemporary style with more sense of freedom, but this was not what I really wanted to do. What I couldn't do was improvise on the musical models of repertoire which I felt drawn to. If I tried to improvise a Baroque Prelude and Fugue, or a sonata in classical or romantic style for example, I didn't know where to start. Anything I tried sounded awful and I usually stopped feeling demotivated.

My ambition for the PhD was therefore (i) to learn to improvise in a defined historical style, and (ii) to be able to exercise some degree of conscious control over the form of my improvising. Therefore, instead of just trying to improvise and hoping for the best, I wanted to balance conscious intentions and planning with the constraints of the moment; to follow my imagination, but also master the techniques of musical construction. In this way I arrived at the idea of improvising on particular models of classical music which had a clear, transparent form, and also genres which featured strict contrapuntal imitation. Having made no progress in this style of improvising meant that I could approach the work as a novice which would be interesting for the study. I was confident that, within a research framework I would be able to identify and overcome the obstacles that had previously defeated me. Therefore, in addition to this being a study in skill-learning I hoped also to acquire knowledge about the learning process itself: what did I need *to do*, and what did I need *to know* or *to change* in order to improvise? These broad aims therefore became my 'research inquiry' from which all other decisions flowed (Nelson, 2013).

1.2 A brief explanation of my approach to the study

As this was a learning study I also had to develop a methodology as I gained experience. In principle I followed three separate directions of study which, although running

in parallel, also produced a constant stream of insights and information which greatly enriched and informed the learning process and experience of improvising. These were: (1) practicing the skills of improvisation, which began in a general way to model my improvising on remembered compositional models taken from a wide historical range; but later developed into a more focused, analytical study of Baroque models (especially Preludes and Fugues, Chorale Variations). (2) autoethnographic techniques of data collection suitable for a self-study: principally, keeping a journal to document improvisation sessions, noting my aims and objectives before improvising, and reflecting on the actual experience afterwards. I also made audio and video recordings of my practice and improvised performances. Lastly. (3) I made extensive enquiries into cognitive psychological literature on any subject which seemed relevant to the experience of improvisation and skill learning.

At the beginning I studied alone, using emerging insights and data from the research process, also my previous experience as a professional musician, to orientate this work. I was in constant contact with two academic tutors who helped me to maintain objectivity, perspective and focus. After one year of solitary study I felt confident enough to improvise in public and enrolled on a course of thirteen (sixty minute) lessons with Jürgen Essl (organist and professor of improvisation at the HMDH Staatliche für Musik und Darstellende Kunst, Stuttgart), which took place over a period of fourteen months. This experience greatly accelerated my development as an improviser and I was able to plan for a public performance by the end of my third year of study.

1.3 Main aims and research questions.

The more I read the existing cognitive literature of musical improvisation I felt this research had become too preoccupied with analysing expert improvisation. This was reasonable in the sense that experts showed a marked difference in their behaviour from

'normal', non-improvising musicians, being fluent in their expertise. However, most of these studies observed experts from outside and speculated in a logical way about what *must* or *should* be occurring in cognitive terms. The results and findings of these studies, couched in terms of information processing, had little to do with the actual experience of trying to improvise which, for me, was dominated by strong negative emotions, doubts about how to best organise my thoughts, and self-critical feedback. Clearly then, by documenting this experience and by gradually aligning it with expertise I hoped to fill an existing gap in knowledge using autoethnographic techniques of documentation and reflection. I also felt that there was also little recognition of the experience of improvising within a specific cultural context - namely that of Western classical music, in which improvisation had been largely erased from mainstream musical practice and pedagogy (Moore, 1992; Hill,2017). As a self-study of a practising musician situated within the culture of classical music my study would specifically address the relationship between improvisation and cultural values and beliefs concerning improvisation, building … 'a broad palette of personal experience and socially-founded perspectives on which specific musical and social interpretations can be based … to understand how it feels and what it means to engage in a particular form of music making' as Stock (2004, p.25) suggests. Addressing these broader research concerns, I was able to formulate my own goals and objectives in the following questions:

1. Why couldn't I improvise? I was an experienced musician with an extensive knowledge of musical structure and instrumental technique. What was wrong or inappropriate about my existing knowledge?

2. What kind of knowledge did expert improvisers possess or use? Did they acquire particular techniques for representing and encoding musical structure?

3. Was improvising skill dependent on personality or emotions? Was I the wrong type of personality? Could I learn to improvise purely by conquering my emotions and critical feedback? Or by becoming less inhibited, more confident about improvising?

These general questions provided the background for more specific questions.

4. Why could I improvise in free, atonal styles but not using historical, tonal languages and genres?

5. Why did I find it so difficult to improvise according to a planned musical structure? How could conscious instructions be incorporated into my improvising without inhibiting the flow of imagination and fluency?

This mixture of general and specific questions initiated a path of learning which was open-ended as I had no preconceived notions of what I might discover, no specific waypoints to anticipate. They (the questions) also usefully reflect the mindset with which I started my study, capturing something I later thought of as rather naive in the attitude and expectations I had towards improvisation at this stage. I therefore return to these questions later in the thesis (see Chapter 9), to answer them in the light of knowledge and skills acquired during the study itself.

1.4 An overview of the thesis and synopsis of chapters

Chapter 1. Introduces the thesis and briefly explains the scope, layout and approach.

Chapter 2. Reviews all the literature relevant to my study in learning to improvise: from seminal cognitive theories of improvisation and their influence on learning methods, I broaden my theoretical perspective to discuss all aspects of the learning experience: practice-based approaches to research, theories of skill learning, embodied and emotional

learning, the influence of social and cultural context, help to provide a solid conceptual framework within which the individual experience of a self-study can be referenced, compared and understood.

Chapter 3. Explains my autoethnographic approach as the methodology of the study. In this chapter all the problems and challenges of self-study are discussed, especially issues of reliability, trustworthiness, generalisability, which are discussed in relation to similar studies and approaches. I describe my biography, former musical training and experience, so that the impact of my individual approach towards improvising can be better interpreted.

Chapter 4. In this chapter begins the thesis itself. I describe my novice experience of improvising, the emotional and cognitive barriers I encountered and how I overcame these through investigating the root of these barriers in wider socio-cultural values and attitudes towards musical creativity. Towards the end of my first year I gained a degree of cognitive and emotional control over my improvising through a process of $categorisation_1$ in which certain features of the task became familiar and meaningful in my perception.[1]

Chapter 5. I describe a more analytic and organised approach towards learning. I begin identifying specific problems in my improvising which I try to solve through written treatises of improvisation. When these didn't provide the insights I needed, I created my own exercises from compositional models, using these as guides for improvising. These exercises gave me a new $conceptual_1$ impression of musical structure, on which basis I began introducing rules into my learning, most notably Fux's (1725/1971) principles of contrapuntal motion, which gave me a secure basis for constructing harmonic textures in diatonic tonality.

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[1] Throughout the thesis I use the $subscript_1$ to identify mental processes and perceptions experienced during improvisation (see Chapter 8.2.1 for further disambiguation)

Chapter 6. This charts the development of further conceptual control as I begin formal lessons in Baroque organ improvisation with Prof. Jürgen Essl at the Musikhochschule in Stuttgart. In these lessons I learnt how to bring my improvising more closely to the Baroque style, through selecting and abstracting (conceptualising$_1$) characteristic features of particular genres and models of the repertoire. This type of *generative* improvisation allowed me to improvise imaginatively while using explicit stylistic constraints.

Chapter 7. I return to private study, reflecting on skills learnt in Stuttgart and how these now affected my practice strategies. As I was becoming more confident and fluent in my improvising, I discovered that I relied increasingly on implicit, automatic processes and less on conscious, explicit modes of construction. This chapter thus investigates the ways in which implicit learning processes affected my conscious awareness of improvising; discussed with reference to neurological theories of consciousness, also literature in implicit memory and learning.

Chapter 8. This follows the final steps of my learning as I prepare for a first public performance of Baroque-style improvising. Automaticity now characterised most of my improvising which, becoming too fast for conscious modes of control, forced me to 'let go' and develop a more embodied approach towards improvising. Letting go of literal constructions of the task allowed new forms of conscious awareness to emerge which I experienced as a semantic, metaphoric naming and labelling of movements. I also explore an emerging awareness of whole musical forms (while improvising) which I term schemas$_1$. The experience of a first public performance is then described in detail, including the cognitive-emotional techniques used to organise attention and feedback.

Chapter 9. In this last chapter I return to my original research questions which I answer in the light of knowledge and skills gained throughout the study, contextualising and comparing my

experience to similar findings in literature. Therefore, this chapter makes 'a required movement away from the proximal to the distal' (Nelson, 2013, p.46) as I emerge from the study experience itself to critically reflect on the insights I have gained into improvisation and investigate ways in which these insights could be more generally applied to pedagogic situations and research approaches into improvised performance. From this I emphasise the conceptual$_1$ quality of improvising knowledge as the distinguishing feature of expert's flexible, expressive and fast control of musical structure as a spoken language; also that, the acquisition of such a knowledge base requires a more explicit acknowledgement of *Werktreue* idealism in pedagogic contexts.

Chapter 2. A review of relevant literature

This chapter is a summary of and reflection relevant literature concerning improvisation, in particular the cognitive processes of performing and learning to improvise. Because my thesis emerged from the lived experience of self study, I found it necessary to include a wider range of research than that found within the field of musical improvisation. Thus theories of skill learning and memory, implicit knowledge formation, development of conceptual control and the influence of emotions on learning and performance are some of the subjects included to reveal the basic assumptions, theories and approach my thesis and research is built on. In addition I should state that, to clarify the reasons for selecting certain literature from general psychology, I have sometimes anticipated material from the thesis itself. Occurring in cases when the connection between the literature and the thesis might otherwise have been obscure, I thus made explicit my use of the research in providing insights and orienting my learning path.

2.1 Cognitive theories of improvisation

Circling around the seminal writings of Jeff Pressing (1946-2002) who proposed various models for understanding improvisation within a cognitive framework, cognitive researchers have established a body of literature which tries to understand what are the main cognitive processes underlying improvised musical performance, also to account for the way in which expert improvisers (in particular) can manipulate, create and perform musical structure in real time.

2.1.1 Pressing (1988; 1998): a theoretical model for an improviser's knowledge

In Pressing (1988), a comprehensive groundwork for cognitive studies into improvisation is laid out. Terms such as motor control, feedback and error correction, and

time scales for the control of movement, indicate his interest in the overcoming of cognitive

constraints by expert improvisers. Viewed as a form of abstracted skill learning, Pressing is

thus able to propose common features to the experience of learning:

> 'In the early stages, a basic movement vocabulary is being assembled and
> fundamental perceptual distinctions needed for the use of feedback are drawn. In
> intermediate stages, larger action units are assembled, based on stringing together the
> existing movement vocabulary in accordance with the developing cognitive
> framework. These action units begin to enable predictive open-loop response. The
> ability to perceive distinctions is refined considerably, and internal models of action
> and error correction are developed. Expressive fluency begins to appear, characterised
> by a mindful 'letting go'. By the time advanced or expert stages have been reached,
> the performer has become highly attuned to subtle perceptual information and has
> available a vast array of finely timed and tuneable motor programmes. ... All motor
> functions can be handled automatically (without conscious attention) and the
> performer attends almost exclusively to a higher level of emergent expressive control
> parameters' (Pressing, 1988, p.139)

Translated into a musical context, such as my own study of Baroque style

improvisation, would mean that, in early stages, a basic vocabulary such as cadences, typical

embellishments, voice-leading textures, harmonic sequences, and so on are identified by the

individual who practises these fundamental moves in many different keys and combinations.

Intermediate stages would then string these different musical cells together to form longer

phrases and sections, with attention being reorientated to accommodate increasingly

automated production. In a later publication, Pressing (1998), expands this conceptualisation

of expert knowledge for improvisation into two more distinct parts: (1) a generic resource of

... 'musical materials and excerpts, repertoire, sub skills, perceptual strategies, problem-solving routines, hierarchical memory structures and schemas, generalised motor programmes, and more ...' (1998, p.53) described as the *knowledge base* (such as the Baroque cadences, figurations, sequences and voice-leading textures I described); and (2) ... 'a set of cognitive, perceptual, or emotional structures (constraints) that guide and aid in the production of musical materials' (Pressing, 1998, p.52), which he terms the *referent*. In this way, the acquisition of generic musical materials (the cadences, sequences, embellishments and typical figurations of the knowledge base) is also identified with a set of cognitive skills and strategies used for memorising and producing them in real time; while the creation of a new cognitive structure - the *referent* - is used to steer and organise these generalised productions towards a particular form or genre (such as a Gigue, a Prelude and Fugue, a set of Choral Variations) or expressive aim (the chromatic intensity of a Passion movement, the ebullient opening Prelude of an Easter service, and so on).

By dividing expertise into a knowledge base and referent, Pressing raises several important questions for cognitive researchers: for example, what is the connection between the two forms of knowledge? Are they fundamentally the same thing, but accessed in a different way? If so, then what are the skills used to access the knowledge base during improvisation? Also, how are these different kinds of knowledge acquired and experienced by improvisers?

2.1.2 Developments of Pressing's model

By addressing these questions, researchers into musical improvisation have elaborated Pressing's theories. For example, Kenny & Gellrich (2002) borrow computer terminology to describe the knowledge base as *hardware*: ... 'patterns, parts of melodies, chord progressions, modulations, voicings, counterpoint ...' (p.130); leaving the referent to provide the *software*

of the operating system: 'systematic rules that assist with constructing melodies, phrases, and larger musical ideas, working with motifs, and establishing relationships among different parts of the improvisation' (ibid). In this sense, there is little difference in kind between the knowledge base and the referent: for, if the hardware contains general stylistic vocabulary and techniques, then the software merely serves as its application during a particular performance. Similarly, Berkowitz (2010) also refers to the 'facts of the skill domain' i.e., scales, cadence formulas, figurations, sequences, passage work etc., which make up the musical vocabulary of a given style or period, which are then rehearsed repeatedly in order to form a knowledge base. Once these 'facts' are integrated into the improviser's long-term memory, ... 'a stylistically appropriate musical surface can be superimposed upon them. Such a surface structure requires another stock of formulas ...' (p.29). From these accounts we gain further insights into Pressing's original conceptualisation of a generalised knowledge base and a more specific referent.

However, while the distinction between the general and the specific is theoretically transparent, it is not clear what the improviser actually does to access or mobilise these different kinds of knowledge during performance. This question is addressed by other researchers.

2.1.3 Johnson-Laird (2002): overcoming cognitive constraints

Johnson-Laird (2002) uses the knowledge base and referent to frame a theory of performance, asking how improvisers overcome cognitive constraints to generate musical improvisation in real time. He looks at a particular aspect of improvisation 'the ability to extemporise new melodies that fit the chord sequence' (p.415) in jazz improvisation and works backwards to deduce three logical possibilities for the improviser to meet this challenge. Each of these possibilities are proposed as algorithms for creativity, and are

concerned directly with the working relationship between the knowledge base and the referent - i.e., the means of accessing relevant knowledge. The first: (i), a 'neo-Darwinian' algorithm allows generation of new material to be unconstrained, leaving all the work of choice and selection to processes of evaluation which, in live or performed improvisation, would have to take place in the moment. The second, (ii) is described as a 'neo-Lamarckian' algorithm in that the individual, through training only generates appropriate ideas in the moment; this means theoretically that any imagined choice will be acceptable, and thus evaluation during the improvisation is unnecessary. The final (iii) algorithm is a compromise between the two, allowing a degree of selection during performance, on the basis that most of the generated material is appropriate. Johnson-Laird's use of algorithms highlights the reality of cognitive constraints, particularly at the novice stage (see my account of novice improvising in Chap.4) when new material needs to be consciously generated, selected and assessed simultaneously; it also describes plausible ways in which experts may in fact bypass processes of selection in performance.

Johnson-Laird reduces the lived experience of improvisation to a logical or mechanistic view of cognitive constraints as a way of explaining performance. His theory does not therefore look at the choices or decisions an individual performer might make to maintain fluency, i.e., how constraints might be overcome through a more flexible approach to rules or by suppressing critical feedback. His theory also relies on the concept of working memory as a limited processing engine which experts must necessarily bypass (as if musical structure was one type of information), whereas more recent research conceives of working memory in more flexible terms, as an emergent property of all activated and relevant brain systems, as Postle (2006) describes: 'working memory may simply be a property that emerges from a nervous system that is capable of representing many different kinds of information, and that is endowed with flexibly deployable attention' (p.29). Accordingly, if

we conceive of working memory as an emergent feature of conscious awareness rather than a specialised processing system of the brain, then its role in the improvising experience may vary greatly depending on the individual's level of expertise. This better defines the role of working memory as an important aspect of a more general cognitive style of processing, being defined through an individual's preoccupation and interest (i.e., their monitoring and selection) in particular features of the task, and reflecting their previous cognitive engagement with those features. As a result I find Johnson-Laird's purely cognitive approach too limited in scope to be really useful in providing insights into expert performance.

2.1.4 Kleinmintz et al. (2014): the role of feedback and evaluation

Using a similar two-stage model of idea generation and evaluation to explain creativity in improvised performance, Kleinmintz and colleagues (2014) explore how different backgrounds in training and experience affect the second (evaluative) stage of the process. This they measured using 'a continuum ranging from stringent to lenient evaluation' (p.1) on the basis that 'evaluating one's own creative product or that of someone else as deviant may inhibit that individual's ability to generate creative products, thus reducing the number of ideas produced (fluency) and their quality (originality)' (p.2). Because they wanted to see the effect of evaluation on creativity, they purposefully compared non-improvising (classically-trained) musicians with others who regularly practised improvisation in a range of styles. It was thus predicted that a background in classical training would produce effects of conformity in creative idea generation, inhibiting these individuals from fluent or original response. Using a range of specialised creativity tests, the researchers' predictions were born out as they observed musicians who regularly practised improvisation responding more quickly and imaginatively than non-improvisers; behaviour which they attributed to greater leniency regarding the evaluation of creative ideas. Thus, this study provides a theory of

failure to learn which is applicable to real learning situations; situations in which improvisers

constantly inhibit their own creative flow through the assessment criteria they use for

feedback.

2.1.5 Clarke (1988): generating musical structure in real time

Addressing the question of how improvisers generate complex musical structure in

real time, Clarke (1988) proposes three different types of mental representation which help to

organise and access memorised material. The first (i) is through an 'associative chain of

events' by which the flow of new music is cued through association with the music currently

being played. In this scenario an improviser works without a formal plan of any sort,

allowing new material to emerge sequentially as the playing progresses. The second (ii) is

through *hierarchical* representations of musical structure in which all musical events and

decisions can be traced back through the hierarchy to more long-term, structural events.

While this appears to introduce an explicit formal plan, Clarke suggests that such a plan may

be automatically rather than consciously followed, through practice and learning. The last

(iii) is through 'repertoire selection', i.e., cueing known material, formulae and phrases in a

verbatim fashion, which are linked together to form new musical structures through a

'varying degree of relatedness' (Clarke, 1988, p.9).

It is interesting to view these different representations in terms of their operational

effect over improvising. It is certainly possible, as Clarke himself suggests, that some

improvisers rely entirely on the third model, in which only over-learnt automatic productions

are strung together in a modular way. Equally possible is that improvisers use all three of

these mental representations of structure as different techniques for improvising, and for

adapting to the constraints of the moment. Clarke's theoretical models for cognitive

processing of musical structure can be understood as universal (I cannot imagine another,

fourth, way of representing musical structure in real time), and thus provide a theoretical basis for further experimentation. Clarke himself does not offer a reason to select one representation over another and for this reason I found it is useful to reflect on my own mental representations of structure throughout my study, while also noting the effect of different types of representation on the improvising process. More studies of this nature would be needed however before this kind of theory can be usefully applied to learning contexts.

2.1.6 Berkowitz (2010): acquiring an improviser's knowledge

While the cognitive theories so far reviewed describe improvisation in terms of generalised skills, other researchers study the specialised skills associated with improvisation in historical musical idioms. Berkowitz (2010) reviews a number of historical treatises of improvisation (including C.P.E. Bach's *Essay on the true manner of playing keyboard instruments* [1753], and Carl Czerny's *A systematic introduction to improvisation on the pianoforte* [1836]), from which he deduces three pedagogical themes. These are: 1. *Transposition*: in which the same phrase is repeated but in a different key or pitch group, in order to ... 'foster a stronger representation of the formula's components and internal relationships' (p.46); 2. *Variation* of musical formulas, patterns or solutions in order to perceive these ... 'not as fixed phenomena, but as flexible frameworks for future improvisations ...' (p.51); and 3. *Recombination*: a technique by which the improviser recalls memorised material from previous tasks to create new musical structures.

These techniques elaborate the theoretical concept of Pressing's *knowledge base* and *referent* as they describe specific techniques of acquiring both a basic vocabulary of patterns or productions and the means of adapting these to create new musical structures. What is interesting is the way in which Berkowitz describes moving from a particular formula - i.e., a

scale or cadence in the key of F major, to a more abstract representation of the same formula through the pedagogic exercises of transposition, variation and recombination. In effect, by mentally recreating the formula in different situations, the improvisers awareness of musical patterns and formulas becomes freed from the particular and made available in a more generalised, conceptual way, as Berkowitz describes: 'Within the conceptual categories of the knowledge base, core archetypes can coexist with the many varied ways of realising them. The flexibility in realisation of an underlying schema is fundamental to the notion of formula ...' (p.53).

This description of a qualitative change in knowledge - from a literal, score-based perception of musical structure, to a more useful, conceptual perception - corresponds closely to my own learning experience which I describe in this study; yet I differ from Berkowitz when he attributes too much of this process to the pedagogical methods and exercises themselves, as if the mere act of transposing alone ... 'allows for the knowledge base to grow, filling it with formulas in all keys that can be reproduced instantaneously and automatically' (p.45); or *variation* itself which ... 'can foster a stronger representation of the formula's components and internal relationships' (p.46). This may seem a rather subtle distinction, but it is nonetheless extremely important, for, as Vygotsky (1986) states: 'The cultural task per se, however, does not explain the developmental mechanism itself that results in concept formation ... Learning to direct one's own mental processes with the aid of words or signs is an integral part of the process of concept formation.' (p.108). Therefore, Berkowitz, in his review of historical treatises, omits to account for the contribution from the individual in securing insights necessary for skill development.

2.1.7 Callahan (2010): memory and musical structure

Callahan's (2010) investigation of improvisational memory allies cognitive

techniques closely to the musical structure of the keyboard music of the Baroque era. In this

way, Callahan considerably extends purely cognitive models by asking exactly what musical

material or information is learnt by the improviser and how (seemingly fixed) formulae,

patterns and phrases could be recreated to form new, improvised music. Thus he proposes a

model which incorporates both the generic musical texture of this style and the means by

which it can be manipulated: a hierarchical structure of three horizontal layers: *dispositio,*

elaboratio, decoratio. At the base of the hierarchy, a musical structure can be seen as an

ordinal sequence of principal events: the *dispositio*, which, in the case of a free prelude,

might be two or three contrasting sections of different tempi, motifs and related tonalities.

These principal events are realised through musical texture, the *elaboratio*, or middle level in

the hierarchy, containing the voice-leading rules and relationships which bind together

polyphonic and harmonic elements. The voice-leading elements of the *elaboratio* can in turn

be improvised into *decoratio* patterns and textures.

Through the model of *dispositio, elaboratio,* and *decoratio,* Callahan is able to

demonstrate different techniques by which the improviser's task can be elevated beyond the

mere verbatim learning of patterns and formulae, and these can be reduced to two important

principles which are particularly relevant to my own study. The first principle is that each of

the typical basic patterns or formulae mastered by a Baroque keyboard improviser (for

example a cadence or harmonic sequence), is conceptual in nature and thus capable of

considerable variation at the level of the *elaboratio*. This source of improvisational freedom

is illustrated in Figures 1 and 1a.
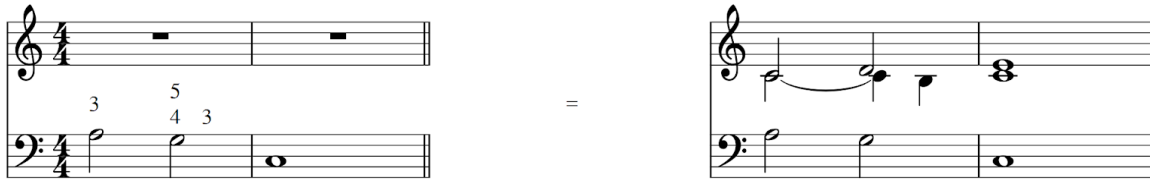
Figure 1. A cadential formula in C major (an element of *dispositio*), yields one solution of the *elaboratio* or voice-leading texture.
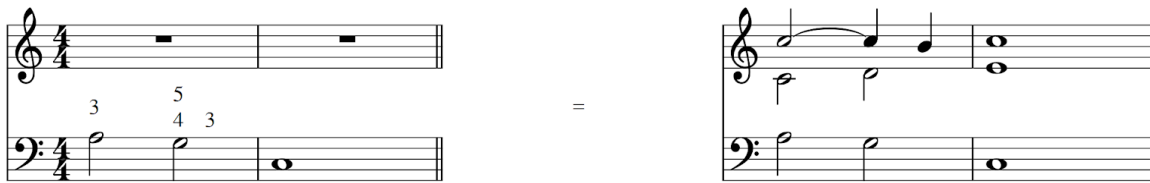
Figure 1a. The same formula yields a different solution of the *elaboratio*

A single element of *dispositio*, a cadential formula in C major, yields one solution of the *elaboratio* or voice-leading texture (Fig.21) which can be inverted without disturbing the original formula (Fig.21a). When we consider the fact that each variation and inversion of voice-leading patterns accepts another level of variation at the level of the *decoratio*, for example, through extended virtuosic scale passages in either of the upper two voices, then Callahan's model illustrates a clear conceptual relationship between underlying principles and 'surface' realisations.

The second principle I have taken from Callahan's work concerns his elaboration of the hierarchical model to provide equality throughout the three levels of the structure. As he describes: ... 'a hierarchical conception allows existing musical material to be digested on several levels simultaneously; an improviser can consider its large-scale organisation, it's more local generating principles, and its surface-level realisation independently ... As a result, he or she can reproduce some aspects of the memorised music while varying others -

applying its motivic content to a different set of skeletal voice-leading progressions (i.e., preserving *elaboratio* while varying *decoratio*), or rendering its same underlying voice leading by means of different diminution formulas (i.e., vice versa)' (p.57). This equality is very important for, given the hierarchical model of structure, it might be assumed that music could only be generated through a series of chords or harmonic events to be elaborated; with the focus of the improviser being directed mostly at the base of the structure, i.e., the *dispositio.* Callahan however, goes some way to rectify this problem, for not only does he describe how Baroque keyboard textures were characteristically constructed through voice-leading relationships at the *elaboratio* level of structure, rather than through mere elaboration of chords, but also how musical structures could be generated through melodic motifs at the *decoratio* level of structure, which are illustrated in Figure 2.
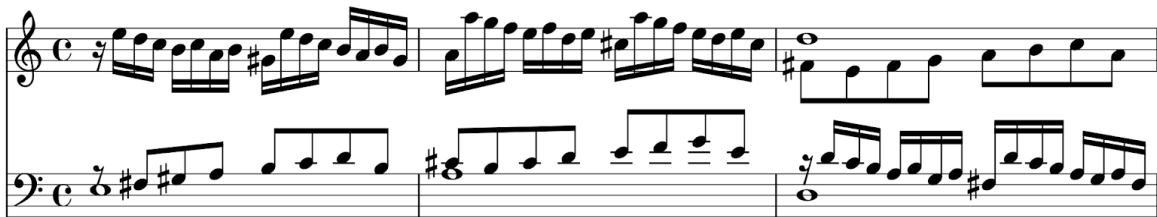
Figure 2. The opening bars of a Toccata in A minor by Georg Muffat (1653-1704).

On one level of analysis, Figure 2 is an elaboration of three harmonic events using stock formulae or figurations. However, it is clear that the musical interest does not lie in the underlying harmony but rather in the level of imitation and contrapuntal relationships at the *elaboratio* and *decoratio* level. Thus, although the music corresponds to a hierarchical construction in theory; in practice (i.e., in an improvised context), the need to continually reconstruct an imitative motivic cell over each chord would compel the improviser to focus on the higher levels of *elaboratio* and *decoratio.* It is this aspect of constructive choice that Callahan explores in his thesis, showing that although the improviser may rely upon an assimilated vocabulary of formulae, these formulae are not fixed at every level to produce

verbatim textures; rather it is a vocabulary of patterns at each independent level of the hierarchy, so that different *decoratio* elements (as in Figure 22) can create new relationships with *elaboratio* voice-leading patterns (over lower-level *dispositio* formulae) in an almost infinite number of combinations.

2.1.8 Summary of cognitive theories of improvisation

The cognitive theories I have selected establish the basic principles of cognitive investigation into improvisation, namely the acquisition of a generalised knowledge base (of musical patterns and automated moves) and its mobilisation in performance through the use of a *referent* (mental representations of musical structure particular to a moment in time). In general, this research reflects on the fluency with which experts seemingly overcome the constraints of novices to create imaginative and expressive new musical structures in real time, and applies the principles of an older body of more generalised research into skill learning. For example Schneider & Fisk (1982) observed that, while learning a new skill, individuals gradually progressed from 'slow, generally serial, effortful, capacity limited' (p.2) performance to qualitatively different kind of control which is 'resource free, autonomous, fast, accurate, and coordinated' (p.3). Clearly, new types of mental representation arise through the extended experience of doing the task, but these crucial qualitative changes in perception and control can only be guessed at by researchers who observe the performance of others, but not the underlying motivations and decisions of the lived experience which leads to this performance.

This makes it difficult for the student of improvisation to use the theories of cognitive research in ways which can inform their learning experience. As Kingscott & Durrant (2010) express: 'students like, at least to begin with, to know what is more convincing or less convincing … when the possibilities are almost infinite, what is a good musical decision?'

(p.128). In my own study I found this particularly frustrating regarding the theses of Berkowitz (2010) and Callahan (2010), which come so close to my own musical-historical field of interest. Callahan (2010), for example, though illustrating not only the musical-structural potential for variation, but also the processes of memory and recall on which this could function, offers no criteria for choice, thus leaving the operation of the theory, to the (mysterious) artistic discretion of the improviser; while Berkowitz (2010), who advances right up to an explanation of the decision making processes behind the theories retreats at the very moment of revelation into a mere naming of the theories involved. Thus, it is ... 'differentiation and coalescence [which] help to explain the reorganisation of the improviser's knowledge base during rehearsal' [Berkowitz, 2010, p.90]; as if the terms 'differentiation' or 'coalescence' themselves possessed implicit powers of communicating knowledge formation and creative decision making.

2.2. Perspectives on learning to improvise

I have criticised the above cognitive theories of improvisation for approaching an improviser's knowledge too impersonally, or even mechanistically, in ways which are difficult to relate to the lived experience of improvising. It is now worth looking at theories which specifically address the experience of learning to improvise in different social situations and contexts and over an extended period of time; also the role of emotions and decision making processes in forming knowledge, and the qualitative changes involved in the progress from novice to expertise.

2.2.1 Kingscott & Durrant (2010): three stages of learning

Kingscott & Durrant (2010) draw on their own phenomenological experience as practising improvisers (in jazz and classical organ respectively) to propose a three-stage model of learning. Initially ... 'we suggest that musicians first gain material and specific skill

generation through practice – the 'concrete'; second, they depend on sense perception to develop further new musical ideas – the 'dynamic'; and third, they become dependent on social interaction, placing improvising skills in a 'social' context' (p.130). The first two stages then assume a rigorous, technical approach to acquiring general patterns - i.e., a knowledge base, followed by a repertoire of possible applications of these patterns - i.e., referents. The authors thus propose that it is on this basis that more artistic, 'sense perception' skills and abilities emerge, with artistic freedom portrayed as the ultimate goal, dependent on complete technical fluency.

The learning theory emerging from this study is clearly a reflection of the researchers own experience, arising from their motivation to achieve excellence (i.e., stylistic coherence and technical fluency) within a particular style. As they themselves describe: 'The manipulation of material within a style is the key skill here, and so the familiarity of that style is paramount – the scales, the harmonic language and progressions. Tuition, then, would ideally develop the ability 'to music' in that given sphere – not necessarily to make up something new and certainly not the production of something 'without preparation' (p.138). It seems to me that the usage of stylistic compositional models brings something of the values of *Werktreue* perfection into their attitudes towards improvisation, a fact which limits the usefulness of the theory as a general strategy. For individuals with different goals and motivations, possessing different levels of instrumental technique and with exposure to different types of cultural context, might well benefit from a less technically-orientated or rigid approach to learning.

Yet, there are some important findings from the study as both subject-researchers report similar learning stages: (i) an initial period of unstructured learning in which they simply tried to copy the recordings or performances they admired; (ii) a later period of formal

tuition, with a respected teacher and expert in the field, followed by (iii) learning through performance, in which the skills and knowledge acquired in the first two stages are accessed in a new way, towards expressive, communicative ends: [through] 'a sense of the occasion to determine what is artistically and spiritually needed' (p.141). Therefore, it is through reading these biographical descriptions of learning, more than through the learning theory they propose, that one gains an idea, a vivid impression of how knowledge for improvising is actually formed and acquired.

2.2.2 Kratus (1991): seven stages of learning

Kratus (1991) also addresses the whole range of learning to improvise, proposing a seven-stage model of development from novice to expertise. This is as follows:

'Level 1. Exploration: The student tries out different sounds and combinations of sounds in a loosely- structured context.

Level 2. Process-orientated improvisation: The student produces more cohesive patterns.

Level 3. Product-orientated improvisation: The student becomes conscious of structural principles such as tonality and rhythm.

Level 4. Fluid improvisation: The student manipulates his or her instrument or voice in a more automatic, relaxed manner.

Level 5. Structural improvisation: The student is aware of the overall structure of the improvisation and develops a repertoire of musical or non-musical strategies for shaping an improvisation.

Level 6. Stylistic improvisation: The student improvises skillfully within a given

style, incorporating its melodic, harmonic, and rhythmic characteristics.

Level 7. Personal improvisation: The musician is able to transcend recognised

improvisation styles to develop a new style' (Kratus, 1991, p.37)

Kratus's scheme of learning is valuable in that it identifies the needs of novice and

intermediate improvisers as qualitatively different from experts: 'What is needed is a more

precise way of conceptualising improvisation to allow for changes that occur as students

develop knowledge, skills and experience' (p.36). Therefore, at the beginning levels of his

approach Kratus models musical-improvisational skills on children's existing behaviour and

cognitive abilities; so that, for example, free exploration becomes increasingly more directed

towards coherent patterns and products (levels one to three). This raises the question whether

such an approach might be suitable for individuals who might prefer more specific answers

for controlling tonality than are implied through (level two) 'process-orientated

improvisation' as the author proposes. On the other hand, Kratus's approach seems rather

over-prescriptive for general application, not only in his detailed description of individual's

focus of attention: from the process, to the product, and from the overall structure to elements

of musical style; but also, in his artistic and aesthetic goals, which reflect a particularly

narrow conception of improvising skills - as a means of 'transcending recognised

improvisation styles to develop an original style'.

2.2.3 Sudnow (2001): the lived experience of learning

Sudnow's (2001) personal account of learning to improvise jazz (from novice

through to fluent expertise) provides some of the most valuable insights to date into the actual

experience of skill learning. Unlike cognitive research which tries to provide a theoretical,

logical interpretation of learning events, there is no explicit clarification of Sudnow's

experience; rather, he seeks to describe the internal experience of learning, leaving the interpretation of his text to the reader. In this way, Sudnow's account communicates vividly and dramatically the confusion and frustration of initial learning stages, followed by a very gradual ability to gain cognitive control over the skill domain. Thus, at the outset of learning he reports: ... 'I didn't know where to go, how to even begin to make up melodies ...' (p.20), and this frustration with his performance is in stark contrast to his aesthetic sensitivity, i.e., his ability to imagine how the jazz ought to sound.

Without any external assistance (his teacher is notably unable to communicate his practical knowledge or skill), Sudnow begins a process of unstructured trial and error, ... 'searching and looking' as he tries to imitate the performances and recordings he admires. Only after many hours of deliberate practice does he notice emerging qualitative changes in his perception of events and action responses, such as *audiation* (the ability to inwardly hear music in advance of playing) and a kind of sensed, kinaesthetic knowledge which he describes as 'pathways' or 'territories' through his perception of the task: 'I could tell what a note would sound like because it was a *next* sound, because my hand was so engaged with the keyboard that through its own configurations and potentialities it laid out a setting of sounding places right up ahead of itself' (p.47). enabling him to aim for sounds in an anticipatory manner rather than acting blindly. Gradually, repeated movements become more automatic and Sudnow describes how his memories for material become more organised and connected, so that sequences of movements become more instantly available and he is able to construct or *re-combine* his improvisations heterarchically through loose associations of learnt material.

Eventually Sudnow reaches a level where, having built up a repertoire of moves, stylistic appropriate responses and sequences, he witnesses isolated moments of totally

automatic procedures: ... 'a line of melody *interweavingly flowed over the duration of several chords,* fluently winding about in ways I'd not seen my hands move before, ...' (p.77). At first he cannot wholly control these fleeting instances of genuine expertise, but gradually learns to perceive events in ways which encourage similar occurrences: ... 'I sing *with* my fingers. One may *sing along with* the fingers, one may use the fingers to blurt out a thought, and one may *sing with* the fingers' (p.79). Ultimately he describes a kind of embodied, kinaesthetic knowledge for generating musical structures (i.e., recombination) in a kind of anarchic use of language which, none the less is a valuable attempt at communicating the phenomenal experience of improvisation: 'Getting the time into the fingers and hand, coming down for a saying to be just so, having a soundful way right at hand in these first rather cautious yet increasingly smooth sector shifts, I began to find ... that I could undertake new shaped and rated courses with well-at-hand route segments' (p.112).

Sudnow's account is unique in that it attempts to capture in writing the rarely documented experience of improvising during novice and intermediate stages of learning. Thus, from his account I am able to perceive three main streams of development running in parallel through the narrative. These are: (i) Sudnow's conscious intentions and awareness of improvising, including his goals for improvising at different stages and his perception of the constraints and features of the task; (ii) emerging skills and abilities which appear seemingly autonomously and independently of his conscious intentions, and (iii) the formation of knowledge structures and connections which occur in the background (unconsciously) yet consistently influence and shape his improvising experience. Of course, Sudnow's extremely idiosyncratic approach to language, means that his text is capable of wide interpretation; yet, in spite of this criticism, I am able to interpret a clear sequence of cognitive advances in Sudnow's learning, similar (for example) to Kratus' (1991) seven-stage plan, or Kingscott and Durrant's (2010) three-stage model of learning. For example, Sudnow clearly develops

his conceptual pathways (through the texture) or groupings of motor movements, before being able to apply these to particular musical, structural goals; and these capabilities precede expressive fluency by a long period.

In conclusion, Sudnow's first-person experience supports rather than departs from theories of skill acquisition; therefore, his account is significant not because he challenges a well-established field of research, but because he offers information about improvising which is usually omitted from written texts: that is, the nature of the individual's *perception* of events at different stages of learning. Thus, from Sudnow we learn how new knowledge emerges into perception to effect qualitative changes in one's perspective of the task; how this perspective feeds back into one's processing of the task, reorganising the knowledge base, leading to new skills, and so on; so that each level of progress towards expertise can be seen to be dependent, as Sudnow (2001) describes ... 'upon the acquisition of facilities that made it possible' (p.44).

2.2.4 Learning to improvise in different social contexts

The accounts of learning to improvise just reviewed, have all approached improvisation as an unfamiliar skill to be learnt in addition to a grounding in score-based interpretation which is at the heart of western classical music. In contrast to modern western systems of music education and training, other world cultures treat improvisation as integral to learning music and thus, improvisation frequently features as a pedagogical tool, used to communicate instrumental techniques and knowledge about music. For example, Dunbar-Hall (2009), describes how students of gamelan music in Bali learn to imitate the teacher without notational aids, copying his demonstrations and thus quickly internalising musical patterns which are used as building blocks to reconstruct new musical forms. Returning again to western culture, historical contexts show that improvisation was similarly

integral to practice, as shown in the partimenti schools of Naples (18th century) and Paris (19th century). Especially in the Italian model of teaching, knowledge was transmitted through practical demonstration through a hierarchic social structure of increasingly adept students serving as *maestrini* (tutors) to younger novices, while the *maestro* (principal) gave daily lessons to the most advanced (Sanguinetti, 2007)

As these models show a diverse range of attitude and practice towards improvisation, it is therefore important to acknowledge that learning and performing improvisation may be facilitated or considerably obstructed by the historical and cultural context in which it is 'always situated and embedded' (Borgdorff, 2012, p.165). In my own study, these studies became relevant as I recognised my own cultural situatedness within the ideals of Werktreue interpretive performance, and thus improvising on models of canonic classical repertoire gave me a feeling of entering a new and strange domain where habitual instrumental techniques and learning strategies were useless, and entirely new modes of behaviour were required. Hood (1960), who taught a range of Eastern musical styles to american students referred to this phenomenon as 'bi-musicality', in which students often had to unlearn habits of score-dependency in order to open themselves to new, oral methods of imitation and rote learning. As he notes: 'the person with no musical training again has an advantage over the music student who misses the printed page and who, in the beginning, finds it frustrating not to be able to "see" where he is going' (p.56). Similarly, Dunbar-Hall (2009) describes himself having to overcome 'a raft of [habitual] learning strategies' (p.157) in order to progress and acquire skills in gamelan music.

In this sense we can see how learning to improvise transcends the domain of music theory or even skill learning to become a form of social practice. Smilde (2008), describes how the student ... 'learns through participation in a community of practice, starting in a

peripheral position and gradually participating in the community's activities, learning

cognitively, emotionally and socially, and slowly reaching a more central position, achieving

full membership in the community' (p.245). This process of social transformation and

integration becomes relevant to my study when I leave my solitary practice and enter a

community of improvisers within a higher institution of learning. Integration into this

community allowed me to acquire invaluable information about improvising which was

communicated through patterns of behaviour I was able to observe in the lessons I attended.

Thus, Leahey (2004) states ... 'It is through social interaction - not through solitary hunting,

foraging, and reproduction - that individual cultures survive and flourish' (p.442), while

Collins (2013) asserts that expert skills ... 'can be acquired only by immersion in the society

of those who already possess it' (p.254).

2.2.5 Learning to improvise within musical institutions

In the previous section I described some of the difficulties which Western classical

musicians, situated within a largely non-improvising musical culture, need to overcome in

order to mobilise their skills in improvisation. The continuing practice of organ improvisation

within musical institutions is a rare exception to a general rule in which classical musical

institutions perpetuate a non-improvisatory culture in which the values of *Werktreue* service

to the score predominate. Thus, Sawyer (2008) talks of 'the core flaw at the heart of our

musical culture' … 'the implicit assumption that the nature of musical performance is to

accurately execute a composer's past vision. Instead, we need a transformation of our musical

culture, one that upends the relationship between performer and composer, one that places the

performer at an equal status with the composer, and one in which both performer and

composer contribute creatively to music' (p.1). In this way Sawyer articulates the wider

implications of improvisation to disturb existing cultural values and power relations which

are transmitted through specialist musical institutions. Introducing the practice of improvisation within such institutions therefore creates specific challenges, as the following researchers report.

Hill (2017) describes a number of beliefs about improvisation which exist in classical music communities. These are, that 'the creative potential of performers is somehow inferior', or that 'because a decision is spontaneous … it is unprepared or that it comes out of nowhere', or that 'a creative work must be entirely original', or that 'improvisation belongs in jazz and various world music and vernacular traditions but not in serious western art music, especially not in classical and romantic music' (p.223). Such beliefs can be described as working ideologically or *hegemonically* to suppress and subvert improvisational practice, as Quicke (2010) describes: Hegemony is all embracing. Its own mode of operation also involves the interweaving of discourses, usually in ways that nullify, neutralise, tame and thus incorporate the opposition' (p.245). Thus, Dolan (2005), explicitly addresses the effect of culturally-informed beliefs and habits about music in his pedagogic approach to improvising: 'Classical musicians are usually trained to know exactly what, and how, they are supposed to play: this may explain why the idea of proceeding into the 'unknown' territory of improvisation might feel intimidating' (p.111). To overcome this fear, Dolan uses what he calls the 'natural schemes' - physical gestures which express and explore emotions - aligning these gestures afterwards with 'learned schemes' through the theoretical analysis of musical scores. In this way, students learn first to express themselves, to identify and communicate a gesture, movement, and only after to interpret this gesture within a stylistic or accurate musical form, an approach to improvisation which is closely related to the *eurythmic* exercises of Jaques-Dalcroze (1921).

Spiegelberg (2008), in contrast to the afore-mentioned pedagogues, proposes a strict rule-based and written approach as an introduction to improvisation: ... 'the composition assignments have very strict parameters, giving the students the comforting experience of paint-by-numbers rather than a frighteningly blank canvas' (p.79). Based on the idea that 'both activities [improvisation and composition] are essentially processes of creating new music' (p.76), the essential difference being that composition simply allows more time for reflection and selection - he proposes that exercises in composition are the first step in inducing creative practices among individuals unaccustomed or fearful of creating music. Once people are comfortable with the idea of creating their own music, Spiegelberg suggests using the compositions as templates for aural imitation and memorised performance, thus developing skills in imaginatively reconstructing music; skills which support improvising music in real time. Thus his pedagogic approach, labelled 'comprovisation' is proposed to overcome the problems of novice creativity in experienced classically-trained students. Similarly to Dolan, Spiegelberg bases learning processes on cognitive theories, especially those of Pressing (1998). Thus, through the structured exercises 'comprovisation' students aim to acquire not only 'a generalised knowledge of the style and musical language' (p.78), but also a repertoire of mental 'schemata' (i.e., piece-specific *referents*) enabling students to structure music in real time.

It should be noted that other authors reject such structured methods of teaching improvisation as inappropriate for educational institutions. Hickey (2009) for example, states that ... *'teaching* improvisation [according to compositional/stylistic models], in the traditional sense, is not possible' (p.285), while the improviser Joelle Leandre (2006) remarks that ... 'when we talk about improvisation it is about life. That's why we cannot teach improvisation. It would be pretentious to teach life to someone else!' (p.562). Yet, it is not my purpose to introduce a discussion about appropriate pedagogic methods at this stage.

Rather, I include this brief survey of institutional teaching because it gives some insights into the difficulties I faced during the initial stages of the study which I attributed to habits and beliefs acquired through former conservatoire training.

2.2.6 Learning to improvise through motivation, confidence and feedback

Another line of cognitive research takes a wider view of learning to investigate the role of motivation, emotions and feedback in influencing an individual's ability to improvise. Shevock (2018), for example, interviewed three professional improvisers to understand how their confidence affected their expertise. Defining confidence as ... 'the ability to maintain a positive perception of self and abilities derived from a feeling of safety' (p.103), Shevock proposes that, without confidence, people feel inhibited or 'blocked' from improvising. Taking this as the focus of his interviews Shevock encouraged his subjects to describe important aspects of their learning experience which allowed their skills to function and develop. These were: (i) the importance of a criticism-free learning environment particularly at early or novice stages; (ii) early exposure to recordings and concerts of other improvisers; and (iii) the presence of influential teachers who guided them through a sequence of positive learning experiences. In a similar way Smilde (2008) associates significant learning events with 'the concept of *empowerment*: positive feelings of agency and ability through which an individual not only develops more confidence, but also fundamentally changes their relationship with the world about them. I interpret these studies to highlight an important factor of improvising knowledge which is procedural, i.e., based in action. Thus, an individual's disposition for action will have a considerable effect on their ability to acquire this kind of knowledge, as Borgo (2007) notes when he describes a successful teacher as one who instills 'in the people he works with, enough confidence to try and attempt what they want to do *before* they know how to do it (p.76).

Another important attribute of the improvising experience is often described as 'flow' - in which the individual feels a notable sense of wellbeing when involved in a cognitively complex task. The concept of flow was first developed by Csikszentmihalyi (1988), who states: 'the universal precondition for flow is that a person should perceive that there is something for him or her to do, and that he or she is capable of doing it. In other words, optimal experience requires a balance between the challenges perceived in a given situation and the skills a person brings to it' (p.30). Csikszentmihalyi observed flow states as a characteristic of expertise across domains, yet other researchers suggest that flow is accessible to novice and intermediate learners through a judicious matching of task constraints to suit the particular skill level of the student. Thus, Dolan (2005): … 'The sense of flow may be integrated from the very beginning of the learning process, together with the practice of structural, harmonic and stylistic elements, which need to be mastered and fully internalised' (p.112). Likewise, Custodero (2007), whose research involved children's creative music making, observed that children, through improvisation, naturally sought out flow states : 'studies of children's musical engagement and flow experience in classrooms have shown they are active agents, creating their own challenges by adapting musical tasks to suit their skills using strategies such as anticipation, expansion and extension' (p.94).

These studies therefore highlight an important aspect of improvising knowledge which is not so much the *what* of learning, but rather the *how*: the way in which individuals approach the task, mobilise and access their existing skills to acquire new knowledge, engage in creative experimentation, and so on. As Kenny & Gellrich (2002) state: 'significant psychological processes ... complement and inform the automation of knowledge bases. Performance that incorporates flow states and risk taking may in fact hold the key to achieving optimal levels of musical communication, providing a clue as to why some musicians are able to access their knowledge bases more fluidly and creatively than other

similarly skilled but less inspired improvisers' (p.120). Learning optimal ways of accessing

knowledge may then be a key factor in the expert's skill development, and for this reason

some pedagogues base their teaching strategies on facilitating such modes of access. For

example, Kristiina Junttu (interviewed by Hill, 2017) describes: 'It was the attitude that you

can simplify everything to where you can work with it. Find that skeleton, play with the basic

things, and then do some modulations, change the metre, change the harmonisation ...'

(p.225).

2.2.7 Learning to improvise as an adult/mature student

Berkowitz (2010) states that: 'during Johann Sebastian Bach's childhood, he was

surrounded by music and musicians, and one can imagine that he was exposed nearly as

much to tonal music as he was to German. In such an environment, it is not hard to imagine

how, given early training on an instrument, the ability to speak the musical language fluently

through improvisation would develop nearly spontaneously, as does the capacity for

spontaneous speech' (p.99). This imaginative description compares improvisation to learning

a language in ways which highlight the advantage the child has over the adult. Whereas the

child (under normal conditions) is situated in a natural learning situation as part of their

necessary and expected growth towards adult competence and maturity, an adult's learning

situation is perhaps more artificial, the result of decisions taken to learn a new skill, or to

acquire new knowledge. This is certainly the attitude of Després et al. (2016) who divided

their interviewed subjects into 'native' improvisers: those who 'started to improvise

"naturally" from the beginning of their instrumental learning [as children]' (p.173), and

'immigrant' improvisers, who learnt through formal training as mature or adult students. By

dividing their subjects in this way, Després and colleagues found that those who had learnt as

children were not as explicitly aware of their motivations for improvising or of the strategies

used to develop their skills. Immigrant, adult improvisers on the other hand improvised for a definite reason: 'In one way or another, the *immigrant improvisers* we interviewed felt that creativity had been left behind in their initial training, so they sought out improvisation as a means of creative *self-expression*' (p.174). This self-consciousness continues with the adult improvisers so that they are also more articulate about their emotions while learning and performing.

Another contrast between adult and children's improvising is explored in Custodero's (2007) study in which both age groups undertake a similar improvising task. Whereas the adults are more self-conscious and inhibited about improvising (particularly when using a tonal language which they intuitively associate with their knowledge of tonal repertoire), the children are more able to treat the exercise as a game and soon enjoy a relaxed and freely experimental approach to the study. Custodero thus concludes that the child's 'awareness of time is situated in the present rather than projected to the future ... and the child's 'instinctual curiosity enables long periods of exploration, rewarded and maintained by the expectation of growth' (p.78). The contrast between child and adult learning of improvisation is so often compared to the (seeming) ease with which children learn to speak their first language, in contrast to the difficulties of the adult struggling to speak a second language (i.e. Després et al. 2016) that it is almost a cliché of improvising literature; yet, while this comparison is considerably more complex in reality than a superficial comparison merits, there is a body of research into second language learning which provides valuable insights into adult learning of improvisation.

2.2.8. Learning to improvise compared with language learning

An important aspect of adult learning is therefore the previous experience and knowledge which they bring to the task. I have already reviewed how other researchers,

(Dunbar-Hall [2009] and Hood [1960]) needed to overcome habitual modes of perceiving and processing music in order to engage in new musical cultures. Researchers into foreign language learning are also concerned with the effects of habitual modes of cognition which interfere with individuals' perception of a new language. Ellis (2011) describes this problem in terms of learnt attention: 'In contrast to the newborn infant, the L2 learner's neocortex has already been tuned to the L1, incremental learning has slowly committed it to a particular configuration, and it has reached a point of entrenchment where the L2 is perceived through mechanisms optimised for the L1. Thus the L1 implicit representations conspire in a "learned attention" to language and in the automatised processing of the L2 in nonoptimal, L1-tuned ways.' (p.40). This is, of course, highly relevant to studies of improvisation in which musicians bring many years of experience in one way of music making (effectively their L1 skills), needing to adjust this to perceive music in a different, improvisatory way (requiring L2 skills). In these situations Ellis suggests that students need to have their attention guided towards relevant, salient features of the stimulus in order to initiate new processing skills which, over time, can become habitual: 'Declarative rules can be used for conscious, attentive, usually slow, regulation of output. Sufficient practice under such guidance can result in the tuning of output modules ... so that eventually these sequences can be performed automatically, without further attentional demand' (Ellis, 1994, p.16).

Therefore, there are many situations in which 'especially adult learners find overt rules psychologically satisfying', as Davies (1980, p.21) notes. Yet, there are limitations to the rule-based style of learning, as Sharwood-Smith (1994) aptly describes: 'the person who knows the rules of French might well assume that they 'knew' more French as a result and would feel frustration when all their technical knowledge of grammar seemed to leave them in the lurch on arrival in the Gare du Nord' (p.38). What Sharwood Smith and other language researchers thus propose is that two distinct learning approaches for adult students are

necessary: one, which is directed towards a conscious understanding of salient rules and features; another, which is not explicitly guided but emerges through practice or *production* of the language in real-life settings. This is because rule-based knowledge cannot be mobilised fluently and automatically, but results only in 'the behaviour of speakers who express themselves in a second language which they master explicitly but which they have never had an opportunity to use in conversational settings and who construct their utterances laboriously, with long pauses' (Paradis, 1994, p.399). Thus, rule-based learning must give way to more unconscious production, and a different *implicit* learning style suitable for situations when 'the material to be learned is more randomly structured with a large number of variables and when the important relationships are not obvious' (Ellis, 2011, p.38).

In this way, the research of second language acquisition highlights important aspects of the learning process of adults which give insights into learning musical improvisation. The fact that (improvisatory) skills and control over spoken language in real time depend on different, and possibly incompatible, cognitive processes, as Paradis (1994) describes: 'the speaker may *either* use automatic processes *or* controlled processes, but not both at the same time' (p.404), has real implications for the experience of a student learning to improvise. It was this clarity in understanding the learner's needs and perspective which drew me to language research. For example, Sharwood-Smith (1994) clearly describes the challenge of production knowledge: 'It therefore becomes more obviously necessary to determine what takes place first, what second and what takes place simultaneously … Performance rules determine what happens millisecond by millisecond, second by second' (p.37); these words capture precisely the experience of the novice improviser who, possibly in full possession of theoretical knowledge of his/her subject, desperately casts about for a suitable action to perform. In this way language studies provide a useful resource for understanding how a rule-based knowledge can be translated into action. They add insights and detail to the

learning theories of improvisation already reviewed: for example, Kingscott and Durrant

(2010)'s proposal for a third learning stage occurring through social and communicative

interaction, or Berkowitz's description of the improviser Robert Levin's experience of

learning through performance: - 'his theoretical training with Boulanger led to active, explicit

awareness of rules and structures, whereas his sense of stylistic formulas was developed far

more implicitly' (Berkowitz, 2010, p.85).

2.2.9 A summary of learning perspectives

In this section I have looked at literature which gives insights into the experience of

learning to improvise. Whereas cognitive theories of improvisation tend to focus on the

knowledge and performance of experts, this research considers the different stages and modes

of acquisition underlying expert performance, through the study of children, novices and

intermediate students of improvisation. Socially-situated learning examines the implicit

processes of absorbing knowledge through observing experts and peers; also how

surrounding cultural values, beliefs and expectations might facilitate or obstruct an

individual's learning experience. In this way, research into learning sheds a new light on

cognitive theories which often try to reduce improvising knowledge to information

processing models similar to computers. By considering the individual's lived experience of

improvising (as described by Sudnow, 2001), important aspects of learning and knowledge

acquisition come to light: for example, an individual's willingness to act, their

self-confidence as an improviser, their emotions while improvising (disposition for flow

states), the effect of previous experience and biography and so on, directly influence an

individual's ability to access knowledge, to focus, to experiment, and their motivation to

continue learning. Lastly, I include literature into second language learning which provides

insights specifically into the learning needs of adult novices, these insights addressing many

of my own questions concerning decision making and the organisation of actions as I begin my own study.

2.3. Practice-based approaches to knowledge development

As a self-study in learning to improvise I needed a research framework which coordinated a number of different areas of activity - artistic goals, musical practice, skill development and academic enquiry. In the following paragraphs I review a number of theoretical frameworks and models which offered a guide for situating my study within existing knowledge and approaches.

2.3.1. Action research vs. autoethnography

Approaching the question of research design was initially problematic. Clearly, as a self-study (of one person), I needed a qualitative model of research which was convincing, articulate and meaningful for other readers, useful and practical for my own learning, and ultimately academically rigorous, as an original contribution to knowledge as expected of a PhD study. In some ways, as a practice-based, reflective learning experience which also combined research theories, my study matched the model of 'action' research. As Thomas (2013) describes: 'The central aim is *change* and the emphasis is on problem-solving in whatever way seems most appropriate. It is flexible in design: the assumption is built in firmly at the beginning that as the research proceeds you will go back to revisit your aims, assumptions, beliefs and practices, think about all of these critically and revise them' (p.147). While aspects of this design appealed to me - especially the flexibility of following a path of learning wherever it led, also the disciplined structure of 'planning, acting, observing, and reflecting' (Davidson, 2015, p.7) which I needed to inform my learning and to clarify my different roles as participant-researcher throughout the study - I soon realised that the action research plan was not flexible enough, as it required an explicit statement of aims and

objectives to be explored at each cycle of investigation. My problem, as I started to improvise, was that it was firstly very difficult to identify an aim or articulate a strategy which corresponded to the actual experience of improvisation. (As soon as I tried to improvise, new constraints emerged from those I had anticipated. It was useless to try and impose a strategy on this experience: I simply had to follow the path which actually emerged through improvising and see where it led.) Secondly, I was in search of knowledge for improvising, which meant I didn't know what it was I needed to know. It was an entirely open-ended inquiry; a sense-making expedition of a new and unfamiliar landscape which was only revealed to me when I tried to improvise.

The sense of studying myself as a participant in an unfamiliar or foreign environment which arose (unexpectedly) through the initial experience of improvisation led my study more towards the aims of anthropological research, as Malinowski (in Myers, 1992) describes: 'the relationship of theory and method; inductive versus deductive research strategies; participant observation; the importance of open-mindedness and self-criticism; the linking of apparently unrelated data; the difference between observation and insight …' (p.24). As the primary methodology for this type of social study was ethnography, it soon transpired that an auto-ethnographic approach would be my best model. Similarly to action research, ethnography is often motivated by the desire for change (Kruger, 2008), which matched not only my efforts to acquire new knowledge and skills, but also a wider and more profound desire for cultural change which becomes increasingly relevant as I challenge my existing knowledge and experience to progress as an improviser. Banks & Banks (2000) describe: 'an ethnographic impulse, in which the writer looks outward towards culture for a sense of place and identity, with the autobiographical impulse, in which the writer looks inward for a site to interpret cultural experience' (p.234). In this way I began to move towards a research model in which cultural values and situatedness could be investigated

alongside an entirely open-minded attitude towards the acquisition of improvisational knowledge.

2.3.2. Learning to perform

Autoethnographic literature offers a number of models for self-studies in learning new musical performance skills. For example, Knight (2009), who learnt to improvise jazz on the trumpet, writes a vivid, narrative account of his experience in which he describes influential conversations with musicians and friends, and significant events which motivated and directed his learning. These are interspersed with poetic passages which capture the lived experience of improvising and learning. Knight then reflects on the wider implications of the cultural and musical segregation which is revealed in his own journey from a non-improvising school training in music to a real world environment of jazz music - 'I began to wonder what I was doing playing music that developed in a completely different physical, spiritual and social environment to that in which we live' (p.81). Dunbar-Hall (2009), in the same collection acknowledges the complexities of research in which one's own personal development is involved: 'research into Balinese music was also research into my own learning and teaching processes' (p.154). This leads him to stringent self-analysis throughout his study, resulting in his recognition of the different 'layers' of previous experience which he brings to the study (i.e., as a performer, teacher, administrator, and so on). Explicitly recognising these 'multiple identities' helped him to better structure his research questions to reflect the influence of previous experience on present learning processes.

John Baily, who immersed himself in the musical culture of Afghanistan suggests a research framework for self-study which brings together insights into the culture, practice and cognition of musical performance. For example, the opportunity to discover through practice

how music is generated: 'the structure of the music comes to be apprehended operationally, in terms of what you *do*, and by implication, in terms of what you have to *know*' (Baily, 2008, p.122); the communication of 'theory and terminology' through teaching contexts in which information is more naturally and intuitively shared than other, more formal, research contexts such as interviews; a knowledge of the influence of ergonomics on musical structure and texture through first-hand experience in instrumental techniques; a deeper understanding of 'modes of enculturation', i.e., the relationship between musical practice and cultural values which recall Gaunt's (2017) description of 'an environment in which the whole approach to being a musician could be absorbed, including underlying principles and values, habits of mind, and elements of daily practice' (p.32). Finally, Baily (2008) suggests that self-studies of learning are valuable because they gain access to the cognitive processes of performance: 'how the performer mentally represents the task performed, and how that representation is utilised in the process of performance' (p.124).

This last aspect of Baily's thesis is important because other researchers, i.e., Kenny & Gellrich (2002) record the impossibility of accessing actual mental representations, due to the fact that 'improvisers themselves cannot access their own subconscious processes at the moment of creation' (p.121). Because Kenny & Gellrich were reporting the accounts of expert improvisers, it seems that the conscious awareness of mental representation can only occur under certain conditions in which: (i) the researcher, through the practice of self-study, is trained to notice and report their own thinking while simultaneously performing, (ii) the improviser is not an expert (who by implication performs fluently and automatically) but a novice or intermediate learner who constructs the task through conscious calculation and is thus more aware of the mental representations used. This supposition reflects the accounts provided by Baily (2008), for example, Rice's (1994) account of learning the gaida bagpipe in which the details of mental representation disappeared: 'I went from tense, slow playing to

relaxed fast playing in the blink of a concept … I now understood that the myriad sounds I perceived as melody and ornamentation were, from a player's point of view, unified into a single concept as ways of moving from tone to tone' (p.125). These factors highlight the usefulness of self-studies which record the whole process of learning, and can therefore provide access to ways of constructing the task which would otherwise be lost when 'later forms of cognitive schema … absorb earlier ones completely' (Bruner, 1967, p.65).

2.3.3. Practice as research

As more artists turn to academia to explore and expand their work (Borgdorff, 2012; Nelson, 2013), a growing body of literature known as artistic practice as research, abbreviated to APaR (Gritten, 2016), has emerged to align and orientate artistic enquiry within traditional models of academic research. Borgdorff, thus describes: 'the transformation of artistic practices to artistic research, and the transformation of academia to a domain that also provides a place for non-discursive forms of knowledge, unconventional research methods and enhanced modes of presentation and publication' (p.xiv). Clearly my own multi-modal enquiry into improvising knowledge fell into this bracket, therefore it is interesting to identify some characteristic problems of this type of study.

- 'One matter that requires constant attention is the doctoral candidates' lack of academic training, particularly in writing skills' (Borgdorff, 2012, p.63).
- 'The erratic nature of artistic discovery - of which unsystematic drifting, serendipity, chance inspirations, and clues form an integral part - is such that a methodological justification is not easy to codify' (Borgdorff, 2012, p.165)
- The danger that artistic practice might dominate the study: that original aims and objectives become lost along with a realistic time schedule, as 'practitioners typically get so engrossed in the practical work' (Nelson, 2013, p.30)

These points I selected as being most relevant to my situation. My relative inexperience as an academic I describe in detail as part of my biographical background, a fact which had several implications: the difficulty in finding an appropriate language style for presenting the personal experience of learning as an academic thesis; the necessity of involving literature without, as Nelson (2013) describes, feeling 'obliged to reach out for a weighty theorist to ground [my] project' (p.30); of needing to incorporate a wide body of relevant literature yet also feeling that I lacked the experience to critically review the theories offered or to develop and assert my own theoretical findings. Not surprisingly I often felt overwhelmed by the scale and scope of my study: I needed to constantly review the boundaries of both practice and research elements, to decide which literature would be relevant even as the events of learning unfolded and took me in many new directions; I also needed to balance practice for many hours each day in order to develop enough skills to produce significant data for the study. These, and other problems, created significant challenges to the methodology of my study, for which I looked to literature in the APaR movement for solutions and advice.

The principal theme of advice is that it is 'the creative process forms the pathway ... through which new insights, understandings, and products come into being' (Borgdorff, 2012, p.146), rather than the demands of the thesis leading the artistic practice. This was important as it allowed me to focus primarily on the musical goals (the development of improvisation skills and knowledge) and to prioritise the data arising from this focus. This focus led me towards the adoption of a narrative style which vividly recreates the learning experience and is reflected in the actual structure of the thesis itself, in which narrative events and reflective analyses of these events in relation to literature are freely intermingled.

So what of the knowledge and findings resulting from this study? How does the artistic experience become translated into the language and currency of academia at the level of a PhD? What about one's contribution to existing knowledge? To answer the first of these questions Nelson (2013) suggests that one's inclusion of and reference to relevant literature is crucial for grounding the thesis within 'a lineage of similar practices' (p.29). For example, in my situation, an extended literature review of cognitive theories, current studies in classical improvisation, learning theories and autoethnographic accounts was necessary in order, not only to define the state of existing knowledge but also how a reflective self-study might contribute 'substantial insights' (Nelson, 2013) to that body of literature. Perhaps more challenging and subtle though is the translation of artistic experience to the academic language of the thesis, or (in my case) the necessity of articulating the inner experience of learning to improvise over a period of several years. Borgdorff (2012), talks of 'thinking in, through, and with art' (p.143), but my study was less concerned with artistic products and more with skill learning and the acquisition of procedural knowledge. Perhaps it was this, the learning aspect, which brought together my practice and research most closely, for, as much as I wanted to improvise, I wanted to understand something about this process. I wanted to know how to improvise, but I also wanted to know about knowing; and for this I needed literature to guide me.

In this way, throughout my study, I used the insights of literature (especially that of cognitive psychology, also theories of implicit and ecological learning) to inform my learning experience. These insights helped me to gain objectivity, and to situate my own skill learning experience within wider contexts in which similar parameters and features were already marked out. The discipline of reading, writing and reflecting took this learning much farther than if I had simply practiced the organ. Through literature I learned how to articulate my inner experience, to capture the changing perspectives of a developing knowledge base

extended over a period of several years, and of relating that which was 'grounded in sensorimotor experience and action' (Duby & Barker, 2017, p.2) to existing cognitive theories. For example, the problems of describing one's own sensed, embodied and semantic knowledge (in contrast to theoretical, declarative or discursive knowledge) is touched on through ethnographic techniques of illuminating 'the obvious' (Kruger, 2008), which, as Nelson (2013) points out, involves a strong critical faculty: 'required to dislocate habitual ways of seeing' (Nelson, 2013, p.45). In this way, APaR authors urge artistic practitioners to incorporate artistic experience within academic traditions and standards; to recognise and integrate this experience with other relevant studies, and finally to communicate this to an academic readership. As a framework for coordinating the two sometimes conflicting worlds of art and research, Nelson (2013) proposes three distinct knowledge areas:

(i) 'know-how', concerns the discreet, personal experience and semantic knowledge of artistic actions, explored in my case through acquiring the skills of improvisation.

(ii) 'know-what' - a related knowledge which emerges through critical reflection during the research process and provides insights which can be communicated to others. While I gained 'know-what' continuously throughout my study (which involved a parallel pursuit of literature as it did the skills of improvisation) this type of knowledge increased especially through the process of writing up which initiated the articulation of learning within the framework of a thesis.

(iii) 'know-that' - in which knowledge acquired through the research and artistic process combined is codified into a theoretical proposition or findings which summarise the study and provide a basis for further research to continue a similar inquiry. This final knowledge emerged in my case only through subsequent drafts of writing up; as I condensed the experience of the study into written chapters, sought a narrative thread to this experience,

searched out themes (principally of conceptual learning), contextualising and comparing these with current knowledge and other improvisers' experience to reach more generalisable conclusions.

2.3.4. Ecological, situated learning

Clearly, improvising, like any action-based skill involves forms of control which extend beyond theoretical or consciousness knowledge. Although action often starts from a theoretical position (i.e. Anderson [1982] describes how a learner may receive: 'instructions and information about a skill. The instruction is encoded as a set of facts about a skill. These facts can be used by general interpretive procedures to generate behaviour' [p.370]), as soon as a person engages in the action itself, other forms of bodily, sensed information emerge from the experience, and it is only through manipulating this information that the person gains mastery over the task. For example, when learning to ride a bike: 'One can give the beginner a few more or less empty rules, but the balancing activity happens when the rules, such as they are, no longer play any role' (Johnson, 1987, p.74). It is for this reason that Anderson (1982) in his description of generalised skill learning talks of a transition or conversion of one type of knowledge which he terms declarative (meaning, conscious, theoretical and reflective) to another type which is procedural, based in actions, and hierarchically organised towards achieving goal states. These qualitatively different types of knowledge have already been discussed in relation to second language learning (see para.2.2.5.1), where researchers highlight the fact that the procedural knowledge used for speaking (effectively the action-based part of language) is not available to consciousness in the same way as declarative knowledge: ... 'the ability to produce the correct sequence of words in their proper inflectional form, whatever processes have been used to reach this result. These remain in fact for ever opaque to introspection' (Paradis, 1994, p.402)

As I have stated throughout the review of improvising literature, the difficulty of articulating unconscious (implicit) cognitive processes in the experience of improvisation creates a limit to researchers' understanding of improvising knowledge; and thus, it becomes an important goal of my thesis to express and articulate the lived experience of implicit learning processes, including knowledge which arises through bodily awareness, as Stuart (2009) describes: 'the formation of kinaesthetic and nervous patterns established through somatosensory engagement and the repetition of goal-directed muscular actions and reactions' (p.42). Over time, this physical, bodily-centered knowledge (hereafter referred to as embodied and situated knowledge) can be seen as *adaptive* because it involves a gradual development of thought and behaviour working to coordinate and optimise the individual's response to their surrounding environment. Borgo (2007) thus writes about ... 'an ecological approach [to learning, which] emphasises the structure already inherent in the environment and views perception as a type of "resonating" or "tuning" to environment information' (p.74). In this way, the concepts of embodied and situated learning offer a useful framework for understanding learning and skill development over a substantial period of time, and incorporate and emphasise the individual perspective of the learner situated not only in a physical environment but also a social one, i.e., Edelman (1989): 'The brain and nervous system cannot be considered in isolation from the world and social interactions' (p.29).

Researchers who recognise the role of the body in shaping and directing knowledge often criticise traditional cognitive approaches for (i) treating the mind as something detached from an individual's perception and situation (Borgdorff, 2012); (ii) for assuming our ability to understand our environment - the meaning we attach to events and features of the environment -, comes from the environment itself, rather than being constructed by the individual (Edelman [1989, p.260]: 'we should not reify [information] as a prior or immanent property of the world); and (iii) for treating human cognition as a kind of

information-processing machine rather like a computer, so that any 'facts' perceived will result in universal-type responses. Thus, to consider the context of musical improvisation: rather than imagining the experience or knowledge of musical improvisation to be a universal property (gained perhaps through completing certain exercises or methods), a situated, embodied approach to learning accepts that only through continuous exploratory actions in an imaginatively-constructed environment can each individual be said to arrive at their own *Umwelt* (Duby & Barker, 2017) - with their own individual way of perceiving and acting (in this case improvising) on that world. As Johnson (1987) states: 'one's understanding is one's way of being in, or having, a world' (Johnson,1987, p.137).

Clearly theories of ecological and situated learning bring cognitive theories of perception and learning much closer to the lived experience of improvisation. They reflect a strong sense of dislocation I experience when starting to improvise; a sense of entering a novel environment, of not knowing how to act or react to events triggered by my actions; of entering into a form of dialogue with that environment which is partly shaped by my former musical and biographical experience but also influenced by present choices and reflection. The idea of adapting - of honing and training one's responses through implicit processes of knowledge formation - is also a valuable concept for understanding a complex process of skill learning over an extended period of time. Yet, although these theories are valuable in understanding many aspects of the improvising experience, I do not reject more abstracted or universal cognitive theories or argue for an entirely individual response to improvising. On the contrary, I believe there are common features to skill learning just as there is a common understanding of musical structure, as Gurwitsch (1984) describes:

> 'Each person experiences his own act of meaning apprehension which he cannot share
> with anybody else. Yet through all these multiple acts, distributed among any number

of persons, and for each person, varying from one occasion to the other in the course of his life, the same meaning is apprehended. If this were not so, no communication, either in the mode of assent or dissent, would be possible' (p.61).

If we do not view common features to structures of understanding as restrictive but as a basis for considerable diversity between individuals; or, alternatively, that many different journeys of perceptual learning might result in the acquisition of a specialised kind of knowledge and experience, then it is possible to juxtapose theories of embodied, individual cognition alongside more abstracted, universal descriptions of improvising cognition (for example of Clarke, Pressing, and Johnson-Laird). Therefore, although I accept and integrate theories of embodied and situated cognition, using this approach to help me articulate and describe my individual *Umwelt* of improvising; I also explore the motivations and choices which construct the *Umwelt*, to understand how these, ultimately result in common, shared features of the improvising experience.

2.4. Defining the knowledge base: general psychology vs. music research

The section of the thesis illustrates my use of literature which extends beyond musical-cognitive studies and research concerned with improvisation. While it was important to embed my study in current knowledge concerning musical improvisation, I also needed to distance myself from music-related literature and to look elsewhere for insights into skill learning and motor control, first and second language learning, theories of emotions, implicit learning and. There were several reasons for this: (i) that musical-cognitive studies themselves interpret and select from this literature, so to take my insights from these studies meant introducing another link in a chain of interpretation. This seemed to me rather risky as it introduced the possibility of errors and inaccuracies as one went further from the source. (ii) I was often curious to investigate the source material of theories which appeared in

music-cognition studies, to have a clearer idea of the original theory. In addition, (iii) musical

cognitive studies discouraged me when I detected implicit values concerning improvisation

and musical practice, particularly the idea that improvisation is an area of extraordinary skill

or the preserve of genius. Goldman (2016) also notes that, in spite of a considerable diversity

of approach on behalf of researchers: 'there are some common threads that run through these

perspectives on improvisation. These include issues concerning novelty, freedom,

indeterminacy, spontaneity, constraints, and other related concepts' (para. 1.2). As I myself

began my learning process (the outcome of which was totally unknown), I preferred to

distance myself from literature which I felt anticipated, shaped or constrained my goals and

motivations for improvising. This led my research into the following directions (which I

summarise briefly below):

2.4.1 Emotions and learning

The role of emotions in learning is rarely mentioned in cognitive theories or

pedagogical manuals of improvisation, yet accounts of novice learning often mention difficult

emotional experiences involving shame and embarrassment (i.e. Després et al., 2016). As my

own study also reports strong negative emotions, particularly at the outset of learning, I

investigated the effect of emotions on learning and on cognitive processing in general.

Goleman (1997) reports that, due to the evolution of the human brain structure which is based

on older limbic systems (of pre reflective senses linking learning and memory), our emotional

responses are quicker to respond than our (later, cortical developments of) reflective, logical,

thinking responses. He talks of 'neural hijackings' in which emotions overwhelm a person, as

'a center in the limbic brain proclaims an emergency, recruiting the rest of the brain to its

urgent agenda' (p.14). This is I believe important for understanding something of the

performance experience of novice improvisers such as myself, who found it very hard to

think logically in the moment of improvising, suffering instead a kind of panic and cognitive confusion, particularly if other people were listening. While this might seem to be the most extreme emotional response to improvising, other researchers report on the effect of emotions on attention and decisions which have a significant impact on an individual's learning potential. Pekrun and colleagues (2014) for example, state that: 'emotions control the student's attention, influence their motivation to learn, modify the choice of learning strategies, and affect their self-regulation of learning' (p.6), while Aragão (2011), in his study of adult second-language learners, defined their learning emotions as 'bodily dispositions for situated action' (p.302) - meaning that a person experiencing, for example, embarrassment while improvising may feel unable to act in ways which were more available for a person who was unembarrassed or confident. Thus, we can understand that emotions play a significant role in the learning and performance experience of improvisation, often preceding the individual's ability to reflect or process the task more logically, and constraining their choices for action.

2.4.2 Theories of memory relevant to improvisation

The problems of defining memory processes in relation to improvisation are legion and beyond the scope of this thesis to investigate fully. Musical cognitive studies are often concerned with the memorising of scores and the reproduction of this type of verbatim musical memory under performance conditions (i.e. Chaffin and Imreh, 1997; Herrera & Cremades, 2014); yet, clearly the use of memorised material is different for improvisation where recall is not verbatim but rather conceptual, based on the improviser's knowledge and representation of musical structure and the use of motor patterns for realising these structures. I thus investigated the literature of conceptual memory as I became more aware of my own conceptual learning and my growing ability to categorise features and events during the

experience of improvisation. Of major interest were theories which offered a biological or neurological explanation of memory centred on just this type of conceptual perception and development, such as Gerald Edelman's TNGS (theory of neural group selection): … 'in rich nervous systems, memory is the specific enhancement of a previously established ability to categorise … Memory thus arises from alterations of synaptic efficacies in global mappings as a result of the facilitation of particular categorisations or of motor patterns' (Edelman, 1989, p.109).

At a later stage in my learning I looked to literature which could explain my transition from conscious, guided control to more automatic productions. Snyder's (2000) description of semantic memory[2] - a long-term memory process in which theoretical knowledge is gradually blended with lived experience - invoked the idea of *recognition,* through which action, perception and cognition could be united in an instant response. This corresponded closely with my sensation of increasing implicit control and embodied awareness (rather than conscious, calculated control of earlier stages of learning), and set me hunting for more interpretations of this new, inwardly-sensed meaningfulness to my actions as an improviser. Neisser (2014) continues the idea of recognition through his descriptions of constructed perception, in which the individual anticipates action responses through the activation of memories of previous responses:

> 'What is the information—the bone chips—on which reconstruction is based? The only plausible possibility is that it consists of traces of prior processes of construction. There are no stored copies of finished mental events, like images or sentences, but only traces of earlier constructive activity. In a sense, all learning is "response" learning; i.e., it is learning to carry out some coordinated series of acts' (p.271)

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[2] Although Snyder is writing within the context of musical literature, his descriptions of memory processes are often general in nature and can be understood without reference to cultural values or specific applications.

Thus, in a similar fashion to Snyder (2000), Neisser is centering acts of cognition (i.e., processing and control over the musical stimulus) in the individual's memory for previous actions; which offers insights into important aspects of the improvising experience at this stage of learning: (i) the letting go of theoretical or declarative constructions of the task and an increasing dependency on more individualistic modes of construction; (ii) the seemingly impossible speed of processing which occurs in fluent improvising; (iii) the sensation of meaningfully recognising certain musical events and features and knowing instantly how to respond in the moment.

Lastly, as I began to extend these types of embodied control and implicit recognition over larger sections of musical structure, I studied the more philosophical writings of Johnson (1987) and Kant (1781/1998) who describe the use of *schemas* - an embodied form of mental representation which is both flexible (conceptual) yet also detailed and capable of organising explicit sequences of response. Kant's description of cognitive-processing of triangles serves as the basis for this literature: 'In fact it is not images of objects but schemata that ground our pure sensible concepts. No image of a triangle would ever be adequate to the concept of it. For it would not attain the generality of the concept, which makes this valid for all triangles' (p.273). This description of the triangle can be usefully transferred to the realm of improvisation in which conceptual musical structures (such as sequences of harmonies) maintain their identification in the improviser's mind despite different ways of realising these structures in terms of time and key signatures, and surface figurations. It is Johnson (1987) though who extends Kant's *schemas* to an entire system of inwardly-sensed *metaphoric* mental representation and control which I adopt in Chapter 8 to illustrate my own experience of guided control over automatic productions and (eventually) whole musical forms.

2.4.3 Implicit vs. explicit learning

The process of knowledge formation, according to biological theories of consciousness and ecological theories, creates neuronal structures which help to predict our responses and thus quicken and facilitate our behaviour in an increasingly familiar environment. For example, Clark (2013) describes how: 'perception, cognition, and action ... work closely together to minimize sensory prediction errors by selectively sampling, and actively sculpting, the stimulus array. They thus conspire to move a creature through time and space in ways that fulfil an ever-changing and deeply inter-animating set of (sub-personal) expectations' (p.186). While offering a convincing explanation of an expert improviser's ability to streamline their responses by anticipating or translating the musical stimulus into familiar mental representations, it also sheds some light on novice difficulties in which *habitual* ways of thinking (i.e., as an interpretive performer) might need to be overcome in order to begin a new way of perceiving the musical structure (as an improviser). But what of the relationship between conscious and unconscious thinking?

In some ways the dichotomy between conscious and unconscious learning echoes the discussion concerning the use of rules in foreign language learning. This is because pedagogical methods rely on conscious strategies for stimulating and guiding implicit learning processes; that, in spite of the ubiquity of implicit learning, there remains a rooted conviction that what one thinks, or focuses on is important during the learning process. Carpenter (1986) in a discussion of pedagogic approaches in mathematics, describes three approaches to this problem: 'The first model proposes that advances in procedural knowledge are driven by broad advances in conceptual [conscious] knowledge. The second proposes that advances in conceptual knowledge are neither necessary nor sufficient to account for all advances in procedural knowledge. The third model concurs with the first that advances in procedural skills are linked to conceptual knowledge but proposes that the connections are more limited than suggested by the first model' (p.117). While the scope of these models is

inconclusive it is at least a type of discussion that extends the findings of improvisation literature which usually goes no further than acknowledging the existence of two different forms of knowledge. Squire (2004) goes further in defining a role for conscious awareness which: 'is the ability to detect and encode what is unique about a single event, which by definition occurs at a particular time and place' (p.174), an implication of the effect of conscious thought in leading and organising implicit mechanisms towards particular goals. It is also Squire (2004) who, by applying these findings to the contexts of learning, suggests that 'what is important is not only the task that is to be learned but also what strategy is implemented during learning, which in turn reflects which memory system is engaged' (p.174). Thus I took this as the beginning of a model in which conscious awareness, through attentional focus, directly influences the encoding of experience and the facility in which memorised productions (i.e., the knowledge used for improvised performance) can be later retrieved.

2.4.4 Skill Learning

It is interesting that, in parallel to my growing awareness of the role of unconscious, implicit learning mechanisms in acquiring knowledge for improvisation, I should, at the same time, highlight the use of cognitive strategies in the same learning process. Yet, the fact is, as my study illustrates, that there is a complex relationship between these two distinct forms of control which is not only fascinating but extremely significant for any individual's learning path. One author who particularly influenced my conscious approach to improvising in this respect was John Robert Anderson (b.1947), whose ACT (the Adaptive Control for Thought) models of human cognition emphasise the links between conscious instruction and the development of procedural (implicit) knowledge. For example, the following text describes

how clear, explicit instructions trigger a series of actions and feedback responses in approaching a mathematics problem:

      P1.   IF   the goal is to do an addition problem,

              THEN the subgoal is to iterate through the

                     columns of the problem.

      P2.   IF   the goal is to iterate through the

                     columns of an addition problem

                     And the rightmost column has not been processed,

              THEN the subgoal is to iterate through the

                     rows of that rightmost column

                     and set the running total to zero. …

      P9.   IF   the goal is to iterate through the rows

                     of a column

                     and the last row has been processed

                     and the running total is of the form

                     "string + digit,"

              THEN write the digit

                     and set carry to the string

                     and mark the column as processed

                     and POP the goal.' (Anderson, 1982, p.371):

Understanding how learning could be organised as an explicit sequence of cognitive actions and responses (the individual's 'flow of control' [Anderson, 1982, p.380]) towards clearly-defined goals later encouraged me to attempt a similar kind of approach in my improvising. Thus, as I proceeded with my learning I continually tried to clarify all aspects of

my knowledge, and often referred to Anderson's analyses of cognitive processes to help me structure and organise my thoughts. In Anderson (1983) all forms of conscious representation are related to three types: 'a temporal string, which encodes the order of a set of items, a spatial configuration; and an abstract proposition, which encodes meaning' (p.45). These three codes form the basis of an investigation into my own mental representations of musical structure while improvising (see Chapter 6.3.3).

2.4.5 Developing conceptual memory and control

Berkowitz (2010) discusses the development of a conceptual memory for improvisation as a facet of expert performance: 'in the moment of performance, the improviser need not be faced with the overwhelming task of consulting a cumbersome collection of possibilities at any given moment, but can instead draw from a conceptually organised system of knowledge' (p.54). He also provides a useful definition of concepts as used by improvisers: 'higher-level categories of musical materials that have particular musical functions (e.g. cadences) or that have the capacity to accomplish specific musical-physical goals when improvising (e.g., how to get from one note ...to another in a certain number of beats or notes)' (p.54). However, the actual acquisition of conceptual knowledge is portrayed rather passively, for example, as a result of practising variants of a formula: 'Learning variants also allows for more efficient organisation of the knowledge base, categorising formulas in terms of their underlying schemata [i.e., concepts] by analogy, induction, and inference' (p.55).

Vygotsky's (1986) research, which investigates the language development of adolescents, describes the acquisition of conceptual thinking in anything but passive terms: 'it is a functional use of the word, or any other sign, as a means of focusing one's attention, selecting distinctive features and analysing and synthesising them … the result of such a

complex activity in which all basic intellectual functions take part ... [which] cannot, therefore, be reduced to association, attention, imagery and judgement, or determining tendencies' (p.106). Thus Vygotsky invokes processes of decision making, experimentation, imagination and feedback in conceptual development, which go way beyond the presentation of certain exercises as Berkowitz (2010) describes, and which reflected more closely my own experience as an improviser.

The socio-cultural studies of Vygotsky (1986) describing concept formation in children are reinforced by neurological theories of concept formation proposed by Edelman (1989). Edelman links concept formation to brain structures 'that can categorise, discriminate, and recombine patterns of activity in different global mappings [established neural connections linking sensory, motion and emotional areas of the brain]' (1989, p.144) and describes the necessity of neurological activity which is 'independent from current sensory input', working instead with memory representations to form new, meaningful relationships from 'the values and categorisations of sensory experiences themselves' 1989, (p.145). He highlights again the fact that concept formation and perception is not a given attribute of learning, arising from 'any inherent logical order, classical categorisation or prior explicit programming' (Edelman, 1992, p.110), but the result of the individual's intentions to coordinate and align their control over a stimulus (such as language) in order to meaningfully communicate with others. Ultimately then, from this literature I understood an acquisition of underlying concepts in musical structure as arising from the desire to manipulate this structure in meaningful, communicative ways comparable to learning a spoken language: 'meaning arises from the interaction of value-category memory with the *combined* activity of conceptual areas and speech area' (Edelman, 1992, p.130).

2.4.6 Summary of general psychology literature

These paragraphs summarise the main literature that I have drawn upon from outside of the field of music psychology and improvisation studies and which was particularly influential in mobilising my learning. By looking outside of the specialist domain of music into areas such as artificial intelligence, implicit learning and skill learning, emotional intelligence and neurological theories of consciousness, I found not only a range of practical insights which influenced and informed my experience in improvisation, but also a freedom from prevailing cultural values which, I later discovered, shaped and regulated a great deal of the practice of classical music, and which I needed to critically question in order to develop as an improviser.

Chapter 3. Methodology

3.1 Understanding autoethnography as a framework for self-study

To adopt an autoethnographic approach to this study was a complex decision, based on several factors. Originally I had approached the task (perhaps rather naively) in a more detached spirit, thinking that I would study my learning entirely objectively or 'empirically' and, by doing so, discover a new cognitive theory of improvisation and learning of general use. However, the reality of the experience being much less theoretical than I had anticipated, it made more sense to emphasise the personal element of the study rather than try to suppress it. In addition a research design was needed to give value to the narrative element of the learning experience, as it was through this narrative that I began to interpret and understand the emerging themes and findings which contributed to the knowledge of the thesis.

An autoethnographic approach is obviously embedded in the parent discipline of ethnography, which I associated closely with research into *foreign* musical cultures. Because of this I did not at first consider it relevant to my own interests: after all, was I not learning new skills within a familiar culture and music style I was long accustomed to? However, the actual experience of novice improvising (in which I acted as a stranger within a foreign environment) corresponded so closely to ethnographic reports of unfamiliar cultural contexts that the research approach gradually took hold of my imagination. Revisiting autoethnographic accounts of learning and studying, particularly those of Baily (1988), Dunbar-Hall (2009) and Knight (2009) who all learnt improvisatory techniques as adult learners from a background in western music, I realised that this approach to qualitative research would enable me to express the actual lived experience of learning to improvise without the problems of translating this experience into 'scientific' language (Barr [2019] complains of losing one's voice in 'academic jargon'), or making facile generalisations based

on the experience of one (Thomas [2013, p.144] quotes the saying *'Einmal ist keinmal'* to explain that one study provides no general findings yet also points out 'how many more do we have to study before we can say that we can generalise?' - a particularly relevant question for self-studies such as this). Moreover, autoethnography provided a flexible framework for the unpredictable path of my learning ... 'in which unsystematic drifting, serendipity, chance inspirations, and clues' formed an integral part, (to borrow Borgdorff's [2012, p.165] description); a reference for my necessary investigation of surrounding cultural values which my attempts to learn to improvise made me more critically aware (Barr, 2012); and a guiding process in which to not only develop as a musical improviser and academic researcher, but 'to share those experiences, motives, and achievements with others' (Nethsinge, 2012, p.2).

Taking an autoethnographic approach thus meant placing myself at the forefront of the research rather than portraying my involvement as a neutral or passive instrument on which to test various ideas. As both researcher and the subject of the research the insights I gained from my experience in improvisation are explicitly interpreted as *situated knowledge*. Thomas (2013) describes this kind of writing as having ... 'an undeniable *position,* and this position affects the nature of the observations and the interpretations that they make' (p.144). Writing as an autoethnographer meant communicating my own perspective of events and interpretation of a complex cognitive development and skill learning process over a period of time. This subjective involvement in the research, rather than compromising the study, offered instead ... 'an immediacy and intensity in the author's feelings and thoughts, which might not be conveyed through descriptions of behaviours about other people' (Krüger, 2008, p.69). While the autoethnographic approach was empowering to my position as a self-study researcher, it also brought a degree of challenge, especially in terms of writing. For just as the lived experience became the focus of the research, so did this experience have to be constructed as a *narrative*, meaning I had to articulate a multitude of mixed information -

subjective emotions and impressions, facts, dates, recordings, written journal entries written over three years; to connect and thread all these events into a clear and logical sequence; to incorporate relevant literature from studies in cognitive psychology, neuroscience, biology, musicology without becoming academic or ostentatious (Nelson, 2013); to produce a text which was academically convincing as a PhD thesis to a panel of academic adjudicators, as well as a wider circle of colleagues and practising musicians (one of my ambitions was to publish the thesis as a guide for other classical musicians). Thus, one of the biggest challenges of an autoethnographic approach is the style and quality of writing which must not only convey information, but also convince the reader as to the *validity* of the study, as Ellis, Adams & Bochner (2011) explain: 'for autoethnographers, validity means that a work seeks verisimilitude; it evokes in readers a feeling that the experience described is lifelike, believable, and possible, a feeling that what has been represented could be true. The story is coherent. It connects readers to writers and provides continuity in their lives' (p.10).

3.1.1. Understanding one's ideological and cultural situatedness

One important aspect of the autoethnographic approach is that the research process becomes a tool for facilitating personal growth. For example, Bartleet (2009) overcame problems in her musical practice as a conductor through the process of studying and documenting her work. As insights emerged through the exercise of writing she was able to re-conceptualise her relationship with the printed score and achieve better communication with her musical colleagues. Thus, personal development might be through articulating moments of revelation (epiphanies) during the study, or through a more gradual change in consciousness of one's cultural and social situation: ... an awakening of the critical consciousness, allowing students to recognise connections between their individual problems and experiences and the social contexts in which they are embedded' (Barr, 2019, p.1110).

This literature became relevant to my study in learning to improvise as I experienced a conflict with cultural values inherited through my training as a classical pianist; these values I increasingly perceived as inhibiting my efforts to improvise. Uncovering my culturally-formed values and beliefs about music: understanding first how they existed in the musical life I was accustomed to, and secondly how they affected my own thinking about music and my perception of myself as a creative artist were issues which became central to the success or failure of my learning path[3].

Ethnomusicologist Steven Feld asks: 'What are the sources of authority, wisdom and legitimacy about sounds and music? Who values and evaluates sounds'? Who can be valued and evaluated as a maker of sounds?' (Feld, 1984, p.386-7). Using these critical questions as a lens allowed me to see my musical training in a new way: not as a simple exercise in skill learning, but as something more culturally defined. A musical training in which creative practices such as improvisation had been entirely excluded, while my role as a purely interpretive musician had been rigorously pursued, firstly by my teachers, secondly by myself as I increasingly aligned my own career ambitions with those I perceived existed in the cultural framework which I surrounded me, and thirdly by the social institutions in which all my musical practice took place. Thus, within the study experience itself, what began as a 'close examination of sound structures and symbols' led unexpectedly to a wider 'analysis of the patterns of human action and thought that infuse these structures with meaning in specific social situations' as Stock (2004, p.19) predicts.

Uncovering the depth to which these ideas of musical creativity affected my ability to learn to improvise was not easy and, although a feature of my novice learning, remained a

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[3] Banks & Banks (2000) also reflect on the cultural issues emerging through autoethnography: 'the consolidation of the ethnographic impulse, in which the writer looks outward toward culture for a sense of place and identity, with the autobiographical impulse, in which the writer looks inward for a site to interpret cultural experience'

contributing factor throughout my study. In this sense I was led to literature such as Goehr's

(1994) historical study of aesthetic ideals governing musical practice, and also to marxist

philosophers Gramsci (1891-1937) and Althusser (1971) who gave me insights into

socio-cultural practice, explaining how existential ideals, regulating the practice of cultural

institutions, are personally absorbed in a process of psychological domination, or *hegemony*

(Lasch, 2007). My eager absorption of this literature illustrates how the research process

influenced my thinking, for as I reflected on my early training and detected 'inconsistencies

in positions taken by individuals or groups' (Stock's, 1992), I utterly changed my perception

of the classical musical culture in which I was situated, so that my development as an

improviser runs parallel to a similar development in critical awareness as I become more

creatively empowered. To be explicit about this process is important because it also reflects

my *situatedness* as a researcher and that my interpretation of experience (for example that I

identify certain ideals as barriers to improvising) is based on theoretical constructs which

cannot be separated from 'facts' of skill development such as fluency as automaticity. Thus,

as Tenni, Smith & Boucher (2003) describe: 'Data is never theory-free. What we choose to

write and how we choose to write it is constructed based on the ways we understand the

world, our practice and ourselves' (p.5) and, as a result, an overriding goal of this thesis is to

be explicit about my ways in which I consciously constructed the task of improvisation and

how these constructs changed throughout the study.

3.1.2. An immersive research experience

To learn to improvise fluently to the level of public performance meant immersing

myself completely into the practice of improvising. The learning experience was therefore

not something separate from my everyday existence, but an integral part; in some ways it

became the focus of my life, a direction and a force for change. I improvised for several

hours every day over a period of three years, reflecting, researching and constantly analysing the experience. This approach can in some ways be compared to the ethnomusicologist who is immersed in 'a disorientating foreign culture and unknown environment' (Myers, 1992, p.22), for much of my learning involved *sense making* of the novel experience of improvisation. Therefore I interpret much of my acquisition of knowledge and skill as *adapting* to a novel environment in which I learn to act increasingly effectively and agentically; and it is for this reason that I draw upon ecological theories of learning (e.g., Edelman, 1989) to explain my experience. In this way, too, my study departs from purely theoretical studies of improvisational skill such as Johnson-Laird (2002) or Pressing (1984), adding to and testing such theories, for, as Baily (2008) advocates, 'learning to perform at an advanced level of proficiency' gives access to hidden knowledge, not only through the experience of overcoming problems of musical construction, interpretation, and instrumental technique, but also through being on 'the inside' of a cultural practice as practitioner rather than on the 'outside' as scientific observer.

After a year of solitary study, I discovered a teacher sympathetic to my situation as an adult learner and interested in my work as a psychological researcher. I thus enrolled with Prof. Jürgen Essl at the Musikhochschule in Stuttgart as an external (Kontaktstudent), receiving more than ten hours of lessons over a period of 14 months. As a fellow student I was also allowed to attend others' lessons and thus gained access to a musical practice in which improvisation on Baroque models was a part of everyday musical activity. Zemp (1979) describes how information which would not be accessed through formal interview techniques is naturally transmitted between master and student in a learning context: 'Conversations about music occur quite naturally in the course of making new instruments and during practices ... By learning to play himself, the ethnomusicologist becomes a musician and participates in these conversations; he learns the terminology in its habitual

context ... [Expert musicians] speak more readily of musical structure when a beginner makes mistakes' (Zemp [1979], in Baily [2008] p.123). Thus, when Jürgen explained historic uses of registration and ornamentation, possible approaches to musical forms, corrections to my improvising and different possibilities, he communicated information which would have been difficult to access had I approached him purely as a researcher. Learning alongside other students I also learned something about their preoccupations: what they liked or didn't like about improvising, how they responded to the different tasks of improvisation: what for some was a source of pleasure and discovery, for others a dreaded chore. Thus, in the period that I improvised within a community of practice my study gains from this wider ethnomusicological experience.

3.1.3. Problem-finding: an open-ended/ open-minded approach to research

Before I began my study I did not know what to expect, i.e., what I might learn about improvisation, or in which direction the learning experience might take me. I was also anxious not to inhibit my experience by setting deadlines or anticipating what ought to happen. This meant that an open-ended approach to the study was more appropriate for me, as I intended to record as accurately as possible what actually occurred, and follow the path of learning wherever it took me. In comparison with other qualitative research designs (i.e., action-research) therefore, in which goals and objectives are more defined for each cycle of action, I adopted a problem *finding* approach, as Borgo (2007) describes: 'Artists adopting problem-solving techniques begin with a relatively detailed plan and work to accomplish it successfully. Those employing a problem-finding approach, by contrast, search for interesting problems as the work unfolds in an improvisatory manner' (p.80). This approach is generally considered more suitable for ethnographic research which tries to avoid predicting outcomes of unknown situations. Krüger (2008), for example, recommends starting from 'broad and

general questions so as to gain a deeper understanding of participants' experience' (p.17), while Myers (1992) quotes the ethnographer Malinowski (1922) in saying: 'Preconceived ideas are pernicious in any scientific work, but foreshadowed problems are the main endowment of a scientific thinker, and these problems are first revealed to the observer by his theoretical studies'. Gritten (2016) too, aligns artistic research with this approach, which he proposes should be 'driven by an exploration of open-ended questions, issues and problems' (p.6).

In reality, a problem-finding approach to learning was quite challenging as it meant that I never knew what was round the corner, how I might best respond, or even if the direction I was going in was a good or profitable one! It was only after I reached a certain level of development that I was able to relax and say 'Now I have achieved x, y, or z' and thus I could look back and see a path of logical development from the beginning of my journey to my present situation. Yet, in spite of these difficulties, the problem-finding approach seems to be common to learning trajectories of improvisers, as Levin recalls: … 'I just sat down and started playing … You start practicing … and you start to improvise … you like what you're doing, or you don't like what you're doing' (in Berkowitz, 2010, p.88). Likewise, Sudnow (2001) describes an extended initial period in which he tried to make sense of the emerging experience, learning more through blind experimentation: 'aimed from the outset, and nearly always, for the most complex of doings' (p.39) than conscious design. In both cases, it was only after a considerable period of open-ended experimentation that these improvisers were able to bring their learning path under more conscious control, and to make explicit plans and predictions of the actual improvising experience.

3.2. Biography and background

A self-study of learning would be incomplete without also knowing something of the personality of the writer, and the 'significant parts of a life story [which] actually form a musician's identity' as Smilde (2008, p.244) proposes. It is also characteristic of autoethnographic studies to include 'a full confession of the scholar's autobiography' (Myers, 1992, p.22) in order to better appreciate the *situated* position of the researcher; therefore, in a similar self-study, Nethsinge (2012) explicitly examines his biography to understand how his 'musical background, understandings, learning, music-making abilities, and skills have formed [his] present identity as musician, educator, and researcher' (p.2). I therefore use the following paragraphs to convey relevant facts about my previous musical and professional experience which lead up to this PhD study. From this I hope to explain something about my interest in improvisation, my ambition to become an improviser; also the way in which my previous learning and professional experience has been shaped by cultural values. From this biography can then be better understood the way in which I construct the task (Tenni, Smith, & Boucher, 2003), my perception of myself as a musician, learner, researcher and improviser; perceptions which define the experience I describe in the central part of the thesis

3.2.1. Musical experience

I was born into a musical family. Both of my parents were professional classical musicians and had received a conservatoire training. Music was then a fundamental part of our family life. My mother taught and played the piano and the organ; she also sang semi-professionally in the local opera company and was responsible for a number of local choirs; while my father played piano and violin and was responsible for musical education in our county. I was taught to play the piano when I was five years old, and entered the local cathedral choir aged seven, so that, between these two disciplines, I was a fluent sight-reader by the time I was nine years old (it is customary for choristers in English cathedrals to

prepare new repertoire on a daily basis). This emphasis on sight-reading was reinforced through my piano experience, for, after my initial lessons, I was left alone to explore the large collection of scores which surrounded the piano in our home. My early musical experience then was solitary and intense, as I retreated to the piano in times of stress, and immersed myself in playing for the sheer musical pleasure and reward. Although my musical experience was focused primarily on repertoire, I remember being frustrated with this purely interpretive work. I wanted to be closer to the composers I played: I copied their portraits, often tried to compose pieces and sometimes tried to improvise. However, although my parents were polite about my compositions, it was clear that such efforts at musical creativity (in comparison with the classical canon) were not to be taken very seriously. Once, when I tried to improvise I was told to stop and play a 'proper' piece of music, after which I stopped this line of musical enquiry.

When I was nine years old, I won a scholarship to attend a specialist music school. I quickly decided that I wanted to become a professional concert pianist, began to practice several hours a day, and gave up academic subjects whenever possible. Musically speaking, my days of freedom to explore repertoire were over. From this point onwards, my training was much more rigorous: I was given pieces to prepare for weekly lessons, pieces which had to be learnt from memory and usually performed in public recitals. Practicing was scheduled (I was assigned a practice room) and loosely monitored, meaning that if my teacher heard me playing other repertoire than that he had set he wanted to know why I was wasting my time! Visiting artists would give masterclasses and feedback on our progress to becoming professional pianists. I and my colleagues in the piano department regularly compared ourselves to professional standards of performance, aiming to bring our interpretation and technical performance of the score to the highest possible level of perfection. This made sense to us as we were continually assessed on our performance, and any deviation from the

printed score was seen as a failing in our performance. Such values were replicated in the competitions and festivals we entered, so that, by the time I left school I had but one idea in my mind - to be as perfect in my technical performance as possible, for only through perfection (so I believed) would I win a competition and have the opportunity to build a career. At no point in my training was improvising discussed as something I might do; nor did I attempt to teach myself. Although my piano teacher was a capable jazz pianist, there was no question of using these skills within the classical domain, as to do so would constitute 'messing around' with the score, which was strictly forbidden.

Later, when I entered a London conservatoire of music, I felt the same expectations of my musical performance from teachers and colleagues. The narrowness of my musical goals which, ignoring factors of expressive communication and agency, aimed only for technical perfection, caused me increasing problems. The more I aimed for perfection in my performance, the less this became attainable. Instead I began to suffer stage fright so each performance became increasingly characterised by an internal struggle for control. Although I had some success as a solo pianist, I felt defeated and depressed about this career path and began to explore other options of earning a living as a musician.

3.2.2. Improvising experience

At first I worked mostly as an accompanist, particularly for singers and local opera companies. However, needing a more stable income, I applied for a job as a dance accompanist in a performing arts school. For this work it was necessary to improvise or adjust written music to fit the rigid frameworks of set phrase lengths and rhythms which made up the ballet exercises. I gladly accepted the challenge of learning to improvise and after a difficult transition period, learnt some basic harmonies which I found I could adjust to nearly every situation. In this experience I learnt through doing, as I needed to accompany

four or five hours of dance classes a day which left little time for reflection or practice. My main problem at first was overcoming my sensitivity to wrong notes, and this was greatly helped by the fact that (on most occasions) the dancers either didn't notice or were too polite to comment! I realised after a while that they listened to music in a different way than I did, using the rhythms, the energy of the music, or the contours of the melody as the impetus for their dancing. Thus, the goals of performance in the dance class were very different to those I had experienced during my conservatoire training (in which success or failure depended on faultless technical competence) and this was a valuable experience for me as I began to appreciate how differently people might listen to my musical performance outside of the world of competitions and musical institutions I was used to.

Working as a dance pianist kept me busily occupied for a year as I managed to scrape together a few harmonic patterns and generally constructed all my material from this safe, but constricted zone. Later, I tried to advance my skills and develop the musical language I used for the dance classes: I wrote out exercises, tried to structure the exercise more clearly, follow a clear tonal plan and so on, but these efforts met with limited success. Usually, the pace of the exercise was too quick to think in this way, and the necessity of staying in touch with the ongoing dance movements meant that any experimentation had to be sacrificed to fluency. I was still sensitive to errors and couldn't stand it if I went wrong, lost my place or ran out of ideas. Looking back, I realise that I always wanted to make a good impression on people listening and, if I felt they were listening critically, I would try hard to control every note. Because of this, I found that, rather than developing in fluency or expressivity, my improvisation was becoming increasingly inhibited. On some days it seemed I could hardly get anything right: when I played I needed to make a decision - about a chord, or a melodic direction, and these choices paralysed me as I didn't have the time to work it out. In these

situations, the only option (I felt) was to retreat into safety, but this resulted in a music so banal I felt ashamed.

Eventually I gave up this work as a ballet pianist, gaining employment instead as principal pianist with a new contemporary music group in Portugal. This job felt like returning to the scores and the stage of the classical music world once again, but in a more positive way than formerly. I was working with composers, conductors and colleagues who valued my chamber-music skills, technical expertise and score-reading abilities. Performing and interpreting new scores was unlike the conservatoire traditions of interpreting historic, canonic repertoire; and, most importantly, I was appearing regularly on the stage, getting valuable experience in public performance, overcoming my stage fright and growing in confidence. As a contemporary pianist I built a reputation in Portugal, and after a while was invited to teach improvisation in a local music conservatoire. In this institution I designed and taught a course of free improvisation to young musicians (aged 13 to 18 years), normally in groups of five or six players. In these lessons I explored ways of constructing music in real time, using narratives (i.e., stories taken for the news) or contrasts (long/short notes, fast/slow, high/low registers), playing to film, and writing graphic scores. Tonally, we used simple scale systems such as pentatonic, gregorian modes, or wrote our own scales, and these constraints seemed to allow the children to organise their music expressively without ruining the fun or inhibiting their freedom to act. I would have liked to extend our work to using diatonic (major/minor) scale systems as a basis for improvising, but felt unable to do this as I remembered my difficulties as a dance pianist. In particular I felt I was unable to control tonal improvisation; I lacked a clear basis on which to make decisions quickly in the moment without feeling paralysed over working out the next steps.

One other aspect of my improvising experience should be mentioned: my relationship with the organ which ran in parallel to my professional career as a pianist. Since my early experience of being a cathedral chorister, I'd been fascinated with this instrument, the scale of its sound world and its magnificent repertoire. Later, in my teens, we'd lived opposite a church with a three-manual organ which I was allowed to practise whenever I wanted. I practised mainly Preludes and Fugues by J.S.Bach, G.F. Handel's Organ Concertos, and the Organ Symphonies of Ch.M. Widor, trying to achieve musical effects from an instrument which had none of the registration and colours intended by any of these composers! As I focused more on establishing a career as a professional pianist, my organ studies waned, but fifteen years preceding the PhD study I found myself once more with access to an organ as I began helping out in our local village church, accompanying the services. This sparked a period of more serious study, leading to examinations at the Royal College of Organists, where I received first the Associateship and then the Fellowship.

One day, I chanced to hear a programme on BBC Radio 3 which featured the improvisations of Parisian church organists. Travelling from church to church, the radio presenter recorded the improvisations and also interviewed the organists about their approach to the task. This programme 'blew my mind'; it was an absolute musical and cultural revelation for me as I couldn't imagine how such dramatic and virtuosic effects could be achieved 'in the moment'. Of course, I tried to achieve similar effects on my village organ, thinking that I could transfer the techniques of ballet improvising to this new situation. However, I hated the results of my improvising on the organ which sounded gauche, disconnected and horribly unconvincing. Because of this negative experience I found improvising particularly hard on the organ. My problems of selecting material which had started at the piano, were exacerbated at the organ where wrong notes seemed to scream at me, and only the most precise movements and coordination was acceptable. Putting aside the

problem of improvisation I tried composing pieces instead for organ, with more success in that I managed to achieve some of the effects I wanted. However, my sights were firmly fixed on improvisation which seemed to me a much more impressive and glamorous goal to aim for. I admired improvisers very much, began listening to improvised organ performances and dreamed of this unique performance approach in which composition was blended with virtuosity, expressive agency and control in one wonderful action.

3.2.3. Academic experience

The decision to enrol in an academic institution at a late stage in my career was rather spontaneous, arising out of the exams I had earlier taken at the Royal College of Organists. These exams had awoken my interest in academic study, which I now wanted to take further. Learning of the Psychology for Musicians course at the University at Sheffield, I signed up with rather mixed feelings at first as I wondered if I would be able to cope with the demands of a masters course. Until this point I had generally avoided academic subjects in my life, giving these up whenever possible in order to focus purely on practical music making. Also my earlier, rather negative experience of musical institutions made me a bit wary that university life might be similarly restrictive. These doubts however were soon replaced by the excitement of discovering psychology. To be able to systematically reflect on the processes of thinking and feeling seemed very liberating, and, as I began to assimilate the standard literature and subjects of music psychology, I realised what a profound effect this study would have on my professional life. Studying and writing about performance anxiety, the different ways in which musical structure and expression is perceived by listeners, or constructed by performers helped me to change the way I approached performance. I felt stronger on stage, more in touch with the public, more willing and able to communicate expressively when I played.

Towards the end of the masters course I wrote two assignments which prepared the ground for this study: one was a critical look at learning and performing practices in classical music which could be described as hegemonic (situations in which individual freedom is constrained by implicit ideals). I discovered the literature of marxist social critics (Althusser, 1971; Lasch, 2007; Riley, 2011) and other voices such as Mikhail Bahktin (1895-1975) who I felt, looked through the ordinary, everyday constructs of social life, penetrating the hidden values and beliefs on which this life was constructed. My admiration for these writers caused me to apply the same critical methods to the social practice of classical music, and to perceive some implicit values and beliefs which constrained and dominated this particular aspect of Western culture. The second was a self-study[4] in trying to improvise a fugue which, though it produced only limited results in terms of my improvising skill development, showed me the beginnings of a systematic approach to analysing the improvising experience. By speaking my thoughts aloud during the improvising experience, reflecting on my experience afterwards and analysing the music I improvised, I was able to glimpse a fascinating world of cognitive processing of musical structure in real time. How much more valuable would a self-study of improvising be over a longer period of time, in which real skill development occurred. Thus, as a result of these two assignments, I felt anxious to make an extended and systematic enquiry into my difficulties improvising; to draw on the insights and methodologies of psychology to better understand, articulate and overcome the perceived barriers to diatonic/tonal improvisation which I had so far encountered; also to explore the effects of hegemonic cultural values and beliefs on former musical development; and to draw on literature in skill learning (i.e. Gobet, 2016; Schneider & Fisk, 1982) to acquire the skills in improvisation which had so far been denied me.

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[4] Full title: 'So you want to improvise a fugue? An investigation of the cognitive and emotional processes involved in a novel task in improvisation

3.2.4 Conclusions arising from biographical section with relevance to improvisation

I now summarise the main points arising from this autobiographical section which I believe influenced and shaped my individual approach towards improvising as I began this study:

- I had received a narrow, intense training in musical conservatoires focused exclusively on the skills of score interpretation. Creative practices such as composing and improvising had been excluded and discouraged as part of this training.

- This training had prepared me for an extensive and varied experience as a professional pianist and organist but I felt frustrated in being excluded from creative practices and unable to improvise my own 'classical' music.

- That even limited skills acquired through improvising for dance classes did not provide me with creative insights. I felt unable to develop these skills creatively, or transfer them to a more classical language or style of music; neither could I use these skills to improvise on the organ.

- That my academic writing experience and knowledge of literature was relatively new (compared to my musical experience). Nevertheless I had obtained a Masters degree in music psychology and through this had developed a special interest in studying the cognitive and emotional processes of improvisation, also the ways in which cultural ideology influenced musical practice.

These, then, were the skills and experience which I brought to the study and motivated the research questions formulated above.

3.3. Documentation and data collection

Capturing a personal creative, or learning process can be problematic when the methods of capture themselves become a source of distraction. Newman (2008), who studied his own composition processes, reviews a number of self-studies which suffered from data collection being too rigid or rigorous. Towards the end of his study he abandoned his own verbal speak-aloud protocol which aimed to capture 'the moment-to-moment decision-making of a composer, especially over the entire scope of the composition of an entire work' (p.8), as he found it intrusive into his creative flow of ideas. Thus, Roels (2013) who made a similar study of composing notes that: 'Putting too much weight on the data collection method risks forcing the creative process into a tight procedure and undermining the notion of a real world study' (2013, no page number given). While modern methods of digital recording facilitate a more 'naturalistic' setting in which one can ignore the methods of capture, a more descriptive, interpretive form of data collection was also needed to record: the flow of cognition and control, my perception of the events of learning, the changes occurring in my knowledge over a considerable period of time. Thus, in addition to digital recordings I also wrote extensively in a journal, using this to record my thoughts and impressions before, during and after improvising.

By using multiple methods of data capture I allowed myself considerable freedom, as I could choose the method which seemed most appropriate to the moment. All my equipment was easily accessible - the logbook was always to hand, an audio recorder was permanently set up to the organ and could be activated at the touch of a button. Even the more complicated filming could be set up within a few minutes, using just a mobile phone and a tripod. In this way I used each resource when I felt motivated to do so; to help me learn, gain knowledge about my work and to encourage me to improvise. Thus I avoided a more inflexible or

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disciplined approach to data capture which might have become arduous and dominated the experience; aiming instead for a more natural flow of data which might... 'capture and reveal moments of discovery' (Nelson, 2013, p.28). At no point did I edit my data, following the direction proposed by Tenni, Smith & Boucher (2003): ...'we must write about what we really prefer not to write about. It is not about presenting ourselves in a good light in charge, competent, controlled, organised and so on, or how we might like to be seen. Rather, it is about writing rich, full accounts that include the messy stuff - the self-doubts, the mistakes, the embarrassments, the inconsistencies ... (p.3).

3.3.1. Audio

I started recording my improvising from the beginning of my study. At first these recordings were occasional - events when I had access to a good organ, or improvised for a public service. I found these early recordings rather depressing as they didn't sound very expressive or convincing to me. Listening to them drew my attention to the product of improvising at a time when I needed to focus more on the processes of learning, therefore I didn't use this method again until I felt more advanced in my learning experience. During my second year I began regularly recording my practice sessions. In order to overcome the inhibiting effects of recording I set up a system which I could activate every time I improvised. The recordings were made using the midi output of the electric organ and captured in a music software programme. The advantage of this system is that it didn't affect the way I practised or the sound of the organ; also the recordings could run for hours without creating large file sizes. In this way I became accustomed to recording myself; I felt I could behave in the same way as when I practised without recording, sometimes pausing to write notes in my journal or try things which may not sound good, without worrying about the recording itself. An unexpected benefit of the midi recordings was that they could be

visualised in the software programme as graphic representations of sound. These graphics I later used to help me understand at a glance the structural shapes and forms of my improvising, and to better control the overall sense of direction.

3.3.2. Video

While I grew accustomed to recording my improvisation as audio files, the extensive size of video files made this medium more problematic. Throughout the study, filming was a rarity and thus a more intensive experience, a type of data collection which strongly influenced the experience of improvising. I found this type of recording to be brutally objective, a feature which could at times be useful, at other times less so, depending on my confidence and learning situation. For example, at first I was annoyed by how much I hesitated to stop and calculate my next steps, and feeling unable to correct this feature of my performance at the time, I therefore stopped filming. Later however, when I was more fluent in my improvising, I used the objective nature of filming to correct this tendency, which pushed my performance beyond the continuous slight hesitations of my comfort zone. Therefore filming became a more relevant and effective learning tool as I neared the level of performance. It helped to improve my posture at the organ, make my body language more communicative and expressive - to push my performance towards a more convincing fluency and expertise.

As I prepared for my final recital the fact that it would be filmed created a sense of occasion to which I wanted to respond. I therefore organised the improvised programme more than if it had been just a live performance, as I felt I was creating a permanent record of my learning achievements. I planned the design of the film, thought about how I would graphically represent information about the organs, the registration I used, the lighting, and

how I would myself appear. In this way, the work of filming helped to bring my improvising to a peak of performance.

3.3.3. Field notes

While the former, digital modes of data collection might be considered more objective, I believe my field notes (later referred to as my 'journal' and 'personal notes' in the thesis proper) capture more accurately the more interesting cognitive and emotional processes of the learning experience. This is because I used the journal to collect all my thoughts and impressions about the experience. Writing these notes served not only as a method of data collection but also as a therapeutic device for articulating my emotions while improvising and for overcoming negative feedback during the first months. The journal allowed me to compare my conscious plans and anticipations of improvising with the actual experience which was initially very confusing; by detailing the events of each session in the journal however, I gained a different perspective: spotting patterns of intention and response which were different to impressions gained during improvising, noting also moments of agency and control which signified better connections in my knowledge and emerging skills. Practising improvisation was often an emotionally intense experience as I tried to make sense of the task and correct many features of my performance simultaneously. Criticising my own playing in order to improve it often created a tendency towards global, negative impressions of myself and my work, particularly after a long session. The act of writing however corrected this impression by providing me with evidence of positive achievements, recorded during the session, which would otherwise have been forgotten. I thus achieved a degree of objectivity, and sense of direction (meta-learning) through taking notes which would not have been possible had I just practised.

As a written record of the whole experience, the journal also provides valuable access to former states of learning and perspectives of improvising which, under normal learning conditions would be overlaid and assimilated by new forms of experience (Bruner, 1967) and the cognitive developments which accompany skill learning (Anderson, 1982). Thus, to read information about my former preoccupations of improvising, how I articulated my problems, experienced the task, also allows me to revisit former ways of constructing improvisation; ways which can be directly compared to my present learning situation and allowing me to better understand what knowledge I have gained, what has been learnt, practised, what features have changed, emerged, disappeared from awareness and so on.

3.3.4 'Talk-aloud' protocol

Talk or speak-aloud protocol (also known as verbalisation) offered itself as an obvious technique in making explicit the accompanying thought processes of improvisation. Davdison (2015) describes studies in which musicians accessed 'new knowledge about one another and their processes as they worked' (p.4), though in self-studies, the act of continually speaking one's thoughts can become intrusive. Newman (2008) who, as already noted, abandoned his talk-aloud protocol during his study questions the validity of this method in capturing all of his thoughts while composing, for example during moments of high cognitive activity, or more automatic processing. In my own experience I had had mixed success using talk-aloud protocol to document a short learning study in Fugal techniques (see Chapter 3.2.3). At first, speaking my thoughts was a positive experience: it seemed to make the learning experience more explicit and accessible, I felt able to articulate problems and design strategies. After a while though, I realised that I could only report thoughts of which I was consciously aware and that this method of capturing data was prioritising such thoughts to the exclusion of all else. This worried me as I might be suppressing or neglecting more implicit forms of

learning, awareness and control. Therefore I decided to reject talk-aloud protocol as unsuitable for a long-term study of learning and to use only my journal for recording relevant thoughts and impressions. My intention while improvising was then to allow my thoughts complete freedom to roam where they willed, and not to constrain these by constantly articulating them.

Notwithstanding this decision, there were occasions when I felt a strong urge to speak aloud during improvisation and the influence of this action on my perception of the task and in acquiring skills is discussed in the thesis (see Chapter 7.5.1)

3.3.5. Conversations with other improvisers

Throughout the period of this study, I sought out opportunities to talk to other musicians, whether novice, student or expert, about their experience in improvisation. Initially, I hoped to gain an external source of data about the ways in which other individuals processed the task, or explained the ways in which they organised their knowledge and represented aspects of musical structure. This kind of detail about the cognitive skills of improvisation I felt was often missing from interviews with improvisers, and it would be useful to compare their experience with my personal data as it emerged through the study.

Notwithstanding these ambitions, I was aware of the difficulties in persuading experts to articulate knowledge which may be predominantly tacit and therefore studied other approaches to the problem of interviewing. Wopereis and colleagues (2013), for example state that 'asking renowned experts to scrutinize their expertise is not as self-evident as it seems … experts often have problems articulating their expert knowledge' (p.222). The approach of these researchers was thus to ask interviewees to respond freely to statements such as "A good improviser is someone who . . ." (p.225); statements which they later analysed using multivariate sampling techniques 'to identify key characteristics' of

improvisational expertise such as 'risk-taking, creation, responsivity'. Deprés's study (2016) also interviewed (a smaller sample of) eight performing classical improvisers, examining the texts for emerging themes or 'categories' which illustrated differences in learning styles between 'native' improvisers (those who improvised from the beginning of learning) with 'immigrant' improvisers (those who learned later in life). While these studies revolved around specific research questions and aspects of improvising knowledge, Uitti's (2006) interviews with over forty contemporary classical improvisers were more open-ended and less constrained, allowing the improvisers to speak for themselves about issues which concerned them. In this way, they read less like a formal interview and more like a conversation between friends. For example, Uitti might start from an open question 'Shall we speak about the things that you are doing now?' (p.439) or a more tailored one, based on his knowledge of the interviewee: 'You had a classical background. With whom did you work?' (p.475), and these questions then stimulated a discussion which the interviewer simply helped along.

This 'informal conversation' approach appealed to me as it resulted in more information concerning individuals' practice and performance techniques, their source of inspiration, interpretations of wider social-historical context and so on. Therefore, my motivation in talking to other improvisers was to follow the open-ended, semi-structured approach of Uitti (2006), while aiming for a much more informal setting and atmosphere, so that the expert would not feel self-conscious or tempted to interpret their thoughts to fit the research question, and so on. The problems of this open-ended approach to interviewing I only later appreciated, for, as I spoke to a range of different improvisers I soon realised that it would be difficult to directly compare their experience of improvising with my own. Each individual, approaching the task of improvising in their own way, thus had their own musical and artistic goals, their own cognitive style, skills and choice of musical language. Often, as

they talked, I was amazed at how different their approach to improvising was from my own! For example, one interviewee was an experienced composer who improvised sketches from his compositions; another subject was a college student, unwillingly learning to improvise fugues in a Baroque style; another was a retired harmony teacher who only improvised harmonisations of hymn tunes. How could I align such different personal backgrounds and musical aims and objectives with my own experience?

My approach therefore has been (i) to allow each individual to talk freely about the aspects of improvisation which were important to them; allowing them to define the topics of the conversation, while (ii) keeping my own preoccupations and concerns in the background as 'a framework of issues, leading to possible questions, leading to possible follow-up questions …' (Thomas, 2013, p.198) until I saw an opportunity to introduce them into the conversation. In this way I ended up with a diverse series of descriptive accounts, snapshots taken of different lives in improvisation, rather than an organised library of knowledge which might triangulate my own findings. However, as these conversations reveal much about the individuals' own experience, I include their statements wherever relevant throughout my thesis, and longer transcripts are included in Appendix D.

3.4 Interpreting the thesis

The aims of autoethnography are to make the individual experience relevant to a wider community of readers, and to go beyond the interests and aims of the individual writer. It's therefore important that my text is meaningful and expressive to a third party not only of the knowledge and skills I gained in improvisation, but also of wider cultural issues, for example, my life and experience as a practising classical musician and of a learning process occurring in conjunction with this practising culture. Banks & Banks (2000) state that: 'we write so as to invite readers to share our emotional responses to our professional activities

and their consequences; that we might write to broaden the perspectives of nonacademic readers and enhance their practical understandings of everyday life' (p.236), and these words serve as a reminder that my text aims to reach a wide field of both professional and non-professional musicians with an interest in musical improvisation; also academic circles with a possible specialist interest in music psychology, as well as other academic disciplines with interests in autoethnography, skill learning and performance, and so on. With this wide field of readership in mind, the following paragraphs will serve to clarify my own roles and perspectives in constructing the text; also to make the reader aware of the main themes present in the thesis, these themes serving as a guide to orientate the reader from the beginning, so that they may more easily interpret and understand the text with relevance to their own life experience.

3.4.1 A text of many layers

One way of understanding the richness of information in an autoethnographic study is through the plurality of perspectives and skills which one person brings to their account. Dunbar-Hall (2009) described these perspectives as 'layers of consciousness' as he interpreted his learning experience of Balinese music in different ways through previous experience as a musician, teacher and university administrator. Similarly, in the biographical section above I revealed a mixed range of experiences which, I anticipated, would shape and influence my learning experience of improvisation. However, in addition to these initial layers of perspective, I would also like to consider new perspectives gained through the study itself as I acquired knowledge of improvisation and experience in learning; also later, more mature perspectives which emerged through writing up and reflection. These can then be listed as follows:

1. Initial perspectives: a professional musician experienced in interpretive performance; a novice improviser in Baroque styles of organ music; a relative newcomer to academic writing and research, having just completed an MA in music psychology.

2. Practice perspectives: I gain insights into the task of improvisation and the study experience; I become more familiar with selected literature as it assists my learning; I gain new knowledge of myself as I develop creative skills and improvise in public.

3. Study perspectives: I acquire academic experience through writing the thesis; I gain a new, more distal, meta-perspective of the whole study - a process of noticing emergent themes and interpreting the experience through these themes.

Each of these different perspectives on the study provided me not only 'with a series of research lenses to understand my learning' (Dunbar-Hall, 2009, p.158) but also valuable access to former stages of learning; for, If I had written the thesis purely from the point of view of expertise it would lose much of its value and relevance as an account of learning. Therefore, to fully exploit each layer of perspective, I have separated narrative sections of the thesis (see Chapters 4-8) which capture the immediacy of novice and intermediate learning, from findings and conclusions (see Chapter 9) which were written with the advantage of greater experience and a more connected knowledge base. Chapter summaries, which reflect on the salient points of learning stages (see Chapters 4.4, 5.4, 6.4, 7.7, 8.6) also draw on intervening 'practice' perspectives as I compared my emerging experience with theories and perspectives from literature. In this way, my approach reflects what Ellis, Adams & Böchner (2011) describe as 'the procedural nature of research' (p.6) to include the reader in the same plurality of perspectives and approaches that I experienced.

3.4.2 Dominant themes in the thesis

Tenni, Smith & Boucher's (2003) warning of 'the importance of engaging in cycles of data analysis early and regularly' is appropriate in my case, for throughout my study I had been focused predominantly on musical practice - acquiring the skills of improvisation to a degree which made the study worthwhile and significant. Achieving these skills while simultaneously exploring a wide base of relevant literature left me little time for reflection and analysis on the *whole* learning process. Therefore, it is not surprising that the process of 'writing up', rather than summarising my knowledge, began instead to influence and develop my perception of what I had learnt. For the first time in over two years, I put aside my daily improvising practice and began to revisit earlier events in the learning cycle, comparing these events with more recent 'ways of knowing' (Goldman, 2016). Until this point I had been absorbed by a sequence of changing perspectives and emerging insights resulting from the skill learning experience. I now had the opportunity to connect this series of fragmented perspectives, to study the study itself, and acquire a new sense of meta-awareness of the whole process, as Nelson (2013) describes: ... 'a required movement away from the proximal towards the distal can be effected through critical reflection. The more embodied experience moves away from the proximal, the more it becomes possible to articulate its import in additional modes, including the intellectual, as patterns 'emerge' into discernible forms' (p.3).

Breakwell, Hammond and Fife-Schaw (2000) describe a process of *coding* in which the researcher reads and rereads a text 'looking for recurrent discursive patterns shared by the accounts under analysis' (p.258); yet, for me it was through both writing *and* reading that I began to notice the presence of dominant themes which, appearing under different guises, linked seemingly disparate experience across the months of study. Coding in this way

involved much trial and error and it took several drafts of the thesis before arriving at a final, stable interpretation of events. Teasing these subjects and themes out of the learning experience was also accompanied by continuous reflection on the experience of improvising. In this way, I noted emergent themes at the end of each chapter, partly as a summary of events taking place during a particular period, but also to keep the thesis coherent: these various themes served as a framework to connect and make sense of the whole experience in learning to improvise, from my novice attempts to my first professional engagement. Some themes, such as emotional considerations or conceptual perceptions emerged as the principal subject of a particular chapter or period of learning, while others, in particular questions of learning strategies or knowledge acquisition were continually present and provided a lens through which I could better organise and understand my lived experience. All of these themes are fully discussed in the final chapter (9) in which I summarise and reflect on the salient points of the whole study.

Chapter 4

Starting to improvise (months 1-12)

4.1 A novice perspective of improvising

What happened when I tried to improvise? During this time I often worked as a freelance organist. Arriving at a new church and a new organ to accompany the sunday morning service gave me many opportunities to improvise, yet I often didn't have the courage to try, and when I pushed myself to 'have a go' the effects were (I thought) disastrous. A typical scenario ran as follows: I would approach the task with an active mental image of what I would play, i.e., I had a clear idea of the material and could run it without any doubts or pauses in my mind (on the bus or the train on the way to the church). However, as soon as my fingers touched the keyboard another reality seemed to take over, as my notes record: "Utter disaster. My fingers simply refused to play the imagined themes, executing instead a series of 'safe' broken chords' (Personal notes, 21st October 2015). The gulf between my ambitions and my ability to realise these ambitions was never so wide as at this point and the situation facing me had an especially cognitive flavour, described by the following graphic which represents a continuum of choice between what I wanted to do, and what I was able to do.

In general then, my experience was that I would start near the 'desirable' with some expression of my musical imagination but, finding that I could not continue in this style or develop the musical ideas without wrong notes, would scurry towards the stilted chords and slow movements of the 'possible', as represented in the graphic of Figure 3.

Musical Output

Possible _____ Desirable
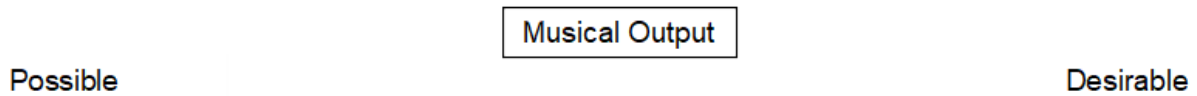
Figure 3. A graphic representing the range of choice between the possible and the desirable as a continuum.

4.1.1 Negative emotions

As a professional musician, trained in the conservatoire tradition of interpretive performance, I habitually aimed for the highest degree of accuracy in my musical performance. Thus, I was extremely sensitive towards the errors of my novice attempts at improvising. Even when I tried to improvise in private I found it was 'a fight against fear', for although I wanted to try out ideas and experiment in a free and uninhibited way, my emotions of shame and embarrassment either brought the process to a halt, or forced me to drastically try and control what I was doing. Goleman (1997) describes such situations - where emotions take precedence over rational intentions - as *neural hijackings*: ... 'a centre in the limbic brain proclaims an emergency, recruiting the rest of the brain to its urgent agenda ... before the neocortex, the thinking brain, has had a chance to glimpse fully what is happening, let alone decide if it is a good idea' (Goleman, 1997, p.14). These words thus capture my novice experience of improvising (although it might seem an exaggeration to invoke such strong emotional reactions from an activity such as musical improvisation) which was dominated by feelings of shame and embarrassment which I felt powerless to control.

Two recordings taken from one practice session half way through my first year, illustrate the influence of these emotions on my improvising. The first recording (Audio_1) is of the opening few minutes of the session and begins with dramatic musical gestures in a

chromatic, romantic style. The pace of the improvisation is also quite fast and it's clear that I'm playing quite fluently without stopping the music to think or reflect. However, due to an increasing sense of the awfulness of my playing throughout this session, (aggravated by the public setting of the church which meant I continually anticipated listeners) I became less and less able to try ideas. A little later in the session (Audio_2) the ebullient opening material is reduced to just two voices, moving at a very slow tempo with many pauses as I check each movement before moving forwards through the music. I should mention that this occurred in spite of a clear strategy I had made for the session to practice a symphonic-style of improvising. I had no wish to practice simple diatonic textures in slow tempos; yet, I felt unable to do anything else as I tried to avoid the criticism of my own thoughts: an emotionally-inspired decision recalling Overskeid's (2000) assertion, that individuals: 'invariably choose the alternative which leaves [them] with the best feeling' (p.285).

At this stage then, it seemed to me that my emotions formed a barrier to my ability to improvise, especially in public situations when I became anxious I might be overheard. The effect of this anxiety on my ability to learn also caused me some concerns, as I recorded in my journal

 'I am in danger of:

1. being chained to a series of ghastly harmonies.

2. being unable to actually control/develop a harmonic style.' (Personal notes, 21st October, 2015)

The frustration I felt over the results of each improvisation session was exacerbated by the fact that I was used to being technically in command of my performance. I knew I possessed enough instrumental skills to perform difficult and complex works; also that I had

a deep theoretical knowledge of musical structure. Yet, I felt unable to unite these skills in the moment of improvisation because of the dominant, intrusive nature of my emotions. I sometimes wondered how I might improvise if I was hypnotised: if, by overcoming my embarrassment or attentional vigilance, might I then be free to explore my imagination (an experiment I unfortunately never had the courage to attempt!)

4.1.2 Undermining self-beliefs

To my mind, my experience was the opposite of what Dolan (after Csikszentmihalyi, 1988) describes as 'flow' when improvising. Flow states are often presented as a kind of ideal mental state in improvisation, in which: ... 'people lose their sense of time and enjoy a strong satisfaction and immediate feedback (Dolan, 2005, p.94); or ... 'A merging of action and awareness ... a loss of self-consciousness, a sense of clear goals and reception of immediate feedback; and a sense of feeling highly challenged and highly capable' (Custodero, 1999, in Dolan 2005). I imagined this sense of flow to be a characteristic of expert improvisers such as the organists who had inspired me to learn (from legendary historic figures such as Pierre Cochereau (1924-1984) and Marcel Dupré (1886-1971) to those of the present day such as David Briggs or Olivier Latry). Comparing my own halting efforts and noting too, how content they looked, how absorbed and seemingly at ease they were with the task, I questioned whether my character was in fact suited to improvising. Investigating the psychological literature on personality types, I encountered Ben Zur, Breznitz & Hasmonay's (1993) classification of two characteristic types of behaviour - A and B. The Type A behaviour pattern seemed to describe my own current involvement with improvisation: ... 'an action-emotion complex that can be observed in any person who is aggressively involved in a chronic, incessant struggle to achieve more and more in less and less time ...' (p.173), while the Type B described (at least to my imagination) the performance of expert improvisers, who

... 'exhibit a calm, pleasant behavioural style, are not pressured by time, and have a sense of satisfaction in their lives ... will tend to flow with the tide of life rather than struggle against it' (p.174). I record this impression I had of myself to illustrate how, at this stage in my learning, my improvising began with a critical awareness of errors in my improvisation and finished with global judgments about my character being unsuitable for the task.

4.1.3 Undefined goals

I was at the beginning of learning, and so the idea of expertise - the actual knowledge state of the expert - was a mystery to me. This vagueness about the quality of expertise made the goals of my improvising equally vague and ill-defined. For example, I did not perceive the task in terms of definite actions, i.e., "I will do this or that action" or organise the task as a set of instructions, i.e., "Start with a theme; add a counter melody, etc.," but made strategies based on generalised observations of expert organists. I recalled one expert who improvised in symphonic style, so I tried to copy his way of improvising; another one, perhaps a more historic figure who improvised a Trio Sonata or Prelude and Fugue, inspired me to do that. This meant that I often tried many different directions and learning strategies in one session. If things didn't go as planned I stopped and tried something else. Unable to decide on one course of action, I had little understanding or control over the events of my learning, and thus, rather than becoming involved in the music (the skills of the task), I became increasingly distracted by my emotions and self-critical judgments about my abilities to improvise.

One reason for not defining my goals more successfully at this stage was the fact that I was used to working in a different way as an interpretive musician. After years of experience in preparing scores for concerts I had developed a way of practising in which I 'just played' - altering the tempo here and there to allow me to find a technical solution - and

by doing so, I invoked a number of implicit strategies for learning which I had developed over time. I no longer needed to make explicit strategies for learning as I had done when I was younger. I assumed I could use the same implicit approach to improvising, but found that I was unable to represent the task of improvisation in the same cognitive terms as my interpretive work: I simply couldn't gain any sense of mental control over the task: I couldn't 'see' what to do! I therefore improvised by 'just playing' (in the same way as I usually practiced scores) but merely reacted as best as I could to events and problems as these emerged. My motivation to continue learning might have suffered had I not had the discipline of the PhD to sustain me, for my difficulties were not solely due to emotions: other aspects of the experience intervened between the task and my sense of cognitive control, as I now discuss.

4.1.4 Attentional blindness

Styles (2006), who observed subjects playing a new video game, reported that: 'When players first tried the game their initial response was usually panic. They felt the demands of the situation were too high, everything happened too fast, too much happened at once and the situation seemed to be out of control' (Styles, 2006, p.201). This description of cognitive overload or attentional 'blindness' reflects my similar situation as an improviser. I didn't know which features of the task I should focus on, or what I should ignore; therefore, I felt overwhelmed by the constraints of the task in the moment of improvising. As soon as I played something I was trying to understand, to process what had just happened, also to calculate what I should play next, this being an incredibly demanding cognitive task in real time, as Sudnow (2001) relates: 'The notes of the path seemed to go by too fast to take hold of them; my hand hadn't developed the grasp over their working constitution ... there was a frustrating inability to hear myself' (p.44).

4.1.5 Automatic thoughts

One last aspect of novice improvising which was considerably influential at first, was a kind of background thinking or ongoing reflection upon the experience which Beck (1991) describes as 'automatic thoughts'. According to Beck, these automatic thoughts run parallel to one's conscious awareness, being a form of continual self-communication and self-regulation of behaviour which requires a particular effort on behalf of the individual to identify. Working with patients as a pioneering cognitive therapist, Beck described this type of discreet, habitual mode of cognition thus: ... 'these thoughts did not arise as a result of deliberation, reasoning, or reflection about an event or topic. There was no logical sequence of steps such as in goal-oriented thinking or problem-solving. The thoughts "just happened," as if by reflex. They seemed to be relatively *autonomous* in that the patient made no effort to initiate them ...' (Beck, 1991, p.36). After reading about the 'automatic thoughts' I investigated my own thinking and awareness during improvising particularly over longer periods of time, for I noticed a recurring emotional pattern to my improvising sessions, in that my emotions generally became more negative in direct proportion to the length of time I practiced; thus, if I improvised for just a few minutes, this could be a positive experience, whereas if I improvised for over an hour I became defeated and depressed.

To my surprise I discovered that after a period of approximately thirty minutes (perhaps as my mind grew accustomed to the task and began to relax), I would gradually introduce figures into my imagination to witness my improvising. These figures were respected personalities of my musical world: organists, composers, teachers, expert improvisers, colleagues both contemporary or historical. Each time I made a mistake these witnesses expressed their horror and disgust at my efforts; I could literally see them shaking their heads! Naturally, my feelings of shame and embarrassment increased in the presence of

these silent witnesses, but, once I had identified this strange scenario in its entirety, I found it quite easy to 'turn it off', and so (as private practice once more became private!) my longer practice sessions became more productive and enjoyable.

4.1.6 Summary of novice experience

What I have so far described in my experience of novice improvising was the opposite of what Dolan (after Csikszentmihalyi, 1988) describes as 'flow' when improvising, in which: ... 'people lose their sense of time and enjoy a strong satisfaction and immediate feedback (Dolan, 2005, p.94); also ... 'a merging of action and awareness ... a loss of self-consciousness, a sense of clear goals and reception of immediate feedback; and a sense of feeling highly challenged and highly capable' (Custodero, 1999, in Dolan 2005). My novice improvising, on the other hand, was dominated by painful emotions and cognitive confusion. I was self-conscious and easily distracted by the presence of other people; I found it hard to focus on the task in a constructive way (as my goals and learning strategies were not well-defined at this stage), and these factors combined to affect my self-esteem and motivation to continue.

My motivation to improvise → Improvised actions → The musical improvisation

"Stop Improvising!"

The Feedback loop

- Negative emotions of shame and embarrassment
- Critical awareness of musical results
- 'Automatic thoughts' (Beck, 1991)
- Cognitive confusion due to attentional overload or 'blindness'
- Self-beliefs: 'I am not an improviser'
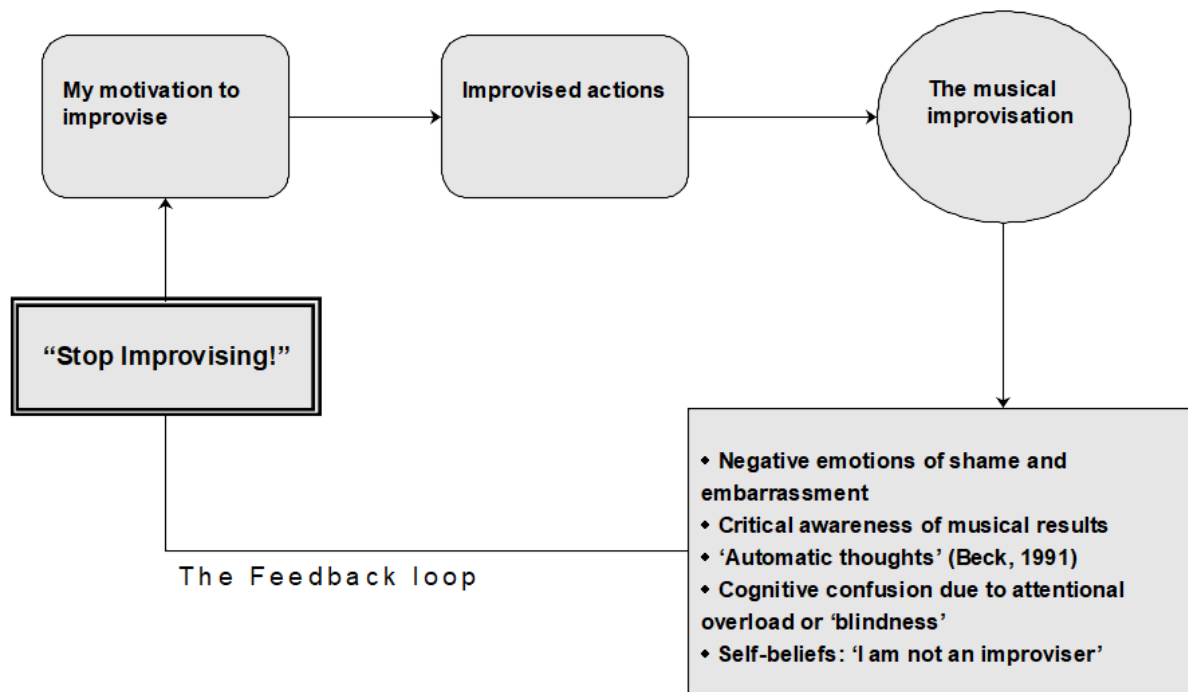
Figure 4. A closed-loop engineering design adopted to illustrate how emotionally-dominated feedback processes continually stopped my flow of improvising.

This disagreeable situation is illustrated in Figure 4 above which shows a closed-loop engineering design adapted to illustrate the influence of cognitive and emotional 'feedback' upon improvisation in real time. The idea of understanding improvisation in this way comes from Pressing (1988) who describes how one's critical awareness of the improvisation functions as a cognitive feedback mechanism, controlling the flow of the improvisation through 'intuitively natural possibilities of error detection and correction' (p.132). What I wish to highlight in this feedback model is the role of emotions and self-criticism, (reinforced by 'automatic thoughts' [Beck, 1991] and attentional blindness) which had the effect, not of moderating or refining the flow of improvisation in a rational or cognitive manner (as Pressing suggests), but of influencing events in a much more radical way: by cutting off the processing flow entirely, or by instigating entirely new departures and directions as I abandoned one task and started another. As I have described, I had great difficulties in

maintaining a sense of direction through my improvising at this stage; in working towards a clearly defined goal or working to an explicit strategy. Although I improvised for several hours a day, I disliked the musical results, and usually felt frustrated about my lack of progress. The feedback loop thus illustrates how this behaviour of stopping or changing direction in response to critical feedback can be reinforced through repetition: the more I improvised in this way, the more I felt ashamed, self-critical and sensitive to errors, and the more I continued casting about, never sure of my strategies and looking for a good direction in my work.

4.2 Social and cultural influences on attitudes towards improvisation.

Because my experience of improvising so far had been quite negative, it occurred to me to question why this should be so? Why were my emotions so strong when I tried to improvise? Why was I so critical about my improvising, and why did this criticism so quickly lead to global judgments about my fitness or suitability to attempt the task? That I must learn the skills of improvisation I was ready to accept; why then could I not engage in learning improvisation in the same way as learning carpentry or electrical engineering? What was the reason for these mental and emotional barriers which arose whenever I started? These questions provoked further reflection concerning my training and experience: why hadn't I improvised more as a child? Why was improvisation not part of my training? As a student, learning a piece meant also studying the composers' biography, their performance practice and the wider influences of culture on their music, but the practice of improvisation had been no more than mentioned by my teachers. I had gained no understanding of how a Baroque composer (for example) used improvisation to compose or perform; how improvisation skills had been acquired or taught. Improvisation was just something you didn't do, so there was nothing to discuss. It was a non-topic.

Realising this, I decided to broaden my focus from the practical exercises and mental processes of improvisation itself, and to read more widely about social and cultural changes in classical music. I was beginning to understand my position not just as an individual musician who wanted to improvise, but situated within a bigger social and cultural context. No doubt I had inherited values and attitudes towards improvisation through years of training; sharing them with colleagues through my professional experience as a musician, with the result that I thought of music (and my role as a musician) as a set of clearly-defined objectives concerning the accurate and stylistic interpretation of a composed score. I had only hazy notions of how music was actually created, particularly in the moment, and this struck me now as an anomaly; for had I not always considered myself to be a creative, imaginative musician? Looking around me I saw my position replicated in a number of colleagues who, like me, had no experience of improvising and considered it to be a mysterious skill completely outside of their own remit. I had never really questioned this situation as I was long used to living within a non-improvisatory musical culture. Yet I now asked myself, how could this happen? The resulting investigation, which drew particularly on Lydia Goehr's historical critique of musical practice The Imaginary Museum of Musical Works (1994), I now summarise, giving a brief synopsis of the most significant discoveries I made and how these affected (i) my understanding of myself as a (would-be) creative artist within the contemporary culture of classical music, and (ii) my ability to improvise.

4.2.1 A historical enquiry: changes in aesthetics and attitudes towards creativity during the late 18th century

It is well known that historically, at least until the early 19th century, it was common for musicians in Western Europe to improvise. Scores were often sketchy, unfinished drafts with many details left to be filled in during the moment of performance; indeed, the necessity

for professional musicians to quickly produce music (for the events of the court or church calendar) meant that musicians had to acquire skills of rapid, craftsman-like musical production. The partimenti schools of Italy typify this approach in that they taught students to realise, through improvisation, the upper voices of a given bass line (Sanguinetti, 2007), in effect reducing the task of composition to one line. This highly practical artistic existence naturally fostered similarly practical expectations about music, for 'to have mastered a craft was to have mastered the rules of a particular form of material production and to have produced a good or useful work of art' ... (Goehr, 1994, p.150).

Throughout the 18th century however, the decline of religion and courtly life which had offered employment to artists for centuries, created new conditions of artistic independence, a fact which brought about a significant change in creative outlook. First artists, and then musicians searched for a new rationale to justify and provide (market) value for their work, as Belting & Atkins (2001) explain: ... 'now art, remaining alone in the place once occupied by religion, had to be written about in a radically new way. Amid the turbulent beginnings of bourgeois culture, absolute art was the reverse side of an art that had been relieved of all its previous functions' (p.60). Such a rationale crucially involved new aesthetics which delineated serious art or music from mere craft - 'absolute art' or 'Art with a capital A' (Gombrich, 1964, p.377). Craft, on the one hand, was associated with the everyday, while 'Art was beautiful because, among other things, and as it would soon be expressed by romantic theorists, it could transport us to higher, aesthetic realms' (Goehr, 1994, p.152). As a result, both consumers and creators of art and music became conscious of the consequences of art, that is, the artistic experience, and it is upon this experience that artistic products would come to be valued.

These important new beliefs about art or Art were captured by Emanuel Kant in 1790: 'In a product of beautiful art we must become conscious that it is Art and not Nature; but yet the purposiveness in its form must seem to be free from all constraint of arbitrary rules as if it were a product of mere nature' (Kant, 1914, p.187). Kant's remarks associate human creativity with that of the natural world, and consequently the creative act grows in stature and significance. For artistic creativity, it was perceived, leads to original works, similar to natural phenomena: 'Genius is the talent (or natural gift) which gives the rule to Art' (Kant, 1914, p.188). In contrast with the usually incomplete and codified (i.e., the use of figures to signify harmonies) scores of the Baroque period, from which performers could perform a version for any particular event, compositions now appeared as finished scores and were soon treated as objects of value in themselves; valued for being timeless utterances in which an original and unique artistic statement was encapsulated.

4.2.2 Aesthetics interpreted into musical practice

Aesthetical beliefs about a semi-divine creative process resulting in a musical score (itself containing all necessary instructions for performance), were reflected in musical practice, which now effectively divided the labour of musical production between the composer and the performer. Essentially, the responsibility of creativity was now assigned to the composer, while the realisation of the composer's vision was assigned to a specialist performer possessing the necessary technical and interpretive skills (Goehr, 1994, pp.176-204). By defining and separating the two roles in this way, improvisation became gradually excluded from performance. After all, if the creative work was completed in full by the composer, there was no need for improvisation, or for any creative contribution from the performer. As a result, far from seeing a musical score as a model for improvisation, Bailey (1993) suggests that interpretive performers develop attitudes of reverence towards other's

works ... 'the music doesn't belong to him. He's allowed to handle it but then only under the strictest supervision' (Bailey, 1993, p.66). The performer's role is thus defined through faithful and accurate renditions of the composer's creative vision, as understood through the score. Such then are the founding ideals of *Werktreue* - an attitude of 'being true to the work' - which motivate the performer to efface their own artistic personality in the service of interpreting another's artistic vision.

4.2.3 Cultural values functioning ideologically within individual musicians

Goehr (1994) concludes that such widely-held aesthetic beliefs about how music is created should not be understood as abstract values, emerging perhaps only during discussions about art, but are deeply-held convictions governing the way musicians lead their lives. This is because they shape a society's perceptions and expectations of what musicians do when they compose or perform or improvise, and thus make up the musical culture within which we exist as musicians. It is this aspect of cultural situatedness - the influence of cultural values in shaping one's individual beliefs - which I now investigated. Assman (2015), for example, describes how culture provides not only meaning, through 'a symbolically and socially constructed universe open for endless progress and development' but also 'a sense-producing institution … a specifically human form of temporal orientation that transcends the limits of one's own span of life in both directions' (Assman, 2015, p.326). It is this sense-producing element of culture which I found most relevant to the way I had developed an idea of myself as a purely interpretive artist without the power or ability to create my own music. It showed me how I did not just passively inherit certain ideas about musical creativity (through an accident of birth as it were), but actively identified with these ideas as I grew up within a wider community of musicians and aspired towards full membership and acceptance within this community.

The idea that individuals actively absorb the values of their surrounding culture, becoming, as a result 'ideological subjects', is explored by the marxist philosopher and social critic Louis Althusser (1971), who suggests that:

> … 'ideology 'acts' or 'functions' in such a way that it 'recruits' subjects among the individuals (it recruits them all) or 'transforms' the individuals into subjects (it transforms them all) by that very precise operation which I have called *interpellation* or hailing, and which can be imagined along the lines of the most commonplace everyday police (or other) hailing: "Hey, you there!"' (p.174).

Althusser is basically saying that ideals (such as those concerning the ideals of musical creativity) appeal to us on a personal level. This explains how, as an adolescent becoming aware of my own ambitions to be a pianist, I could have become simultaneously aware of the 'ideal' pianist - i.e., a technical superman who could master any score, win any competition through the indisputable fact of his flawless interpretations and instrumental control. In this way, my natural musical ambitions would have been channeled towards the ready-made role of the interpretive performer, a role which was further reinforced through training and increased exposure within a cultural system governed by these ideals.

Two other important aspects of ideological thinking I learnt from Althusser. One, is that ideology is implicitly reinforced through behaviour: it is what people do to show conformity with society. Therefore, behaviour which indicates other, contrary ideals is liable to attract criticism from the society whose ideology is (implicitly) rejected. The pressure to conform is thus very strongly reinforced through cultural (i.e., musical) training, and breakaway behaviour, such as improvisation on classical models, might be judged as strongly non-conformist by those who held the ideals of *Werktreue* performance to be sufficient for a musician. As Althusser himself states: 'Indeed, if he does not do what he ought to do as a

function of what he believes, it is because he does something else, which ... implies that he has other ideas in his head as well as those he proclaims, and that he acts according to these other ideas, as a man who is either 'inconsistent' ... or cynical, or perverse' (Althusser, 1971, p.168). The second point was that ideology is itself misleading, as it does not correspond to reality; rather, ideology represents a very special interpretation of reality: 'that in ideology men represent their real conditions of existence to themselves in an imaginary form' (ibid, p.163). With this statement I understood how, for many years, I had pursued a career in interpretive performance in the expectation of musical fulfilment which had never arrived; and how my early, creative ambitions - my first experiments in improvisation - which (I suspected) might have yielded real insights into musical structure and expressive performance had been suppressed, replaced by conformity with the 'imaginary' goals of *Werktreue* attitudes towards the printed score.

4.2.4 Summary of social and cultural influences on improvisation

These descriptions of socio-cultural changes in aesthetics and musical practice (Goehr, 1994) and their influence as ideological beliefs over musical thought and practice, are particularly relevant to the institutions of classical music (Althusser, 1971): i.e., the teaching institutions of conservatoires, the performing institutions of concert halls and festivals and competitions, the institutions which promote and disseminate classical music, and so on. As a professional musician I was a product of these institutions, yet I now possessed insights into the nature of ideology, and thus I began to search out and examine my beliefs about musical creativity or my sense of role as an interpretive musician; beliefs which manifested themselves in statements, such as: "You are not an improviser" or "You should not be improvising". They helped me to understand why it was so difficult to shake off a need for perfectionism in my performance, as described by Frost et al., (1990): 'Performance must be

perfect or it is worthless. Any minor flaw constitutes failure' (p.451), for I was not just conditioned through training in the conservatoire and other institutions to focus on and correct technical inaccuracies; I was also a subject of 'interpellation', that is, I had embraced the ideals of Werktreue interpretive performance, and personally identified my own aims and ambitions as a musician with these ideals, just as Hegel describes: ... 'personal individuality and its particular interests ... pass over of their own accord into the interest of the universal [and] knowingly and willingly this universal interest even as their own substantial spirit , and actively pursue it as their ultimate end.' (Hegel, 1991, p.282).

4.3 Making progress: addressing initial problems

The insights I gained from my cultural and historical studies of musical practice helped me to gain a new perspective on my studies. I now realised that my musical training in interpretive performance had also instilled cultural values and attitudes towards classical music which made it difficult for me to improvise; and while I couldn't change habitual ways of thinking overnight, I was from this point on, more patient with myself when improvising. I paid less attention to my emotional reactions and began noticing other aspects of the task which I could analyse and describe in cognitive terms. This new period in my learning is marked by a visit to an organ improvisation festival in Berlin in which, for the first time, I observed other student improvisers attempting similar tasks in Baroque improvisation in a series of public masterclasses.

4.3.1 Witnessing other novices and intermediate learners

The Internationales Orgelimprovisationsfestival in the Kaiser-Wilhelm -Gedächtnis-Kirche, Berlin is an annual event featuring recitals in different styles of organ improvisation. One feature of the festival is that each visiting artist gives a public masterclass on the morning of their own recital. Anyone is welcome to play, though on the occasion that I

visited, participants were mainly students from the organ improvisation class of Wolfgang

Seifen at the Universität der Künste in Berlin. My principal interest in attending the festival

was to observe the behaviour of students during the masterclasses who I anticipated would be

considerably more advanced than myself. To my surprise, I observed that the students in the

masterclass were generally nervous and reluctant to improvise in public. In all cases a general

request for volunteers to improvise elicited no response: only after the professor had

persuaded individuals to play could the classes proceed. Sometimes individuals who had

signed up to participate changed their mind and refused to perform.

The pedagogical approach of the two masterclasses I watched was quite simple: the

expert proposed a theme and suggested ways of improvising on it typical of the organ

literature. For example, the theme could be harmonised or embellished as in a Chorale

Prelude; or made into a set of variations; even a free-style improvisation was possible.

Although the themes suggested were simple ('Three Blind Mice' was one of them), as soon

as the students started playing it was clear that the tasks of improvisation were not so simple.

Principally, problems arose through improvising in a diatonic, tonal language, as I noted at

the time: 'In general, most students' problems arose through the task demands of

harmonisation. ... Problems such as grasping the wrong harmony seemed to arise from time

constraints, i.e., individuals simply lacked the time to work out a solution from the many

possibilities. Thus, while they could work out some, or most of the phrase, they could not

work out all of it fluently' (Personal notes, 17th May, 2016).

This information gave me a new perspective on my own efforts to learn improvisation.

I identified strongly with their mistakes, with the frustration they showed in the continuous

misalignment of their performance, in which (to borrow terms of language learning) their

performance - or procedural knowledge - differed so greatly from their *competence* - the

more passive declarative or theoretical knowledge. For example, one student was criticised by a professor for lacking a "logical harmonic movement", i.e., one in which the direction of the bass line moved in strict contrary motion to the melodic line. The student indicated that he was well aware of this problem; the trouble was that, when improvising, he was forced to accept any chord possible as he reacted within the constraints of real time. Another student was criticised for parallel movement in his harmonisation yet, when he tried to correct this, the result worsened with pauses and slips in his performance. Observing the nervousness and reluctance of the students, also their difficulties in performance, I realised:

- that negative emotions while improvising were not common amongst novice improvisers

- that students who were new to improvising characteristically experienced difficulties coordinating their actions

- that previous musical training in interpretive performance did not appear to facilitate students' ability to improvise

- that theoretical knowledge in novice and intermediate students seemed to be far in advance of their procedural knowledge, i.e., they 'knew' more than they could 'do'.

These observations helped to situate my own learning experience within a wider context of novice and intermediate improvising. Although I could not interview these students and therefore verify my observations, I subjectively felt my own problems and frustration as a novice were shared amongst many, part of a common situation rather than something particular to my experience, or (worse still) the unavoidable results of my personality. This no doubt helped me to calm down and accept my situation as a novice. I realised there were simply difficulties to be overcome in acquiring new skills over a complex task, and also that

the knowledge and experience I brought to the task were not always a good fit, which made this task of acquisition uncomfortable and confusing in the early stages of learning.

4.3.2 Calming down, taking stock and making a strategy

Until now, in my improvising sessions, I had usually ranged about trying to make my improvisation sound like an expert without any clear strategy of how to achieve this. This meant that, on the one hand I corrected problems as they emerged, on the other hand I was continuously setting new goals as I remembered different aspects of expert performance: thus, I might start out trying to improvise a whole sonata form movement, but then become distracted by the need to make rapid registration changes, or to create imitative textures. Sudnow (2001) recalls a similar situation when he describes himself ... 'in pursuit of the most magniloquently organised affairs, each day the bulk of my practicing spent roaming all over the keyboard, rather than lingering in a delimited territory and mastering ways to deal with a sparse course of melodic movements' (Sudnow, 2001, p.39). Now, however, on my return from the improvisation festival in Berlin, I felt less isolated and sensitive about my learning situation. I was a novice in certain techniques and, having watched other novices, I felt more willing to accept my own situation. Therefore, rather than 'superimposing' expertise on my performance (and becoming upset when this failed to work), I began to think more strategically. I lowered my expectations for each session, slowed down the pace (tempo) and aimed for more simple musical results such as coordinating my movements between several chords, or putting two independent voices together. In this way, I began a conscious search for connections between what I attempted to do and the musical textures and shapes which emerged.

4.3.3 Recognising the interference of existing skills

I was now beginning to understand how training in interpretive performance was not only insufficient for the skills of improvisation, but also created certain problems. I had noticed in Berlin that students' actions often did not seem to correspond to their conscious intentions. It was as if their hands were acting ahead of their thoughts, and by the time they had a chance to respond it was too late: the wrong harmony accompanied the chorale melody, the cadence had ended on the dominant, and so on. Noticing these features in my own performance I reflected on the sequence of events in which my actions anticipated my ability to consciously respond in a more accurate way. Schneider & Fisk (1982) refer to a similar process of 'interference' from previously learnt action responses. They talk of the 'difficulty in inhibiting automatic processes' and 'large negative transfer effects' (p.10) as individuals adapt existing skills to new environments. Applying these insights to my own situation I understood that my perception of musical events triggered long-term memories (of scores which I had learnt over the years), before I had a chance to recognise and process these events in the 'new environment' of improvisation. Once I recognised this sequence of events in my work I was able to give myself some time to correct it. Consequently I became more committed to very slow and careful work in which I took whatever time necessary to coordinate simple movements between my hands and feet and the events of the music as they emerged.

4.3.4 Acquiring new procedures

Until this point, each time I started to improvise I was struck by the unfamiliarity of the experience. Although certain aspects of the task were familiar - the organ and, to some extent, the music I produced - the context of improvisation made everything strangely different. My main sensation was that I felt lost and disoriented when I improvised. I wished I had a guide to show me how to organise my actions sequentially; also to show me which

actions and musical decisions were good or effective, and which were bad. I had read in Anderson's (1982) description of skill learning, that 'knowledge should first be encoded declaratively and then interpreted' (p.389) into a new kind of action-specific *procedural* knowledge. As I began to structure my improvisation practice sessions more carefully, repeating simple formulae, taking more time to coordinate my actions, and noting the links between these actions and the flow of the music I found that I was beginning to acquire the rudiments of procedural knowledge. For example, I could construct particular sequences of movements; passages of music, certain chords and harmonies began to come more easily; I felt I could 'go to' certain places and sometimes even 'produced a semblance of competence' as Sudnow (2001, p.38) describes. The following paragraphs attempt to capture my conscious experience of these initial developments which profoundly changed my perception of events within the 'environment' of the task.

4.3.4.1 New categorisations of the environment

Novice improvising, as I have described, was often like driving at top speed through a maze of unknown streets without a map; and this experience of improvising still occurred even when I took time to think about my actions. Yet, in spite of this cognitive confusion, certain events and features of the task began to seem more familiar. Largely because I was starting to improvise within a more circumscribed space (sticking to the same simple four-voice chords or two-part melodies), I was repeating musical events more and more. Although these events stayed the same as usual - a chord in A major, a step downwards in the left hand bass line, and so on, something about them appeared in a new guise, like meeting someone I knew in an unfamiliar context. I found a description of this experience in Edelman (1989): 'The world becomes "labelled" as a consequence of behaviour that leads to particular *selective* events within such neural structures in each animal. This process leads to the

formation of relevant perceptual categories and to the association of behaviours with certain constellations of those categories in an adaptive manner' (Edelman, 1989, p.41).

The experience of labelling or naming that which was previously unfamiliar, I understood to be the basis of new perceptual *categorisations* of the musical stimulus as Edelman describes. Accordingly, categorisations arose from the ability to link one's actions to features in a meaningful way; a process which resulted in synaptic change and the formation of neuronal groups or 'maps'. At its most basic form, a sensory sheet or mode of the brain registered an experience (i.e., sight or touch) in the world, and this connection between the brain and the external world created an *n*-tuple. As the single-mode *n*-tuple connects with other sensory and motor modalities a 'global mapping' was produced, which integrates the perception of the moment into ongoing sensory experience and memory structures of past experience (an important part of Edelman's theory is the inclusion of emotion and valence through additional communication with 'non-mapped regions such as those of the brain stem, basal ganglia, hippocampus, and parts of the cerebellum' (1989, p.54) . Thus, perception and cognition, according to Edelman, is never fixed but dynamic, as it continues to sample the environment in real time - a particular kind of semi-autonomous activity called *reentrant connectivity.*

Relating my experience of naming and labelling to Edelman's descriptions of categorisation was useful as it gave me insights into certain features of learning: (i) that the formation of 'global maps' (i.e., the neural structures of the categorised features) are formed and strengthened through repetition which would more commonly occur as I delimited my improvising to a particular style or language of music; (ii) that categorisations were personalised features of my experience, arising through my exploration of a personal *Umwelt*; therefore they occurred not through predetermined neurological groupings and connections of

the brain, but were stimulated through the behaviour of learning; (iii) that neurological

categorisations do not correspond precisely to classical categories (of theoretical knowledge),

although clearly there is a strong overlap between perception and theory. For example, I

might interpret new categorisations as certain ways of acting upon harmonic, contrapuntal, or

other formal elements, yet my experience of categorisation contained something quite

different which transcended the theoretical constructs themselves: containing elements of

motivation, imaginative structures and emotions. Thus I first became aware of

categorisations as mental structures which could serve as the basis for a personal memory for

improvisation; not fixed like a computer-like memory, but subject to a process of continuous

dynamic change throughout the learning process: 'under the influence of continually

changing contexts, it changes, as the structure and dynamics of the neural populations in the

original categorisation also change' (Edelman, 1992, p.102).

4.3.4.2 Awareness of concepts as a basis for mental control

My reading into neurological theories of categorisation led me onwards to readings

in conceptualisation, a more intricate mental operation performed upon the categories

themselves. Edelman (1992) describes concepts thus: 'An animal capable of concepts

identifies a thing or action and on the basis of that identification controls its behaviour in a

more or less general way. This recognition must be relational: it must be able to connect one

perceptual categorisation to another, apparently unrelated one, even in the absence of the

stimuli that triggered those categorisations' (Edelman, 1992, p.108). Conceptual thinking is

often used in musical contexts to describe the elements of musical structure; groupings of

notes and features which are understood to perform certain functions, such as 'cadences',

'movements', 'tune' or 'melody', 'accompaniment' etc. The ability to perceive music in

terms of concepts represents therefore a considerable advance upon categorisation, for they

are not tied to 'outside inputs from sensory modalities' (Edelman, 1992, p.109). Rather, conceptual formation is a kind of categorisation *of* categorisations, involving memory of past experience. As Edelman (1992) describes ... 'in forming concepts, the brain constructs maps of its *own* activities, not just of external stimuli, as in perception' (p.109). The ability to conceptualise is described as inherent to normal brain activity, which forms both categories and concepts according to experience.

Reading these descriptions of concept formation I realised how powerful a conceptual way of constructing and representing the musical stimulus would be to the improviser. Limited as I was to detailed decision making and intricate note-to-note calculations I could only dream of constructing complex musical textures fluently in real time, yet, concepts offered a possible solution as they combined knowledge or cognition of the task with economy of processing, as Vernon (1968) illustrates in his description of a child's growing conceptual awareness of their environment:

> 'Very soon also the number of new and unfamiliar objects which the child encounters, even in his somewhat restricted environment, becomes bewilderingly great. He may not be able to handle and examine each one of them in detail and find out what it does and what he can do with it. But if he can perceive and remember sufficient of its essential qualities to be able to compare it with other similar objects he has perceived previously, then he can class it as being the same type of object. And he can predict that it is likely to behave in the manner characteristic of that type of object, and that he should react to it in a particular and appropriate way' (p.29).

4.3.4.3 Improvising in 'complexes' and 'pseudo concepts'

Unfortunately, at this stage (towards the end of my first year of study) conceptual control over my improvising was not yet possible for me. Although my careful, cautious

improvising allowed me to familiarise myself with features of the task, i.e., to form new categories₁ particular to the improvising experience, I was unable to create more generalised productions out of these categorisations on which I could base my actions. This meant that I was unable to create coherent musical structures (either at a global level of complete forms, or a more local level of musical paragraphs), and my improvisations tended to ramble on through a series of local, phrase-to-phrase connections and unstable relationships (see Audio_3 for an example). For example, I might construct a sequence of two or three harmonies; realising this I tried to repeat it, transposing up a level. After a while, tiring of this, I might notice one of the chords as particularly expressive, and make a new sequence out of this chord. These experiments were made without understanding how I had arrived at the chords in question, and without any awareness of how such sequences could contribute to an overall form. Vygotsky (1986) describes these types of loose connections and associations as *complexes* and *pseudo concepts*, for example: 'In a complex, individual objects are united in the child's mind not only by his subjective impressions but also by bonds actually existing between these objects' (p.112).

4.4 Themes emerging from Chapter 4 (months 1-12)

My situation after a year of self-study I now summarise through the following emergent themes:

1. **Unstructured experimentation**: novice improvising had been characterised by an initial period of unstructured trial and error, as I grew accustomed to a novel environment.

2. **Categorisation**: a more structured approach towards improvising had occurred through an experience of categorisation, which linked thoughts to actions in a meaningful way.

3. **Negative learning emotions**: the novice experience of improvising had been dominated by shame and embarrassment, which I had traced predominantly to effects of cultural conditioning in *Werktreue* ideals (see below).

4. **Unsuitability of knowledge**: my experience as an interpretive performer did not provide me with the insights I needed for improvising. In some ways my existing skills interfered with my ability to improvise. My existing knowledge thus needed to be *interpreted* into a qualitatively new form of knowledge through the learning process.

5. *Werktreue* **idealism:** an investigation of my cultural situatedness indicated widespread cultural beliefs about *how* music was created and *who* could create it, summarised as an attitude of *Werktreue*: in which interpretive performers developed attitudes of reverence towards the printed score.

6. **Lack of agency**: when improvising I felt dominated by the constraints and difficulties of the task. I could not perceive the task in terms of creative musical decisions or opportunities for self-expression.

Figure 5 (an expansion of Figure 3) captures my perspective of the task of improvisation at this stage of learning. I drew this figure as a means to record my impressions of each session during this time. The five main features of the experience are: Valence, Agency and Control, Musical Output and Fluency, which are visualised on a continuum from left to right. Although the design of the graphic records my sense of frustration with the musical results of my improvising and the many pauses I made to calculate next steps and avoid errors (I often rated my performance far to the left whereas the ideals that I aimed for were at the very right of the graphic), the fact that I was recording my own impressions of improvisation helped me to gain a more objective awareness of my own learning. The graphic also indicates my motivation to overcome initial frustrations and to gain skills in

fluency and musical expressiveness.

Valence	
Distressed	Happy

Agency	
Reacting (powerless)	Planning (in control)

Musical Output	
Possible	Desirable

Fluency	
Pausing/Calculating	Instinctive/Automatic
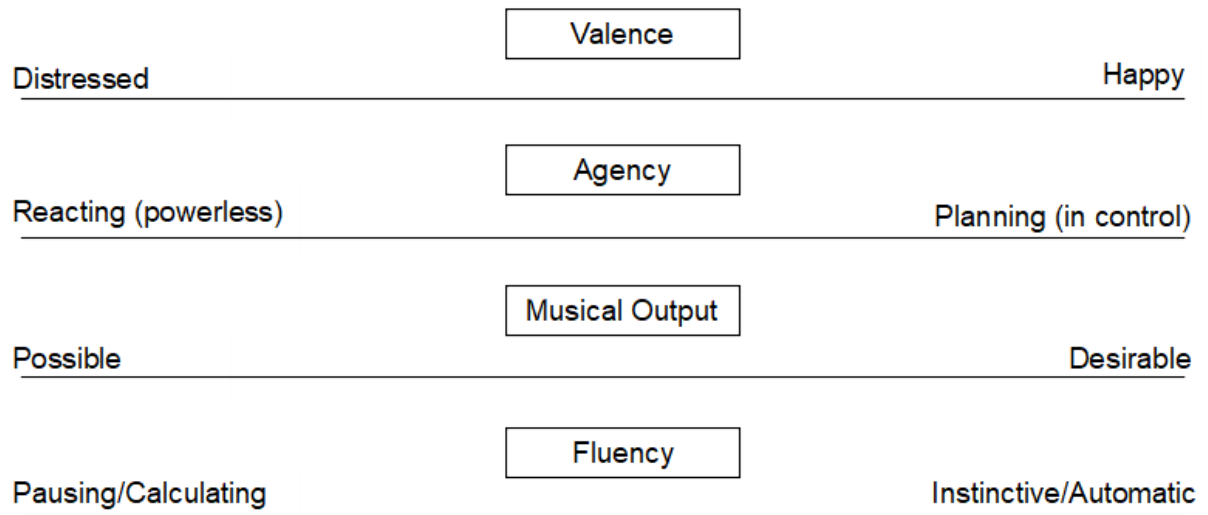
Figure 5. A representation of the main features of my experience of improvisation during the

first year of study.

Chapter 5

Developing conceptual perception and control over improvising (months 13-17)

5.1 Introduction to Chapter 5

Throughout this chapter I focus on two main problems in my improvising: (i) a lack of coherence in form and structure; and (ii) a lack of fluency manifesting itself in continuous pauses. Tackling these two problems through different strategies initiated a new perception of musical structure in terms of underlying concepts or function, a perception which allowed me to establish a basic repertoire (and knowledge base) of patterns and formulae suitable for recreating Baroque organ textures.

5.2 Aiming for coherence in form and structure

'Take a starting point of G minor - this is a very emotionally loaded key with associations to great preludes of the past! I want to rhapsodise freely, but I also want to enter the same world and achieve similar emotional effects to those lovely preludes by J.S.Bach and Max Reger' (Personal notes, 14th December, 2015).

I include this extract from notes written at the beginning of my study to indicate how free and undefined my approach to musical style and form had been: I made no distinction between the musical styles of J.S.Bach and Max Reger, there is little reference to a particular musical structure, and no defining of specific goals or strategies for improvising a Prelude; instead I aimed for unspecified impressions, highlighted features gained from different compositions and composers which together represented a Prelude I might improvise. Perhaps I was more focused on recreating a particular emotional experience through my improvising, similar to that I experienced when listening to these pieces, though again I had little idea how this might have been achieved through improvisation. This situation is echoed by the researcher and organist-improviser Tandberg (2008) when he reflects: 'in the case of

improvisation … initial stages are sometimes comparable to the process of groping in the dark. ... We can easily feel that we lack an overall idea which can give our work a sense of purpose' (p.229).

Although I had, by the end of my first year, reduced the parameters of my improvising from complex to simple, I still rambled through loose associations of material, and this unstructured rambling was causing me increasing concern. After a series of recordings I made while improvising on a given fugue subject (see Video_1) I wrote in my journal: 'Following on from the film project ... I realise that I need now to apply a formal structure to the improvisation. .. The film shows an organic process of 'trial and error' which incorporates all aspects (harmonic, contrapuntal, formal). Because of this, there are too many variables to progress towards clarity and precision. - I go round in circles' (Personal notes, 16th January 2017).

5.2.1 Improvising to a 'borrowed' formal plan

Turning to written treatises for advice, I found two texts which approached the problem of improvising musical structure through a strict plan of phrase lengths (defined in beats and bars) and key structure. Hennie Schouten (1955), after preliminary exercises in improvising four-bar concluding phrases to a given melody, continues with exercises in *Binary Form* which she describes: 'The simple binary form consists of two phrases of 8 bars each. During the first phrase, one often modulates to a related key, modulating back to the original main key in the second phrase' (p.17). In a similar way, Marcel Dupré (1975), constructs *Binary Expositions* through a rigid plan of eight-bar phrases, defined by the final cadence ... 'the first phrase is called the "Antecedent" if it ends with a half cadence (that is to say on the dominant) and the second will be called the "Consequent" if it ends with a perfect cadence (that is to say on the tonic)' (p.14). Deviations from the plan are also considered: 'If a theme is not answered by a Consequent, but instead by a phrase which is completely

different, this type of phrase is known as the "Commentary'" (p.20). In this way, Dupré

arrives at a general formal plan for structuring the first part of an improvisation:

'1. The Theme, 4 measures.

2. The first deductive Commentary of 4 measures, connected to:

3. A repetition of the Theme, 4 measures.

4. The second deductive Commentary, of 4 or 8 measures, which must be different from the

1st Commentary, and which must conclude with a perfect cadence' (Dupré, 1975, p.26).

While the clarity and logic of these formal approaches seemed initially appealing, the

reality of the exercise was frustrating. As soon as I thought of a melodic idea (the Theme) I

also had to think how it would fit to a four-bar phrase, while also constructing a suitable

harmonisation. These constraints continued while I worked out whether my improvised music

fitted Dupré's description of a 'deductive commentary'. Working my way through the

exercise in this effortful way I found I could only produce music which seemed incredibly

contrived and far removed from the kind of imaginative, creative improvisation I aimed at. To

improvise to so many conscious constraints seemed more of an exercise in discipline than a

path to inspiration or skill learning; besides which, I never felt sure if the results were good or

not, and was continually distracted by asking myself: Was that a good four-bar phrase? Did I

link to the 'deductive commentary' in the right way? Was the music supposed to sound like

this, or should I try something else?

Dupré himself offers some guidelines in the execution of his exercises, for example,

that 'it is by patient repetition and by the constant improvement of the same passage that the

student progresses most rapidly' and also that 'it is necessary to work very slowly, but strictly

and methodically, forcing oneself not to stop until one has come to the end of 4 or 8 measures

which have been settled in advance' (p.III), but even after patiently following these

suggestions I found the experience unsatisfactory. After several attempts I did indeed become

more fluent, but the musical results still sounded artificial and unexpressive and I couldn't see a way of developing a more organic, free and expressive style of improvising through this kind of exercise.

5.2.2. Constructing musical form through motivic development

By contrast with the treatises of Schouten (1955) and Dupré (1975), Whitmer (2012) approaches the problem of formal construction through motivic invention and development: 'The chief principle underlying an easy and fluent improvisation is the exhaustive study of the melodic, rhythmic and structural aspects and possibilities of a fractional part - such as one or two measures - of the basic melodic theme selected' (Chap.1, Para.1). I was drawn towards Whitmer's approach because he explicitly offers advice about harmonisation, encouraging the student to consciously *not* focus on harmony, but to improvise only through the melodic lines: 'the harmonic effects must be disregarded until all other generating of effects has been accomplished. In other words, a short rhythmic-melodic entity must become a longer entity through expansion. *This is your problem*' (Chap.1, Para.6). To illustrate this principle, Whitmer's opening exercises and chapters explore all the possibilities of melodic imitation and development using just one short motif, extracted from a hymn tune by Sir Henry Gauntlett (see Figure 6)

Figure 6. Melody proposed by Whitmer (2012) for 'spinning' musical form.

The student is encouraged then to deconstruct this melody into smaller motivic cells, from which musical sequences (ascending and descending) can be constructed. The exercises are initially unharmonised, allowing the student to focus solely upon the principle of forward motion, or (Whitmer's term) 'spinning' the theme. While the melodic exercises were very

simple to perform, later exercises, which assumed the student's ability to add counterpoint and harmony and create 'codas' and 'modulations', were more problematic. There was no explicit guide as to how to construct these additional voices, and I found that working out the texture impeded my melodic inventions producing the usual pauses and haltings for calculation. The fact that Whitmer encourages one to simply forge ahead regardless of errors ... 'do not get too fussy about how every part of the "thing" sounds' ... 'Instead, strive for a rough go-ahead energy' (Chap.1, Para.8), was not effective in my case, as I found the experience of 'forging ahead' caused too many errors, and I soon stopped through feelings of shame and embarrassment.

In summary, my experience learning to improvise coherent forms and structures through written treatises was largely unsuccessful and frustrating. Although each treatise proposed a range of exercises for achieving clear musical structure, the exercises were either too abstracted or theoretical (with numerous constraints); or, in the case of Whitmer (2012) lacked relevant information to serve as an effective guide. Therefore, I didn't clearly perceive how the exercise was supposed to facilitate my ability to improvise larger musical structures. The writer presumably understood this connection: their own experience as improvisers had guided them to write the exercises, reducing the task to its essential elements, providing a framework for recreating the whole. However, the connection between the 'rule' and the whole task was not communicated to me through the exercise; which meant that I learnt only how to harmonise a particular melody, or complete a phrase, without gaining any sense of how to develop this skill. Thus, the salient points of the exercise were presented without meaning, as Endsley (1995a) notes: 'operators must do more than simply perceive the state of their environment. They must understand the integrated meaning of what they are perceiving' (p.33).

5.2.3 Clarifying my mental representation of musical structure

Turning to cognitive literature for guidance, I noticed that my problems in improvising a coherent form and structure seemed to be described by Pressing's (1988) description of a mental representation or *referent* : ... 'an underlying piece-specific guide or scheme used by the musician to facilitate the generation of improvised behaviour' (Pressing, 1988, p.153). Although this text was known to me, I was struck this time by the function of the referent in generating the improvisation. In spite of Pressing's definition, I realised I had been thinking of the referent as a passive structure, a mere reflection of the improviser's actions, i.e., that through an improviser's actions a *referent* mental representation or memory of the improvisation would be created. I now considered these factors in reverse: that an individual's mental representation (i.e., their anticipation of their actions) which they bring to the task would generate, govern and constrain the musical results of their improvisation. This realisation encouraged me to look again at my original representation of the problem: the improvisation of a free Prelude. Noting once again that my referent was not well defined (for example, I'm not even sure which composer or model of composition I'm following: ... 'those lovely preludes by J.S.Bach and Max Reger') it's not surprising that my improvising was rambling and unfocused. Should I then better define my referent? How could this be done?

The answer to this I decided lay in restricting my improvising to particular compositional models. Throughout my first year I had attempted to improvise in many different styles, as the mood took me, and so I often ranged from Medieval styles through to 20th century modal and Contemporary atonal idioms. It now occurred to me that, by focusing on a particular compositional model or style, I might gain better insights into constructive techniques; also, if I could become fluent in one style or genre, this fluency might later be transferred to other musical styles. I therefore decided to focus solely upon selected models of Baroque repertoire as a guide for improvising. These models had a clarity of structure

which connected with one of my initial research goals: to exercise explicit control over the task, i.e., to be able to say, 'I will now improvise a Fugue on this theme in three parts, in D minor' or 'I will improvise a Prelude, Fugue and Toccata in a North German style'. I was also drawn to repertoire which encouraged me to improvise in a relatively clear and unadorned language of diatonic tonality, as I had particular difficulties in improvising fluently in this harmonic style.

Thus, at the beginning of my second year of study (October, 2016), I began to focus on German organist composers from a period c.1629-1750. These composers with typical compositions are listed in Table 1.

Table 1

An overview of compositional models, representative composers and tasks for improvisation, from the beginning of my second year of study

Musical models	Composers	Tasks for improvisation
Preludes (free form)	J.S.Bach (1685-1750) Dietrich Buxtehude (c,1637-1707) Georg Böhm (1661-1733)	· to establish a particular tonality · to modulate to a particular, related key · to allow imagination or fantasy to dictate structure and decision making
Fugues and Ricercares	J.S.Bach (1685-1750) Dietrich Buxtehude (c,1637-1707)	· to transpose fugue subject in the dominant · to invent a counter-subject.

	Georg Böhm (1661-1733) Giovanni Gabrieli (1557-1612)	· to combine both subject and countersubject up to four parts · to invent linking material between voice entrances and so to construct a Fugal exposition
Chorale harmonisation and embellishment	Dietrich Buxtehude (c,1637-1707) J.S.Bach (1685-1750) Johann Pachelbel (1653-1706)	· to harmonise a chorale theme in four parts · to decorate and embellish the chorale theme, i.e., by adding passing notes. · to harmonise the theme in all voices of a 4-part texture

5.2.4 Describing problems of attention in relation to form

Restricting my improvisation to particular forms and models of the Baroque repertoire, and making my strategies more explicit (as described in the Tasks section of Table 1), did not initially make my improvising easier. Although I was happier improvising to the style of the Baroque model, I experienced an uncomfortable overcrowding of constraints similar to those I'd experienced improvising to written exercises of Dupré (1975) and Schouten (1955). For example, if I tried to improvise a Fugal exposition according to the four guidelines mentioned in Table 1, then I could only proceed extremely slowly and carefully; and even then I had to keep pausing to think as more voices were introduced and the texture became more complex and difficult to control. In attending to these demands I had to consciously construct each action, working out the relationships between the voices and predicting the intervals that would result in order to avoid unwanted dissonance and errors. Attending so many constraints meant I had little awareness of anything else in the

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improvisation except these small steps of construction. To perceive other elements of the musical texture, or even to gain new insights into the task seemed impossible when I was so preoccupied over each step and this worried me, for how could I ever learn new skills or bring these skills towards larger musical structures if I could not see beyond the micro-steps of construction?

5.2.5 Creating my own reduced scores as guides for improvisation

This frustrating inability to think beyond each step, each separate movement while improvising, motivated me to look more closely at the scores I used as models, to see if I could bring my improvising to work at a different level of musical structure. I decided to make an analysis of different elements (harmonic, tonal, rhythmic, motivic) to see if this provided me with information or insights into the structure which I could then focus on in my improvising. I began by copying out certain chords and harmonic progressions which I liked, noticing how this exercise helped me to perceive the pattern of the progression more clearly without the distraction of figurations and decoration. Discovering this insight into the harmonic element prompted me to also write out different figurations which, by so doing, helped me to notice how a composition might use only one or two figurative ideas which were then used by the composer to construct larger patterns and sequences, these joining the chord progressions. Progressing in this way through the analysis of various different musical elements it soon occurred to me that I might use one of my written analyses as a guide for improvising: the information which I took from the score would then serve as a basis for guiding the other elements which I improvised.

An example of one of these 'skeleton' or reduced scores is given in Figure 7 which shows first an extract from the third movement of J.S.Bach's Trio Sonata in E-flat major, BWV 525, followed by (5a) an analysis in which the musical texture is reduced to chord sequences and harmonic progressions; and (5b) another analysis which reduces the upper two

voices to a rhythmic outline and includes written information of tonal events such as

modulations and cadences.

To use these scores as a guide was easier and more intuitive than I anticipated. For

example, using the harmonic/chord analysis as a guide (see Figure 7a) I found it relatively

simple to embellish each harmonic event with semi-quavers, linking each bar to the next. I

allowed myself considerable freedom with all the improvised semiquavers, not attempting

patterns of imitation, but allowing each hand to execute whatever was easiest, trying however

to keep strictly to the harmonic guide. Likewise with the second exercise (7b), although I

treated the given information of rhythmic patterns and cadences very strictly, I allowed

considerable variation in the motivic patterns, thus allowing me to follow the guide as

fluently as possible.

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Figure 7: Extract from the third movement of Trio Sonata BWV 525 for organ, by J.S.Bach

(1685-1750). From, *Sechs Sonaten für zwei Claviere und Pedal (Band 15, p.10)*, Leipzig:

Breitkopf und Härtel.

Figure 7a. A reduced-score of the third movement of J.S.Bach's Trio Sonata for organ BWV 525, showing the harmonic movement as a template for improvisation.

Figure 7b. A reduced score of the third movement of Bach's Trio Sonata for organ BWV 525, showing the rhythmic skeleton as a template for improvisation.

Using these reduced scores as guides or templates for improvisation provided a very different experience to the unstructured improvising I was used to, or the abstracted, theoretical written exercises of the treatises. Knowing the original model very well (I had performed this Trio Sonata in recitals), it was weird to make up my own music which was strangely related to the original but also very different. Although the musical results were rather simple, the feelings of constructing my own music along the guidelines of a 'real' composition gave me real pleasure and satisfaction. This was because my reduced scores, for the first time in my experience, gave me access to stylistic musical decision-making in real time: for example, as I improvised the first bar through the harmonic analysis (5a), I made up my figurations and, just at the point where I might say to myself "what chord comes next?", the question was itself answered by the score which provided the next chord. The removal of this burdensome questioning regarding each step of harmonic construction also allowed me some freedom in my cognitive processing of the task which allowed me to notice new features of the task: I could concentrate on the patterns of decoration, the semi-quavers I improvised, or the sequence of cadences (in 5b) over a longer section of musical structure.

Figure 8. A reduced score of a Ricercare for organ by Giralamo Cavazzoni (16th century), showing the imitative voice entrances as a template for improvisation.

A similarly reduced score of the opening of a Ricercare for organ by Cavazzoni (16th century) is given in Figure 8 (see Audio_4 for a realisation). The Ricercare shares essential features with the Baroque Fugal exposition in that each voice enters imitatively in turn using the same opening motif; however the style is simpler than the Baroque Fugue and easier to manage, for the subject of the Ricercare is short, the pace of the music slower, and the musical textures simpler and less elaborate. One of my principal difficulties in Fugal improvisation was to maintain the polyphonic texture while simultaneously deciding when to bring in more voices; therefore in this exercise I created a score which showed me when to introduce each succeeding voice. Using this as a guide allowed me to focus on constructing

the voice entrances and combining these successively into two, three and four-part polyphonic textures. Thus, by not worrying about the timing or placing of the voice entrances I gained instead insights into other factors of musical construction - the ebb and flow of contrapuntal textures through a Fugal exposition, a sense of timing over the voice entrances and an experience in improvising a whole section of music - a Fugal exposition from the opening voice to a sectional cadence. (a recording Audio_ 4, gives an example realisation of this exercise).

5.2.6 Identifying underlying concepts in musical structure

The insights I gained from using a reduced score as a template for improvisation began to change my perception of musical structure. This was a gradual process which began with certain analyses: for example, with regard to Bach's Trio Sonata BWV 525, I studied the harmonic movements and sequences, I studied the timing of events, the use of imitative voice entries to generate structure; I noted the overall key structure, and the way the composer modulates to each new key. Through this experience, a more significant, qualitative change occurred as I realised that the information I was analysing could be thought of in terms of more generalised functions: for example, a sequence of harmonies could be represented as a series of *opening moves* designed to establish the tonic key. These *opening moves* might be realised in many ways without destroying their function of establishing the tonic key. Similarly, techniques used to bring in voice entrances at certain times could be thought of in functions which went beyond a particular instance - in terms of *delaying*, *anticipating*, *breaking*, *joining,* and so on; again, the particular notes used were not so important as the same function might hold with different notes; or, indeed, a different function might have been chosen altogether.

Thus, there was a loosening of the boundaries in my perception of musical structure; in fact, the possibility of changing a musical structure didn't appear so threatening anymore. The emerging perception I had of underlying conceptual elements and their relationship to the more superficial patterns through which they were realised, seemed to me to offer a world of possibilities for my improvising. However, although this dawning awareness of conceptual relationships within the musical structure of the score became fundamental to my development of improvisational skills, it is also important to stress that my awareness of concepts at this stage was passive and observant. I noticed the presence of conceptual function in the structure, but I could not yet create my own concepts for generating improvisation or making my own conceptual musical decisions. Thus, I was dependent on my reduced scores for improvising coherent structures.

It's possible to draw a causal link between my dawning perception of music in terms of concepts and the exercises I created, for as Vygotsky (1986) states: 'To form ... a concept it is also necessary *to abstract, to single out* elements, and to view the abstracted elements apart from the totality of the concrete experience in which they are embedded' (p.135). Because I had abstracted various elements of the texture (i.e., the harmonic or rhythmic skeleton) and used these as principles on which to improvise new versions, it follows that I should start to perceive these principles in terms of more generalised concepts. It is therefore important to understand my conceptual perceptions arising through a directed dynamic engagement with the stimulus or task; these actions resulting in valuable new mental representations of musical structure. Therefore, because of this distinction between my previous knowledge and musical understanding, and that which arose through improvising, from this point on in my thesis I label these concepts with the subscript$_1$.

5.3 Decision making and fluency in diatonic harmony

5.3.1 "What chord comes next?"

In parallel to these exercises in form and structure, I also tackled the problem of decision making and fluency within a diatonic, tonal language. This usually took the form of a question - 'what chord comes next?' - which emerged continually when I improvised. So, for example, when improvising a free Prelude, I might start with a tonic chord and immediately be confronted with the problem of choosing succeeding chords; similarly, in a longer structure, such as Bach's Trio Sonata in E-flat major (see Figure 7), I might successfully analyse each chord theoretically, but I could not often understand the criteria on which these particular chords were chosen. Figure 9 illustrates this problem of choice by showing a series of chords, each representing a possible departure from the chord of C major.
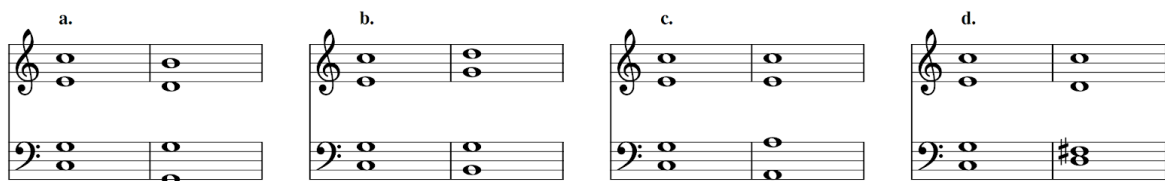
Figure 9. Illustration of harmonic choice framed as 'What chord comes next?'

Each of the second chords represents a possible direction of the music following the initial statement of root tonality. The necessity of choice always caused me to pause and reflect, and this was for a number of reasons: (i) to work out possible options, (ii) to assess the value of one option over another, (iii) to work out how to construct the chosen option without constructing parallel fifths and octaves between the voices[5], (iv) to evaluate the consequences of the choice once it had been played.

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[5] The rules governing the movement of independent parts within a polyphonic texture during the Baroque period are largely inherited from the Renaissance period. These rules are codified by Joseph Fux (1725/1971) in five species of counterpoint exercises which I later discuss in detail (see Para.5.3.5). At this stage, my knowledge of voice-leading principles was dominated by only two concerns: to avoid parallel motion in fifths and octaves. between any two voices.

5.3.2 Using the 'règle de l'octave' for generating harmony

As I struggled with this problem, I became aware of a system of pedagogy for diatonic harmonisation called the 'règle de l'octave' (rule of the octave) in which an exemplar of suitable harmonisations with implicit, voice-leading polyphony was given to an ascending and descending scale. As Christensen (1992) explains: 'The idea behind the [règle de l'octave] is that each scale degree can be associated with a unique harmony, one which reciprocally defines that scale degree' (p.91). The assimilation of this system meant that not only was a possible harmonisation at hand, but through recognising the harmonic solution, the improviser was also orientated within a harmonic and tonal schema, defined by the 'rule'. Thus, the règle de l'octave served as a type of crude musical and technical system by which the improviser could orientate themselves tonally. An example of the règle de l'octave, by the 18th century theorist François Campion (in Christensen, 1992) is shown below.
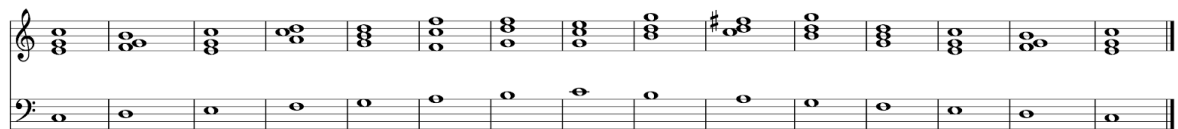
Figure 10. The 'Règle de l'Octave' of François Campion (1686-1747)

While the theory behind this kind of rule was clear, I found it difficult to put it into practice, i.e., to use this system for organising a free prelude, or even for harmonising a chorale. On the one hand the system felt too limited to serve in the context of free and imaginative improvisation; on the other hand, to use this system for a stricter task such as harmonising a choral theme, would involve all the complexities of transposing the 'rule' into the relevant key and simultaneously finding ways of interpreting the chorale theme in terms of the prescribed harmonisations. No doubt it was possible to absorb the règle de l'octave to such an extent that it could be produced effortlessly, but I didn't feel sufficiently motivated to

try when the musical results were so limited. In conclusion, I felt that such a highly prescribed system of harmonisation would not be suitable for the kind of imaginative, creative improvisation I aimed towards. The pros and cons of using the règle de l'octave are also discussed by Christensen (1992) when he says:

> .. 'of course, the *regle d'octave* was never considered sufficient by itself as a model for the Free Fantasy [i.e., Baroque Prelude]. Pedagogues recognised that many of the harmonies and bass progressions not included in the paradigmatic formula were necessary for a successful Fantasy, just as they were necessary for the realisation of a figured bass. (Indeed there was something of an aesthetic contradiction in prescribing any kind of normative progression for the Fantasy)' (p.109)

5.3.3 Looking for insights in academic treatises of harmony

Another strategy for solving the problem of harmonic decision was to use a formal or academic study in harmony as a guide. After trying several publications, I settled on Tchaikovsky's (2005, originally, 1900), *Guide to the Practical Study of Harmony* as the most approachable and authoritative treatise. This was because Tchaikovsky not only brings his considerable achievements as a composer to the task, but also adopts a brevity of explanation which contrasted well with the dense theoretical approach of some other writers. Disappointingly, once I began, I found even Tchaikovsky's economical approach to harmony produced too many rules to be applicable to the context of improvisation. Beginning with simple triads in root position, exercises are then given using inversions and their usage within the scale or mode is discussed, also their relationship to the tonic key; the aim being (so it seemed to me) to categorise each possibility of harmony according to theoretical rules and terminology.

Such a method, though satisfyingly logical from a theoretical perspective, necessarily means defining ever more complex chords in order to be complete and systematic. For example, regarding the chords of the seventh, Tchaikovsky advises: 'The chords of the seventh on the 5th and 7th degrees may also be connected with the Dominant triad; the seventh must here resolve not into the fundamental tone, but into the fifth of the triad ...' thus we have a set of rules for applying to the seventh chords, once these have been identified as such; yet, this is not sufficient for simultaneously one must also remember the exceptions that:, 'As regards the chords of the seventh on the 7th degree, they can be connected with the Dominant triad only in case the latter stands between the second and third inversions of the chord of the seventh, and two voices remain stationary, while the Bass progresses in contrary motion to the third' (p.46). The impossibility of ever remembering such complex and subtle rules encouraged me to drop this line of study; also, I realised that adding theoretical knowledge to my existing awareness of constraints and rules would not solve my fluency problem. What I lacked at this stage was insights into how to adapt theoretical knowledge to performance (i.e., procedural knowledge or productions), not more theory!

5.3.4 Discovering Fux's (1725/1971) voice-leading rules for Renaissance counterpoint

Since the beginning of my PhD I had engaged in a study of Renaissance-style counterpoint. Joseph Fux's *Gradus ad Parnassum* (first published in 1725) explicitly rejected contemporary trends in composition[6], proposing instead that composers should learn rules of good and effective musical construction through a study of the Renaissance vocal style of writing as epitomised by Palestrina (1525-1594). Fux then organises this study into a series of graded exercises exploring five characteristic types or 'species' of counterpoint; and although

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[6] Although Fux records some doubts over the power of his treatise to change compositional trends towards the chromatic and dramatic. In his own words: 'I do not believe that I can call back composers from the unrestrained insanity of their writing to normal standards' (p.17)

I studied all of these species, my principal focus was upon the basic intervallic rules of motion underlying the 1st species which are detailed in the introduction (or Dialogue[7]). Fux begins by dividing the various possible intervals into Consonant (unison, third, fifth, sixth, octave - of which the third and sixth are 'imperfect', the remainder 'perfect' consonances; and Dissonant (second, fourth, diminished fifth, tritone, seventh). He then illustrates the three possible motions of voices in juxtaposition:
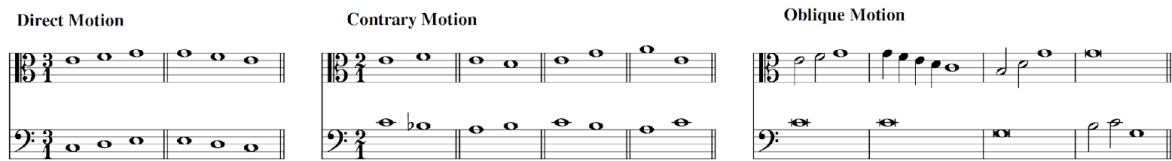
Figure 11. Three rules of intervallic motion. From, *The Study of Counterpoint from Johann Joseph Fux's Gradus ad Parnassum*" (p.21-22) by A. Mann, 1971. New York: W. W. Norton.

 In addition to these illustrations, Fux adds the following 'fundamental rules'

> *First rule:* From one perfect consonance to another perfect consonance one must proceed in contrary or oblique motion.

> *Second rule:* From a perfect consonance to an imperfect consonance one may proceed in any of the three motions.

> *Third rule:* From an imperfect consonance to a perfect consonance one must proceed in contrary or oblique motion.

> *Fourth rule:* From one imperfect consonance to another imperfect consonance one may proceed in any of the three motions' (Fux, 1725/1971, p.21)

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[7] Fux presents his text as a conversation between the student Josephus and the master Aloysius (representative of Palestrina himself)

Although Fux's aim is to make clear the implicit constraints guiding the composers of the Renaissance, much of these motions and rules apply equally well to the construction of Baroque music and, indeed any music which is built on voice-leading principles of resolving dissonance to consonance (Salzer and Schachter, 1989). Fux's rules thus represent valuable insights into the treatment of consonant and dissonant intervals (and thus, tension and resolution) in the language of diatonic harmony. Using these rules for constructing simple two-part textures, soon helped me to harmonise a melody - as the rules provided a useful criteria for choosing a bass line. Through practice I began to understand the motion between theme and bass in terms of intervals, and from calculating the interval it followed that I could choose an appropriate motion (parallel, oblique, contrary) suitable for the next harmonisation. Extending the rules to construct inner parts and voices resulted in strong, expressive harmonies which rewarded the initial efforts at calculating intervals and motions.

It is worth observing at this point that my perception of harmony and harmonisation changed quite radically through Fux's contrapuntal principles. Previously I had reduced harmonic textures to *chords* as illustrated in Figure 9, which did indeed make the problem of choice overwhelming, as Whitmer (2012, Chap.1, Para.12) warns: 'The chord plan has a fixity of purpose that is sure to stop one before one is well started'. The composer and music theorist Ernst Toch (1977) therefore makes a distinction between (i) chords which are imagined as ... 'a fixed unit, or pattern, within the frame of which each voice seeks to take up its appropriate place' and (ii) chords which capture a moment of harmonic motion: 'Just as the mists and clouds adopt the most diverse shapes in constant integration, diffusion and re-formation, thus the moving voices in music result in constantly changing harmonies' (p.5).

It is this latter, contrapuntal motion which I now perceived as *resulting* in chords, and which provided a new and more productive point of focus[8].

5.3.5 Using Fux's (1725/1971) rules as concepts$_1$ for constructing four-part harmonisations

Towards the end of my second year I recorded myself (Audio_5) applying Fux's rules of motion to the construction of a bass line to a given chorale melody, as preparation for harmonisation. The recording illustrates that I am able to construct each motion fluently, and this fluency is not only due to practice, but also to an emerging confidence in decision making which is supported through the rules. For, although Fux's rules allow a number of solutions, each of these solutions is safely incorporated within the rules, so I am able to decide without hesitation and pauses arising from the need to anticipate the consequences[9] of action. In this way, Fux's rules, for the first time in my learning experience, function as concepts$_1$ for improvising my own music. The fact that these concepts are translated from Fux's rules of motion (rather than rules which result from my own analyses) makes them no less significant, for they show my use of a generalised rule for generating improvisation which is freed from a particular score or one version of events. Each rule functioned conceptually$_1$ for constructing harmony, not only because it represented something which was true or general about the intervallic relationships in the Baroque style, but also because Fux himself translates the rules into movements - contrary, parallel and oblique, which informed

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[8] I believe Tillman, Bharucha & Bigand (2000) refer to a similar type of harmonic perception when they notice how individuals become implicitly sensitive to: 'the relations between different keys' and 'subtle changes in the harmonic function of a target chord' (p.887).

[9] Anderson (1982) explains how difficult it is to allow oneself to act when the consequences of actions may not be known: 'Although new productions have to be created sometimes, forming new productions is potentially dangerous. Because new productions have direct control over behaviour, there is the ever-present danger that a new production may wreak great havoc in a system' (p.380). While it may seem an exaggeration to compare the dangers of a virtual environment (i.e., a wrong harmony in musical improvisation) with the dangers of a physical environment, i.e., crossing a busy road, it is my experience that the same mechanisms of caution and hesitation were automatically triggered in musical learning contexts in which I felt vulnerable to receiving critical feedback.

me how to *act* (thereby successfully translating theoretical knowledge into productions or procedural knowledge for improvisation). By focusing on the concept$_1$ when I improvised, new material could be generated within the constraints of the style, while at the same time allowing me the freedom to follow my imagination. Once I had sufficient practice in constructing the intervals between the bass line and the chorale melody, I soon found I could construct the inner voices (alto and tenor) of a four-part texture in the same way. Thus, I found a solution to creating four-part harmonisations using Fux's principles.

5.4 Discussion of progress during months 13-17: gaining a conceptual$_1$ form of cognitive control

Throughout this chapter I have described a process of acquiring various rule systems for organising my thoughts and providing a structure to the learning and improvising experience. Like learning a spoken language, I had chosen to improvise within a particular musical system (of diatonic tonality) which was identifiable through numerous stylistic rules functioning at a basic, generic level (i.e., the voice-leading principles of prepared dissonance resolving to consonance) and more specifically through the many different forms and character pieces of the Baroque repertoire. Without any system of rules to my work I realised that everything I did was novel: I was simply 'wandering inconclusively across a potentially infinite space of possible features' as Wanner (1986, p.670) describes, unable to form a learning strategy or make an informed musical decision. I had looked for structure and guidance in the ready-made exercises of treatises, but soon rejected these and looked instead for insights through constructing my own reduced scores of compositional models.

However, my experience of gaining insights through rules cannot be explained solely through the direction of attentional focus, but also on aspects of agency, imagination and creativity which as demonstrated through my adopting Fux's (1725/1971) voice-leading

principles. Originally I discovered these rules in their original context (as principles for constructing strict contrapuntal textures in a Renaissance modal style), but, as I was also preoccupied with my harmonisation problems, I also imagined how a bass line could be improvised to a chorale melody in the Baroque style using the same principles. This resulting experience in facilitating new perceptions, conceptual$_1$ insights and actions for the task of harmonisation can be explored in several ways: (1), that Fux's rules themselves go some way to translating theoretical knowledge into procedural as he also reduces the rules to directional concepts - direct, parallel, and oblique motion, which could be directly applied to the context of improvisation; (2) that my cognitive demands were reduced through Fux's rule which only produced appropriate choices for action (i.e., Johnson-Laird's [2002] neo-Lamarckian algorithm), allowing my imagination freedom to process the task in a new way; (3) that, by creatively applying Fux's rules to the task I was also able to control the constraints, matching these to my skill level, an important condition of achieving 'flow states' (Csikszentmihalyi, 1988), thus implying that insights were influenced by agency, control of the stimulus, and positive learning emotions. These three points combine to illustrate how my specifically *conceptual* insights might have emerged from a particular re-creative, imaginative act in which the rule was used as a tool to solve a particular problem (of harmonic construction), corresponding to Vygotsky's (1986) hypothesis that: 'concept formation is a creative, not a mechanical passive, process; that a concept emerges and takes shape in the course of a complex operation aimed at the solution of some problem' (p.99).

Learning to become agentic as an improviser can also be seen as an important development in this stage of my learning. Similar to Smilde's (2008) idea of 'empowerment' through significant learning events, or Shevock's (2018) exploration of expert improvisers' acquisition of confidence, the events described in this chapter underlie a new approach to learning through a sense of control. Acquiring valuable conceptual$_1$ perceptions through

being agentic encouraged me to continue in this path. For example, the following extract from my journal illustrates how I now consciously manipulated the task, not only to achieve a particular musical result, but also to perceive new conceptual relationships or features about the task, similar to those I had already observed and assimilated:

'1. Unable to see connections until the left hand is played on its own.

2. Experience offers a completely new perspective to previous mental representation.

3. Yet the solution 'emerges' through playing left hand alone. It was potentially there all along (implicitly), yet it must be made explicit through a particular process ...' (Personal notes, 2nd January, 2017).

The revelation of a 'solution' occurred in response to my manipulation of the task as I searched for greater clarity. I was no longer a passive agent reacting as best I could to events as they emerged during the improvisation but was actively searching for information - for a particular way of perceiving relationships in the texture which informed my actions. It is this active searching which now defines my approach to improvising, which Vygotsky (1986) describes as ... the decisive factor in concept formation ... the so-called determining tendency' (p.99), so that I often aimed at clarifying my thoughts while improvising to match the kind of production system flow of control described by Anderson (1982) so that a harmonisation task might flow in this way:

P1

IF   the goal is to improvise a bass line to a chorale theme

THEN the subgoal is to calculate the intervals between the notes of the theme and (possible) bass notes

P2

      IF   the goal is to calculate the intervals between the melody notes and (possible) bass notes

      THEN the subgoal is to categorise these intervals in terms of motions - parallel, oblique, contrary

P3

      IF   the goal is to categorise these intervals in terms of motions - parallel, oblique, contrary, And the motion is parallel

      THEN the subgoal is to choose a different bass note

In this way, through emulating the production system of artificial intelligence models, my improvising became more strategic and I began to acquire a basic vocabulary of patterns and formulas suitable for creating the generic, voice-leading textures of Baroque organ music.

5.5 Themes emerging from Chapter 5 (months 13-17)

1. **Integration of rules**: a period of learning in which rules were actively sought to organise thoughts and acquire stylistic knowledge.

2. **Creative agency and positive emotions**: a more agentic experience through creating rule-based strategies and exercises which consciously manipulated musical elements. With insights emerging from this experience, emotions were more positive and attention more focused on the task.

3. **Initial conceptual$_1$ perceptions of musical structure**: a clear departure from former *Werktreue* perceptions of musical structure in which every element was fixed.

Conceptual$_1$ impressions emerged only while improvising. Compositional models

were now seen in terms of underlying structural and expressive functions.

Chapter 6

Generative mental representations and musical form (months 16-30)

6.1 Introduction to Chapter 6

In this chapter my study took a new direction as I received lessons from an expert Baroque improviser, and participated in a social community of improvisation. These lessons facilitated my development adding new perspectives, techniques and focus to my existing work. The influence of observing other improvisers' behaviour and improvising myself in public settings helped me to discover a new level of conceptual$_1$ control over the task allowing me to generate imaginative improvisation within stylistic guidelines.

6.1.1 Contextualising my decision to take lessons in Baroque improvisation

Up to this point I had wrestled with the learning task in isolation, an approach which I had not questioned as being necessary for the particular kind of focus and conditions I needed as a researcher and adult learner. The question of finding a teacher now arose as I realised I might not acquire all the information I needed in isolation. So far my solitary approach had proved fruitful and I had overcome the worst of my cognitive and emotional difficulties and placed my learning on a more strategy-orientated learning path through my own efforts. However, through my studies I was also becoming more informed about the cultural practice of organ improvisation, its long traditions of performance and pedagogy which (in Germany and France in particular) remained unbroken until this day[10]. My visit to the improvisation

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[10] Tandberg (2008) gives a detailed account of these traditions. In Germany, following a perceived decline in organ improvisation and liturgical playing in the 18th century, teachers such as Johann Georg Herzog (1822-1909) and Josef Rheinberger (1839-1901), revived the old traditions of Chorale harmonisation and variation, also improvising free Fantasias (Preludes) and Fugues. Herzog traced his own musical training through a succession of teachers through to J.S.Bach himself, and expressed this by 'employing Bach's forms and compositional techniques for his own music' (Tandberg, 2008, p.125). This lineage was continued through his own students until the present.
The French tradition originates in a cultural resurgence following the devastation to churches, organs and liturgical music at the end of the 18th century (Ochse, 1994). This revival (which runs parallel to the German tradition) flourished through the improvisation, repertoire and composition classes of the Paris Conservatoire (founded in 1795) producing many multi-faceted musicians who counted

festival in the Gedächtniskirche in Berlin (see para.4.3.1) with its opportunities to watch

masterclasses and recitals was also an influence as I noticed how professors and students

handled the instrument in a different way to myself, and referred to patterns of behaviour and

techniques of which I knew nothing. For example, tasks were given such as 'improvise a

Chorale Prelude on the theme …' and the student would immediately select certain stops and

arrange the musical material in ways which seemed to be shared by the professor and the

other students. The students were also clearly used to improvising in public, whereas I was

still much too frightened to attempt this. If my long term intention was to appear in public as

an expert in Baroque improvisation it seemed important to inform myself about such

techniques and cultural practices, also to learn how to perform and communicate my skills to

listeners.

6.1.2 Defining the relationship between the lessons and my self-study

I still feel lucky to have met and received lessons from Prof. Jürgen Essl, who was not

only an inspirational organist, composer and improviser, but also a sympathetic teacher who

responded to my needs as an adult learner. Initially I was nervous about a potential return to

the apprentice-master relationships of my youth (which had often been difficult and

counter-productive) as I didn't want to be dominated by the teacher's personality, or be

forced to complete many basic, prescribed exercises through a fixed pedagogic method[11].

improvisation as one of their skills. Organists such as Louis-James-Alfred Lefébure-Wély
(1817-1869), César Franck (1822-1890); later Marcel Dupré (1886-1971) and Olivier Messiaen
(1908-1992) developed a grand, symphonic style of improvisation which was supported by the
technical innovations and characteristic timbre of the organs designed by Aristide Cavaillé-Coll
(1811-1899). For myself, I was more interested in studying the German tradition than the French,
hence my focus on German Baroque models and my choice of German institution and Professor.
[11] Apart from my own experience with the prescribed exercises of the improvisation treatises already
discussed, I had also heard other people talk of study experiences within institutions being highly
regularised. One expert improviser giving a public masterclass described being made to study the
endless scale harmonisation exercises of Dupré (1975), while Tandberg (2008) also describes fixed
pedagogical methods:such as those received by Heinz Wunderlich (1919-2012) in classes with Karl
Hoyer (1891-1936) at the Leipzig Conservatoire: 'The initial lessons with Hoyer involved playing
chorales from written harmonisations. Next was the task of adding ornamentation to the chorale
melodies, still using written harmonisations ...These initial exercises employed passing notes to
ornament three against one, or quaver triplets against crotchets. So the exercise was repeated with two
against one, and afterwards with four against one – in other words quavers and semiquavers against

Fortunately, once the lessons began, I discovered that Jürgen's approach corresponded, rather than interfered, with my own patterns of learning established throughout the previous year. The schedule of lessons was not overwhelming (I received only ten hours in total spread over a period of fourteen months), which allowed me time and freedom to absorb the information into my own playing; and, in addition, Jürgen respected my previous experience as a performer and was interested in my specific questions regarding improvisation. Rather than use a fixed method, he taught me the skills I wanted to learn, explaining the constructive techniques and performance traditions of the Baroque in terms of techniques suitable for improvisation.

In the following paragraphs, wherever relevant, I try to be clear what are the strategies and techniques I learnt from Jürgen and what arose from my own learning experience. In general the tuition deepened my understanding of the relevant characteristics of national styles, forms and genres of the Baroque organ repertoire. Although I was already working with underlying concepts$_1$ my lessons gave me a new level of conceptual$_1$ control as I watched the actions and approach of an expert involved in the task. It is this theme of conceptual$_1$ control which, under Jürgen's tuition, comes to define my new abilities in improvising imaginatively yet also within stylistic guidelines, which dominates this chapter.

6.2 Lessons with Jürgen Essl

I started lessons with Professor Jürgen Essl in the third month of my second year of study. Needless to say, the first lesson was the most difficult! I had never before improvised in a Baroque style in public, and was very nervous about the results. My first task was to play a free Prelude in Baroque style, and I was so anxious about Jürgen's feedback that I found it impossible to know what to do. When I started playing it sounded like a well-known Prelude by a French 20th century composer which made me even more confused. Should I try and

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crotchets' (p.159-60). Although these exercises are typical of those I devised for myself or studied with Jürgen, the freedom to choose what and when to do these tasks I found invaluable.

change the style, or keep going in this neo-Baroque style? I tried to keep going but in a faltering, incompetent way. My hard won knowledge and techniques acquired in private seemed to fade away as soon as I had to improvise a defined task. Jürgen, however, was very calm and patient (as he remained throughout all my lessons). His first observation was that my approach to improvisation was 'chaotic', that I needed to clarify my thoughts and to simplify my goals. Although this was disappointing (for I had been consciously trying to clarify my goals for some time [see Table 1]) I soon learnt to calm down, and draw on my existing knowledge, gradually integrating this with the many new techniques and behaviours I learnt through Jürgen's tuition.

6.2.1 Extending the knowledge base

I soon realised that Jürgen's knowledge of the Baroque organ repertoire greatly exceeded my own. His criticisms and suggestions were accompanied by relevant historical and cultural facts; he knew the biographies and characters of the composers whose models we studied, and he also had a technical knowledge of organ construction. He knew the musical models we were studying inside out, not just from performing and teaching it, but also from studying its compositional and constructive principles on which he improvised. For example, he described typical cadences explaining how these could be used to structure many of the phrases in music of this period; stylistic embellishments and ornaments were written out as he showed me which were used for ascending intervals and which for descending; he also had a way of identifying certain pieces by characteristic features of rhythm, melody or registration which he then used for constructing improvisations in a similar style. For example, in my first lesson he introduced a way of treating dissonance known as *durezze et ligature* which serves as a method[12] for generating a dissonant, expressive Prelude or Toccata in the Italian style; in

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[12] This term was reserved in Italian keyboard music for particularly harsh and chromatic dissonance. Jürgen's interpretation of this compositional style was to construct a dissonant harmony on every main beat of a duple time movement, resolving this to a consonant on every (succeeding) weak beat. Thus the music was constructed through dissonance as the main focus of attention.

another lesson he showed me how to recreate the imaginative pauses and unprepared dissonance of the *stylus fantasticus* typical of Dietrich Buxtehude's organ Preludes. Whereas I had aimed for an indeterminate or universal Baroque texture, Jürgen spoke of different national styles: the Italian, French or German Baroque style, which could be wonderfully demonstrated in the room where we worked - this room containing various large working organs representative of all of these different nationalities! Thus, through these lessons I considerably increased what Pressing (1998) refers to as the improviser's *knowledge base*, including the 'musical materials and excerpts, repertoire, sub skills, perceptual strategies, problem-solving routines …' (p.53) on which more advanced skills can develop.

During these first lessons I was especially influenced by the wonderfully grand, statuesque, chromatic and colourful repertoire of the French Baroque composers such as Nicolas de Grigny [1672-1703], Claude Balbastre [1724-1799], and Louis Marchant [1669-1732]); but, these preferences aside, I now began a period of concentrated study of Baroque organ repertoire as I also began practising a series of tasks set me by Jürgen. These tasks I now list in Table 2, which it may be useful to compare with a similar summary of tasks (see Table 1) from several months earlier in my private study.

Table 2

An overview of models, representative composers and improvisational tasks studied in lessons with Jürgen Essl

Musical models	Composers	Representative tasks

German Baroque		
Preludes and Toccatas	Georg Muffat (1653-1704) Dieterich Buxtehude (c,1637-1707) Georg Böhm (1661-1733)	- to modulate first to the dominant, not to the subdominant - to limit figurations used - to identify and learn typical cadences - to restrict texture to not more than four parts - to make use of short, contrasting sections - to sometimes use the *stylus fantasticus*
Fugues	Georg Muffat (1653-1704) Dieterich Buxtehude (c,1637-1707) Georg Böhm (1661-1733) Johann Pachelbel (1653-1706)	- to construct 'tonal' and 'real' answers to Fugue subjects - to introduce thematic entrances in different registers of the keyboard
Chorale Variations	Johann Sebastian Bach (1685-1750) Johann Pachelbel (1653-1706)	- to use two different voicings when practising harmonising: (i) with three voices (SAT) in the right hand, and one (B) in the left hand; (ii) with two voices in each hand (SA in the right hand, TB in the left hand) - to write down a good Chorale harmonisation, and use this for practising the variations. - to use linear motions between the parts when copying J.S.Bach as a model. - to study and copy characteristic variations: typical figurations, rhythmic devices, constructive devices, registrations and so on.
French Baroque		

Preludes (plein jeu; grand jeu)	Nicolas de Grigny (1672-1703) Louis Marchand (1669-1732) François Couperin (1668-1733)	- to make use of rich dissonant harmonies (2nd inversion chords, diminished 7th and 9th) - to continually establish dissonant intervals which either resolve onto consonant intervals, or onto new dissonant intervals - to use typical registrations.
Duos, Trios	Nicolas de Grigny (1672-1703) Louis Marchand (1669-1732) François Couperin (1668-1733)	- to study and use typical ornamentations, figurations and registrations for the different solos involved.
Improvised counterpoint over Gregorian cantus firmus	Nicolas de Grigny (1672-1703) Louis Marchand (1669-1732) François Couperin (1668-1733)	- to study the main constructive features of the style, the setting of the cantus firmus as semibreves with surrounding accompaniment; the registrations involved. - to practice the characteristic preparation of dissonance and its resolution. - to practice constructing harmony around the cantus firmus
Italian Baroque		
Toccatas	Girolamo Frescobaldi (1583-1643)	- to improvise a particular genre of Prelude called *durezze et ligature* which continuously establishes new dissonant intervals, within a four-part texture
Concertos	Antonio Vivaldi (1678-1741)	- to alternate tutti with solo sections - to use distinctive registrations, themes and figurations

6.2.2 Discovering the expressive role of registration

During my lessons Jürgen would often introduce a task through the use of a particular registration. For example, when improvising a contrapuntal accompaniment to a Gregorian chant melody, set as a cantus firmus (in the French Baroque style), we began by setting a typical *plein jeux* registration: 16', 8', 4', 2' with added mixtures, in the manuals, with a high, bright cornet (4' or 8') for the melody of the cantus firmus which was played in the pedals. While, for an opening Prelude (again from a French Baroque Suite), a *grand jeux* could be constructed from powerful reed stops: the Clarion (4'), Prestant (4'), Trompette (8') or Basson (8' or 16'). So powerful and distinctive are these registrations that I began to realise how much of an improvisation can be influenced through the choice of stops used. For example, in the case of the *grand jeux*, the sheer weight and complexity of the sound gives a visceral, plastic quality to the sensation of harmonisation; it inspires one to amass dissonance, revelling in the clash of massed harmonics produced by the mixture stops. These registrations, played in a resonant acoustic, also require pauses for the sound to clear, so that dotted rhythms and chromatic leaps typical of the characteristic French *Ouverture* come naturally to one's hands.

Similarly, when improvising a Chorale Partita in the German Baroque style, Jürgen showed me how a choice of figuration or texture was inseparable from the choice of registration used to realise them. Solo stops, such as the Quint 2 ⅔ or Nasat 2 ⅔ having a resonant, expressive colour are used for slower paced variations than the Mixtur 1 ⅓, Tertia 1 ⅗ or Sifflöte 1, which, being much brighter and thinner in quality, would be used for fast-paced, nimble figurations. In this way I started to move away from the rather abstracted approach to Baroque improvisation (which characterised my former private study) towards a more informed approach based in my experience of performing the Baroque repertoire on historic instruments. Matching registrations with the musical texture of the models added a

tactile, sensory level of information to the improvising which inspired and guided my work. Rather than calculating harmonic intervals in a purely academic, theoretical fashion, my improvising began to resemble the kind of creative modelling typical of the Baroque period itself, in which composers resorted to the sound and feel of their instruments, blending this with knowledge of existing templates of compositional types to quickly construct *ad hoc* musical structures suitable for each occasion.

6.2.3 Refining skills in harmonisation

It should be recalled (see Para.2.3.6) that I had adopted Fux's (1725/1971) rules or principles for intervallic motion in order to develop more fluency and control over harmonisation and constructing stylistic Baroque keyboard textures in four parts. One of the first tasks which Jürgen set for me was the harmonisation of a Chorale theme. This I did as best I could, constructing each harmony as I went along and using Fux's principles. Jürgen made a few stylistic suggestions to improve my harmonisation (for example, he suggested thinking of one tonality for each phrase so that harmonies within the phrase belonged to that tonality, rather than veering off into modulations) and then asked me to repeat the Chorale theme using the same choice of harmonies as before. This however I found impossible as I had no recollection of my former harmonisation! Because I had simply created each harmony in an ad hoc fashion as I went along, proceeding note by note as it were, without a system or meaning behind my choices, I had no understanding, no memory for what I had created. Jürgen now began to teach me how to memorise my harmonisations and to become aware of an overall harmonic plan for the chorale.

My first task then was to write out a harmonic solution which could be used as a basis for variations (a Chorale Partita). Although this compositional approach might be thought to reintroduce attitudes of *Werktreue* perfection I had recently overcome, I found the exercise valuable in defining and refining my choices of harmonic progressions and for understanding

the consequences of different choices in detail (for example, writing out allowed me to study the progressions of inner voices, or to reflect on the relationship between one phrase and the whole Chorale). The opportunity to deliberate and reflect over harmonic decisions in a more systematic way was therefore productive for me at this stage, and I consequently spent much time writing out harmonisations over the following months, also using my hands to test many different possibilities before arriving at a final version. Thus, through mixing exploratory improvising with written work, I gained a great deal of clarity in my Chorale harmonisations.

Returning to the organ, my written harmonisations exercises were now elaborated by different physical renditions. Whereas I had previously harmonised a four-part texture (I refer to these parts as Soprano, Alto, Tenor and Bass, abbreviated to SATB) using just the hands, Jürgen asked me first to harmonise playing two parts (SA) with the right hand, one with the left hand (T) and one with the feet (B). Following this I had to play one voice (S) as a solo in the right hand on a different manual, two voices (AT) with the left hand, and one (B) in the pedals as before; following this, the top voice (S) was played in the pedals, the Alto with the right hand, Tenor and Bass in the left hand. These different voicings forced me to work harder at constructing each harmony, in particular the movement of the voices as I progressed from one harmony to another, and so I became increasingly adept in both representing (mentally) a harmonisation and performing it through improvising. (See Video_2 for two different voicings and harmonisations of the chorale melody 'Erschienen is der herrlich Tag')

Over time, these exercises changed my perspective of harmonising a Chorale theme. Whereas previously I had harmonised each moment or motion as it appeared, I now saw the chorale in terms of phrases, each phrase signifying a sequence of related harmonies and harmonic decisions. I could plan each cadence or modulation to a related key as a structural point within the whole framework, rather than grabbing any expedient solution; my memory for certain harmonies increased as I perceived them more meaningfully, through their

expressive function within the phrase (which I voiced internally as: 'to stabilise a phrase, to modulate expressively, to start, finish, or continue a phrase' etc.). Thus, Jürgen's strategies for harmonising initiated processes of memory and meaning, which relate to cognitive theories of memory *chunking*. Tandberg (2008) explains how these processes affect the improviser's perspective of events: … 'chunking in improvisation refers to the process whereby we look back over the course of events whilst simultaneously looking forwards. Thus the music we are playing, or imagining at a moment, remains a part of what has gone before. What we are in the process of doing takes place in relation to what has just occurred as well as that which is coming later' (p.235). This process of gradual memory formation, its effect on automaticity and role in an expert's improvising knowledge, I later discuss in more detail (see Chapter 7).

6.2.4 Developments in conceptual$_1$ control over the improvisation

Jürgen's style of teaching relied primarily upon demonstrating what was possible in improvising. He described actions in terms of opportunities rather than rules; even when rules were unavoidable, they were discussed more as guides or solutions for making one's improvising more stylistic or coherent rather than abstract, coercive commands. This non-coercive approach was reflected in the language used: a characteristic "You *could* do this [demonstrating a solution] … or this ..." rather than "you *must* do this". In spite of his rigorous knowledge of the Baroque idiom he seemed to condense and reduce the theoretical rules to a minimum, introducing these only when it was relevant to the style or genre. Thus his teaching was always aimed at facilitating action, for I found it hard to introduce new rules into my improvising[13], and one highly relevant rule which could be both mentally sustained *and* translated into action, was worth more than many abstract, complex and theoretical rules which overburdened my cognitive perception of the task and interfered with my performance.

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[13] My experience of the difficulties of introducing new rules into my improvising I also saw replicated in other students' lessons and masterclasses. It recalls Paradis' (1994) statement in relation to language performance, that: 'the speaker may *either* use automatic processes *or* controlled processes, but not both at the same time' (p.404).

It was through this practical, imaginative and facilitating connection of theory to action that I realised I was developing a more conceptual$_1$ control over my improvising, for with Jürgen it became a routine aspect of the lesson to abstract relevant features from the musical texture, and to apply these features as general rules for steering my actions closer to the model. This relationship between the specific to the general encouraged a specifically conceptual$_1$ quality to the mental representations we were using (in that we interpreted a specific feature into a general rule which was then used to improvise similar specific features). In a similar way to my adoption of Fux's (1725/1971) principles for intervallic motion, I felt liberated in that I could use my imagination while simultaneously following the constraints of the model. The effect was to bring the experience of improvisation closer to the original compositional model, and it sometimes felt to me as if I was making creative musical decisions in the same way as the composer.

For example, improvising a Chorale Partita (a set of variations based on a Chorale) began with the exercises in harmonisation already described, so that I worked on a particular harmonisation until I was satisfied with it. Then taking this harmonisation as a written model, Jürgen demonstrated how different figurations could be introduced without disturbing the harmonic flow. Thus, the harmonisation itself became conceptual$_1$ providing a basic mental structure on which variation could occur. The individual variations might then be introduced through a particular registration combined with a motivic idea, these features also used conceptually$_1$ to construct new textures wherever possible (opportunistically) over and through the basic harmonisation. Complexity of counterpoint, virtuosity, perfection of form were thus reached by degrees, while conscious attention was always directed towards simple, attainable goals.

Another example of this simple, conceptual$_1$ approach can be seen in Jürgen's introduction to Fugue improvisation which I had previously experienced as the most complex

of tasks. Taking the Fugue we began with a harmonisation task in which the theme appeared in each part of a four-voice[14] texture. In this way I established a basic harmonic concept$_1$ (similar to the Chorale variations) which allowed me to construct the other voices around the theme whenever or wherever it was introduced. After this, the Fugue exposition was constructed through a strict scheme in which each voice took the theme, one after another, finishing with a four-part texture. Following the strict rule of opening voice entrances, the Fugue construction was quite free: we avoided introducing the theme in the same way (which would be boring), exploring different registers instead; free, sequential material was used to join up the different voice entrances, and I tried to finish in the same key as I started! Thus, although the Fugue as a genre can be extremely rule-based and challenging, this introductory approach to improvising a Fugue was creative, liberating and manageable in terms of constraints.

Of course these simple, effective instructions describe only the conscious, explicit part of the task, in effect the tip of the iceberg. Although I was mostly focused on these conscious rules and stylistic constraints I also realised that there was a more implicit part of the work on which I was less focused. This included skills, productions and knowledge already acquired, which were automatically drawn on while trying to respond to Jürgen's new suggestions. A great deal of information was also communicated through Jürgen's demonstrations at the organ. Watching him harmonise a Chorale theme with a particular movement of the fingers or improvise the opening of a Fugue, timing the voice entrances in a certain way; noticing the way he 'reached' for a musical idea, articulated a motif, maintained a level of focus, energy and flow while improvising, taught me many things about the task which we never explicitly discussed. Thus, even when constraints were explicit and simple,

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[14] I refer to the origins of the Fugue as found in the imitative vocal writing of the Renaissance. Therefore it is customary to think of Fugue texture in terms of Soprano, Alto, Tenor and Bass voices.

their effectiveness should be understood against a backdrop of rich and complex sources of information, much of which was implicitly communicated through demonstration.

6.2.5 Summary of Jürgen's lessons and their influence on my learning

There's no doubt that my studies in improvisation, which had previously been guided by my own inclinations and insights, now developed greatly over this period of fourteen months in which I received lessons. Although the hours of tuition were not many and the lessons widely spread I received a great deal of relevant and effective information about Baroque musical forms, organ registration, and typical approaches to improvisation (within the Baroque style) which mobilised my existing skills and transformed my approach to the task. I was better able to contextualise my work through comparing my own efforts to the students and teachers I observed; I gained a sense of shared difficulties as I watched others mustering up the courage to experiment in front of their teachers, or wrestle with problems of coordination as they tried to assimilate a new idea into existing productions. The students I spoke to opened up about their experience of learning to improvise: some were enthusiastic about it, hoping to become experts like their teachers, others only improvised because they had to, as it was one of the disciplines of their course on which they would be examined. These conversations (see Appendix D) gave me an impression of different experiences and approaches to improvisation which I was able to contrast and compare with my own.

6.2.5.1 Participation in a learning community

As a fellow student, a participant in the learning-teaching cycle, I was in a privileged position, giving me 'direct entry into the performance event' as Baily (2001, p.96) remarks, for I not only gained access to dialogues of learning and information exchange which were normally hidden, but also, through my own learning experience I found I could contextualise and interpret what I saw. For example, early on in my visits I witnessed an advanced student rehearsing an improvisation of a large-scale sonata form. Although the techniques used and

the romantic style of the improvisation were far in advance of my own skills as an improviser, I perceived that the cognitive processes behind the performance was similar to those which I was beginning to develop in my own playing. I particularly remember an exchange between the student and professor about the opening of the fourth movement which, after a grand opening, introduced a four-voiced fugue subject. The professor made several suggestions for registration, and for the timing of voice entries in the fugue; and each time he made a suggestion the student returned to a certain point and tried the same section again. What impressed me was the conceptual nature of the performance and the understanding between the student and professor: they were able to discuss the structure of the piece, the form, the gestures or registration used, yet every time the student played the notes were different! Each improvisation was clearly created upon a conceptual structure which could, in its underlying features, be shared between the two musicians.

6.2.5.2 Witnessing the 'operational' knowledge of improvisation

In this way, becoming a part of this community, even as a part-time student, added depth to my experience as I witnessed a tradition of improvising which extended back in Germany to the Baroque era. Watching people tackle the various tasks and models of improvisation gave structure and clarity to my growing knowledge base. It was a peculiarly 'operational' knowledge which recalled Baily's (2008) phrase: 'the structure of the music comes to be apprehended operationally, in terms of what you *do*, and by implication, what you have to *know*' (p.122). Thus, by watching Jürgen and colleagues approach the organ, select registration and begin improvising a Fugue, or free Prelude or Chorale Vorspiel I saw their cognition in action. Each task, I perceived, could be distinguished by a set of cognitive models and behaviours: for example, a free Prelude meant prioritising learnt productions allowing the fingers 'to run', while also focusing on certain opening moves, serving (for example) to establish the tonic key; a Fugue, on the other hand, involved a more studied

approach as it was necessary to understand the harmonic implications of the theme before starting, while the improvisation also needed careful treatment of voice entrances, leading these towards modulatory points and so on. This operational knowledge thus informed me about the flow of energy and cognition: how players divided their attention between their memorised productions and the constraints of a particular task; how they found solutions to problems in the moment and got out of unexpected difficulties; how they stole time to plan their next moves, balanced risks against certainty, and so on. In this way I also gained an impression of the different levels of performance (of students progressing through stages of learning, of the different professors and experts), the expectations of improvisation shared between, and thus how each improvisation that I witnessed related to a communal language of musical style, structure and behaviour.

6.2.5.3 Gaining a sense of performance

Thus, through the experience of individual lessons and the exposure to a pedagogic culture of historical improvisation, my own improvising gained a new focus and clearer goals. Ultimately it showed me how to bring my improvising to some kind of performance as there was no place in my lessons with Jürgen for the rambling, reflective improvising I had been doing in private. Each task began with some kind of improvised performance, either demonstrated by Jürgen or attempted by myself. However hopeless or confused the attempt might be, Jürgen always encouraged me to continue until the end; I couldn't just stop in the middle, but must always create a whole structure, i.e., to find my way back to the tonic key and produce a cadence, or continue a variation until the last note of the Chorale theme. Thus the discipline was good for me at this stage as (once I calmed down and found a way of accessing my procedural knowledge) I found I had sufficient experience and knowledge from my private studies to sustain me. Thus, after a year of self-study and practice, I had sufficient ability in my improvising to respond to Jürgen's suggestions, while my experience in

self-reflection and analysis of my learning (through the methodology of the study) helped me

to contextualise and process new advice and criticisms of my performance productively.

Although, as an adult learner with considerable experience as a performing musician, it might

have been difficult for me to adopt a student's role, my own preparation along with my

respect for Jürgen's abilities and knowledge (not to mention my own ambition to learn and

develop) helped me through these difficulties.

6.2.5.4 Acquiring the basis of a generative model for improvising

Jürgen and I never spoke explicitly about the cognitive details of my research such as

conceptual$_1$ control, mental representation or learning emotion, for the simple reason that I

was at this time more focused on the practical skills of improvisation and later developed a

theoretical explanation for the process of skill acquisition (mainly through the process of

writing up the thesis). However I realised, even at this stage, that Jürgen's way of improvising

involved a very particular cognitive model, based on the conceptual$_1$ discoveries I had

already discovered (see Chap.5). This is not surprising at one level because both Jürgen and I

were engaged in the same task of improvising on stylistic models, thus our cognitive

approach involved the same production model, or 'operational' knowledge which Baily

(2008) describes. The fact that Jürgen, as my teacher, was more advanced than me, does not

alter this connection between us, for I believe we were both passionately interested in the

relationship between the compositional model and how this provided a basis for creative

improvisation, and also in obtaining clarity about this process, i.e., identifying rules and

concepts$_1$ which served to guide our actions. Jürgen, so he told me, had been a very careful

and diligent student, and I believe this gave him clear insights into the task of reconstructing

a style or model which I found enormously effective. In this sense my description of Jürgen's

approach recalls Baily's (2001) description of his second teacher Amir Jan: '[Jan] had learned

the music via the theory, and it is probable that these cognitive processes were built up

around it, so that in musical performance he invoked the theory at a cognitive level' (p.94).
Whereas other students described their teachers as brilliant and intuitive improvisers who
lacked the ability to articulate their knowledge, I appreciated Jürgen's ability to organise my
cognitive approach to an improvisation around a few principles, clearly emphasising what to
do in terms of actions.

6.3 Returning to self-study: generating my own concepts$_1$ for improvisation

It might be thought that once my time as a Kontaktstudent was finished at Stuttgart I
would have felt bereft of guidance, but this was not the case. On the contrary, having learned
so much I was eager to continue my studies in my own way, using the insights I had gained
from my lessons with Jürgen to develop my skills towards communicative performance. In
the following paragraphs I relate how I returned to my private studies and learnt how to
generate my own stylistic improvisations, selecting features from Baroque models through
techniques I had learnt in Stuttgart, using my own analyses and practice strategies.

6.3.1 Modelling a French-style *Plein jeu*

Soon after my period of study in Stuttgart I was improvising a French Prelude (called
Plein jeu - meaning full organ) using, as a model, the opening movement of Louis
Marchand's 1.ere Livre d'órgue (see Figure 12). This type of Prelude was new to me, and I
recorded my first impressions: ... 'static, majestic, chordal, based upon inner workings and
strivings by circuitous routes to some triumphant and unexpected conclusion. It is at once
mysterious and massively convincing' (Personal notes, 6th April, 2018).

Figure 12. Opening bars of a Plein jeu by Louis Marchand (1669-1732), From Archives des Maîtres de l'Orgue (Vol.3, p.1), by A. Guilmant and A. Pirro, 1901, Paris: A.Durand & Fils..

My problem was that, while I admired the style, I did not understand how the music was constructed, i.e., the creative principles by which Marchand created these effects; and when I tried to improvise my own version I felt the results were not convincing. I therefore made several analyses of the Prelude, and also wrote out several passages by hand which allowed me to study features of the style such as the contours of the bass (pedal) lines, and the contrapuntal relationship between these and other voices. Regarding the movement of harmony in the Prelude, I noticed that ... 'the harmony stays around a delimited area, ... So, one doesn't simply spin off into remote keys. The insistence upon certain chords and the way in which these composers return to I, IV and V is an expressive feature' (Personal notes, 6th April, 2018). As a preliminary exercise then, I created a reduced score over which I could improvise the remaining material (see Audio_6)

Figure 13. A reduced score of a Plein Jeu by Louis Marchand (1669-1732) as a template for improvisation.

Yet, this analysis, while allowing me to assimilate many features of the model, did not provide me with the insights I needed into the characteristic harmonic movement, 'the inner workings and strivings by circuitous routes' that had originally inspired me. Therefore I made a different analysis of the harmonic movement between each chord which I wrote in closed position (i.e., with all the relevant notes as close together as can be written) on one stave.

Figure 14. Harmonic motion illustrated as closed-position chords in a Plein Jeu by Louis Marchand (1669-1732).

The use of closed-position chords allowed me to perceive and thus achieve a clearer mental representation of the relationships of dissonance to consonance which characterise this opening passage. This mental representation now provided explicit instructions for the improvisation: (i) over a tonic pedal note, play mainly tonic and subdominant chords. From these (ii) create a dissonant harmonic movement which resolves immediately back to the tonic or sub-dominant, or may resolve via another dissonant harmonic movement. The implicit part of these instructions included the usual stylistic constraints (although the

four-part texture of the hands is unusually expanded by two pedal parts in this example), but also distinctive timings (for example, the repeated rhythm of half-note to two quarter-notes in each bar) and linear, chromatic movement of the inner voices which I retained through performing the model reiteratively in between improvisations (see Audio_7 for an example of this improvisation).

6.3.2 Defining the mental representations of generative concepts$_1$ for improvisation

As the previous example shows, an important part of the work at this stage was finding a good and effective way to mentally represent the characteristic features selected from the model. A mental representation needed to be cognitively 'light' (so as not to overload my processing of the task) and capture something essential about the model which allowed it to be recreated, organising my procedural knowledge in ways which simultaneously kept my imagination free. This representation was thus not binding towards particular notes, but usually conveyed something in the nature of a relationship, as in the example before it captured the patterns of dissonance within a sequence of harmonies.
The role of mental representation is also recognised in skill-learning literature. Gobet (2016), for example, proposes: 'Good representations offer at least four advantages: (a) they provide access to relevant knowledge while allowing flexibility in its use; (b) they enable the application of efficient search methods; (c) they make it possible to decompose problems into subproblems where specific solving techniques can be applied; finally, (d) they make it possible to coordinate several problem spaces that are a priori unconnected, something that is particularly important with ill-defined problems' (p.73).

As I became more aware of research into mental representations and their role in skill learning, I decided to investigate my own mental representations which I used for improvising. I was not only curious to clarify the kind of representations I used, I also wanted

to better understand the relationship between my representations of the task and my performance. As Anderson (1980) states: 'if one's goal is to develop a theory of the connections between stimuli and responses, it helps to have a model of the structures and processes intervening between stimuli and responses (p.1). Capturing the way I thought about improvising was a rewarding but also challenging task. As I set about writing, drawing, describing my conscious impressions I realised that there were insurmountable limitations to the exercise. For example: (i) in a complex task such as musical improvisation, mental representation will be too numerous, rapid and fluid to be contained within one form of representation; (ii) that a great deal of information is represented implicitly and is therefore not available to consciousness particularly as skills become more automated and fluent; (it might have been easier to capture my representations of the task at earlier learning stages when all my actions were consciously and effortfully constructed); and (iv) that the act of describing one's mental representation tended to affect the representation itself, thus it was difficult to capture a 'pure' representation without the feeling that I had contrived it in some way. However, in spite of these reservations, the exercise manages to convey the kinds of images and ideas on which I improvised and thus illustrates something about my perception of certain tasks of improvisation during this time.

Figure 15. A graphic layout of a Fugue theme (centre) with improvised counter-subjects, used to develop and organise musical material.

6.3.3 Using Anderson's (1983) three codes of knowledge representation

Figure 15 demonstrates the use of a graphic layout in working out a Fugue theme and its counter-subjects. I often worked out the possibilities of a Fugue theme in this way: by placing the theme in alignment with the counter-themes the relationships between the themes

can be more easily visualised, counter-subjects can be worked out in direct reference to the

theme, variations of themes more easily calculated, and the intervals of dissonance and

consonance more clearly understood. As a result of drawing Fugue themes and their

derivative counter-subjects in this way I developed clearer mental representation of important

thematic relationships. Anderson (1983), the author of ACT (the Adaptive Control of

Thought), includes mental images in his 'tri-code theory' of knowledge representation: 'This

theory assumes three codes or representational types: a temporal string, which encodes the

order of a set of items, a spatial image, which encodes spatial configuration; and an abstract

proposition, which encodes meaning' (p.45). It is on these three codes that the following

discussion is based.

6.3.3.1 Images
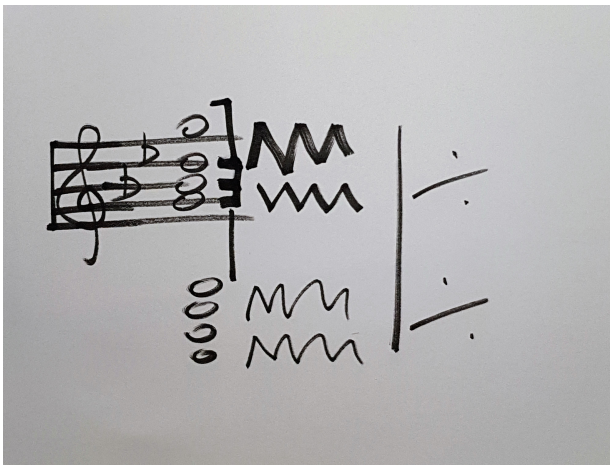
Figure 16. A graphic representation of the opening section of an improvised Prelude in G

minor.

The graphics of Figure 16 captured my initial impression of the opening bars I wanted

to improvise: the use of the G minor chord and subsequent elaborations of this chord.

However, after drawing the graphic, my improvisation changed: the graphic drew my

attention to the function of the opening chord in establishing the tonic harmony, so I

improvised more elaborations within the tonic chord before initiating harmonic movements

towards the dominant (see Audio_8). In this way, the image was first used as a generative

principle for improvising the opening moves of the Prelude, but then as a tool for elaborating

these opening moves into a more formal structure.
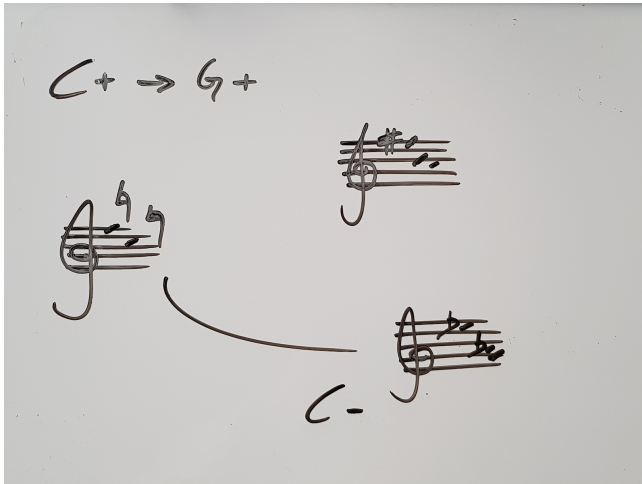
Figure 17. An image representing improvised modulations from C major to closely-related

keys G major (above, right) and C minor (below, right).

In Figure 17, I drew the essential bits of information I needed to modulate from C

major to related keys G major and C minor. To understand this image it's necessary to explain

two parts of the mental representation: (i) is that a key or tonality can be recalled, not by the

entire scale, but by salient or distinguishing features: thus C major is represented to me here

by the absence of sharps and flats (in this case the image shows two natural signs), G major

by the three notes written (which include the F-sharp) and C minor (which includes a

distinctive semitone of G and A-flat); (ii) is that, by holding the representative salient features

in working memory, I found that I could quite easily modulate to a key. Therefore the image

again serves a double purpose of capturing the mental representations I used for a certain task

(i.e., of modulation) while also helping me to define these representations through the act of

drawing.

6.3.3.2 Temporal Strings

To represent the main events of an improvisation using a temporal string is both simple, effective and flexible. The main feature of the temporal code is that it records only the order of events, not their duration. So, I could imagine the opening events of a Prelude as a temporal string in the following way: G minor chord - Elaborations of G minor chord using triplet rhythm - D minor chord - Elaborations of D minor chord in semiquavers - G minor chord, etc. While the order of events is thus fixed by the temporal string, it still allows infinite freedom in terms of timing, so that each event can be elaborated for as long or as short as the improviser wishes. The temporal string can also be graphically represented (see Figure 18) which illustrates the way in which different types of encodings can be combined.
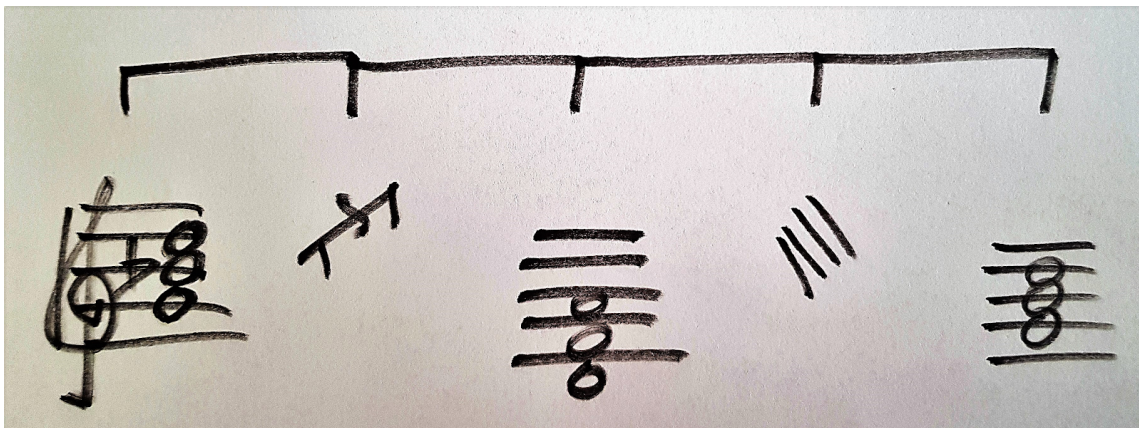
Figure 18. A graphic representation of a temporal encoding of events in the opening section of an improvised Prelude.

One advantage of the temporal encoding is that other events can be inserted without altering the order of other elements in the string. For example, if I thought that the return to the tonic chord or key was too sudden I could insert other harmonic way points to expand this part of the musical structure. Thus, the temporal string is particularly effective in representing and developing one's sense of musical structure.

6.3.3.3 Abstract propositions

Accompanying these graphic representations of ordinal and spatial events, are abstract propositions: these not only describe the musical events being improvised (i.e., the beginning or ending of a piece, the episode in a Fugue), but also as Anderson (1983) suggests, include meaning: that is, our beliefs and opinions about these events, (i.e., 'is it easy or difficult to perform', 'is it an important part of the musical structure'). Therefore abstract propositions contain information which is extremely influential not only over one's representation of musical structure, but also one's self-beliefs, approach to the task, emotions and motivations. Because my methodology included keeping a journal in which I regularly recorded my emotions and beliefs about the tasks I practised, I learned to appreciate the influence of such abstract propositions in organising my knowledge and defining my approach to the task, as Table 3 illustrates.

Table 3 lists some statements typical of my own learning experience. In each case I offer an alternative version of the meaning implied in the statement to illustrate the potential effect of the abstract proposition on improvisation.

Table 3

Propositional statements with alternative meanings relevant to improvising experience

Statement A	Statement B
I don't know how to do this	I know how to do this
A Prelude should have a logical musical structure	I'll improvise the structure of this Prelude as I go along
People will judge my performance	No one here knows as much as I do about improvising

A Fugue should have a set structure of modulations	I'll bring in the voices in whatever key I find myself in, and finish in the tonic
It must sound like Bach	I want to express myself

6.3.3.4 A kinaesthetic code

Although Anderson (1982) limits representational codes to the three forms I have discussed, he also acknowledges the possibility of a fourth, 'kinaesthetic' code for representing action and movement. Strongly related to the idea of embodied and situated knowledge (see para.2.3.4), the kinaesthetic code is, I believe, justified by the necessity of goal-directed action in improvisation, which clearly requires a special kind of awareness and sensory information. As Johnson (1987) illustrates in his description of learning to balance: 'It is crucially important to see that balancing is an activity we learn with our bodies and not by grasping a set of rules or concepts. First and foremost, balancing is something we do. The baby stands, wobbles, and drops to the floor. It tries again, and again, and again, until a new world opens up - the world of the balanced erect posture ... Balancing is a preconceptual bodily activity that cannot be described propositionally by rules' (p.74). The sensation of action, of organising and distributing our limbs to achieve goals in an environment is thus discreet, sensory in nature, extending beyond theoretical description and not communicable to another. Yet, at the same time, sensory information is not vague, but, in its own way extremely precise, this precision often being represented to the individual in terms of spatial relationships. For example, Stuart (2010) asserts that 'a basic underpinning of the capacity for such engaged, embodied judgment is the ability … to feel your own body from the inside as it is positioned in relation to those things within your world' (p.40). Baily (2008), from a performer-researcher's perspective, also suggests that a spatial representation is useful for

understanding kinaesthetic information: 'one important conceptual model at the musician's disposal is a spatial model in which movements are planned and experienced in visual, kinaesthetic, and tactile terms' (p.125). This awareness of movements connected to musical events, positioned and timed within an interior, imaginary space I also experienced, sometimes with extraordinary clarity, as my notes record:

> *'A changing landscape. As I start to routinely practise the variations, my work becomes more 'mapped' - I can (as it were) erect scaffolding on a structure, or pause and resume work in various mental locations. This is in contrast to the 'casting about' of previous months'* (personal notes, 22nd May, 2017)

Or:

> *'I suddenly found myself aware of the whole shape - that is, I could see the whole piece before me, like a landscape - and this vision had never before been possible, in spite of many attempts to imagine ... I was aware of my place in the overall scheme of things, while I was improvising. This enabled me to make new judgements as to length of phrase, timing of elements such as new voice entries or modulations'* (personal notes, 12th July, 2017)

But these, highly developed visual 'maps' representing my actions over a whole musical structure were rare insights into the task. More common was a growing sense of connection throughout my learning between the actions I performed and the musical results, a linkage which strengthened as I learnt to perceive, understand and later generate music through conceptual$_1$ principles. Even at a basic level, as I now demonstrate, kinaesthetic encoding can be seen to take over from theoretical knowledge especially when the action-musical event linkage is clearly understood and habitually performed.

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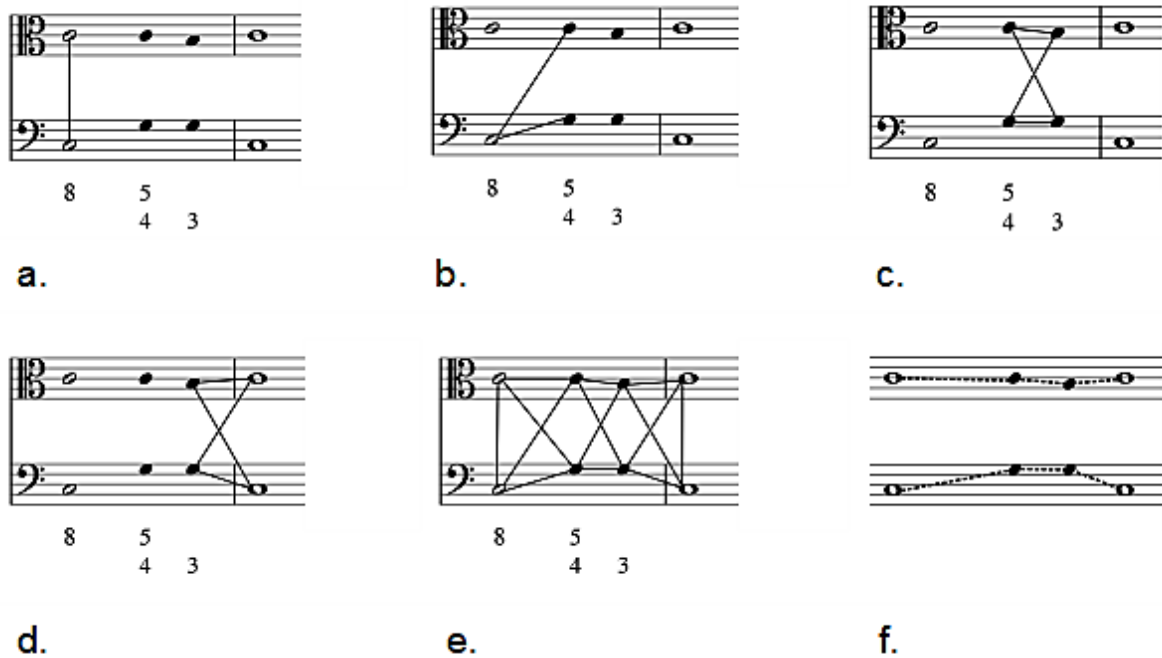
Figure 19. Images of a cadential formula becoming conceptually₁ represented.

In Figure 19, images a to d represent the sequence of movements as I construct a cadential formula in C major. Each movement forwards is represented by a straight line linking the relevant notes, while the lines linking the staves represent the need to coordinate the movement forwards between the two hands. After the entire cadence had been constructed, I had a complete mental representation or kinaesthetic impression of the cadential formula (e), and as I repeated the formula I relied increasingly on image (e) rather than the separate images (a) to (d). Through greater familiarity over time, the formula became more generally represented; certain features dropped out as it was no longer necessary to represent them (f) leaving me with a representation only of the distinctive contour of the phrase. From this point onwards, graphical or explicit forms of representation gave way to more embodied or kinaesthetic modes of representation. While such representations were not directly accessible to consciousness, yet they were still subject to a form of cognitive control,

which Stuart (2010) describes as: 'the result of our capacity to memorise and form fluent, non-cognitive melodic movements' (p.45).

6.4 Discussion of progress during months 16-30: towards a generative, creative and stylistic improvising

It was interesting at this stage to compare my experience of learning to generate musical structure with cognitive theories earlier reviewed (see Chapter 2.1). Pressing's (1988) description of a 'basic movement vocabulary' and the 'fundamental perceptual distinctions needed for the use of feedback' (p.139) clearly corresponded to the work I achieved before my lessons in Stuttgart, while his mention of: 'the ability to perceive distinctions is refined considerably, and internal models of action and error correction are developed' (p.139), links to the knowledge and skills I acquired through Jürgen's lessons, which brought improvising so much closer to the compositional models. Yet, the reduction of experience to a cognitive theory omits much which was essential to my learning experience: for example, without Jürgen's influence and expertise I might never have achieved this level of refinement; in addition I needed to dominate my learning emotions, control critical feedback, develop agency, gain access to social learning and expertise in order to proceed through these events of learning. Thus Pressing only describes certain observable or deducible aspects of learning without offering insights as to the kind of experiences and decisions on which these skill developments depend.

Similarly, the development of this theory into a generalised knowledge base of generic patterns and movements, coupled with a referent: 'a set of cognitive, perceptual, or emotional structures (constraints) that guide and aid in the production of musical materials' (Pressing, 1998, p.52) can be compared to the mental representations I described for generating specific stylistic improvisations. Clearly, I drew on an existing knowledge base, i.e., a reservoir of existing productions on which to construct models of a particular

improvisation, but the 'cognitive, perceptual, emotional' structures I acquired were the result of many analyses of compositional models and the translation of these analyses into procedural knowledge which, as I have described, had to be conceptual, in order to function generatively for guiding my imagination within stylistic features and rules. Again, the theory corresponds to the basic developmental path of learning, but is too limited in information to offer insights into the lived experience of this developmental path

The kind of improvising I now achieved I described to myself as *generative* in the sense that it corresponded to my original goals for improvising creatively within a rule-based system. Arriving at this level of ability felt like actually *generating* real music in a way which I never had done before; it was a liberating time in my study, a feeling of finding my expressive voice after years of being mute. I have tried to describe in as much detail as possible my sensations, thoughts and ways of constructing this generative style of improvising, focusing in the last paragraphs on conscious mental representations. Using Anderson's (1983) visual, ordinal, propositional codes helped me to explore various ways in which I consciously constructed the task which could be added to the more implicit kinaesthetic codes.

Johnson-Laird's (2002) cognitive model, which explicitly addresses the problem of overcoming cognitive constraints, is interesting because this aspect of improvising was clearly an important part of the generative improvising I describe. By constantly refining the knowledge I used for specific models of composition and linking the mental representations I used to relevant productions I was able to significantly reduce the amount of calculation I was making during each improvisation, thus reducing cognitive load on working memory as Johnson-Laird describes. Thus, I progressed from a more open approach as a novice where all musical decisions were taken in the moment (corresponding to Johnson-Laird's first, 'neo-Darwinian' algorithm), through a period of conscious, rule application (the second,

'neo-Lamarckian' algorithm) before finding a compromise between rules and creative choice in more generative, conceptual$_1$ mental representations (corresponding to the third algorithmic model). It was only this conceptual$_1$ representation of selected features which provided a cognitively 'light' mental structure from which I could generate many specific musical instances; thus overcoming the constraints of working memory not only through training, or by adopting a more permissive attitude towards choice or errors, but through developing particular perceptions of musical structure which were recreated in performance.

The images, ordinal strings and propositions, and kinaesthetic representations I explored (see Chapter 6.3.3) can also be compared to Clarke's (1988) generative models of (i) heterarchical association of musical material, (ii) associative linking of musical ideas, and (iii) repertoire selection, i.e. improvising through learnt patterns and productions. My interpretation of these different models is that my generative improvising, at this stage in my development, corresponded most closely to the (i) associative approach and (iii) the use of repertoire selection. The conceptual$_1$ representations of musical features and structure very rarely provided me with a clear, theoretical 'map' of a musical structure (Clarke uses tree diagrams to illustrate how every musical event can be linked to increasingly higher-order events in the hierarchy); only with a starting point from which I generated my own music according to the rules. My improvising, as I have discussed, tended to proceed at a phrase-to-phrase level, where repertoires of learnt productions could be guided by conceptual$_1$ rules and features occasionally resulting in a complete improvised form.

Lastly, I'd like to recall Callahan's (2010) depiction of a specifically Baroque musical structure and texture imagined through the different layers of *dispositio, elaboratio,* and *decoratio*. Callahan proposed an elegant cognitive model which linked the possibilities of manipulating each level of musical texture (each level absorbed through a combination of theoretical principles, patterns and techniques) to generate different kinds of music.

 In this way Callahan added musical context to Clarke's (1988) models, as each different approach - hierarchical, associative, and repertoire selection was explained not only in cognitive terms but also in terms of musical decisions and consequences. The flexibility of this theory, in that the improviser was free to focus on each tier of musical structure in a generative way, corresponded closely to my description of improvising on different models and genres in the Baroque style. For example, at a fundamental level, I believe the *elaboratio* level of voice-leading patterns was corroborated by absorption of these patterns through Fux's (1725/1971) rules, and can then be seen playing a significant role in constructing a form such as the French-style Prelude or *plein jeu*; a form in which *dispositio* elements (i.e., a general move to the dominant and return to the tonic), and *decoratio* elements would be less significant.

My own discussion of mental representations in terms of images, ordinal strings used for constructing a free Prelude (see chap.6.3.3) also illustrates exactly the kind of balancing which Callahan proposes between the two upper tiers of musical texture (*decoratio* and *elaboratio*), as I generated figurations and imitative patterns linking the underlying voice-leading harmonic events. Thus, I was drawn to Callahan's particular use of hierarchical representations of musical structure to link the three tiers of musical structure together at the phrase-to-phrase level rather than relating these hierarchical links to the whole structure in a rather over-determined way as Clarke (1988) had done.

6.4.1 Emphasising the conceptual$_1$ nature of generative improvisation

Returning to the experiences described in this chapter, I would summarise my own mental model for generative improvisation at this stage as fundamentally conceptual; meaning that it was established through a particular learning process which resulted in my perception and interpretation of musical texture and structure in terms of underlying conceptual functions, which were then used as mental representations for re-creating my own

versions of the musical style. Although corresponding to the theories outlined above, my

experience in constructing effective, generative concepts$_1$ which linked my patterns and

productions of playing to the stylistic features of the models, involved much experimentation

at manipulating the musical texture, attempting multiple tasks, developing different

approaches towards these tasks and towards improvising in general; returning to further

analyses of the score, and searching in an often rather blind way to bring my creative

experience closer to the models. Arriving at a 'good fit' in this way between my

improvisation and the original model signified:

1. An ability to perceive the musical model in terms of expressive functions and

   characteristic features operating at all three levels of texture (*dispositio, elaboratio*

   and *decoratio*)

2. An ability to mentally represent these functions and features conceptually 'as the main

   instrument of thought' (Vygotsky, 1986, p.139) for generating improvisation

3. A willingness to act agentically, i.e., to make creative, musical decisions without

   questioning one's ability or right to generate music

As a result of reaching this level of generative improvisation I felt like a different

person: I had reached a definitive stage of development; I'd come out of my shell, my private

musings and experimentation; I'd braved the challenge of public performance, improvised in

front of a recognised expert, traversed the experience of 'failure' i.e., of revealing my

shortcomings as a learner, found that instead of being humiliated I had in fact learnt a good

deal and was now developing exciting new skills in Baroque improvisation. I thus felt more

confident about improvising not only because I'd learnt certain techniques which facilitated

my improvising (although this contributed a great deal), but also, and perhaps more

importantly, because I felt in possession of strategies which gave me the means to acquire

new knowledge. This blend of enjoyment, confidence and cognitive engagement with the task is reflected in Csikszentmihalyi's (1988) description of flow states: 'to remain in flow, one must increase the complexity of the activity by developing new skills and taking on new challenges' (p.30), which allows me to say that I regularly experienced flow states at this stage in my improvising - a big step forwards from the insecurity, negative emotions and critical feedback of earlier stages!

Thus, I knew more about studying compositional models, extracting features, building mental representations of musical structure which allowed me to generate all manner of stylistic improvisations. And with these new skills came new horizons, new ambitions: I worked now with an awareness of public performance, what had previously been a dream was now a real possibility. Having watched expert improvisers in Stuttgart I had a more concrete impression of the skills used and the kind of mental and behavioural approach of experts towards the task; I felt my own skills were on a path towards this kind of expertise if I continued developing. I was no longer searching for basic underlying structures, rules such as those of Fux which had been so important in helping to make sense of the environment of improvising in earlier stages of learning. Now I wanted to fine-tune the concepts$_1$ I used, to gain greater fluency and expressive control over the music through my productions; in particular I wanted to bring my improvising towards the complete forms and structures of public performance, to be able to improvise a whole Prelude and Fugue or Chorale Variations without stopping. These new challenges and directions in my learning form the basis of the following chapters.

6.5 Themes emerging from Chapter 6 (months 16-30)

1. **Generative, conceptual$_1$ improvisation**: describes an ability to improvise creatively and imaginatively within stylistic constraints. Stylistic principles and characteristic features are selected and conceptually$_1$ represented.

2. **Learning within a community of practice**: involving socially-transmitted codes of behaviour and knowledge about improvisation; also participation within living traditions of learning and performing.

3. **Learning with an expert improviser**: a pedagogical theme involving the communication of expert knowledge to the student, strategies used to develop skills, knowledge, creative agency and artistic independence.

Chapter 7

Explicit and implicit learning processes: a reflection on learning during months 16-30

7.1 Introduction to Chapter 7

In this chapter I go back in time to reflect on the development of skills and strategies over a period of 18 months. Looking at this development reveals how previous difficulties in establishing conscious control over the task had become more resolved as my strategies incorporated intuitive response and reflex actions which I had formerly experienced as interference. Realising this increasing acceptance of intuitive responses in my work motivated me to investigate the research of implicit, unconscious learning processes and knowledge formation. I discuss the effect of implicit learning on my conscious awareness of improvisation, and reflect on how this relationship was then optimised to develop my skills towards automaticity and performance.

7.2 A growing awareness of implicit, intuitive learning processes

As the lessons with Jürgen drew to a close and I returned to my own private learning I had the opportunity to reflect and take stock of my learning so far. I was now used to practicing a limited number of tasks and models for several hours daily, and because the tasks I attempted were more circumscribed, they became more familiar: for example, I might spend several days working with just one Chorale melody, trying many different harmonisations and simple variations; tiring of this I might focus on Fugal techniques, trying to construct exposition structures out of two or three different themes. This considerably deepened my knowledge of certain techniques and of the musical structures I worked on, as the following journal extracts illustrate:

1. *'Make fugal subject + answer of theme. Question of real or tonal answer..*

2. *Link these to prepare for the theme. Question of timing..*

3. *Theme itself - should be ornamented? Augmented? Question of ending of the phrase..*

These questions cannot be solved by theoretic knowledge alone. A great deal of trial and error is undertaken within the loose limits (guidelines or shortcuts) of 'rules'. It's necessary to practice certain transformations, i.e., the conversion of themes into fugue subjects and answers. But at the same time, I need to develop a sense of what is appropriate - how do I move, plan my attention, to gain a feel for the task' (Personal notes, 18th June, 2018)

The extract indicated a considerably more advanced and detailed awareness of fugal structure than formerly, as could be seen when I compared notes with a similar practice session over a year earlier: 'Improvising on Martini fugue subject. Difficulties: the usual! constructing voices; remembering the fugue theme transitions [between each voice entrance] are difficult' (Personal notes, 2nd February, 2017). My knowledge of structure was now much more detailed, making the task better defined: whereas before I tried to match the task with my theoretical knowledge of a fugal exposition, bringing in the theme in four voices sequentially, I now noted whether the theme was 'tonal' or 'real' (a factor influencing the construction of the answer) and focused on the relationship *between* the voices, creating the music which links one voice to another throughout the exposition. This more detailed perception of the task might not be so surprising however given the many hours of study I'd spent on Fugal improvisation during that year. What I think is more interesting is to note the reference to more intuitive, imaginative skills: … 'going beyond theoretical knowledge' to 'develop a sense of what is appropriate'. It is these implicit, unconscious learning processes

which I want to discuss in this chapter, and the increasing role that they played in my learning experience.

Another extract indicates a similar situation in which the improvisation was taken over (one might also say hijacked to recall Goleman's [1997] description of 'neural hijacking') by intuitive, imaginative processes, guiding my actions towards a different improvising experience to that I had planned:

> *'Is this a passing phase? In some ways I expect so, as everything seems to pass to some extent. A couple of days ago I went into a 'playing fast' phase - like I found my fingers for the first time. Jürgen had already mentioned the importance of 'keeping going' when improvising a fugue, but I'd never been able to do this until recently. Strange, that after all those months of reticence and hesitation, suddenly I felt the need to move regardless of the consequences.*

> *With the need to move, I had to place the burden of work on the fingers. I think I discovered the use of unconscious processes, the letting go, which research records. But these descriptions were merely by-products of the experience: for me, the important conscious self-instruction was to go with the fingers - let them decide rather than me. A strange split-sensation of divided control' (Personal notes, 29th June, 2017)*

In this instance I experienced a sudden urge to play fluently, automatically, without trying to consciously construct or control the improvising. As a result I had a different sensation of improvising: of going 'with the fingers' as if the brains behind the improvisation were now in my hands. This raised the issue in my mind of 'divided control' as it felt as if, by going with the fingers, I was not in control anymore over the direction of the improvising. Rather, I had a 'strange split-sensation of divided control': I knew that it was my fingers

which operated through my will, my body, yet the rush of events which I had instigated by improvising fluently, i.e., without conscious control, created a dichotomous situation. It was my improvising yet it was my fingers, not me which executed it! Like the young wizard in 'The Sorcerer's Apprentice' I was aware of unleashing forces over which I had no direct control. What did this mean? To clarify this question I want to return to an earlier perspective of learning in which implicit learning processes were experienced simply as a choice between two approaches to improvising: controlled or automatic.

7.3 Controlled vs. implicit learning

Since the start of my study I had experienced limitations to the control I had over the task. This had been a source of conflict and frustration at first as nothing ever seemed to go exactly as I planned. I made a strategy for a practice session, or a plan for an improvisation, but found, as soon as I started playing, that other forces seemed to take over. My fingers reacted in ways I couldn't directly control, steering the music in unexpected directions; my understanding and impressions of the task were so different to those I had anticipated that my careful strategies and plans had to be put away while I tried to make sense of the novel experience (see Chap.4.1). The only solution to this dilemma seemed to be either to go very slowly (controlling and planning each note), or let my fingers wander around producing music through kinaesthetic sensation, as I noted on 2nd January, 2016:: ... '*a sense of choice between two directions, two strategies. These two different approaches produced very different improvising experiences. Knowing which direction to choose was often difficult*'.

As I progressed in my learning this choice of strategy between kinaesthetic (flowing, not pausing) or controlled presented itself on a daily basis. Partly because of my training and experience in interpretive performance (perhaps also because of my analytic interest as researcher) I tended to prioritise conscious learning as it allowed me to be accurate in my

performance and be more aware of what I was doing. As Schneider & Fisk (1982) assert: 'Controlled processes develop automatic processes, maintain enabling conditions, maintain critical time decaying information, and are used in problem solving' (p.16). Thus, to better integrate rules and study connections between my thoughts and actions I used a controlled approach; occasionally, though I would break out into less restrained, fluent improvising which, as I have described, produced a very different improvising experience. My habitual prioritisation of conscious construction and the fact that fluency provided such a different experience often disturbed me however. What if I was not learning sufficiently through my conscious approach? Interestingly, this problem was reflected rather than resolved by the treatises of improvisation I studied, for while Dupré (1975) suggests 'it is necessary to work very slowly … strictly and methodically' (p.iii), learning through accuracy and observation, Whitmer (2012) urges the student to 'strive for a rough go-ahead energy' learning instead through a sense of forward motion which ignores errors.

Clearly, the two different approaches produced two kinds of knowledge, but which was the most important? Did each approach lead one by a different route to the same goal? Or was it possible that I would forever be limited to only one level of insights? My inclination was towards the latter belief as I doubted that the conscious, careful approach would automatically lead to performance as Dupré suggested: at some point I suspected I would have to leave my comfort zone and 'let go' in order to learn how to mobilise what I had learnt. This belief was supported by my awareness of research into language learning (i.e., Sharwood-Smith, 1994; Paradis, 1994) which clearly proposed two different environments (the classroom in which rules could be conscious studied and absorbed, and real-life settings for communicative performance) in order to produce a complete pedagogy, also the skill learning research of Schneider & Fisk (1982) which specifically described the necessity of letting go of conscious control and the difficulties some individuals have in

doing this: 'performers must learn to allow automatic productions to be executed without direct control … on a number of occasions we have found subjects who were not willing to let go of their attentional resources' (p.11). I have already described my own difficulties in letting go as I tackled the exercises of Whitmer (2012 (see Chap.5.2.2) and felt overwhelmed by the experience of performing so many errors.

7.4 Integrating implicit learning with conscious awareness

My lessons with Jürgen had helped me to overcome a tendency to caution and hesitation. As I had hoped, the discipline of the lessons in which I was constantly required to perform whole structures 'warts and all' had accustomed me to the process of leaving my comfort zone and I felt able to use both conscious and kinaesthetic approaches in my practice sessions. However, looking back through my improvising journal I noticed other factors which contributed to a growing use of automaticity in my improvising: this was mainly in the clarity and relevance of the rules I used for conscious construction which, under Jürgen's guidance had resulted in the *generative* stylistic improvisation described in the previous chapter. My mental representations of improvisation now represented these rules in ways which allowed me to improvise imaginatively without hesitation; I was more sure of myself and thus more willing to let go. In this way - through clarifying the rules and linking them conceptually$_1$ to the underlying features and characteristics of the models - I found I was gaining more experience of forward movement in my improvising and taking more opportunities to play without stopping and calculating. Thus, almost without realising, the dichotomy between controlled and automatic approaches had softened and resolved as the following extract from my journal illustrates:

> *'A constraint should be manageable in the sense that one can obey the rule without*
>
> *losing all fluency. Sometimes one needs to relax the constraint and take an*

'opportunistic' approach ... This means that one simply follows the fingers, and looks for opportunities to introduce the rule whenever possible' (Personal notes, 3rd July 2017)

As this extract shows, there was both conscious control through the presence of a rule or rules, yet these were only calculated from time to time in a way which did not disturb the flow of the improvising. Around the rules (which served as a loose guide to keep the improvisation within stylistic boundaries) I allowed more fluent productions to flow so that I 'followed my fingers' and was guided by kinaesthetic sensations. This brings me back to the same point I made earlier (para.7.2) in which I noticed that my practice - through a strategic blend of controlled and automatic productions - invoked implicit knowledge over which I had no direct or conscious control. That is, while I might use a declarative rule (as a reference to the style), I could also let go and allow more free, sensed actions to guide my actions in an unplanned way. This process of letting go also stimulated my musical imagination so that, by running with the fingers I allowed ideas to emerge in my awareness of the task: ideas which I perceived as pathways through the texture, possibilities of action and directions to go on which I could intuitively decide in the moment. Thus I divided my control over the improvisation between a few conscious rules and semi-autonomous sensations of movement and musical imagination which emerged in the moment-to-moment experience of improvisation.

7.5 Practice strategies which integrated explicit and implicit learning

7.5.1 Speaking aloud

The following paragraphs describe an example of this type of conscious strategy for invoking my unconscious or implicit knowledge. In March, 2018 (month 25 of my study),

while improvising around a given melody as a cantus firmus[15] I had the idea to speak aloud the degrees of the scale - that is, to name the notes of the cantus firmus by the degree of the scale that they represent - while simultaneously improvising the surrounding harmony. This action had a startling effect of *cueing* a sense of harmonic context as this extract describes:

> *'... I notice that it [speaking aloud the degrees of the scale] orientated me to the tonic (obviously as one names the relationship directly to the tonic). This also cued other associations and progressions. For example, if one names the 4th degree then one automatically recalls functions in which the subdominant plays a part, for example IV-V-I cadence. But in addition, the choices of chords related to the 4th degree are somehow known. The knowledge was stored in my mind, so this is a good way in capitalising and releasing/expressing this knowledge' (personal notes, 16th March, 2018)*

Thus the effect of speaking the relationship of the note to the tonic triggered and made available implicit knowledge which connected each note of the cantus firmus to its harmonic context. The effect of this kind of knowledge was to produce a cognitive 'map of the terrain'. I sensed or knew which chord(s) would be appropriate, and I had an impression of where to go to perform the harmony with my fingers: it linked my actions to the chords as objects within an internal space. Clearly this was a very different kind of experience to consciously working out a harmonisation or blindly experimenting with different chords. My (conscious) strategy of speaking had therefore triggered a particular knowledge which I needed to perform more fluently; a strange concept in which one activates knowledge which belongs to oneself yet seemingly emerges outside of one's direct control!

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[15] The use of a given melody as a cantus firmus relates to the musical models of the Renaissance era and, in my particular study, to the exercises in strict counterpoint of Joseph Fux. The melody is written out in semibreves and an accompaniment improvised in various rhythmic patterns around the melody.

I now applied the mapping-through-speaking technique to my harmonisation of Fugue subjects, specifically those of Dietrich Buxtehude (1637-1707), which circle around the tonic and dominant, often requiring subtle harmonisations which are difficult to perceive. This strategy is illustrated in Figures 20 and 20(a):

Figure 20. Annotated Fugue subject (BuxWV156) of Buxtehude (1637-1707) in F major: thus F = 1, G = 2, A = 3, etc. Where the answer modulates to the dominant, C = 1, D = 2 etc.

Figure 20a. Annotated Fugue subject (BuxWV166) in C major. C = 1, D = 2; when the answer modulates to the dominant, G = 1, A = 2, etc.

Again, the effect of speaking aloud the relationship of each note of the Fugue theme towards the tonic was to cue relevant harmonic information. I immediately 'knew' which chords or harmonies I could go to as they were now presented before me in an imaginary internal space. My perception of the themes changed with this new harmonic context; I no longer saw the subject and answer as detached objects, melodic lines needing accompaniment, but as harmonically-rich phrases which flowed between the two poles of tonic and dominant. In this way I mobilised implicit knowledge which informed my actions

and encouraged me to improvise more fluently, because I felt able to direct my actions towards the harmonies presented in the imaginary space without hesitation.

7.5.2 Allowing knowledge to emerge

The previous paragraphs illustrate how, by following a sudden intuition (to speak aloud the notes of a Fugue subject in relation to the degrees of a scale) I both triggered insights and then used these insights to develop my skills in harmonising a Fugue subject. Not all my insights were so dramatic however, and on another, earlier occasion, I recorded a more gradual impression of emerging knowledge:

'It [the task] changes from something unknown to something known (when I know something it takes a recognisable shape in my mind - the shape itself is not important(?), it's the recognition which is the important element), from something not felt- an idea or a theory in words or a diagram - to something felt, which is more kinaesthetic, more 'in the fingers'. As I progress, more solutions - related to larger structures emerge' (personal notes 21st May, 2017).

What happened in this event was that I became objectively aware of knowledge emerging in my consciousness as I was improvising. I was trying to construct an accompaniment over a theme in the bass, and the accompaniment was supposed to be a chain of suspensions (dissonant intervals resolving to consonant). I began the session with only a theoretical knowledge of the task, meaning that I knew the kinds of dissonant-consonant intervals I would have to construct, but, when I started improvising I wasn't sure what moves to make to realise my theoretical knowledge as a musical passage. However, after some experimenting with different kinds of musical material, different tempi and figurations, a solution emerged which I 'recognised' as the procedural knowledge I needed, this knowledge taking a kinaesthetic form in my imagination. The event was significant because, from this

point onwards, I had a different perspective of my daily practice as a learning process. Although I often sat down at the organ without knowing what I should do, I realised that through practising I usually arrived at the knowledge I required. I thus became more patient and respectful towards the *process* of practising, and less inclined to assess my abilities as 'not knowing' but rather as 'emerging knowing' through my practising strategies.

7.5.3 Triggering implicit knowledge

Similarly, on 7th August 2017, I recorded an incident where, through a particular practice strategy of repetition over a limited amount of musical material, I triggered insights into the task; these insights provided new focal points for my attention and information on which I could further develop the task.

'My altered strategies were then:

1. To stay with these models until new insights emerge.

2. To repeat fluently smaller sections until the contrapuntal relationships had been understood and practiced correctly.

Through the exercise of these strategies I began to perceive new musical elements in the models: how the music moved from harmonic point to point. These harmonies, which proceeded in the form of a slow procession through the piece, provided the stability of a structure from which all the figurations could momentarily depart and decorate.

My awareness of harmonic 'points' informed my improvising, which now focused on driving to the next point, and establishing such a point in my fingers and perception' *(personal notes, 7th August, 2017).*

In this incident I received new impressions of the underlying harmonic structure of a free Prelude. It is interesting that, as I started the session I had tried to impose a more fluent way of practising, avoiding pausing for conscious calculation or error correction (for example, as Whitmer [2012] advocates), yet by simply forcing myself to go forwards without correction I had obscured my perception of events and simply improvised without direction or control: as my emotions worsened I became convinced of the futility of the strategy. However, through slightly altering the constraints and limiting the material to a few phrases, I had managed to benefit from the fluency which now allowed me to perceive harmonic movements extending over larger sections of the structure. In this way, I was learning not only to manipulate my conscious control over my improvising to also permit kinaesthetic, fluent productions to be integrated; but this blend of conscious-automatic improvising was also supported and integrated with processes of implicit learning which ran parallel to the more conscious experience, emerging from time to time as insightful events.

7.5.4 Summary of practice strategies: meta-cognitive learning

One way of understanding my growing integration of implicit learning processes into my practice is through the idea of *meta-cognitive learning*. As Brown & DeLoache (1988) describe: 'the basic skills of metacognition include *predicting* the consequences of an action or event, *checking* the results of one's own actions (did it work?), *monitoring* one's ongoing activity (how am I doing?), *reality testing* (does this make sense?), and a variety of other behaviours for *coordinating* and *controlling* deliberate attempts to learn and solve problems.' (p.282). The foregoing extracts from my journal give examples of these meta-learning skills and illustrate how far I had travelled from the simple perception-reaction learning of earlier stages; though, earlier stages in achieving this level of objectivity can also be seen in Chapter 2 (when I had overcome the barriers of negative emotions and was better able to *monitor* and

check my improvising) and in Chapter 3 (the acquisition of *generative principles* which allowed me to *coordinate* and *control* problems of stylistic improvisation. What was occurring now in my practice was that I became more consciously aware of my intuitions (an idea to do a certain task or follow a particular strategy such as using figured bass notation, or speaking aloud), following these to see where they lead, noticing the emergence of new perspectives, insights as information on which to develop further strategies. In addition I engaged in *reality testing* as I realised my practice skills and strategies went beyond my conscious experience in controlling the musical texture and tried to understand what was going on through a different framework - that of implicit learning. Of course I was considerably helped by the discipline of the research methodology: such fleeting, momentary impressions might have been forgotten had I not written them out in my journal and thus reflected on their source; and by so doing, my interest in my learning extended from a study of the practice strategies themselves (which incorporated implicitly learnt information into my improvising) to the source of implicit ideas themselves. What stimulated my implicit knowledge, how was it formed, what role did it play in my development as an improviser?

7.6 Reflection and discussion of implicit learning

7.6.1 Perspectives from literature

It was my position as researcher which now led me to investigate literature into implicit learning as I sought to understand the nature of this hidden stream of information I was learning to control and accept into my improvising; and which continually manifested itself in new perceptions, intuitions (to act or adopt strategies) and insights into the task.

7.6.1.1 Are we governed by implicit processes of learning?

Schachter (1992) noted the ability of patients with various memory disorders and brain dysfunctions to acquire knowledge about stimuli of which they had no conscious recollection. For example, in the condition known as 'blindsight', patients with lesions in the visual (striate) cortex were able to respond to stimuli of which they have no conscious knowledge; in another instance, amnesic patients were able to learn 'an artificial grammar and a complex spatio-temporal sequence' (p.11,114) again without any conscious memory of the experience. Such instances of non-conscious (implicit) learning are, according to Schachter, 'characteristic of normal cognitive function and ... not some sort of exotic curiosity that occurs only in pathological conditions' (1992, p.11,115); they illustrate how humans regularly acquire information without conscious awareness of the learning process, or of its influence on their behaviour. Reber (1993) makes the common observation that children learn a great deal about their 'physical, social, cultural and linguistic environments' without conscious awareness, but then extends the concept of implicit learning to assert that our general behaviour and everyday decision making is influenced more by implicit factors than by conscious, rational judgement:

> 'people appear to be, generally speaking, *arational*. ... The important insight was that, when people were observed making choices and solving problems of interesting complexity, the rational and the logical elements were often missing. It was not so much that decisions were being made that were irrational, it was rather that decisions were being made on the basis of processes that simply failed to take into consideration rational elements. ... people often did not seem to know what they knew nor what information it was that they had based their problem solving or decision making on' (p.13).

The conclusions of this research were that, while different kinds of learning (i.e., explicit and implicit) could be understood to occur in parallel, each producing a different kind of knowledge, there were more limitations to one's conscious contribution towards knowledge acquisition than was generally assumed, and there was much of the learning experience over which I could not have direct control. I have several times reported on the conflict between my conscious aims for improvisation and the reality of the actual improvising experience; I now found a description of this conflict in Schachter (1992) who remarks that "implicit knowledge is often expressed unintentionally and tapped indirectly' (p.1113). According to such studies, information could not only be acquired without conscious awareness, but could also influence behaviour in ways that individuals were themselves hardly aware of. This lesser role of consciousness in the learning process leads Reber (1993) to suggest that, although conscious awareness is a powerful component of the human experience, we should question our ability to understand the complete processes of learning and perception purely through our conscious knowledge:

> 'Consciousness, in my view, should be treated as a kind of biological metaphor, a "psychological" abstraction for an underlying complex of physiological and neurological actions, not unlike the way in which we have long treated similar abstractions like *mind, image*, or even *ego*. The question of whether it makes sense to construct theories based on the presumed "reality" of mental events or whether this exercise is simply "something to do till the physiologists get here" is really a question of pragmatics' (p.86).

7.6.1.2 Biological theories of (un)consciousness

In addition to the literature of implicit learning, I also explored the writings of Gerald Edelman (i.e., 1989, 1992). Centred around his Theory of Neuronal Group Selection

(TNGS), Edelman describes neurobiological processes underlying perception and learning in terms of 'reentrant signalling', a type of semi-autonomous communication occurring in real time between multiple sensory, emotional and motor brain regions:

> … 'reentry is a process of temporally ongoing parallel signalling between separate maps [established synaptic pathways] along ordered anatomical connections. Generally, such connections are reciprocal and more or less in register. But triangle reentry can occur among three maps or more, and connections between any pair of these maps can be divergent or convergent. Reentry can be continuous or phasic and can behave recursively. It is not simply feedback however, because in any chunk of time, it involves parallel sampling from a geometric range of spatially extended maps made up of neuronal groups. (Edelman, 1989, p.65)

From Edelman's writings I came to understand that unconscious, implicit learning processes reflected neural activity which continually and semi-autonomously organised and integrated experience - a 'bootstrapping' process of gradual synaptic strengthening and selection in response to conscious goals; and an automatic integration of new experience within existing knowledge structures and memory. That, although it was a naturally-occurring property of the brain to identify and categorise features and objects within a stimulus, the definitions of the categories themselves were not pre-programmed, but formed through goal-directed actions of 'a moving organism actively sampling its environment' (1989, p.54). In this way, Edelman united conscious and non-conscious learning within an adaptive, ecological framework which he terms 'Neural Darwinism': '[which] explains in neural terms the processes of perceptual categorisation, generalisation, and memory, and it shows how their interactions can mediate the continually changing relations between experience and novelty that lead to learning' (1989, p.43)

So what of consciousness and the role of conscious awareness in this seemingly implicitly-dominated learning theory? Interestingly, Edelman (1989) does not marginalise the role of consciousness in learning and experience as much as other authors. Recognising the late arrival of brain structures such as frontal, parietal, temporal lobes (on which consciousness depends) in the evolutionary time frame, and the fact that these structures are built on and around older, implicit brain structures responsible for primary consciousness, Edelman is able to define qualities of consciousness which give insights into the conscious experience of learning. Thus, it is only through conscious awareness that we can be free from the present - 'the external drive of current behaviour' (1989, p.186) to develop a long-term memory with a sense of the past and a notion of oneself which is time independent. However, the very sophistication of higher-order consciousness which is able to perceive and interpret present events according to these more stable reference points (the self and the past) means that consciousness is necessarily a model of experience: 'consciousness shows intentionality: it is of or about things or events. It is also to some extent bound up with volition. ... But it is *not* a simple copy of experience (a "mirror of reality"), nor is it necessary for a good deal of behaviour' (1989, p.112).

Because of this complex interaction between multiple brain areas giving rise to conscious awareness, Edelman (1989), in a similar way to Schacter (1992) is able to describe many diseases of consciousness leading to severe discrepancies between individual's conscious awareness, memory and processing of events. Yet this should not lead us to underestimate the role of conscious awareness in learning. Although consciousness might be a powerful symbolic interpreter of experience, the freedom from the present sense stream and a highly-developed sense of self, independent of time, allows the individual to develop memory structures such as goals, aims and ambitions which remain stable, i.e., also independent from the present sense stream. This is particularly important for learning as,

through attention, we can select (from a multiplicity of potential) actions in relation to our goals. As Edelman (1989) describes: 'attention has come to be regarded as the outcome of a group of mechanisms needed to cope with a variety of selection problems in the control of action. Such views are concerned with how skills can be related to output systems and with how particular constraints are exercised in determining any action that ensues in the light of a goal taken prior' (p.198).

Through these writings I now gained a picture of the role of consciousness, through attentional mechanisms, effectively leading or guiding (remotely or symbolically rather than directly) implicit, non-conscious processes of knowledge formation, perception and learning. While my conscious perception of events could be understood as an interpretation of these background processes, i.e., '*not* a simple copy of experience' as Edelman (1989, p.112) asserts, nonetheless, there could be perceived a close partnership between the two, linked most strongly through conscious goals, in my case, the musical and personal goals which had motivated the study and initiated the learning process.

7.6.2 Conscious experience of implicit learning: cognitive 'events' and 'Aha!' moments

These descriptions of the relationship between conscious and unconscious, explicit and implicit were challenging to my preconceptions of learning, and motivated me to reflect more deeply on my experience of learning so far. Going back through my written notes of improvising sessions, I noticed that many of the entries described seemingly unexpected events; moments of sudden insights, meaningful cognitive events or "Aha!" moments during which I suddenly understood something new about the task, or about the possibilities of action. All of these 'cognitive events' I transferred into a table copying my text verbatim into

one column, my interpretation of the 'event' in another, and a description of the significance and effect of the event on my learning progress (see Appendix C)

7.6.2.1 The role of attentional focus in implicit learning

Looking at this table of events, I noticed that it was rare indeed for any of my improvising sessions to occur in a way which I had anticipated. What I reported was inherently unexpected; afterwards I wrote down what had happened, tried to understand it, describe it, process it, but these were conscious reactions to an implicitly-guided experience. As predicted by the findings of research outlined above, all of these events could be interpreted in terms of attentional focus: moments when separate elements of the stimuli suddenly seemed connected or reorganised in a new way; or when one element became distinct from surrounding features, claiming my focus of attention for a short period of time. For example, on 13th February 2016 I suddenly became aware of the sound characteristics of different organ registrations, realising that: 'it's possible to change one's attentional focus, for example, to concentrate on sound/timbre rather than structure'; on 19th January 2017 I experienced a new feeling of control over 4-part textures, as I suddenly 'saw' each voice in a different way - as a separate element over which I could exercise control. As these unexpected events brought new features of the task more distinctly into my perception, so I responded by using this new attentional focus to generate the music and to gain insights from a novel perspective of events.

It's interesting then to note Edelman's (1989) comments regarding 'systems of attention … how they vary before and after the acquisition of motor or cognitive skills' (p.201). What I experienced was a sequence of events in which (i) certain elements suddenly emerged in my perception in such a distinct way; this (ii) motivated me to focus on different aspects of the task in turn, controlling and manipulating them to gain a different kind of

improvising experience. For a while, these elements were the main focus of my work, defining the task and leading my development; then (iii) after a brief period (usually one or two days) they once again became part of the background texture as my attention was claimed by new features. Yet, although the salience of such features subsided, my perception of the musical texture was never the same, but always remained informed by this sequence of events and the new information I had generated. Thus, my learning path as illuminated through these cognitive events can be seen to be a succession of many different attentional perspectives, allowing me to understand the interior workings of a complex musical stimulus in a kind of linear sequence. From this sequential understanding of separate musical elements, actions could be organised and ultimately connected to form more general, conceptual$_1$ and fluent productions.

7.6.2.2 Emerging, new perspectives of the task

Therefore, as a result of these 'cognitive events', I found I afterwards understood something new about improvisation and about the learning process. For example, on 22nd May 2017 I noticed that I could hold a clear representation of musical structure in my mind, working on aspects of this improvisation without losing my sense of place:

> '*a changing landscape. As I start to routinely practise the [Chorale] variations, my work becomes more 'mapped' - I can (as it were) erect scaffolding on a structure, or pause and resume work in various mental locations.*

A similar development of perspective of musical structure occurred on 12th July 2017 when I suddenly received a sensation of locating musical 'objects' within an imaginary space:

> '*I suddenly found myself aware of the whole shape - that is, I could see the whole piece before me, like a landscape - and this vision had never before been possible, in*

spite of many attempts to imagine it. Note, that the landscape image had no details,
and contained no information as to what I might play. The image was simply
available as a focus of attention, so that I might be aware of the narrative, or Form of
what I was improvising; instead of stringing together, or constructing material
according to various ideas held in my head, I was aware of my place in the overall
scheme of things, while I was improvising.'

Other events were seemingly related to my research studies as I investigated and reflected on the literature and culture of improvisation. Thus, as I read theories of emotion I became more objectively aware of my own emotions while improvising and the effect of critical feedback on the learning process: 'I wince away from errors as if burnt. Thinking is restricted' (29th February, 2016); while Goehr's (1994) description of the *Werktreue* ethic and its effect on classical musicians' perception of musical structure is (I believe) reflected in a new acceptance of many possible variants of a musical idea: 'I don't seek *the* solution, but *a* solution (24th March 2017). In this sense the events related to literature reveal a slightly different relationship between explicit and implicit knowledge to the more unexpected insights I had of mental representations of the task. Whereas the events of mental representation - the sudden 'seeing' of musical structure as a landscape for example, might be understood as self-willed, I could never have imagined such an insight: it emerged in my experience as entirely novel and unexpected as a gift! Events related to literature on the other hand seemed to capture moments of transference, when theoretical knowledge became procedural, integrated into the lived experience or environment of improvisation, influencing my decision making and cognitive processing of the task.

7.6.2.3 Awareness of developing skills

Lastly, there were many events which, though unexpected in themselves, reflected long-term developments of skills of which I was continuously (and consciously) preoccupied. For example there are many entries relating to harmonising and the construction of contrapuntal, voice-leading textures. Thus, on 2nd January 2017, I noted that 'each separate element can be executed discreetly - a process by which one 'sees' a solution', referring to an event in which I perceived a way of directing my attention between the two lines of an Invention; this in a way which allowed me to 'see' the relationship between the two parts more clearly. Later that month (19th January, 2017) this sensation is extended to the four-parts of a harmonisation task; this time I'm able not only to 'see' the relationship between the parts but construct each line independently. Emotions and feelings are also involved in these skill-learning events[16] as on 11th March 2017 when I realised:

It is possible to enjoy - know - understand chordal motion. The reason I don't is a question of attention: If I am looking elsewhere, I cannot stop, enjoy/savour the richness, the rich experience of the chord I am playing

Thus, attention, emotions and skills can be seen to be equal partners in these conscious experiences of learning development. Again, on 7th August 2017, it is harmony that provided the subject of an event in which I perceived the underlying structure of the improvisation in terms of harmonic 'points':

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[16] It's interesting that, although I experienced a great deal of frustration and negative learning emotions as a novice, I often recorded more positive feelings of agency, pleasure and satisfaction in my journal. Even when I recorded negative feelings (29th February 2016) these events, through the act of being recorded, provide an opportunity for reflection and objectivity. Feelings of enjoyment (11th March 2017), control (19th January 2017) and agency (28th February 2018) were proudly recorded in my journal; and, as it is natural to enjoy more positive emotions as skills develop and one experiences more rewarding musical results, I notice that often positive feelings often emerged as a result of a successful strategy which allowed me to 'see' the solution to a problem or experience greater control over certain elements of the task.

My awareness of harmonic 'points' informed my improvising, which now focused on driving to the next point, and establishing such a point in my fingers and perception.

As I increasingly perceived the harmonic 'points' of one model, I also began to perceive the harmonic relationships in another, more contrapuntal model. It does not seem to matter whether it is two voices, three voices or four voices, they never depart from this harmonic framework, jumping only from point to point and describing/constructing the harmonies which characterise this style. While I already knew this to be the case, I now saw it with different eyes, and also felt it in a new way, as if it emerged in 3D like a holograph, from the texture of the score.

My representation of harmonic and contrapuntal events thus developed considerably in subtlety and complexity as my skills increased. So, as I practiced the exercises of figured bass and Partimenti scores, absorbed Fux's (1725/1971) rules for contrapuntal motion, and reflected upon Toch's (1977) distinction between (theoretical) chords and expressive, harmonic flow, events occured which integrated these techniques with expressive agency.

7.7 Conclusions for a better understanding of explicit and implicit learning mechanisms while improvising

By studying the literature of implicit learning and also the neurological processes underlying this type of knowledge formation, I gained important insights into my improvising experience. At the outset of my learning I had tended to view the relationship between conscious and unconscious learning as a conflict: I could not get my improvising to align with my conscious expectations and strategies and experienced reflexive actions as interference. Thus I tended to prioritise conscious learning throughout the earlier part of my study as I struggled to bring my improvisation under control. This produced mixed results in my performance: on the one hand I developed clearer conscious mental representations of

musical structure and of the task, ultimately leading to the generative structures used for stylistic improvisation (see Chapter 6), on the other hand I was slow to develop a sense of performance and of larger sections of musical structure, as I realised when I started lessons with Jürgen Essl. Later however, as my skills increased I realised that in spite of the conscious focus in my work, I was steadily incorporating more fluent productions into my practice; and accompanying this fluency were strategies which helped me to let go of my habitual conscious construction. These strategies involved responding more to intuitions and emerging insights which focused my attention in new ways upon the task and helped me to develop skills. Realising that a seemingly autonomous flow of information and knowledge formation was emerging into my conscious awareness in this way I made a table of the principal cognitive 'events' and 'Aha!' moments in my learning (see Appendix C).

Studying these events helped me to understand more clearly the connection between my conscious experience of learning and the background, implicit processes of knowledge formation. However unexpected the 'Aha!' moments of intuitions and insights into the task, they were clearly not random or wholly autonomous. Rather they were closely connected to aspects of the task which intrigued, or perplexed me such as the skills of harmony and counterpoint I practiced, or the dichotomy between conscious calculation or automatic fluency as a learning approach. Clearly then there was a strong connection between my conscious awareness, and the background, implicit processes of knowledge formation; through these momentary cognitive events, I perceived a meeting point of the two different types of learning. My interpretation of the intuitions and insights I experienced while improvising was supported by the literature I encountered. Writers such as Reber (1993) and Schachter (1992) emphasised the dissociation between explicit and implicit learning, which supported earlier, novice impressions of learning - that consciousness did not reflect a whole or true picture of the sense stream. On the other hand, Polanyi (1959) describes a similar

process of emerging perceptions as one first focuses on individual elements of the task, and only perceives a more meaningful relationship with the whole task: 'we cannot comprehend a whole without seeing its parts, but we can see the parts without comprehending the whole. Thus we may advance from a knowledge of the parts to the understanding of the whole … the focus of our attention is shifted from the hitherto uncomprehended particulars to the understanding of their joint meaning' (p.29)

In addition, Edelman's (1989) description of attentional focus as a feature of consciousness, but also as an emerging property of implicit mechanisms, provided a lynchpin or interface between the two disparate forms of learning: on the one hand I was consciously aware of (and could manipulate) my focus of attention towards certain features of the task, on the other hand, this conscious focus could be said to activate implicit learning mechanisms through which I acquired knowledge outside of (in parallel to) conscious awareness. Naturally I paid attention to those features of the task in which I was most interested at any one time (i.e. harmonic and contrapuntal construction, learning emotions, and so on), therefore both my conscious attention and implicit learning mechanisms could be said to be connected to short- and long-term goals of learning the skills of improvisation within a particular musical style. It is this connection between goals and different forms of awareness of improvising that I now explore in the following paragraphs.

7.7.1 A framework for understanding implicit learning and conscious awareness in relation to goals

By introducing aspects of implicit and non-conscious learning, the picture of the learning experience became considerably more rich and complex, for I understood that my perceptions while improvising extended far beyond the extent of conscious awareness and control. In effect my thesis now introduces the full 'intentionality of sensations, perceptions,

acts and representations', as Imberty (2000, p.130) describes, which made up the phenomenal experience; a complexity I had so far avoided in previous chapters through my prioritisation of conscious construction. However, as I have tried to demonstrate throughout this chapter, nonconscious and background processes of learning and response could be understood not as chaotic or interfering with more conscious, calculated responses, but connected, as different types of response to the same environment. One way of organising this rich and multi-faceted improvising experience is by adopting a goal framework in which the behaviour of the individual is classified through different levels of awareness, as Moskowitz (2012) explains: 'One can enact (a) conscious response to address conscious goals, (b) implicit responses to address conscious goals, (c) conscious responses to address implicitly triggered goals, and (d) implicit responses that are in the service of implicitly primed goals' (p.29). Applied to the context of improvisation, these different types of conscious and implicit response are explored in Table 4

Table 4

An interpretation of conscious and implicit behaviour during improvisation in relation to goals, using Moskowitz's (2012) theoretical framework

Type of goal and type of awareness	Examples of this type of experience while learning to improvise.
Conscious response to conscious goals	All conscious and explicit elements of the learning experience. Includes theoretical, declarative knowledge, conscious strategies in relation to known goals. For example:

	· a deliberate and strategic use of theoretical rules and methods, such as Fux's (1725/1971) voice-leading rules, the *règle de l'octave* etc., the analysis of compositional models and use of reduced scores · consciously focusing attention to selected features in the task · adopting a certain attitude or emotional stance while improvising
Implicit response to conscious goals	Intuitive or automatic adjustments in behaviour, emotions, cognitive processing of the task while improvising. For example: · automatically slowing down or trying to consciously control the flow of events to avoid errors in performance · evoking of imaginary, critical peers (as discussed through Beck's [1991] 'automatic thoughts'), (see para.4.1.5) · intuitive use of strategies, musical decision making · physiological reactions (quickened pulse, sweating)
Conscious response to implicit goals	Explicit thoughts and feelings emerging through implicit processes of perception and learning. For example: · Unexpected emotions, and moods, i.e., a feeling of agency, or conversely of timidity. of which one is aware. In this sense the implicit goal might be to avoid embarrassment or humiliation. · Unexpected cognitive approaches and attitudes towards the task, i.e., musical decisions or strategies emerging during improvisation which seem to be in response to long-term (implicit) rather than short-term (conscious) goals. · Unexpected mental representations and new perspectives of the task;

	'Aha!' moments when unconscious (implicit) knowledge becomes available to consciousness (see Table 4) · Emerging skills such as audiation (the ability to 'hear' music in the imagination before playing), or awareness of 'pathways' through the stimulus (i.e. Sudnow, 2001).
Implicit response to implicit goals	The most difficult to describe, these types of responses might never be identified, or only at later stages of learning when their influence became more explicit. For example: Habitual emotional and cognitive processing of the task, i.e., perceptions of musical structure, beliefs about musical creativity and self-beliefs/roles absorbed through training in interpretive performance which shape behaviour without the individual being fully aware. It is also through implicit responses to implicit goals that we might understand an individual's failure to learn, for example by consistently thinking about the task in ways which block their perception of relevant features or their ability to act without conscious calculation (see Ellis [2006] in relation to second language learning). · Background, unconscious processes of perception and learning such as memory chunking or the formation of procedural knowledge which results in fluency and automaticity

Table 4 offers a framework for understanding the complex relationship between my conscious awareness of learning and the background, implicit formation of knowledge which ran, in a sense, parallel to this awareness. Through this framework I understood that my experience of learning encompassed many gradations of conscious awareness, sometimes dramatic as in a revelatory or "Aha" moment, at other times more implicit and intuitive, involving habitual responses, feelings and attitudes which I only recognised later through reflection. Of course there were moments when my awareness of improvising seemed at odds

with one's implicit learning processes, particularly in situations when I wanted to control every note and felt reluctant to 'let go' and allow automatic productions to flow. However, as my learning developed I was acquiring ever more subtle and strategic uses of attentional focus, which allowed me to combine background processes of knowledge formation, intuitive responses to learning situations and automatic productions with my conscious awareness of improvising. This meant that, even when attempting to consciously follow a strictly delineated strategy of learning or performance, I no longer tried to consciously control either the flow of the improvisation or the learning experience; rather, I tried to guide the course of events more loosely, opportunistically; allowing a rule to be introduced here and there as I also permitted automatic and semi-autonomous actions to flow forwards. This open-ended approach to improvising and learning is reflected by Huang & Bargh's (2014): 'even when a person consciously engages in goal pursuit, one is not necessarily controlling (or even aware of) how that goal has transformed one's experience of the world' (p.123); and ultimately this was my position, for I was now more aware of the limits to conscious control, more willing to let go and trust implicit processes to take me (perhaps by unknown paths) to my eventual musical and performance goals. These paths I now trace in the following chapter as I progressed through automatic productions to a new, *semantic* form of control over my improvising which allowed me to perceive whole musical forms and structures.

7.8 Themes emerging from Chapter 7 (months 16-30)

1. **Implicit learning**: unconscious, background processes of knowledge formation and skill acquisition during learning. Conscious awareness of these processes while improvising

2. **Increasing intuition**: an advanced stage of skill learning characterised by increased use of intuitive decision making and strategies (Gobet, 2016).

Chapter 8

Emerging expertise: fluency, schemas and semantic control (months 24-36)

8.1 Introduction to Chapter 8

This chapter charts the final stage in my practical study. I describe increasing fluency and emerging skills in my improvising, a 'letting go' of conscious control to perform more automatically, and (accompanying these changes in performance) different perceptions and processing of the task. Whereas formerly I had constructed the music step-by-step, I now started to plan and control larger sections through increasingly embodied sensations which were less available to consciousness. I therefore looked to literature which helped me to understand the formation of long-term memory structures suitable for expert performance, and my use of these in performance as a form of *semantic* (meaningful) control. The chapter concludes with my preparation and performance of three Baroque-style improvisations for a public recital, which signified the final goal for my learning development as an improviser within this self-study.

8.2 Introducing schemas$_1$ as representing complete musical structures

The more I improvised using the generative techniques I'd learnt with Jürgen (and now developed in my daily practice), the more familiar I became with certain aspects of the task. Features such as figurations, typical harmonic sequences, opening and closing moves, the constructions of inner voices and so on, became more automatised. As it was no longer necessary to think about every aspect of construction, my memories and representations of these events thus lost finer details and became increasingly grouped or chunked in the way that Snyder (2000) explains:

'Chunking is the consolidation of small groups of associated memory elements. Just as a single number is a unit that is distinguished from all others by its unique visual features, the individual items in a chunk become its features. It is as though chunking helps memories to "coagulate" or "solidify". This is especially true with repeated exposure to a particular experience' (p.54)

Through the process of encoding or 'chunking' performance productions into long-term memory, my attention became freed from detailed constructions of the musical texture and I began to perceive instead larger sections and new relationships of musical form. This then brings my thesis to the point of (emerging) expertise where I can discuss the use of mental *schemas*: that is, imaginative representations of complete musical structures and form.

The term *schema* is a rather ubiquitous term in cognitive psychology, used to describe all kinds of mental representations of action and behaviour. Within the context of musical improvisation, the *schema* is identified by Berkowitz (2010) both as ... 'an underlying architecture with various possible surface realisations' (p.105), yet within this overall shape or architecture, smaller patterns and formulae are also described as schemas: ... 'musical schemata, the archetypal patterns which define a style' (p.28). This seems confusing as the *schema* might equally apply to any type of mental representation, yet there is one aspect which is common to both definitions: and that is the *conceptual* nature of the schema. As a conceptual structure, *schemas* represent an abstraction of certain important relationships between features, these relationships then being used to form a new mental structure for guiding behaviour. It is the conceptual, non-literal and embodied construction of a *schema* which the philosopher Kant (1781/1998) stressed when he discusses the ability to recognise all three-sided shapes as triangles: 'In fact it is not images of objects but schemata that ground our pure sensible concepts. No image of a triangle would ever be adequate to the

concept of it. For it would not attain the generality of the concept, which makes this valid for all triangles ...'(p.273).

8.2.1 Disambiguation of concepts$_1$ categories$_1$ and schemas$_1$

The preceding paragraph illustrates some of the wide usage of terms such as *schemas*, and *concepts* throughout psychological literature. Throughout my thesis, however, I reserved the terms *categories, concepts* and *schema* for very specific types of mental representations of musical structure which emerged at different stages of my learning experience. As a general principle to distinguish mental representations which are created through the experience of improvisation, I use the subscript$_1$. Thus, Categories$_1$ signifies certain individual elements and features of the task becoming more recognisable, familiar and meaningful. The term Concepts$_1$, however, describes a more advanced and imaginative cognitive engagement with the task: namely, the perception of important underlying relationships in musical textures which provided insights into musical construction and decision making. Again, although the act of categorisation or conceptualisation involves musical 'objects' such as cadences, chords and so on, it is important not to confuse these things with their theoretical meanings. Before I began to improvise I was aware of cadences and their usage for completing sections of music; yet this theoretical knowledge did not prepare me for constructing my own cadences within the context of improvisation. The concept$_1$ I developed for certain cadences arose out of many actions of improvising musical sections; formulae which I later categorised$_1$ and recognised as 'my old friend' the cadence.

The introduction of Kant's (1781/1998) *schema*, in which he reflects on the lived experience of perceiving many and various three-sided shapes as triangles, is relevant to my thesis at this time, because it corresponds to my growing awareness of larger forms of musical structure. Kant describes a kind of implicit knowledge of the triangle, which is not

passive, being imaginatively constructed by the individual; conceptual in nature and usage, but also embodied in sensation. This captures so well my emergent sense of musical architecture, that I prefer to reserve the term schema$_1$ (with the subscript$_1$) for the perception of complete representations and awareness of musical structure.

Thus there is a sequence to my terminology which corresponds to the different perceptions I had of the task at different stages of skill learning. These are now summarised:

Table 5

Disambiguation of terms: categories$_1$, concepts$_1$, generative mental representations of musical structure and features, and schemas$_1$.

Term The subscript$_1$ links the perception procedurally to the experience of improvisation	**Cognitive actions involved**
Categories$_1$	A meaningful perception of individual features in the stimulus, associated with a feeling of familiarity. The result of naming or recognising features.
Concepts$_1$	The perception of meaningful relationships between musical features. An act of imaginative construction in which the improviser perceives the environment through the concept$_1$.
Generative mental representation of musical style, features, and structure	A grouping together of concepts$_1$ relevant to stylistic rules or generic features. A generative mental representation of improvisation is therefore also conceptual$_1$, allowing the improviser to generate whole phrases and sections of imaginative improvisation within stylistic boundaries.

Schemas$_1$	A more implicit mental representation of larger-scale or complete musical structures serving to guide the use of concepts$_1$ and other generative mental representations of the improvisation

8.3 The path towards schemas$_1$

In the following paragraphs I completed the final months of my practical and artistic study. During this time I prepared three improvisations for a public recital and therefore brought my work to a new level in which whole, coherent musical forms were improvised without stopping. Not surprisingly, the act of improvising whole forms rather than short passages and excerpts changed my perception of events. I had to acquire new skills in controlling events within a longer time frame, and the exercise of these skills resulted in new perceptions and mental representations for which I reserve the term schema$_1$. My use and experience of schemas$_1$ in accessing long-term memory and organising actions in relation to whole musical forms is now described.

8.3.1 Chunking of memory and actions

As already mentioned, through consistent daily practice of a limited number of musical tasks, and a more stable (conceptual$_1$) representation of musical structure and salient features, my cognitive processing of these tasks was changing rapidly, becoming more streamlined and fluent. Constructing a four-part, voice-leading cadence, or harmonic sequence, even the opening sections of selected Fugue subjects were tasks which before had been complex and effortful, yet now could be performed fluently without thinking about details, such as each line in the texture or the spacing of each chord (a common feature of the skill learning experience, illustrated in the way one ties a shoelace, or rides a bicycle in a series of increasingly coordinated movements.) As certain features became increasingly

superfluous or redundant to my construction of the task, so did my mental representation of events become more grouped or chunked; and this was reflected in my cognitive approach: I no longer planned each movement in a passage but recalled a whole sequence of movements through one salient property or feature, a type of memory access described by Anderson (1982) when he states that 'a partial pattern specification can be matched more rapidly than the full specification' (p.53).

This new, fluent approach necessarily altered the focus of my attention while improvising: rather than imagining a single phrase of music or sequence of harmonic movements, I now aimed for several phrases - paragraphs and short sections, performing these without stopping to reflect. Sometimes I even improvised a complete structure such as a short Prelude, a Fugal exposition or Chorale Variation without pausing. Yet this new fluency, welcome though it was, was also accompanied by anxiety, for it often felt that my hands ran away from me. Novel skills had emerged so suddenly that they seemed disconnected from my previous improvising, as the experience of automised productions was very different to the conscious strategies I had habitually used. This stage in my development thus felt like a leap forward as much of my knowledge became more fluent and autonomous.

8.3.2 The problem of control over automatic productions

Cues, in whatever form of encoding or mental representation used by the improviser, retrieve or access procedural knowledge, i.e., ways of acting upon the stimulus, and thus, they are highly connected to the problem of next steps, or decision making in real time. This is due to the nature of procedural knowledge, which is primarily linear, as Hiebert & Lefevre (1986) state: 'A key feature of procedures is that they are executed in a predetermined linear sequence. It is the clearly sequential nature of procedures that probably sets them apart from other forms of knowledge' (p.6). Yet, this connection between the cue and procedural

knowledge, though theoretically simple, is more complex from the learner's perspective: for, throughout the various stages of learning (illustrated through the phenomenon of chunking), there occurs a constant regrouping of the stimulus or task. New perception-action couplings are absorbed into new concepts$_1$, and these generalise upon many of the old concepts$_1$ which are now hidden from view. Another way of understanding this reordering of knowledge for performance is that productions can be hierarchically associated or embedded, so that, once one element of the hierarchy is triggered, other linked productions are automatically performed in sequence. Hiebert & Lefevre (1986) clarify this structure in terms of sub-procedures and super-procedures:

> 'An important feature of the procedural system is that it is structured. Procedures are hierarchically arranged so that some procedures are embedded in others as sub-procedures. An entire sequence of step-by-step prescriptions or sub-procedures can be characterised as a super-procedure. The advantage of creating super-procedures is that all subprocedures in a sequence can be accessed by retrieving a single super-procedure … The subprocedures are accessed as a sequential string once the super-procedure is identified' (p.7).

Understanding the hierarchical structure of production knowledge helps to understand (i) how a great deal of information can be encoded within action sequences, and (ii) how these action sequences can then be performed fluently and automatically. Codes of representation such as images, strings and propositions which previously were useful in defining the separate elements involved are now bypassed; and it was this bypassing of familiar cues and information that I found initially disorientating. I needed new information, new mental representations of awareness and control more suited to the fast cueing of automatic productions in which knowledge which I only implicitly sensed; and to the

organisation of larger sections of musical structure which I was now beginning to perceive when I improvised.

8.3.3 Metaphoric, embodied representation of automatic productions

Looking to research for guidance I discovered an eloquent and perceptive explanation of less conscious control over action through the idea of *metaphoric representation*, a particular kind of embodied experience as described by Johnson (1987):

'... let us consider a very simple, but pervasive, metaphorical understanding: MORE IS UP. The propositional expression "more is up" is a somewhat misleading shorthand way of naming a complex experiential web of connections that is not itself primarily propositional. It is no accident that we understand QUANTITY in terms of the VERTICALITY schema mentioned above in exactly the way we do. Examples such as *Prices keep going up; The number of books published each year keeps rising; His gross earnings fell; Turn down the heat,* and many others, suggest that we understand MORE (increase) as being oriented UP (involving the VERTICALITY schema). There is a good reason why this metaphorical projection from UP to MORE is natural, and why MORE is not oriented DOWN. The explanation has to do with our most common everyday bodily experiences and the image schemata they involve. If you add more liquid to a container, the level goes up. If you add more objects to a pile, the level goes up. MORE and UP are therefore correlated in our experience in a way that provides a *physical* basis for our *abstract* understanding of quantity' (Johnson, 1987, pxv).

This quotation offers an example of a non-literal form of mental representation and control over a stimulus which I found particularly relevant while improvising. From Johnson's thesis I gained several insights: (i), that a one-word cue, functioning conceptually

or schematically, could directly access and organise a great deal of encoded information; (ii) that concepts such as UP, MORE and so on can be imposed upon other concepts such as QUANTITY and VERTICALITY, adding not only new properties of organisation, but also adding a more finely-tuned control to existing productions; (iii) that the use of metaphor as described by Johnson was particularly suitable to my development of procedural knowledge in which I needed orientation to direct my actions with regard to space (the organ) and time (the length of the whole improvisation). In this way, Johnson's description of metaphor corresponds to my growing sense of kinaesthetic (movement-based) awareness, offering an explanation for the construction of meaning which accompanied this awareness. It is this sense of meaningfulness that I now discuss, for as I learnt to ascribe meaning to my perceptions and actions, so did I gain an effective, more responsive and flexible control over increasingly automated actions.

8.3.4 Semantic control and the construction of meaning

Johnson's (1987) description of metaphoric mental representation is valuable because it captures some quality in a mental representation which is both non-literal (i.e., not explicitly but implicitly available to consciousness), yet also a powerful cognitive tool for controlling and directing actions. The control itself emanates from the meaningfulness of the cue, for it is the knowledge and experience invested in a metaphor such as MORE, UP, LESS, THICKER, AROUND etc., which can then be unpacked and expressed through actions within the environment. Another way of describing the acquisition of meaningfulness is through the construction of *semantic* memories, as Snyder (2000) explains: 'semantic memory is the primary type of memory involved in *recognition*. Semantic memories are often used implicitly, without our even being conscious of them. Much of our abstract categorical knowledge about the world is employed in the selection of sensory input, a recognition

process that usually takes place outside conscious awareness. This process is based on *identifying* the things around us by processing them through the appropriate semantic memory categories' (p.78). Clearly this relates to my former description of 'naming' or categorising$_1$ events and features as I learnt to organise the novel environment of improvisation (see para.4.3.4.1); yet, I interpreted this same process to relate now to a new categorisation$_1$ of the actions themselves, as these actions become linked to increasingly conceptual$_1$ control over longer sections of musical structure. Indeed it is this complex and layered encoding of experience, in which conceptual$_1$ understanding and action-event couplings are implicitly organised through continuing practice and learning strategies, that leads me to describe this new level of development in terms of *semantic* meaning and representation. This is because the term *semantic* captures both the depth of encoding, and the simplicity of the sensation; it links the ability I had at this stage of performing complex sequences of actions automatically while, at the same time, representing these sequences non-theoretically in a novel, discreet and embodied way which was rich in meaning.

8.3.4.1 Case study: semantic 'naming' of harmonic movements

The reader may recall from previous chapters that the complexity of constructing harmonic movement within a diatonic, tonal language was one of my biggest challenges while learning to improvise. At first I proceeded through my theoretical knowledge which meant the task was also rather abstract: my decisions were not personally expressive, they were primarily correct responses to the rules I was using. Later, as I learnt to apply a clearer, more systematic rule system through Fux's (1725/1971) voice-leading principles, I was able to generate patterns of movement for constructing textures which became increasingly associated with a repertoire of harmonic moves. Constructing these formulae through

repetition naturally increased their familiarity; as I performed them more automatically, harmonic sequences and patterns became grouped or chunked in my perception.

At the same time I began to perceive and link these sequences of harmonic movements to musical-expressive functions at a particular moment in the musical structure. An example of a musical-expressive function might be: to aim towards a certain place in the musical form, i.e. 'before the theme comes back', or 'my last statement of the theme'; or alternatively it might be an expressive decision to increase tension through adding chromaticism or quickening harmonic change. These musical-expressive functions were often *named* in my imagination while improvising - a moment of recognising or defining a certain move forwards: "Ah, it's you!", the 'you' being a defined structure or mental representation of the event as I then encountered it. If I had to reduce this structure or *name* to a word it would be something like AROUND or THROUGH (serving metaphorically, as Johnson [1987] proposes); and later, as I reflected on these words, I realised that they signified ways of moving which are often in relation to a sense of tonal centre, as it might be towards security, or away from security. Yet, at the same time, such is the subtlety of these types of kinaesthetic or embodied representations of harmonic movements (Stuart's [2010, p.45] description of 'fluent, non-cognitive melodic movements' is particularly apt), that the *naming* process captures many expressive characteristics which cannot be reduced to theory or words. Rather, the *naming* process is a feeling of personal identification with the stimulus, of perceiving one's actions not in terms of theory but in terms of personal meaning.

8.3.5 Increasing skills on the basis of semantic control

Semantic associations and labelling of the stimulus spread throughout my improvising as automaticity increased. As I developed a more meaningful relationship with my actions I experienced an increase of skills and insights in all of my regular musical tasks,

similar to the surge in abilities I had formerly experienced through my development of

concepts$_1$ culminating in generative mental representations (see Chapter 6). In both cases, I

profited from increased clarity and certainty in my work, provided by the peculiar stability of

conceptual$_1$ knowledge. These qualities I came to consider a crucial factor contributing to my

fluency as an improviser, reflecting the fact that cognising the entirely unknown was costly in

terms of processing. Therefore, while I accepted that an element of the unknown was

unavoidable (and also desirable in terms of creative interest) I aimed at this stage to gain as

much clarity and certainty in my knowledge of the task as possible, while simultaneously

training my technical resources and productions to steer me through passages of unknown or

unexpected occurrences.

8.3.5.1 Stability in cognitive processing of the task

It is useful to recall that, as a novice improviser, I experienced considerable instability,

as I acted mostly in an unknown environment and had to calculate each action in relation to

novel features. Later I learnt to categorise$_1$ these features, but categorisation lacked the

stability of conceptual connections, mainly because I had to encounter the categorised

features in the same way for me to recognise it. For example, I might form a category$_1$ for a

chord or sequence of chords, but if I changed the figuration of the passage then these chords

lost their identity, in which case I might categorise$_1$ them in a fresh way as they reappeared in

their new texture. Thus, as Barsalou (in Schank, Collins and Hunter, 1986) propose: ...

'cueing conditions and accessibility constantly change [and] the temporary constructs that

represent a category are rarely if ever the same' (p.652); and this development led on to the

beginnings of conceptual development through unstable *complexes* and *pseudo concepts* (see

para.4.3.4.3). One advantage then of continuing this development to the formation of true

concepts$_1$ for improvisation (which guide the improviser towards recreating the characteristic

features of a style or model) is that concepts$_1$ are also stable: they represent an interpretation of features on which behaviour can be controlled 'in a more or less general way' (Edelman, 1989, p.141); also corresponding to the principle of *degeneracy* in that many different actions or variations in the stimulus can be brought under one concept$_1$ allowing one to interpret the environment and select appropriate behaviour more efficiently.

8.3.5.2 A sense of flow and creative involvement

The emergence of semantic association thus represents a similar increase in stability, as Snyder (2000) states: 'Semantic memories seem to be related [by] conceptual hierarchies of various types, and seem not to be vulnerable to the same types of transformation or distortions that episodic memories are' (p.264). As a result, my improvising environment was becoming increasingly familiar, labelled in a way that meant, within my regular tasks and musical models, I rarely encountered entirely novel features; rather, I recognised new versions or arrangements of features which were already known. In this way, while I might not have the exact response or production I needed, I could quickly adjust another production to make it sufficiently suitable. Feeling that I possessed sufficient resources to act in response to the challenges of the situation had a profound effect on my mood and absorption in the task: I often felt creatively involved in creating a meaningful and expressive musical structure and spent less time in doubt over what to do next, or in calculating an action before performing it. This description of my enjoyment of improvising may recall an earlier discussion concerning flow states (see para 2.2.4), in which 'a person should perceive that there is something for him or her to do, and that he or she is capable of doing it' (Csikszentmihalyi, 1988, p.30), and certainly it is worth mentioning that now in my private improvising, I regularly enjoyed a sense of flow.

8.3.5.3 Anticipation and 'sculpting' the stimulus

However, this sense of flow can also be described in more cognitive terms: that, through my sense of familiarity with the environment of improvisation, I was more able to *predict* what was coming. With prediction I gained cognitive breathing space, and time to respond with a greater sense of control and creative choice over my actions, for at least as far as I could 'see' ahead. This brought me to the idea I had found in literature of an actively constructed reality, as Neisser (2014) explains: 'The cognitive approach to memory and thought emphasises that recall and problem-solving are constructive acts, based on information remaining from earlier acts. That information, in turn, is organised according to the structure of those earlier acts, though its utilisation depends also on present circumstances and present constructive skills' (p.277). At this stage in my development I was clearly able to bring many hours of practice and experience to the task; and, as I began to prepare for a public performance and therefore to limit the number of tasks I worked on (the models, styles and genres of improvisation), so I gained an increasing sense of meeting the stimulus half-way. (This became more relevant as I actively planned the events of each individual improvisation nearer to the concert.) Prediction of events thus became possible through actions which controlled the environment itself, moulding the stimulus towards the presentation of familiar events, as Clark (2013) describes: 'perception, cognition, and action ... work closely together to minimise sensory prediction errors by selectively sampling, and actively sculpting, the stimulus array' (p.186).

The idea of the individual actively sculpting the outcome of events is appealing, because it offers insights into the anticipation of events involved in schema-driven performance. Endsley (1995a) explores this perceptual phenomenon through graded steps within a theoretical framework known as 'Situational Awareness' (SA), a phrase originally used to define fighter pilots' ability to perform under stress. A basic summary of the theory is that, in the first stage the individual learns ... 'to perceive the status, attributes, and dynamics

of relevant elements in the environment. All the data that pertains to the task' (p.36); in the second step, they learn to synthesise these elements within meaningful relationships: 'Level 2 SA goes beyond simply being aware of the elements that are present to include an understanding of the significance of those elements in light of pertinent operator goals ... particularly when put together to form patterns with the other elements (gestalt), the decision maker forms a holistic picture of the environment, comprehending the significance of objects and events' (p.37); while, in the third and final stage of learning, the individual acquires the ability ... 'to project the future actions of the elements in the environment - at least in the very near term ... This is achieved through knowledge of the status and dynamics of the elements and comprehension of the situation' (p.37).

Endsley's model is interesting because it mirrors the sequence of events in my own learning. The first stage corresponds to my sense of categorising features and events, what Endsley refers to as 'relevant elements in the environment'. The second stage can be compared to the formation of meaningful conceptual$_1$ relationships in which I perceived underlying structural principles of the musical style. Endsley describes this as 'comprehending the significance of objects and events'. Lastly the individual achieves a knowledge of how events will unfold, a complex sequence of recognition (of salient features) and linking this recognition with memories of past events; and while it might seem presumptuous to associate my performance as an improviser with those of USA fighter pilots, I believe that Endsley's descriptions match my emerging sense of *schematic* awareness of overall form and musical structure at this stage of development!

8.4 Preparing for a public performance

Towards the end of my third year of study I began preparing for a public recital. I had been looking for a suitable opportunity which would allow me to improvise without feeling

too much pressure, and this seemed to arise when I was invited to give a solo recital in a local monastery. The monastery had been closed to the public for many years and was now reopening after a refurbishment. This meant that the organ recital was not the principal focus for the public, but a means of attracting them into the monastery and to enjoy the refurbishment. The organ itself was quite simple although large in scale; it was an original 18th century Baroque organ in the Iberian style with two manuals and no pedals, so I only needed to improvise with my hands. I decided to integrate my improvisations within a more standard programme of composed repertoire. Each was spaced at regular intervals throughout the recital which I hoped would give me a chance to recover from the intensity of the improvisation experience. In total I planned three short improvisations, each based on a different Baroque model so I had a variety of keys, textures, characteristics and forms to work with. I began a careful preparation on paper, noting down registrations, distinctive features, and making a key plan of modulations[17].

8.4.1 Creating generative mental representations

The plans I used for practicing helped me to construct generative mental representations of selected features which I needed to guide my imagination within the stylistic constraints of each model, also as a guide for constructing the whole shape of the piece. My improvisation journal gives an example of working with one of these plans: 'It's possible to move in 4-part harmony from key to key [and maintain a stylistic texture]. This corresponds to the performance goal, and maintains balance of constraints vs. freedom, i.e. I must go to the stated key, but I can use whatever path I choose' (personal notes, 12th September, 2018). These notes show that I kept a certain degree of looseness and freedom within my written plans as I didn't want to feel constrained by a rigid or formal plan; instead, I hoped to deepen my awareness of the whole shape of the improvisation as a schema$_1$, while

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[17] An example of a plan for an improvisation is given in Appendix E.

simultaneously allowing for various versions and adaptations of the same conceptual

structure.

The three improvisations were:

1. A Two-part Invention in G minor (in the style of J.S. Bach, 1685-1750), using the

soft flute registrations.

2. A Toccata or Tiento in the Dorian mode (in the style of Francisco de Arauxo,

1575-1654), suitable for the registrations and voicing of the Iberian Baroque organ[18].

3. A Prelude, Fugue and Toccata in the North-German baroque style (after Buxtehude,

1637-1707), using various full-organ registrations.

8.4.2 Reducing critical feedback

As the recital approached, I realised I needed to change the way I perceived and

processed my improvising during the moment of performance. In a practice environment one

is focused on improving one's performance, therefore critical feedback (so long as it is

constructive and accompanied by good strategies) is an integral part of one's work. In a

performance environment however, it would be more important to keep going, to remain

motivated and focused on the whole structure rather than reflecting and evaluating each small

step. I therefore practised 'switching off' my critical feedback and tried to accept all of my

improvising actions without correcting anything; simply continuing whatever happened until

I got to the end of the whole improvisation. This created a different kind of improvising

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[18] It might interest the reader to know that the Iberian Baroque model of organ is quite different in design from the modern instrument, using a split- or divided-keyboard system. This means that all the registration on the right-hand side of the organ is used for the right-hand part of the keyboard (above middle C); and all the left-hand registration for the left part of the keyboard. In effect, one has two manuals in one, so long as one stays within the boundaries of the keyboard: solos can be accompanied on the same manual; also rich, contrapuntal effects created through performing two independent voices in each hand using contrasting registrations on each side of the manuals.

experience, in which I was less conscious of the construction of the musical structure: my conscious, reflective decisions seemed to be no longer involved as there was no time to engage in this type of thinking. Decisions were made more in the moment 'on the hoof', a musical structure was somehow created and I began to have a sense of thinking through my fingers, i.e., through the actions themselves. I should say too that this way of acting without reflection - this plunging onwards through the improvisation was not a comfortable sensation for me, and seemed to go against my instincts for safety and control over my performance. I was constantly reminded of Anderson's (1982) description of productions having 'direct control over behaviour' which means there is 'the ever-present danger that a new production may wreak great havoc in a system' (p.380). Certainly it felt as if I was handing over control to systems I barely knew or understood, and the thought of doing this in a moment of public performance was often quite terrifying!

At the same time as I struggled with the idea of letting go of my conscious control, my perception of my improvising was changing through the effect of reducing critical feedback. Whereas before, in my normal practising context, I had constructed a gap between my performance and what I aimed at - an ideal, imaginary improvisation, which I tried to attain through the strategies of the practice itself; this gap was now reduced. By turning off critical reflection and keeping going until the end I had the sensation that what I performed *was* the actual improvisation; I had to accept entirely the product of my improvising (at least during the moment of performance) and so, for the first time in my experience, my perception of my role as the creator of that product was changed and I became that which I aimed for: the performing improviser. Of course, this doesn't mean that I stopped being critical of my improvising; on the contrary, the transition to automatic productions was not easy and resulted in a lot of improvising which I didn't like. However, I stopped being critical during the moment of improvising, letting events unfold until the end; and this created a unifying

effect on my work, bringing all my productions to a single point - the improvisation itself, which I have tried to capture in the graphic of Figure 21.
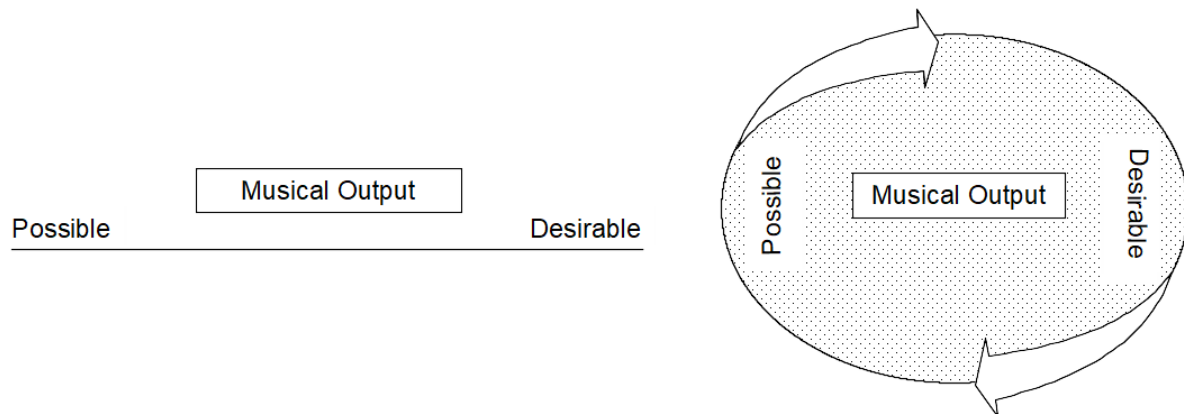
Figure 21. A comparison between novice perception (left side of Figure) where the 'desirable' is separated from the 'possible', and schema$_1$-guided performance (right-side) where the both elements are combined.

8.4.3 Aiming towards schemas$_1$

The improvising experience induced through my preparation for performance brought me closer to my awareness of the whole musical structure or schema$_1$, and reminded me of literature in which different learning strategies were proposed to acquire specific kinds of knowledge. Sweller (1988), for example, writing about problem-solving skills, described how novice students tended to work backwards from the information presented to them in the problem - a technique described as 'means-end analysis', whereas experts drew on the more extensive knowledge of their previous experience to understand information as 'belonging to a particular category of problem states that require particular moves' (p.261). In this way, experts were able to gain immediate impressions of the whole sequence of actions involved in solving the problem, an awareness which Sweller describes as 'the schema-driven approach'. As he states: 'a schema encodes a series of problem states and their associated moves. All

states encountered have schemas associated with them indicating appropriate forward moves'
(Sweller, 1988, p.262). Recalling Sweller's description of experts' approach to problem
solving, I tried to emulate this in my improvising. Starting from my generative mental
representations of characteristic stylistic features, I planned to add a plan of principal
structural events which I could use as a map for orienting my progress through the whole
form; events such as principal modulations (away from and return to) to the tonic, sectional
changes of texture, or a scheme of voice entrances, depending on the type and genre of the
improvisation. For example, as preparation for the Two-part Invention I notated some suitable
themes and motifs, also a tonal plan of the modulations (G minor - D minor - C minor - G
minor) and practised steering my improvising towards each of these keys in turn. While, for
the opening section of the Prelude, Fugue and Toccata, I wrote down the following events:

(i) 'opening flourishes in the tonic key'

(ii) 'rising scales in the right hand embellishing chords'

(iii) 'modulate to the dominant, as a preparation for the Fugue'.

Repeatedly improvising over these sequences of events, I was able to develop a better
impression of how to adapt my actions in relation to the whole structure. The plans I made to
orient my improvising were notated as an ordinal string (see Chapter 6.3.3.2) which meant
that there was a looseness to the constraints allowing me to intersperse other events in
between those notated. For example, within the modulation sequence of the Two-part
Invention (G -D - C - G) I could also modulate to the relative major: G minor - D minor - B
flat major - C minor - G minor. Thus, there was a conceptual$_1$ feel to the maps I used; they
served as general guidelines rather than rigid constraints and allowed me to respond
expressively to momentary inspirations and follow my imagination in new directions without
losing track of the whole shape. In this way, adapting my performance productions of short

musical sequences towards structural waypoints I began to build a sense of the overall form of the music *while I was improvising*. I had an implicit feeling for how to act in relation to that overall shape; a sense of right or wrong guiding me towards good pathways and away from bad pathways, without being able to say clearly (in that moment) on what basis I made these decisions.

It is this sense of appropriateness guiding my decision making during improvisation which I define as a $schema_1$ experience. For, it's important to stress that, even as I practised over certain fixed elements, or even wrote down a Fugue theme, this process of preparation never constrained the actual musical material I was improvising, or produced a finished composition to be memorised. On the contrary, the methods of preparation I have described always allowed me considerable variety in terms of musical material and actions, so that, as I approached the recital I did not know what notes I would play, nor how I would start the Prelude, or by what means I might reach the dominant key. All these features and elements were left to the moment of the recital. What I prepared were the mental representations of features and texture, the actions which constructed these features as music, and the pathways leading from one event to another through the whole structure. It was these preparations which I hoped would serve as a basis for constructing the improvisation in public, yet it was also my hope that I might achieve some kind of awareness of the whole musical structure, as an embodied $schema_1$ which could be used for guiding my actions in a more coherent and expressive way.

8.5 The performance experience

As the recital approached, I felt extremely anxious and questioned whether I could really go through with improvising in public. The whole task suddenly felt very new and unfamiliar; my skills seemed fragile and prone to failure. I wondered how the public might

react to Baroque-style improvising in which the forms and structure were so clear. Would I start something I couldn't possibly continue; that, just as I established something clear for the public to follow, I would falter, stammer, lose my way … These nightmare visions compelled me to practice hard, using the strategies I have described and trying all the different possibilities of realising my written (informal, tonal) plans. However, a few days before the actual concert I found that practising didn't feel productive any more; it felt like I was trying to control things too much. So, in response to these intuitions, I decided to stop practising. This was a hard decision to make, particularly because I kept running the improvisation in my imagination; and each time this happened I found myself faltering, going wrong, my mind going blank…

8.5.1 Improvisation I - dominated by emotions

The first improvisation, the Two-part Invention, didn't go well. As soon as it started I felt very nervous and conscious of every note I played. There was a sense of unreality about the experience, a kind of 'what on earth are you doing?' which produced feelings of panic as I realised I was unable to form a clear mental representation of the musical structure. It was just as I had feared: I felt unable to control the flow of the music or think imaginatively. I watched as if from a distance as my hands tried to perform some patterns and sequences, but I was miserably unsatisfied with the results which seemed fragmented and full of errors! As this experience unfolded I realised at the same time that I was trying hard to consciously control the improvisation; my preparation and training 'kicked in' at last, and I had a coherent thought - that I needed to overcome this instinct and 'let go'. This I managed to do only towards the end of the piece, as, with a big effort, I finally brought my emotions under control. Letting go of conscious control produced an instant improvement: my fingers played some fluent productions, more expressive music resulted and my mind cleared. I managed to

finish the piece coherently, bringing the music to the tonic key and finishing with a good final cadence. This gave me a new boost, for I had a sense of achievement: I had actually improvised something tonal and coherent (even expressive) in front of the public. From the jaws of failure I'd snatched a little taste of victory and also learnt an important lesson - not to try and control events too tightly. Using the following repertoire pieces to recover from this rather intense experience, I resolved to apply this sensation of 'letting go' to the second improvisation.

8.5.2 Improvisation II - emerging cognitive control

The Tiento[19] in the Baroque Spanish style proceeded with a much stronger feeling of expressive agency and control over the material. Although I constructed the overall structure of the improvisation sticking more closely to my written plan than I would have liked (ideally I hoped to depart from this written plan and explore new and unexpected directions), the contrapuntal lines of the musical texture and harmonies within these waypoints were expressive and stylistic. I felt able to construct and use the relevant generative mental representations of musical features to balance my imagination within constraints as I was used to doing in my practice, and this had a calming effect on the way I processed the experience. As a result, rather than worry about the public or my own sense of anxiety, I focused more productively on the task itself. I could organise my attention in the same way as when I practised, allowing my hands to perform while simultaneously 'looking ahead' and preparing pathways through the structure. As my attention became better organised I had a wonderful sense of communicating directly through my music with the listeners; for was I not literally creating the music I wanted to create as people listened to the results.

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[19] Tiento translated literally as 'touch' is a free Prelude-type of form combining flourishes and scale-like figurations with more vocal, imitative sections. The model of Tientos which I took from Iohannis Cabanilles (!644-1712) are additionally characterised by a modal tonality, a four-part texture which might be fugal in style, use of split-keyboard registration and ideally suited to the Iberian registrations of the organ I was performing on for this recital.

8.5.3 Improvisation III - led by schemas$_1$

Feeling greatly encouraged, I launched into the final improvisation - a Prelude, Fugue and Toccata in the North-German style - with a great deal of energy (see Video_3), and this time I experienced a sense of the overall schema$_1$. From the opening flourish and sequences, I realised that I wasn't using my informal tonal plan in a detailed way; nor did I want to, for I felt more grounded in the moment, and I was enjoying the sensation of making musical decisions in the moment. I had an image of the three individual sections of the piece in my mind but little else; and perhaps I was also helped by the registrations chosen for this piece which were strong and carrying. I knew I had to prepare the Fugue section by finishing on the dominant chord of G minor, but this occurred without incident and when I started the Fugue I heard my theme ring out throughout the monastery building. Joining other voices in sequence to this theme felt logical and within my capability. I created some sequences (an episode section of the Fugue structure) and brought the voices in again. Before I could go too far or lose my way I brought the Fugue to a close and began the Toccata. Again, starting this section of the piece felt organic, I wanted to play the racing figures of the Toccata and unleash the energy stored through the discipline of the Fugue. I felt carried along by the improvisation itself, strongly guided by the inner schema$_1$; that, so long as this mental representation held good and true, my actions were right and appropriate to the overall structure. This blend of cool cognitive awareness mixed with unforeseen, creative improvising was an exciting performing experience which more than repaid the work I had invested in the process of learning, and matched the hopes and expectations I had had for my improvising with which I had started on this study.

8.6 Discussion and reflection on schemas$_1$ in relation to musical form

This chapter centres around a number of techniques for mentally representing the task as performance became more fluent and automatic. These techniques culminated in the use of a schema$_1$ for guiding improvisation, which corresponded in my experience to a sense of rightness or appropriateness in my decision making as I constructed a musical form. In contrast to the *generative* concepts$_1$ for improvising within stylistic constraints, the schema$_1$ for overall musical structure could not be explicitly defined (for example, the use of an informal tonal plan as preparation for schema$_1$-guided performance was quite different to the analysis and selection of musical features used to construct a generative concepts$_1$). This does not mean that my experience of the schema$_1$ was vague or- ill-defined (just as in Kant's [1781/1998] original description of a schema there is no doubt about the perception of a triangle); rather, that the schema$_1$ had a very embodied mental representation which evaded explicit description. On the other hand, as with any of the conceptual$_1$ structures I have described, there was a small part which corresponded to theoretical or declarative structures, which means that it is always possible to describe schemas$_1$ in relation to musical theory - modulations, changes of tempo and meter, and so on; particularly those features in music which segregate boundaries and help listeners to process musical form. This might seem as though one could construct a schema$_1$ for improvisation in a literal, theoretical way (as in the exercises of written treatises, see Chapter 5.2.1) but this I found was not the case. The schema$_1$ in my experience emerged as the last of a sequence of learning states characterised by the acquisition of conceptual$_1$ mental representations and perspectives of the task. Categorisations$_1$ and generative concepts$_1$ thus preceded the schema$_1$, and each representation was created through directed, imaginative cognitive interaction with the task; these interactions continually reconstructing features until meaningful relationships occurred which could be classified or named in terms of categorisations$_1$, concepts$_1$, and schemas$_1$.

Therefore, I would strongly distinguish the idea of musical form as a purely theoretical structure from the mental representation of a schema$_1$ used for improvisation, in the same way as Toch (1977) contrasts form with 'FORM':

'Whatever FORM may be, let us not confuse it with *forms*, namely, the forms used in classical music. These forms generally constitute what is taught and studied under the heading of "form", frequently augmented by "analysis", thought the "analysis" also means nothing else than the analysis of these forms … A piece may be written in any one of the classified forms to its minutest detail and still may exhibit a pitifully poor FORM … And a piece may reveal not the slightest affiliation to any of the traditional forms, and yet may be a prodigious masterpiece of FORM … 'How would you describe the form of a fugue? Among the wealth of Bach's fugues no two show the same structure. Yet each of them displays a masterly FORM (original emphasis), be it macrocosmically majestic or microcosmically graceful and dainty' (p.154).

Taking Toch's (1977) distinction of FORM as true to the schema$_1$ as I experienced it, it's important then to understand the levels of freedom involved. It indicates that my approach to improvised musical structure was now a long way from the *Werktreue* ideals of form with which I had started the study: in which the whole musical structure depended on fixed relationships at every level of texture. My approach was now looser, more organic and cognitively lighter; an approach which I found was precisely described in Ledbetter's (1990) introduction to the Baroque composer and organist G.F. Handel's (1685-1759) exercises in Fugue: 'Handel's exercises relate to another tradition, that of the improvised fugue. Here the fugue hardly has a set texture, still less a fixed form, but is more an effect. It's only distinguishing feature is that there should be a principal subject, which enters successively at

different pitch levels. Integrity of parts is not necessarily maintained, and connecting material is made up from what are essentially elaborations of basic continuo formulas' (p.2).

Interestingly then, it was through an attitude of creative freedom towards musical structure that I achieved formal coherence in improvisation. At a cognitive level this makes sense as, in the moment of performance, conscious control is unsuited to processing the complexity of the task in a flexible, responsive way. In terms of musical form or FORM, I can report my own experience which attempted both types of control during the same recital: certainly, by letting go and using more automatic processes, triggered more through semantic association than conscious *control*, I had a sensation of monitoring the sequence of events. When this occurred (in the third improvisation) I also had a sense of genuinely creative improvising - the musical structure had a natural, inner logic which was appropriate to the moment and unpremeditated; while my other two improvisations, in which I tried more consciously to construct the musical form, I would describe as less imaginative and less satisfying from a formal point of view.. Thus, it was only by letting go of conscious control that I attained a sense of schema$_1$ or organic FORM (as Toch [1977] describes, and maybe something in this contrast in approach to musical structure is captured by Leahey (2004) when he makes a distinction between *rule-following* and *rule-governed* behaviour:

'The earth revolves around the sun in an elliptical path governed by Newton's laws of gravity. However, the earth does not follow these laws in the sense that it computes them and adjusts its course to comply with them … the motions of natural objects are governed by physical laws without following them by internal processing' (Leahey, 2004, p.440).

8.7 Themes emerging from Chapter 8 (months 24-36)

1. **Semantic memory and embodied representation:** as productions gain fluency and automaticity, conscious awareness of improvisation is altered to monitor and control larger sections of musical structure from a more distal perspective.

2. **Performance techniques:** particular cognitive and emotional strategies are employed to meet the conditions of improvised public performance.

Chapter 9

Findings and Conclusions in relation to the initial research questions

In this chapter I reflect on the main themes and features arising from this study. Returning to initial research questions formulated at the beginning of the study (which also allows me to regain a novice perspective of the task), I answer these questions in turn, comparing and contrasting the knowledge I have gained with other perspectives found in literature, interviews and personal conversation with improvisers. Thus, in this chapter I offer more generalised conclusions concerning classical musicians' experience of improvisation, including: (i) the qualitative differences in knowledge between the interpretive performer and the improviser; (ii), the effects of personality and emotions on learning to improvise; (iii) the various ways in which improvisation is consciously represented at different stages of learning; and (iv) the effect of cultural and social context on individuals' learning and performance of improvisation. I also summarise and try to define the salient features of a conceptual$_1$ knowledge for improvisation, which allows for generative, expressive and fluent musical creation in real time. I finish by describing the wider implications of my study (and this discussion) for pedagogic methods in teaching classically-trained musicians to improvise, and for further research investigation into improvisation.

9.1 Research question 1: Why couldn't I improvise? I was an experienced musician with an extensive knowledge of musical structure and instrumental technique. What was wrong or inappropriate about my existing knowledge?

9.1.1 The imperative of procedural knowledge

I began the study with a great deal of skills and experience as an interpretive performer of classical music, yet, like many classically-trained musicians, this knowledge did

not allow me to improvise. The idea that one can possess extensive musical knowledge, but

not know how to improvise, implies the necessity of specialised knowledge for a particular

domain. Anderson (1982), whose insights into the cognition of performance I have drawn on

extensively throughout the study, refers to this specialised knowledge - resulting only from

active engagement in a task - as *procedural* knowledge, thus: 'the distinction between

procedural and declarative knowledge is fundamental[20]. Procedural knowledge is represented

as sequential productions, whereas declarative knowledge [theoretical, non-experiential

knowledge] is represented as a propositional network' (p.370)[1]. If we understand declarative

knowledge to be purely theoretical - knowing *about* something without direct experience of

doing, then the process of learning to improvise can be seen as a normal skill learning activity

described by Anderson (1982). However, my study (Chapter 4) indicates a more problematic

process of transition of knowledge involving negative emotions, interference of learnt

actions, cognitive confusion, and so on; aspects of learning which are likewise reflected in

many studies (i.e. Dolan, 2005; Woosley, 2012; Chyu, 2004) which describe the specific

challenges of introducing classical musicians to improvisation. Why then should the

acquisition of procedural knowledge in improvisation be so problematic for

classically-trained musicians?

I believe Goldman (2016) touches on this problem, when he states that: 'different

musicians may know about similar musical structures in different ways; different ways of

knowing facilitate different kinds of perception and cognition that underlie different

performance behaviours. Some of these ways of knowing can facilitate improvisatory

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[20] The distinction between these two types of knowledge has been variously described. Scheffler (1965), for example talks of "knowing that" and "knowing how to", while Berkowitz (2010) talks in terms of (linguistic) *competence* versus *performance*: 'perceptual competence allows for the comprehension of the speech … of others using this knowledge base, while productive competence provides for the generation of communicative utterances based upon this knowledge' (p.97). In a similar way, Hiebert & Lefevre (1986) distinguish between *conceptual* versus *procedural* knowledge, while Anderson (1983) uses the terms *declarative* vs. *procedural*

performance practices' (abstract). Goldman's description of 'different kinds of perception and cognition' extends the discussion beyond a straightforward acquisition of procedural knowledge. It brings us back to my opening statement that classically-trained musicians (such as myself) frequently possess considerable expertise, involving technical instrumental skills, an extensive knowledge of repertoire and musical style, historically-informed performance practices, a deep knowledge of musical structure, and so on. It is this complex and distinctive 'way of knowing' that the classically-trained novice improviser must transfer from one domain of expertise (interpretive performance) to another (improvisation), and to achieve this transition, as I have demonstrated in my study, requires a significant qualitative change on behalf of the student in their perception of musical structure

9.1.2 A conflict between two ways of knowing about music

The notion that the two areas of expertise conflict with each other, rather than connect or compliment, underlies comments such as Woosley's (2012) when he describes classical musicians as being 'taught to perform notated works in a specific manner … this can lead to the notion that all music must be practised in the exact manner in which it will be performed' (p.9), or Schuiling (2016) when he complains that: 'performers are caught up in a paradigm of "reproduction" … in this paradigm, the demand to play "just the notes" or to stick to the composer's intentions is not just an ethical obligation but an ontological necessity' (p.42). In both cases the authors are taking the interpretive performer's musical approach as a starting point for discussing alternative, improvised approaches to music. Whereas the interpreter understands music through the written score, in which every element is predetermined, the improviser, as Woosley (2012) goes on to say: 'has total freedom. Musical boundaries can be created or ignored ... Improvisation helps us to remember the importance of freedom in the "spirit of performance" that we, as musicians, need to have' (p.15). Confronting this freedom,

as I discovered, is one of the principal difficulties of learning to improvise, coming from a score-based training and experience.

Considering the particular way in which the interpretive performer views the score as a completed work, how can they possibly perceive the same score as a model for improvisation? Which elements can be altered without destroying the integrity of the whole musical structure? Looking to cognitive theories for guidance produces only an array of options: a *referent* structure should be constructed, but how? Different connections between musical elements - hierarchic or associative - can be used to *generate* structure, but in what order? This situation of doubt and uncertainty over how to act, how to select, how to act agentically and make creative decisions, is characteristic of novice improvisation in classical contexts. It is a problem which extends beyond emotions to involve deeper belief structures about how music is created. To overcome these beliefs, as I argue below, classical musicians may be forced not only to question habitual modes of thinking and processing music, but also to critically examine the cultural values and ideals in which they are situated[21]. It is also, I believe, only through a more explicit recognition of the conceptual$_1$ nature of the improviser's knowledge that I will illustrate how classical musicians can be sufficiently guided towards a qualitatively different way of perceiving and processing musical structure.

9.2 Research question 2: Was improvising skill dependent on personality or emotions? Was I the wrong type of personality?

As this question arose from the belief that I might be innately unsuited for improvisation, I will link my notion to widespread cultural perceptions of the concert

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[21] A friend and colleague Nicholas McNair who teaches improvisation to classical musicians at secondary level adopts exactly this strategy, as he recently explained to me: 'from the beginning of my improvisation teaching I have sought to deconstruct the dominant mode of seeing classical music with its composers and scores. Through reading Lydia Goehr's book 'The Imaginary Museum of Musical Works' I was alerted to some of the mechanisms whereby people are held in thrall to the dominant mode' (N. McNair, personal communication, 11th July, 2021).

improviser as a 'wizard'-style entertainer, possessing innate gifts and a distinctive outgoing type of personality. Comparing this stereotype to similarly generalised perceptions of the classical musician's character and personality (as interpretive performer), it is possible to understand how such a perception can dominate novice improvisers' perception of the task and of their own abilities. Lastly, investigating the influence of personality on learning contexts enables me to challenge the conception that improvisation is dependent on personality, proposing instead a construction of improvising skill based on the acquisition of strategies and positive learning emotions.

9.2.1 Attributes of the professional improviser's personality, as commonly perceived

A common cultural construction of the classical improviser, particularly those of the concert organists I observed, is what I term 'the wizard'. It is a perception which thrives on ignorance of the skills underlying improvisation (the idea that improvisation skills can be learnt and studied), a notion that creativity is reserved only for those with innate creative gifts, and the rarity of improvised performance. The wizard type of improviser demonstrates extraordinary skills with fluency, agency and control over the task. This type of classical improviser accepts themes from the audience as 'proof' of their ability to create music without planning[22]. Comparisons with composed music are naturally made when improvisers use titles such as Suite, Fugue, Symphony, etc., yet as Rzewski (2006) describes, there is an

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[22] The practice of taking themes from the audience is highly popular within the French symphonic tradition of improvisation. Artists such as Jean Langlais (1907-1991) and this teacher Marcel Dupré (1886-1971), regularly improvised Organ Symphonies - multiple movement works on a grand scale, based on two or more given themes, and featuring contrapuntal devices such as Fugues. Langlais himself discusses this style of improvisation in Bailey (1992). The popularity of this style of 'instant composing' approach to improvisation came to its peak with the figure of Pierre Cochereau (1924-1984) who, in addition to world tours of over two thousand concerts, improvised in the cathedral of Notre-Dame in Paris to thousands of listeners every Christmas Eve on given themes.The link between improvisation and composition is emphasised by other improvisers such as David Briggs who transcribed and recorded improvisations by Cochereau in a CD entitled 'The Illusionist's Art'.

element of illusion about the improviser's ability to instantly compose: 'The art of the improviser can be compared to that of the magician. The improviser does in time what the magician does in space. The magician does something with the right hand which distracts the attention of the spectator from the action of the left hand. The improviser follows an unintended action (a) with a purposeful action (b), whose function is to make (a) appear purposeful also' (p.492).

However, if perceptions of 'the wizard's' skill seem confusing in terms of musical-structural approach and integrity, the idea that they are free to follow the dictates of their imagination in the moment is a more rooted conviction. Stemming from 19th century ideas that improvisation was 'inspirational and gave musicians immediate access to the world of transcendent truth' (Goehr, 1994, p.233), the improviser's performance is often characterised by 'much-heralded uncertainty', a 'risk-taking agenda' and 'edgy virtuosity' (Peters, 2012, p.6). Elements of this approach can be seen in the language used by improvisers to discuss their craft: "Improvisation is ... the only art in which a human being can and must become the music he or she is making. It is the art of constant, attentive and dangerous living in every moment. It is the art of stepping outside of time, disappearing in it, becoming it" (Curran, 2006, p.483). Thus, I would align my original idea of the professional improviser's personality with the following common beliefs:

- The improviser is able to dominate their instrument and the performance situation, to demonstrate extraordinary technical and musical skills.
- The improviser immerses themselves totally in a creative-communicative relationship with their audience, creating in response to inspiration received in the moment.

9.2.2 Attributes of the interpretive performer's personality, as commonly

perceived

The implications, in spite of the uncertainty regarding what improvisers actually *do* is

a certainty that they do it with flair and extroversion, and this might appear daunting for some

classical musicians who believe that 'a musician's personality should never distract from the

music' (Rea, 2015, p.200). Whether it is through training (i.e., learnt behaviour, or through

natural inclination is not clear) but Lehmann, Sloboda & Woody, (2007) assert: 'research has

identified several personality traits that are common in the [classical music] profession and

often associated with anxiety. One such characteristic is *introversion*. Introverts have an

inward-looking personality … [they] prefer to be cautious and plan ahead' (p.152), qualities

which would fit badly with the (seemingly) unplanned and spontaneous activities of

professional improvisers accepting themes at the last second and are demonstrative

(outward-looking) in the way they communicate with audiences. Similarly, Kemp (1982),

who researched student classical musicians, characterised their personalities through

'introversion, pathemia and intelligence' attributes which he says 'reflect something about the

nature of being a musician in terms of his life-style, cognitive style and work habits' (p.12).

Rea (2015) supports the close association between the nature of the task (interpretive

performance) in encouraging 'introversion and a suppression of personality', noting also that

with the focus being on technical skills and accuracy, 'there is limited consideration for the

relationship with the audience, an aspect that is widely neglected in the training' (p.199).

Therefore, I believe my perspective of character and personality is representative of

an interpretive performer situated in a cultural context of classical music and trained in

interpretive performance. On the one hand I perceived my musical personality as introverted,

i.e., trained to look inward (to my knowledge of the musical score) rather than outward to

audience expectations; and to subvert my personality to serve the score. On the other hand, I perceived professional improvisers - which I aimed to become through my study - as outgoing, confident, capable of direct communication with a highly expectant audience, capable of delivering instant composition (either through illusion or through genuine creativity, I couldn't say). Thus, there was a dichotomy between the two personality types which I associated at the outset of the study (see Chapter 4.1.2) with Ben-Zur, Breznitz & Hashmonay's (1993) Type A (neurotic, frustrated) or Type B (calm, satisfied) personality types. Whether this portrayal or use of literature is accurate I doubt (with hindsight), nor is it really important as it really only reflects the sense of innate inappropriateness for the task that I imagine many classical musicians might sense as they compare their own knowledge and experience of music (interpreted as personality or innate gifts) with their impression of professional improvisers - the 'wizards'.

9.2.3 Personality attributes in learning contexts of improvisation

For many classical musicians then, there may be a sense of one's personality being a barrier to improvising; a sense of lingering doubt about one's innate fitness to improvise. This is particularly so as one begins study and feels unequal to the challenge of improvising one's own music, as Woosley (2012) indicates: 'Improvisation involves allowing the personality of the pianist to be expressed through music. It is exposing' (p.11). Others, such as Kristiina Ilmonen (in Hill, 2017) are more positive: 'We believe that [improvisation] is a very good way of finding elements in yourself as a musician that you would not otherwise find. So, through improvisation, you can find your personality as a musician' (p.230). However, these positive predictions of personal change and development through learning to improvise may not be universal: in conversations which I had with students (in Stuttgart HMDK) they revealed rooted beliefs that they would never achieve the expertise demonstrated by their

teacher[23]; and this belief, surprisingly, was often voiced by those who I considered to be advanced in their skills. This emphasises the fact that individuals will respond in different ways to the challenges and strategies of learning contexts: some being willing to change fundamental perspectives and self-beliefs as they acquire skills in improvisation; while others, even while acquiring skills, cling to habitual self-perceptions of themselves as innately unsuited for improvisation.

9.2.3 Questioning the construct of improvising skill in terms of personality

What then of the improviser's personality? As I acquired the skills of improvisation I rejected the idea of the 'wizard' personality as too limiting for the range of musical skills and approaches I discovered possible through improvisation. Can one, in spite of this range of skills, still propose certain personality attributes as essential for improvisation? Gobet (2016), for example, talks of typical traits of *creative expertise* as 'dominant, confident, and able to face the competition. They are independent and introverted. .. they are willing to take risks and accept the consequences of failure' (p.128). But are all creative experts like this? Or is this a type of behaviour which experts characteristically demonstrate within their chosen field of expertise? Are these not also relative constructs of personality traits dependent on social norms of behaviour which define attributes such as confidence, dominance, introversion in different ways. Thus, any attempt to define the personality of an improviser seems to raise more questions than it answers, and a closer acquaintance with many diverse improvising personalities supports the rejection of specific personality traits for improvisation. For example, Anton Bruckner (1824-1896), one of the most creative and celebrated organ improvisers of the 19th century (Tandberg, 2008) was notably shy, unassertive and unconfident, as Watson (2020) describes: 'He never lost his simplicity of character ... or his

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[23] This response was common amongst students whose teachers characteristically demonstrated their skills as a teaching strategy. The demotivating effect of fluent demonstration on students is noted by Woosley (2012).

unquestioning deference to authority. Although his intellectual powers cannot be doubted in the light of his achievement, he remained inwardly insecure and constantly sought testimonials and certificates as to his ability' (p.1)[24]. How, might one ask, could one improvise with such a character? The answer, I believe, is in the knowledge gained from the task itself, when that knowledge allows the individual to act with agency and control over the stimulus. Patterns of behaviour can also be learnt for particular contexts and situations, as I discovered through participation in a practising community of improvisation; ways of approaching the instrument, choosing registration, etc., which inspire confidence in the improviser, and also in the audience. This would reflect Bandura's (1997) words that: 'there are two kinds of self-confidence - one a trait of personality, and another that comes from knowledge of a subject' (p.65).

Perhaps then, it is more helpful to think of improvisation less in terms of global personality types and more in terms of learning emotions and pedagogical strategies? For example, when Sietze de Vries (2018) asserts: 'there are professional organists who can't even play a melody back to you and yet you can teach any child of six or seven years old to harmonise a melody with three chords', does this observation reflect personality types? Or age differences? The effect of training and experience, or learning emotions? Lehmann, Sloboda, Woody, 2007) attribute an 'inordinate concern about minor mistakes and inconsistencies and a tendency to notice what is wrong instead of what is right', to 'perfectionism' - a 'disposition' or 'personality trait' which is common among classical performers, but add that these traits 'may not be set firmly beyond a person's control'

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[24] A similar range of character portraits of celebrated improvisers can be found in Ochse's (2000) study of French and Belgian organists. From these we understand, for example, that César Franck (1822-1890) avoided virtuosity and 'any of the feats of skill customary among the acrobats desirous of dazzling the gallery' (p.58), while Camille Saint-Saëns (1835-1921) 'emphasised clarity and brilliance' (p.58); both performers being 'classed as "severe" performers by their contemporaries' (p.59).

(p.153). Thus, what is originally perceived as a personality trait can be influenced by learning strategies through which an individual acquires new skills, new ways of behaving and acting as a musician and improviser which redefine his personality. This kind of development marked my own learning as I noticed how people began to describe my improvised performance in terms of innate abilities: "you have a gift for improvising", which also influenced my own perception of self, so that I began to think of myself, my personality and character as suitable for improvisation.

In summary then, despite the obvious variety of characters and personality types, each with their own disposition to learning and performance, it is likely that very few personality traits could be considered as barriers to improvising. The 'wizard' personality type, though currently dominant as a concert improviser in classical circles, is by no means the only valid role model for improvisation. My own teacher Jürgen Essl, for example, was never overly demonstrative when improvising, yet he enjoys an international career, and is relaxed and communicative in front of an audience. Although there might seem at first to be a bad 'fit' between the skills of improvisation and reported tendencies towards shyness and sensitivity to errors amongst classically-trained musicians (Kemp, 1982; Lehmann, Sloboda, Woody, 2007), these impressions frequently disappear as individuals engage in successful learning paths and develop their own style and approach towards improvising. In the following paragraphs I will investigate positive emotions during learning experiences, and the acquisition of cognitive strategies which build self-confidence, creative agency and control over the task, these being more influential factors over the improviser's path towards expertise than personality traits and innate qualities.

9.3 Research question 3: Could I learn to improvise purely by conquering my emotions and critical feedback? Or by becoming less inhibited, more confident about improvising?

As this question arose through a perception that negative emotions experienced as a novice served as a barrier to acquiring the skills of improvisation[25] I now link my own experience of learning emotions to similar reports in research. The following discussion covers these three points:

1. Negative emotions experienced by novice improvisers (trained in *Werktreue* ideals of interpretive performance) can be traced to a sense of alienation from creative practice. Strategies for overcoming this are discussed

2. Emotions continue to play an important role throughout the learning process even at the level of expert performance.

3. The role of emotions in improvisation can be better understood through autoethnographic techniques of documenting one's own experience, which encourage objectivity and reflection.

9.3.1 Is the novice experience of improvisation dominated by emotions?

Negative learning emotions as I experienced them (see Chapter 4) are clearly replicated in other accounts of novice improvising amongst classically-trained musicians. Most researchers explicitly mention *fear*: of ''not knowing what to do', 'getting stuck', 'making a fool of myself', and 'losing control' (Dolan, 2005, p.111); Hill (2017) mentions students who are 'scared of making decisions' (p.228), 'fear of making mistakes, failing or embarrassing oneself' (p.229), while Woosley (2012) asserts that 'fear drives many from ever

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[25] Again, the question captures a naive perspective reflecting common perceptions of improvisation, not as a skill to be learnt, but something accessed through attitudes of 'freedom and spontaneity and originality' (Goldmann, 2016) which are discussed in the previous section.

attempting to improvise' (p.20). In all cases, the authors make a similar connection from negative emotions to underlying beliefs and learnt habits acquired through previous training. Thus, Hill (2017) mentions prevailing 'attitudes emphasizing a single correct model of performance and interpretation can inhibit creativity and increase performance anxiety' (p.229), 'overly critical and perfectionist attitudes towards the score' (p.226), and 'an underlying attitude that the creative potential of performers is somehow inferior' (p.223); Dolan (2005): of 'fear, originating from the contemporary culture of 'perfect performance'' (p.111), and Woosley (2012), that 'when a classical pianist attempts improvisation, there can be a tendency to immediately compare the improvised music to works of the standard repertoire' (p.10).

It is not surprising that individuals, having been trained to learn music in one method, should resort to habitual modes of emotional and cognitive processing as they attempt to improvise. Anxiety over errors could therefore be interpreted as a process of evaluative conditioning 'whereby an emotion is induced by a piece of music simply because this stimulus has been paired repeatedly with other positive or negative stimuli' (Juslin & Västfjäll, 2008, p.564). In this way, one's attempts to improvise in a certain style such as Bach, or Mozart, would naturally trigger former associations with this repertoire, thus leading to fear of errors, and so on. However, given the fact of these negative emotions in many learning contexts, it's also important to note their effect on individuals' sense of judgement while improvising: Pekrun (2014), for example, notes that 'emotions control the students' attention, influence their motivation to learn, modify the choice of learning strategies, and affect their self-regulation of learning' (p.6). Therefore, we can imagine situations in which, because of their emotions, individuals are unable to respond to learning strategies, to notice improvements in their improvisation, or feel positive or relaxed when improvising.

A couple of examples serve to illustrate this point: for example, Després et al. (2016) noticed that 'immigrant' improvisers (those who came to improvisation from a background in interpretive performance) use less words associated with pleasure and fun than 'native' improvisers (who had improvised from an early age). Likewise I noticed a tendency to feel anxiety whenever I improvised, as I compared my improvising to the compositional models, an emotional approach to the task which persisted even after I was quite advanced in my skills. Another example is students' reactions to game-like exercises as proposed by pedagogues (i.e. Dolan, 2005; Hill 2017). My own teacher Jurgen Essl also used this method of disassociating the improvisation task from classical repertoire. Yet, although this method works well with many students, there were also occasions when the student simply refused to play 'games' involving 'wrong notes'. In these situations, the student's negative emotions (of shame, fear, and embarrassment) seemed so strong that they interpreted the exercise as a humiliation rather than a learning strategy.

In a similar way, if we accept that classically-trained musicians often believe that 'their creative potential … is somehow inferior' (Hill, 2017, p.223) then it also helps to understand how such beliefs can be reinforced by emotions. Goleman (1997) claims that 'the emotional mind [carries] a particularly strong sense of certainty, a by-product of a streamlined, simplified way of looking at things that can be absolutely bewildering to the rational mind' (p.291), thus, students' emotions can convince them that their improvising is worthless or pointless, no matter what the musical results are. This inability to value one's own creativity can become a dominating feature of the novice improviser's experience, and arises particularly (I discovered) during first attempts to improvise on a compositional model. In effect, as soon as one plays something which is not written in the score, there is a strong feeling of uncertainty, of going 'off-grid', even of committing an 'artistic crime' (Bailey, 1993). Thus I propose that the classically-trained novice is in a unique position of *alienation*

from creative practice as they attempt to improvise; a position created and reinforced through a combination of learning emotions, beliefs about creative practice (*how* music is created and *who* can create it) and self-beliefs about their inability to improvise.

For this reason, I propose the following model which places the classical musician's sense of alienation at the centre of associated emotional and cognitive problems arising as they begin to improvise

A classically-trained musician's experience of novice improvisation

Perception of improvisation dominated by the fluency of experts

Stepping outside the habitual role of interpretive performer serving the score

Lack of experience and skills in improvisation

Sense of alienation from creative practice = "I can't improvise" "I don't know what to do"

Trying to apply *Werktreue* ideals of musical structure and form to improvised music

Trained sensitivity to errors in performance

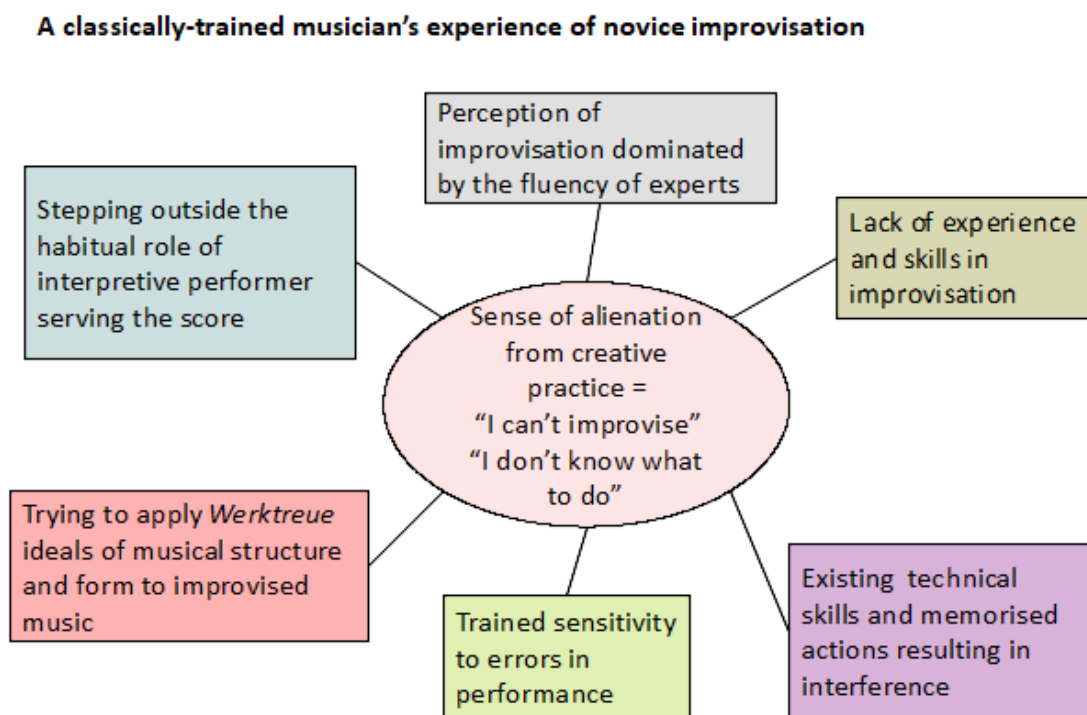Existing technical skills and memorised actions resulting in interference

Figure 22. The classically-trained musician's emotions as a novice are traced to a sense of alienation from creativity.

9.3.2 Emotions throughout the learning cycle

Regarding the role of emotions throughout the learning cycle, I have already emphasised (above) the importance for each individual (no matter what their personality traits) to access positive emotions while improvising and also acquire a sense of creative agency and empowerment through learning. In this section I want to explore the ways in which these emotions can shape and influence the experience of improvisation itself during learning. When Woosley (2012) mentions that 'many students may at first be hesitant or even fearful of allowing their creativity to shine through their improvisation' (p.15) he doesn't only describe an emotion (fear), but also a reluctance to act (hesitation) *because* of the emotion of fear. This is what Aragão (2011) observed in students of language when he proposed that '*emotions* imply movement ... emotions here are defined as bodily dispositions for situated action' (p.302). For example, a reluctance to 'let go' and allow automated productions to take over performance (widely reported in skill-learning literature, and also in this study) can also result in deficiencies in learning as individuals lack access to valuable experience acquired only by more fluent movement. In a similar way, Overskeid (2000) links sadness (negative emotion) to self-doubt within the context of problem solving: 'sadness makes one experience situations as unpleasant more easily. In problem solving, one such unpleasant state is doubt. Because sad people should be expected to doubt their solutions more easily than others, they will also have a motive for more thorough checking of solutions' (p.297). This is an interesting connection because there are clearly situations in learning where an analytical problem-solving attitude is useful, for example, when integrating rules into my improvising (Chapter 5.4), and this work may be motivated by a feeling of doubt, causing one to check one's actions and remove the cause of doubt. On the other hand, more pleasant, positive emotions are clearly associated with a willingness to experiment (Borgo, 2007), and an ability to access 'flow states' (Dolan, 2005) with a contrasting cognitive style of processing, as Pekrun (2014) describes: 'When enjoying learning …

making it possible that one's attention is fully focused on the task. Enjoyment can promote students' flow experiences during learning, such as deep involvement and complete immersion in the activity' (p.12).

Thus, in a general way, one can associate positive emotions with a willingness to act and acquire knowledge through experience, whereas negative emotions tend to halt movement, promoting checking and careful constructions of the task. Positive emotions, arising from increasing self-confidence and agency over the task, can also be linked to more advanced stages of skill learning in which individuals increasingly rely on intuitive decision making, as Gobet (2016) describes: 'decisions are still based on analytical thinking, but intuition starts to play an important role: problem situations are organised and intuitively' (p.99). This emergence of more intuitive learning strategies is something I described in detail (see Chapter 7), including the positive emotions I experienced as I explored and integrated more intuitive decision making as an improviser. In the following extract, the expert improviser Malcolm Bilson gives an example of his emotionally-guided, intuitive decision-making approach to learning: 'you like what you're doing, or you don't like what you're doing: you develop your taste, "yes I like this … no I don't like that" … and at some point you don't have to say that, you just know where you're going …' (p.89).

9.3.3 Achieving a better understanding of emotions through autoethnographic techniques of data collection

One of the benefits of an autoethnographic study is the opportunity to gain insights into one's musical practice (Bartleet, 2009). Recording my emotions in a journal during and after practising gave me the opportunity to reflect on my emotional responses to improvisation. For example, I discovered the influence of 'automatic thoughts' (Beck, 1991) - imaginative scenarios in which critical figures reported their feedback on my improvising

(see Chapter 4.1.5); I also gained a better awareness of positive emotions which I recorded in my journal, but tended to suppress during the actual playing experience. These advantages of methodology are echoed by other researchers; for example, Aragão (2011): 'Reflection on beliefs is one of the major aspects that create optimal conditions for change in the process of language learning, with the emergence of alternative ways of thinking' (p.310), while Roels (2013) in a similar creative self-study, reports that: 'making memos or field notes was used to become fully aware of the changes that this research has wrought on my practice and vice versa' (p.5). Therefore, I propose the autoethnographic methods for achieving greater self-awareness of one's emotions while improvising because, as I suggested earlier, certain emotional responses can be difficult to overcome and extraordinarily influential over students' self-beliefs and experience of the learning process. Pekrun (2014) warns us that, in many situations: 'students may regard their emotional experiences as a private affair that they do not want to share' (p.9) and also ' that teachers' judgements of students' emotions can be very different from students' self-view' (p.9). Therefore, creating opportunities for students to reflect and understand their *own* emotions while improvising could be a valuable tool for pedagogy, empowering individuals to access a more positive and productive improvising experience.

9.4 Research question 4: Why could I improvise in free, atonal styles but not using historical, tonal languages and genres?

This question refers to a former experience in improvisation (see Chapter 3.2.2) in which I improvised fluently using a non-tonal system of harmony. Improvising using tonal, diatonic harmony however was too difficult and required this study to attain the skills. I therefore investigate this question from the perspective of experience gained in both styles of

improvisation which I compare with general approaches and attitudes towards different styles of improvising.

9.4.1 What are the skills involved in different harmonic systems and historic styles of improvisation, and how do these compare?

This study began with the goal of acquiring skills in tonal improvisation, as I found this musical language particularly difficult to control. The complexities of coordinating contrapuntal, voice-leading lines within a harmonic framework, and the necessity of resolving dissonant to consonant intervals on which this style depends was for me, overwhelming; the only approach possible in this style was an extremely slow, effortful construction, in which I experienced no sense of expressive or imaginative freedom. Atonal languages, on the other hand, offered a domain of comparative freedom as I dismissed the problem of harmonic language and focused instead on other elements of the texture, such as the interrelationships of rhythmic cells. Does this mean that improvisation in tonal languages of harmony are more difficult to master? Certainly, general trends amongst concert improvisers indicate that tonal improvisation in historical styles is rare,[26] as de Vries (2014) explains:

> 'I almost have an aversion to the French Romantic improvisation style ... Even the
>
> Haarlem competition [an international organ competition for improvisation] has
>
> become infected with this dogma; it must be new, it must be creative, it must be
>
> personal – all important of course but not the be all and end all. For me it's much

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[26] I know of only three concert organists: Sietze de Vries, Wolfgang Siefen and David Cassan, who improvise in Baroque forms. However, this refers specifically to recital contexts and does not take into account organists who improvise in church contexts. Knowing the prevalence of tuition in historical forms and styles of improvisation (particularly the techniques of Choral Vorspiel, Variation and harmonisation), it is likely that a great deal of diatonic, tonal improvisation occurs in Germany; however, very little of this way of improvising appears on concert stages compared to the French Romantic style, and other, more contemporary languages.

more interesting to be faced with a single manual meantone organ with a 4 octave

compass and to improvise something beautiful in two voices. That's a real challenge."

My interpretation of the 'French Romantic style' in de Vries' description is that it is

based on a harmonic system of adapted modal scales as championed by the composer and

improviser Olivier Messiaen (1908-1992)[27]. An example of these scales is given in Figure 23
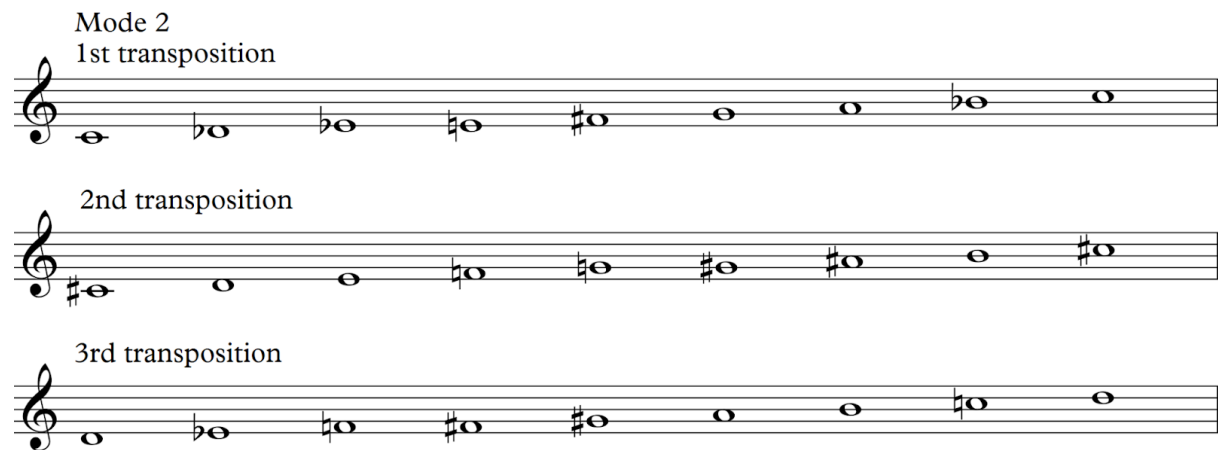
Figure 23. Modes of 'limited transposition'[28] (Messaien, 1956)

This type of scale is presented by Messiaen in his treatise: *The Technique of my*

Musical Language (1956) as a system for generating all melodic and harmonic aspects of the

musical texture. In contrast to the strict rules regarding the treatment of dissonant and

consonant intervals in diatonic systems (see Chapter 5.3.5 for a comparative view of Fux's

[1725/1971] rules governing the motion of these intervals), dissonance and consonance are

treated more equally by Messiaen, as the aim is to create an chromatic, colourful sonority.

This means the improviser, harmonically-speaking, is in a position described by

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[27] Messiaen was a highly celebrated and influential improviser. Most of his improvising occurred as he accompanied the Mass through his duties as organist at the Église de la Sainte-Trinité, in Paris.

[28] Because the scale itself is constructed through alternate semitone and tone steps, there are only two possibilities of modulation, each of which occurs through transposing the scale up one semitone, for any other transposition replicates the original scale on another degree; thus, Messiaen (1956) refers to these scales as 'modes of limited transposition'.

Johnson-Laird (2002) as 'neo-Lamarckian' in which only appropriate ideas will be generated in the moment as any combination of notes in the modal scale are acceptable; thus the improviser is not dependent on the lengthy training customary in diatonic, tonal languages for controlling the relations of dissonance and consonance at a similar level of fluency and expressivity.

In a conversation I had with the concert improviser Wolfgang Mitterer, he compared his experience of improvising in diatonic tonality with Messiaen's scales of limited transposition.

'It could be very stressful when you start a tonal thing, and then you lose the tonalities and you can't find it back! On the other hand if you forget this and come in with a Messiaen style it's not so difficult, because you just keep the [harmonic] tensions and you don't resolve them in this style' (Wolfgang Mitterer, personal communication, 26th October, 2016).

Thus, for Mitterer, the challenge of maintaining the harmonic purity of diatonic tonality is more challenging than the modal style, because there is no specific need to resolve the dissonances in modes of limited transposition; these are maintained unresolved as part of the colour and character of the style.

Lastly, I include a quote from the organist and improviser Jean Langlais (in Bailey, 1993), who compares the skills of improvisation in a free, atonal style, with the discipline of a Baroque, contrapuntal form, featuring three independent voices:

'I met a very gifted man, both for the organ and for improvisation. He was the winner of a competition in Haarlem. … I gave him three themes. And he did something really free [atonal]. I then realised that he was very gifted but that his background was not

developed sufficiently. Then I said 'this is a very brief theme, do a trio with that'. And he was unable to do a trio … Improvisation can be very complicated. Those people who say 'I can improvise easily' - they are amateurs' (p.38).

In spite of these quotations, it is not my intention to assert that one kind of harmonic system (i.e. diatonic tonality) is harder than all others. Only that the rules of diatonic tonality are more complicated to control and more unforgiving if one has not mastered them, than other systems. As I suggested above, some individuals might greatly prefer the challenge of a complex, rule-based system, and find the freedom of atonality difficult to master. My own experience is reflected in Langlais' words as (i) I discovered skills and fluency in improvising using atonal systems did not transfer as skills using diatonic, tonal systems of harmony (ii) it was the complications of constructing contrapuntal textures (independent voices) within tonal systems of harmony which I found particularly difficult and challenging.

9.4.2. Perceiving tonal languages of music as improvisatory systems

I have already talked of the effect of emotional conditioning to certain styles and languages of music as a result of former musical training (see Chapter 9.3.1) on individuals' ability to improvise. The same effect of former training can make it difficult for musicians to perceive systems of diatonic tonality (most closely associated with the historic masterpieces of canonic classical repertoire) in terms of opportunities for creative freedom and self-expression. My own view as a novice was that tonal systems of harmony represented a challenge or test of my skills, certainly not a musical language for having fun or relaxing! Similarly, Wolfgang Mitterer told me: 'It's one thing to improvise on the organ [in a classical style], and another thing to improvise in a free-jazz quartet. Which is one of the most free things in a musical life - this conversation with three other people. Then you go for the energy, not the harmonies; you use the harmonies to put energy' (Wolfgang Mitterer, personal

communication, 26th October, 2016). The composer and improviser Carlos 'Zingaro' (2006) also describes conscious attempts to distance himself from classical styles as he sought creative freedom: 'After abandoning classical playing at 16/17, I kept my back turned to that music because of basic trauma and frustration … even tried to learn the bass clarinet and the trombone in order to 'escape' the violin … Improvisation gave me the possibility to figure out different ways of using it … coming up with something that could finally surprise or interest me' (p.601).

Because of these learned associations between diatonic tonal systems and the classical repertoire, I propose that it is particularly difficult to perceive historical styles of music in terms of conceptual$_1$ underlying principles. For example, one improviser I spoke to told me that: 'you cannot organise [an improvisation] per se as you would do in a Beethoven sonata where motivic, logical things become like a big sudoku - everything locks together' (see conversation with Harry, Appendix D), a perspective which captures a *Werktreue* approach towards musical structure in which every element in a work is fixed by the composer. Compare this approach, however, with the following jazz musician's perspective towards musical structure:

> 'For jazz musicians, structures (a set form and harmonic structure) are a great convenience in that they give us a framework for improvising where everybody in the ensemble can be 'on the same page'. The best analogy I have come up with is to a clear glass kitchen mixing bowl. It's rigid, but you can see through it. And no matter what you put in it (pancake batter, candies, tuna salad, a goldfish in water), it retains its shape. So each 'chorus' of improvisation you can put something different in the musical bowl' (Hersch, 2006, p.577).

Hersch's description makes explicit the conceptual$_1$ skills and approach towards musical construction in his brilliant analogy of the 'clear glass kitchen mixing bowl', which allows and encourages an organised freedom: 'a framework ... where everybody can be on the same page'. Again, the conceptual$_1$ mental construction of the 'set form and harmonic structure' is effortlessly conceived, and can be compared to my complex, effortful attempts to describe my emerging conceptual$_1$ perception of Baroque forms and harmonic structure! A final example is given by Wessel (2006), who describes a more contemporary (free atonal) approach in which the conceptual framework itself is created anew: 'I will often develop my musical concepts around the notion of a situation for the performers … The idea is a simple one; capture material from your partner performer on the fly, transform it in some selected manner, and re-inject it into the performance' (p.426). For musicians such as Hersch, and Wessel, the conceptual$_1$ nature of the task is explicit and offers the correct blend of discipline, organisation, and freedom which they need to stimulate their creativity quickly, in the moment of performance. As I will argue in the following paragraphs, it is this conceptual$_1$ quality of approach which defines the particular quality of the improviser's knowledge base, yet, due to learned perspectives of the tonal language associated with historic styles of repertoire, this language may be particularly difficult for classically-trained musicians to construct in terms of underlying conceptual$_1$ principles.

9.5 Research question 5: Why did I find it so difficult to improvise according to a planned musical structure? How could conscious instructions be incorporated into my improvising without inhibiting the flow of imagination and fluency?

9.5.1 Are conscious instructions necessary?

With much talk of flow states, fluency and automatic performance, there is a widely-held belief, often reinforced by expert improvisers themselves, that conscious

instructions simply interfere in the improviser's performance. For example, Robert Levin stated: 'I never, and I mean never, say "I'm going to modulate to f-sharp major now," or "I'm going to use a dominant seventh now" … I do not for one millisecond when I'm improvising think what it is I'm going to be doing. I don't say, "Oh I think it's about time to end now …"' (in interview with Berkowitz, 2010, p.123). Or consider the following extract from a conversation in which I asked a retired harmony teacher (Paul) to describe his awareness of harmonising a hymn tune:

Paul. 'I can hear it, in my head. And I can hear it in various different ways, you know: are you going to use IIb or II7b[29], or ... is the dominant going to have a suspension in the middle parts; is it going to have a 7th on the dominant? So, yes .. there are lots of variations on the basic stock phrase, but I've got the sound of it in my head.'

J. 'The sound of it, yes, but going beyond the sound … Can you possibly describe another kind of mental representation? Like an image or graphic?'

Paul. 'Well.. I'm not so good at doing it now - practically .. because I haven't taught A-level music for the last 8 years. I haven't done any harmonising chorales or anything for the last 8 years and you get out of the habit.'

J. 'Yes, but I'm interested in how you actually recall that information in a way that allows you to do what you just showed me.'

Paul. (thinks a long time.. then laughs) I don't know to be honest. I really can't put it into words. There must be a lot of finger memory, you know, the shapes of chords ... I

[29] Paul refers to chord symbols notating triads based on each degree of the scale, thus: IIb = a triad with the second note of the scale as its root, in first inversion.

have these stock moves in my head; I've got the sound of the chords, which I think is there, certainly just before I play them. Sometimes the whole stock move is there in my head before I play ..(for example) the four chords.'

Paul's difficulties in describing his awareness of the task while improvising is characteristic of experts who do rely more on automatic productions than conscious construction. This makes it confusing for the novice improviser or researcher to understand in what way improviser's do represent the task in the moment of performance. As a novice myself, I rejected the idea of 'not thinking' while improvising for several reasons: (i) my experience of free atonal improvisation indicated that conscious instructions (i.e. a modal scale) could be used without interfering with the flow of action; (ii) the style of the Baroque music which I aimed to copy argued against a non-conscious approach: the clarity of structure and constraints in, for example, a Fugue, or a Chorale Partita could not be improvised without some form of conscious control or awareness of the sequence of events; (iii) performance constraints, such as those typically faced by the church organist also argued against non-conscious awareness, as Jean Langlais describes: … 'in churches we are obliged to improvise all the time. If a priest is very slow, we are obliged to adapt to that. If the priest is very fast we also have to adapt' (in interview with Bailey, 1993, p.37)[30].

For these reasons I believed it necessary to accept the need for some kind of conscious instruction, awareness and control on the part of the improviser over the clearly-sequenced events of Baroque forms and musical structures. The question then was *how* to integrate instructions into one's improvisation without disrupting the flow of action, and without even being aware of using them. Soon after I started the study, a clue to this style

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[30]Cognitive theories support this view, for example (Clarke, 1988): 'An improviser must construct a [mental] representation for at least a short sequence of events in advance, and cannot operate at speed or with any fluency on an event-to-event level. [Experts] may have become unaware of these hierarchical structures … but they undoubtedly exist' (p.7)

of cognition emerged in another conversation I had with the concert improviser Wolfgang

Mitterer:

WM. 'You have to find a way... if you think "I'm in G minor and there's the

possibility to go to D minor" .. if you think [like that] it never comes out a good

improvisation. You have to find a way to stop thinking and improvise freely'.

J. 'So, a conscious decision: "I'm now in G major and I'll head towards to D minor"

this would, as you say, kill the process?'

WM. 'My teacher would have said 'You have to know both' and, of course, he is

right. You have to know the theory and it's good if you know this theory; because then, if a

thought comes during improvisation like "Oh, now this is G minor" then, this thought, if you

know what you're doing (in theory), then this thought, which is coming up, doesn't block

you. You also have the right thought to continue and can forget it again. I think it's a mixture

finally, yea?' (Wolfgang Mitterer, personal communication, 26th October, 2016)

Mitterer thus begins with the denial of conscious instruction (similar to Levin above)

but then he corrects this to describe a way in which the conscious thought "this is G minor" is

integrated into the automatic procedures of performance: so that "it doesn't block you". It is

this process of integration of conscious thought into one's improvising which I now discuss.

9.5.2 Stages of integrating conscious instructions through the learning process

In the initial stages of skill learning, conscious instructions are used to 'generate the

desired behaviour to at least some crude approximation [of the skill]' (Anderson, 1982,

p.369), while there is little possibility of integration as appropriate actions must be discovered

for each sequence of the performance. This is why a novice's performance in particular is

characterised by pauses as they work out how to coordinate actions with mental instructions.

There appear to be two distinct pedagogical approaches at this stage. One, is that fluency and flow should be encouraged *before* conscious instructions inhibit the student's ability to improvise (Whitmer, 2012; Jaques-Dalcroze, 1921; Dolan, 2005); in this way, through movement, rather than conscious calculation, the student implicitly learns to integrate conscious awareness into performance. This approach might be likened to riding a bike, in which only efforts to move forwards and achieve balance can provide the procedural knowledge. The other approach is that taken by treatises such as Dupré (1975) and Schouten (1955) which try to clarify the conscious instructions so that the student is better able to organise their actions. My own experience of trying both these approaches is documented in the study, in which, due to my sensitivity to errors and a need for conscious, explicit, clarity about the task (also noted in Kingscott & Durrant, 2010), I was drawn more towards the second approach; though I rejected the written exercises in favour of designing my own reduced scores[31].

There now follows a stage of learning in which the novice learns to interpret theoretical rules (which define a musical style) into a conceptualised$_1$ knowledge base of patterns and formulas (i.e. Pressing, 1988; Kenny & Gellrich, 2002; see also Chapter 5 in my study). I use the term conceptual$_1$ because of the mental processes involved: the individual takes a particular arrangement of notes, for example, a perfect cadence in C major, and through the exercise of constructing this formula in many different musical contexts gains a more generalised mental representation (see Figure 19). Theoretical knowledge is much

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[31] Whether one adopts a strategy of fluency or conscious calculation, the student aims at a new kind of knowledge which, as Mitterer suggests above, doesn't interfere with action. For novices of course, this is impossible, as their conscious thoughts and instructions bear little relation to the actions they perform. These actions must first be discovered and organised. Theoretical knowledge must, therefore, become integrated through experience 'in the field', as Baily (2001) asserts when he says: 'only as a performer does one acquire a certain essential kind of knowledge about music' (p.86). Note, that the kind of performance we are talking about here is improvised, not interpretive performance, as it is only through the creative acts of improvisation that one can achieve a particular understanding of musical-theoretical knowledge as it becomes relevant to the task.

reduced, because the cadence is no longer constructed through individual notes, but through essential features represented by an image, or feeling - an act of construction - in the fingers. It is this generalised way of constructing the cadence which creates the conceptual₁ mental representation, and which I propose is the most distinctive quality of the improviser's knowledge. This stage of learning, in which the improviser acquires a basic conceptual knowledge of formulas and patterns, is, in my experience, the most commonly addressed in written treatises, and most clearly linked to conceptual learning in literature of improvisation.

The next stage in learning (and encoding of conscious instructions) is often more difficult to capture as it results from a particular style of cognitive interaction with the musical stimulus. In my study I described (see Chapter 5.4) a moment in which I intentionally reduced an exercise to selected features in order to understand or 'see' something in the musical structure. What I saw could not be communicated directly to another person, yet, it was experienced as a critically important piece of information, something I needed to know which accelerated my learning and deepened my knowledge of the task. In this way the experience of emergent, conceptual₁ representations of the task can take on distinctive features, as the Table 6 indicates:

Table 6

A comparison of two accounts of emerging conceptual₁ knowledge during learning

	Rice (in Baily, 2008, p.125):	Personal Notes (7th August, 2017, see Appendix C)
Student's awareness of problem	'I had made a distinction between accent and mordent and melody note'	'Originally I separated harmony from counterpoint as a separate discipline. It

		concerned me how the two might be related'
Emergent awareness of conceptual$_1$ knowledge as solution to problem	'I now understood that the myriad sounds I perceived as melody and ornamentation were, from a player's conceptual and physical point of view, unified into a single concept as ways of moving from tone to tone'	'I began to perceive … how the music moved from harmonic point to point. These harmonies, which proceeded in the form of a slow procession through the piece provided the stability of a structure from which all the figurations [contrapuntal elements] could momentarily depart and decorate'
New concept$_1$ is used to guide improvisation	'Gaidari [gaida players] needed to think only of melody tones and, as they moved between them, their fingers produced ornamental tones'	My awareness of harmonic 'points' informed my improvising ...
Performance is dramatically improved through conceptual$_1$ control	'I went from tense, slow playing to relaxed, fast playing in the blink of a concept... I had found the elusive gaida player's fingers and solved le mystère des doigts bulgares'	… which now focused on driving to the next point, and establishing such a point in my fingers and perception'

.

In Table 6, I have aligned an extract from Timothy Rice's account of learning to play the *gaida* bagpipes (in Baily, 2008), with a similar extract taken from my own journal. In each case, there is a distinctive sequence of events. Initially, the student wrestles with a particular problem: in Rice's experience it was a problem of recreating a type of melodic inflection and expressive character typical of the Bulgarian style he studied; in my case it was

a similar problem but harmonic nature, as I tried recreate the chromatic, expressive motion of a French *plein jeu*). In both instances the solution to the problem emerged unexpectedly through perceiving the musical elements in a new relationship or structure which is often closely associated with a particular motion or technical approach: thus, Rice discovered 'ways of moving from tone to tone', while in my account I perceived how the music 'moved from point to point'. The conceptual$_1$ representation can therefore be seen to link an element of theory with the organisation of embodied actions. The final act of the improviser is to use the emerging concept$_1$ for generating similar passages of music 'as the main instrument of thought' (Vygotsky, 1986, p.139), facilitating fluent, imaginative, improvisation within stylistic constraints.

Because of the highly experiential nature of this type of emerging knowledge, it is often difficult for researchers to access or understand this stage of learning in the same way as the acquisition of basic formulas and patterns. However, in spite of the intuitive way in which improvisers encode aspects of musical style and performance at this more advanced level, I believe they should still be understood in terms of basic processes of conceptualisation$_1$ as I have demonstrated. Thus, when Mitterer talks of having 'the right thought to continue and can forget it again' I believe this should be understood as a conceptual$_1$ mental representation of task which involves an element of conscious theory and explicit instruction, and therefore cannot be accounted for purely in terms of intuition, emotion or inspiration (though these might also be involved). It's interesting to note that, in spite of the fact that conceptual$_1$ mental representations cannot be directly communicated from one improviser to another, it is nevertheless common for musicians to engage in a period of formal study in which advanced stylistic features of a musical style (such as those described above) can be absorbed and understood. For example, Kingscott & Durrant (2010) refer to 'a process of assimilation and formal learning [through which] one reaches a point

where meaningful improvisation may take place' (p.141), while in my study I needed the guidance of an expert improviser (Jürgen Essl) to show me techniques in extracting salient, characteristic features from selected models. The two processes of explicit instruction and subjective integration on behalf of the student, however, need not be exclusive as the student is often able to interpret the professor's instructions conceptually$_1$ (as I discovered) through former experience in conceptualising$_1$ the basic formulas and patterns. In many ways, experience of participation in a practising community of improvisation also illustrates how conscious goals and instructions can be assimilated into procedural actions and performance behaviours (see Chapter 6.2.5.1).

How then do these stages of advanced conceptual$_1$ encodings of conscious instructions connect with the fluency and automaticity of expert performance? What of 'letting go' and allowing automatic productions to take over? In skill-learning literature (i.e. Schneider & Fisk, 1982), the interference of conscious control with (increasingly) fluent and automatic actions is well documented; thus, we understand that all improvisers have to negotiate a process of allowing procedural actions more autonomy, as the improviser learns to take a step back, as Berkowitz (2010) explains: '"Letting go" means allowing the proceduralised/automatised sub-elements, processes, and structures of the knowledge base to guide the improviser from moment to moment, as he or she steers the "bobsled" at a more global level' (p.125). Després et al. (2016) also talk of a process of 'unlearning' one's knowledge as experts prepared for performance and tried to distance themselves from habitual conscious ways of construction. In my own study I tried to capture this process of letting go of conscious control in detail; a process which included the increasing use of intuitive learning strategies (see Chapter 7.5), and faster and fluent automatic productions controlled more remotely, through embodied sensations of metaphor (Johnson, 1987) and semantic recognition (Snyder, 2000, see Chapter 8.3.4.1).

However, I do not believe we should understand this transition from conscious control to automated productions as involving a qualitative change in the nature of the mental representations used, for two reasons: Firstly, it is more a question of degree or proportion, as the improviser is (by my theory) already using conceptual$_1$ representations which integrate a small element of conscious representation with automated actions; thus, as automaticity increases, the proportions of unconscious to conscious increases, and the conceptual$_1$ structure, while remaining cognitively 'light' and unobtrusive, triggers and organises more and more automated productions[32]. Secondly, I believe that the concert improviser, rather than developing a qualitatively new kind of knowledge, utilises certain techniques over existing knowledge to form a distinctive kind of cognitive approach towards performance; one in which conscious control adopts the characteristic distant, monitoring role (illustrated above) over automated productions which must maintain fluency at all costs. This I discovered as I approached my first public performance and realised that I would have to 'turn off' any sense of critical feedback, and also accept any of the events of the improvisation, working with these events within a sense of the whole musical structure or schema$_1$ (see Chapter 8.4). A similar cognitive reorganisation is also evident in Levin's (in Berkowitz 2010) description of preparing for a public performance: 'I would lie awake in the hotel room … before a concert thinking about a possible plot line for a cadenza. And I would sit there saying "Let's see: I could use such and such a theme, and I could take that in a sequence, that would take me to such and such … The problem is that you get into the concert and start to work and suddenly your mind goes into overdrive and you don't do those things, or you forget them, or you just go in another direction … And I began to realise

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[32] My conception of the improviser's cognitive control over increasing automaticity thus runs close to Anderson's (1982) theory of composition and proceduralization, for example: 'the composition of multiple steps into one produces the speedup and leads to unitary rather than piecemeal application. The dropout of verbal rehearsal is a result of the fact that proceduralization eliminates the need to hold long-term memory information in working memory' (p.384)

you're just going to have to let go of it and go wherever you go' (p.123). Thus, we understand from Levin, that his habitual ways of constructing the task, even as an expert, can involve clear conscious planning, but that in the moment of performance he suppresses this element of conscious control to allow automated productions more freedom.

9.6 Research question 6: What kind of knowledge did expert improvisers possess or use? Did they acquire particular techniques for representing and encoding musical structure?

In the previous paragraphs I illustrated the necessity of understanding the conceptual$_1$ quality of the improviser's knowledge as the only means of explaining conscious awareness and control over the improvisation without interfering in automatic, fluent productions. In the following paragraphs I summarise the main features of a conceptual$_1$ knowledge for improvisation, emphasising its role in creative decision making at all levels of learning, and exploring the implications of an explicitly conceptual$_1$ knowledge for improvisation on pedagogy and future research directions.

9.6.1 The main features of a conceptual$_1$ knowledge for improvising, summarised

By emphasising the conceptual$_1$ quality of the improviser's knowledge I do not propose a new cognitive theory of improvisation, or a radical departure from current cognitive research. Having gained a knowledge which allows me to improvise it is interesting to return to the cognitive theories I earlier reviewed (see Chapter 2.1). These theories clearly describe important features of my present knowledge and skills: for example, I use a mental representation or *referent* of musical structure and of the task (Pressing, 1998); my knowledge is cognitively 'economical' and provides (stylistically appropriate) learnt actions to inform present decisions (Johnson-Laird, 2002); I also regularly rely on all three of Clarke's (1988) generative approaches (associative, hierarchical, and repertoire selection) to

improvise musical material at three different layers of musical texture - *dispositio, elaboratio* and *decoratio* (Callahan, 2010). As general theories and approaches, such research offers a range of cognitive possibilities to the novice, but they cannot guide one's learning towards the clarity and certainty one needs to improvise. Beyond general descriptions of cognitive processes there remains a degree of mystery over what the improviser actually does. Therefore, the aim of this thesis has been to describe and articulate an acquisition of knowledge which has clarity and certainty, and also to give this process a name - of conceptual$_1$ learning, within the context of language learning of children and adolescents as described by Vygotsky (1986).

That improvisers use conceptual knowledge is not a new idea. Both Pressing (1998) and Berkowitz (2010) explicitly state that expressive flexibility and structure can only be combined fluently in real time through conceptual knowledge, but this is mentioned either as one of several attributes of knowledge, (along with motorised patterns or a semantic memory), or as a stage in learning, associated closely with basic formulas and patterns. I also disagree with Berkowitz's description of conceptual knowledge as communicated through exercises and strategies (for example, of transposition, variation, and recombination), as my experience showed it was possible to execute many such exercises without acquiring conceptual insights into the task. Thus, there is insufficient recognition or elaboration of (i) the specific role played by the individual in gaining conceptual knowledge; (ii) the way in which conceptual knowledge, insights and representations guides one's learning; (iii) the way in which conceptual knowledge differs qualitatively from other, non-conceptual, forms of musical perception, i.e. *Werktreue* attitudes, in which every element is fixed.

Vygotsky (1986) on the other hand, places conceptual knowledge: 'the result of such a complex activity, in which all basic intellectual functions take part' (p.106), at the heart of an

individual's ability to gain expressive control over language. It is also Vygotsky (1986) who explicitly describes the cognitive interactions with the task which enable the individual to obtain conceptual insights:

> 'The cultural task per se, however, does not explain the developmental mechanism itself that results in concept formation. The investigator must aim to understand the intrinsic bonds between the external tasks and the developmental dynamics, and view concept formation as a function of the adolescent's total social and cultural growth, which affects not only the content but also the method of his thinking. The new significative use of the word, its use *as a means of concept formation,* is the immediate psychological cause of the radical change in the intellectual process that occurs on the threshold of adolescence' (p.108).

Thus, as I have tried to capture and articulate throughout the thesis, it is these emerging insights into the task - the realisation of a new significative use of a cadence, or harmonic movement, or any particular arrangement of notes - which suddenly and meaningfully connect these (formerly theoretical) objects to expressive musical gesture and structure, which is the most important part of the learning experience in forming the improviser's knowledge. Therefore it is my belief that, by explicitly stressing the conceptual$_1$ nature of the improviser's knowledge through all stages of learning, we gain a better understanding of the student's flow of control (Anderson, 1982), i.e., the speed, accuracy and flexibility of their actions while improvising, and also a more convincing account of the individual's ability to acquire a sense of creative agency arising through the clarity of conceptual$_1$ insights into the underlying patterns and functions of musical construction.

Emerging conceptual$_1$ knowledge is peculiarly meaningful and convincing for the improviser, being an 'intimate, direct encounter with experience in which we are personally

involved' (Jeffreys, 1966, p.143). This is why terms such as *recognition* or inward *naming* of features and experience are invoked throughout the thesis. There is also a clarity to this kind of mental representation which informs one's actions and develops one's perception of the task and of oneself as creative agent. I mentioned earlier (see Chapter 6.4) that a conceptual$_1$ representation rarely provides a 'clear, theoretical 'map', but this needs qualification. Vijay (2004) makes a useful distinction between cognition of music which occurs *in-time* (for example, improvisation) and cognitive processing which occurs over time, or is not time dependent (such as composition or analysis). Whereas latter forms of understanding might result in theoretical plans and maps (Clarke's [1988] tree diagrams of hierarchical structure are a good example), these kinds of representation do not describe the embodied clarity of the concept$_1$ which emerges *in-time* and thus captures a 'real-time interaction with the structure of one's environment' (Vijay, 2004, p.164)

It's important therefore to understand the role of emerging conceptual$_1$ knowledge in creatively empowering the improviser. The concept$_1$ not only guides and motivates one's actions but also engages one's imagination; what Jeffreys (1966, p.143) calls an act of 'total perception, not a calculated checking' and which automatically inspires motion and a new, active construction of the musical stimulus, reflected in expressions such as 'finding pathways through the knowledge base' (Berkowitz, 2010, p.88), or 'going for the sounds' (Sudnow, 2001). This introduces the notion of movement into the experience of conceptual$_1$ knowledge: as one moves from a theoretical position to a more active, empowered involvement in the task, and also towards new possibilities of action as an improviser. This has important consequences on learning, as Polanyi (1959) describes when he says that: 'the shaping of knowledge is achieved by pouring ourselves into new forms of existence' (p.34).

Therefore, a large part of the conceptual$_1$ acquisition of knowledge depends on one's disposition for action, as it is only through a willful readiness to act, to experiment, to manipulate musical structure towards expressive ends that one stumbles upon conceptual$_1$ understandings and representations. This is particularly significant for the solitary learner who may not be guided and encouraged to make the kinds of free movements advocated, for example by Dolan (2005) and Jaques-Dalcroze (1921). However, by understanding emerging conceptual$_1$ knowledge as the motivating, guiding force and substance of the improviser's knowledge throughout the various stages of learning, we can understand how the improviser does in fact encode the task, as my original research question proposes. It is not a literal encoding of information as I originally, resulting in a 'shorthand' static form of knowledge (as a theory or proposition), but rather, an encoding of a particular experiential, imaginative encounter with musical structure over time, as Vijay (2004) describes: 'we may understand *musical* improvisation as the in-time, temporally extended exploratory interaction with the structure of one's acoustic, musical-formal, cultural, embodied, and situated environment' (p.165).

The main events of this encoding process and knowledge formation can now be summarised:

1. The novice begins with a period of unstructured experimentation. Improvisation is experienced as an unfamiliar environment in which actions and their consequences are unguided and unknown.

2. Through increasing familiarity, simple, directed actions can be linked to musical consequences. This results in a more meaningful recognition of certain musical elements and features, while improvising. This process of recognition is termed Categorisation$_1$

3. The intermediate learner acquires the ability to engage in problem-solving exercises, and to experiment with rule-based systems of musical construction. This results in a Conceptual$_1$ understanding of basic formulas and patterns using a limited stylistic language.

4. The learner now benefits from the guidance of an expert improviser and participation in a practising community of improvisation. Conceptual$_1$ control is now exercised over more refined stylistic principles. The student becomes aware of performance behaviours, and learns to generate and create stylistic improvisation more fluently.

5. The range of conceptual$_1$ knowledge expands quickly. Productions become more fluent and automatic, and the improviser is compelled to 'let go' of conscious control and reflective decision making. Non-literal (metaphoric, embodied and semantic) representations of musical events now guide the improvisation more intuitively. Learning strategies also become more intuitive.

6. Expertise: new ways of mobilising the knowledge base become necessary for live improvisation and public performance Critical feedback and conscious instruction (which interfere with fluency and automated productions) are entirely suppressed and attention focused on an emerging sense of the whole structure (Schema$_1$).

9.7 Implications of my study for pedagogic methods of teaching improvisation to classically-trained musicians

An autoethnographic study necessarily emphasies the individual and personal nature of learning, and I certainly benefited from a teacher who showed empathy towards students' feelings and perspectives, and was thus flexible in the strategies he used to mobilise their

improvisational, creative skills. An outstanding improviser himself, Jürgen Essl not only possessed the knowledge for improvising in a range of historic styles, but also knew how to make improvisational ways of thinking 'visible to the student' as de Bruin (2017) recommends. Many of the masterclasses I watched, on the other hand, served only to promote the teacher's perspective, while the student was simply criticised for the failings of their performance. Of course, having emerged from a long period of highly-reflective self study, its perhaps natural that I would emphasise the cognitive and emotional processes of learning rather than the products (an approach which is particularly explored in Biasutti, 2015; 2017), but, on the other hand, my learning was focused towards expert performance, in which musical products cannot be ignored; in which context, facilitating student's ability to perform as improvisers also becomes a critical factor.

If I combine my experience of learning with the pedagogic literature I have read then the following suggestions come to mind.

- **Keeping theory to a minimum**: a pedagogical approach which is characteristic of improvisatory musical cultures (i.e. Baily, 2008; Dunbar-Hall, 2009) and important for encouraging rather than inhibiting action, is the ability to reduce theoretical principles to their most essential features in relation to improvisation.

- **Creative agency**: a theme which appears in many papers (Shevock, 2018; Borgo, 2007; Hickey, 2009) is the student's feeling of confidence or agency. Central also to my own learning experience was the necessity of acquiring this sense of creative agency over the task, which motivated and facilitated my acquisition of knowledge. Acquiring agency can be a complicated and individual process, involving tackling self-beliefs, identifying musical goals, and designing one's own strategies and

exercises; yet it should be seen as an essential attribute of the improviser's knowledge and skills, without which, musical decision making is almost impossible

- **Reflection and meta-learning**: de Bruin (2017) states that: 'Articulation and reflection are methods that help the student to focus observations of expert problem solving, and gain access and control of their own problem-solving strategies' (p.87). As I have suggested above, the use of autoethnographic techniques such as journal keeping, audio recording and filming, can help students to monitor their emotions, focus their attention and gain a more objective awareness of their learning and improvisation performance.

- *Wertktreue* **attitudes and beliefs**: in contexts where improvisation is taught to classically-trained musicians, it would be beneficial to explicitly reflect and acknowledge the influence of *Werktreue* attitudes and ideals on musical practice; also how these ideals affect individuals' ability to improvise.

The fact that teachers such as Jürgen Essl develop a variety of approaches to teaching improvisation reflects not only the diversity of students but also the range of different experiences which individuals bring to the task. A feature of my study however was the difficulty in transferring perspectives of musical structure typical of interpretive performance to the flexible, conceptual$_1$ perspectives necessary for improvising. This characteristic problem for classically-trained musicians is, I believe, implicitly reflected in many of the strategies mentioned in research, particularly when professors talk of instigating new perceptions of musical structure in terms of variation and plurality (Hill, 2017); however, I would propose that a more explicit recognition of the conceptual$_1$ quality of improvising knowledge and cognitive control would help to unite many currently diverse strategies and approaches to teaching.

9.8 Suggestions for new research into learning and performing improvisation

Many of the suggestions are implicit in the thesis. I have earlier criticised cognitive theories for being too general to apply to the lived experience of learning to improvise. One of the aims of this study has been to make a more meaningful connection between these two approaches, and much more work could be done in this area. For example, this study could inspire researchers to investigate novices' and intermediate students' cognitive approach to improvising rather than focusing purely on experts. Current studies in this field, such as Custodero's (2007) study of children's improvising, already yield valuable information, but there is very little information regarding adult learners of improvisation, while structured studies, such as this, which gather data of learning patterns over extended periods of time are practically non-existent. Methods of collecting improviser's experience used in this study such as journals and notebooks of daily experience are recommended, particularly as there is evidence from literature that individuals can learn to identify, monitor, and articulate their conscious thoughts and mental representations while performing and improvising music by using such methods. Of particular note in this respect is Lisboa, Demos & Chaffin's (2018) research into musicians' 'performance cues' in which a subject was taught to 'practise the thoughts and feelings they want to convey to the audience along with the actions that produce the musical sounds' (p.521); also Beck's (1991) extraordinary account of discovering 'automatic thoughts' in his subjects. The advantages of this approach are manifold: (i) rather than deducing cognitive processes from the observation of experts, this would give researchers direct access to earlier stages of knowledge formation and skill learning on which expertise is based. (ii) that novices and intermediate learners generally use conscious, effortful constructions of the task, which means they themselves are more aware of their cognition than experts who have replaced these ways of cognition with more automated, intuitive methods. There is no shortage of subjects for such studies, particularly in learning

institutions such as Germany and France, which also offer clear pedagogical frameworks within which the responses of students could be compared.

The study of improvisation within a practicing community (such as that which I have described in the HMDK Stuttgart) might also encourage a different perception of improvisation as being a more everyday, creative skill, similar to language production, rather than something rare, to be understood in terms of innate expertise or extreme skills. In this context, Vuust & Kringelbach (2017) suggest a number of approaches for empirical studies of improvisers; but some of the theoretical frameworks used in this study could also be employed for interpreting data and understanding embedded, experiential processes of learning and knowledge formation. These include ecological frameworks of situated, adaptive learning (Reybrouck, 2005) and biological theories of consciousness (Edelman, 1989, 1991), which are particularly insightful into the neurological background of concept formation; adults experience of second language learning (a subject currently only linked to improvisation in Berkowitz, 2010), also a rich and developing field of artificial intelligence which I have only tapped through a now rather distant source in Anderson's (1982) models of cognition. Artificial intelligence is a field which I myself would like to explore in the future, with the aim of assisting in the design of cognitive models aimed at recreating human concepts of rule-based creativity, which could be extraordinarily insightful for our understanding of learning and performance processes of improvisation. Such models can, as I discovered (see Chapter 5.4), equally inspire the clarity of investigative thought as modelled on a production system, which can be so effective in learning contexts of improvisation.

9.9 Epilogue

To break out of one's ideological situation and begin to improvise can be a disturbing process as I have described, but worth doing, if only for its effectiveness in breaking the

ideological chain. It was my experience that a structured approach to learning to improvise carried me through the barriers of ideology to a different kind of musical life which is now more natural, creative and rewarding. I hope that my thesis will encourage others to also take this path.

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