

**ACTIONS TOWARDS FREEDOM**  
**Theoretical and Practical Perspectives on**  
**Improvisation and Composition**

A thesis submitted for the degree of Doctor of  
Philosophy

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## **Abstract**

This thesis, and the accompanying portfolio of pieces, is concerned with investigating practical and theoretical meeting points between improvisation and composition. Such meeting points are evaluated alongside a consideration of 'freedom' in improvised music, for which a frame is drawn from George Lewis's concepts of the 'Afrological' (placing emphasis on expression of the 'self') and 'Eurological' (in which the 'self' is explicitly avoided). It is suggested that a reconciliation of these two extremes might be found in a compositional 'creative displacement', which might change an improviser's environment in unforeseen ways and thus stimulate explorations of expressive novelty. Three different compositional approaches to 'creative displacement' are investigated: through fixed notation, through electronic real-time notation, and through leadership in a workshop setting. In each case compositional experiments will be undertaken and documented, detailing the creation and realisation of the pieces included in the accompanying portfolio. A terminology for the theoretical consideration of these approaches will draw on theories of complex systems, the philosophy of Gilles Deleuze, and various socio-musicological models such as those of Steven Feld and Charles Keil.

Through an evaluation of the portfolio compositions in rehearsal and performance, this thesis will conclude that a reconciliation of Lewis's 'Afro' and 'Eurological' can be found through the external application of limitations to improvisational creativity. Such constraints will be described as 'creatively displacing' if they provoke a performer towards an exploration of novel expressive approaches. In order to achieve this in practice, limitations must be carefully judged with regard to their degree of abstraction, the manner of their presentation and the nature of their notation; it will be suggested that the presence of a leader is vital in achieving this. These conclusions will lead to a questioning of conventional ideas of improvisation and leadership, and suggest a re-evaluation of indeterminacy within notation.

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*Free improvisation is not an action resulting from freedom; it is an action directed towards freedom.*

Davey Williams (1984, p. 32), quoted in Borgo (2002, p. 165)

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## Introduction: The Case for Intervention

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### 1.1 Introduction

This thesis, and the portfolio of pieces that accompanies it, will seek to examine potential meeting points between improvisation (primarily 'free', but subsequently also through practices within limitations) and composition. An evaluation of the significance of such meeting points, which have been reached through experiments in notation, leadership and the use of new technologies, will be framed by key topics in the field of contemporary improvisation research, and will lead to a consideration of how new compositional practices might emerge from these theoretical bases.

In such considerations it is pertinent to ask to what end a composer can benefit a free improviser, or vice-versa. Why, for example, should a composer wish to leave anything to the choice of the performer? And equally, why should an improviser wish to be constrained by externally determined plans and structures? To examine such areas is to provoke strong feelings from both sides of this apparent spectrum. From the compositional perspective arises suspicions of a lack of control or diluting of aesthetic intention; for example, Boulez is quoted in Attali (1985) as stating that:

'Often, these improvisations are nothing more than pure, sometimes bizarre, samplings of sound that are not at all integrated into the directives of a composition. This results in constant arousal and appeasement, something I find intolerable' (Attali, 1985, p. 146)

Alternatively, some free improvisers have labelled composition as an infringement into the creative freedom that their practice would seem to provide. Improvising percussionist Eddie Prévost has written extensively on what he sees as the political aspects of improvised and composed music, and describes the difference between the two in such terms:

‘A composed sound commands a different social priority. The musician is being requested to do something by another. Such an instruction may be considered restrictive and (if only in an abstract sense?) as oppressive. A collective improvisation is a freely interactive discourse. A composed work is – by contrast – an authoritarian one’ (Prévost, 2004, p. 20)

And yet, despite these opposing viewpoints, composers increasingly seek to work with experimental improvisers, and improvising performers actively seek out new pre-composed avenues for their creativity - from the 1971 collaboration between Don Cherry and Krzysztof Penderecki, to the 2007 project by British composer Andrew Morgan and American free improviser Ken Vandermark. Also notable in this regard are improvisers turning to new notations, such as Wadada Leo Smith, and the work of improviser-conductors such as Butch Morris and Walter Thompson. Such collaborative and multi-disciplinary work indicates that there is a case to be made for compositional intervention within the practice of free improvisation, and it is this case for intervention which will be examined and elucidated in this introductory chapter. In order to contextualise this examination, it is first necessary to consider the historical circumstances which gave rise to the ‘freely’ improvised or ‘non-idiomatic’ improvisational practices which we know today, with a particular focus on the roots of the desire for such ‘freedom’.

The American free improviser and academic George Lewis separates the post-war search for improvisational liberty into two branches: ‘Afrological’ and ‘Eurological’. As will be shown in the following two sections, these two approaches are distinguished by the degree to which a performer’s ‘self’, including cultural and historical tendencies, can contribute to improvisational decision-making. This relationship is of prime importance to the research which follows, and Lewis’s terminology will form one of the key frameworks for considering subsequent theoretical stances.

## 1.2 Afrological Improvisation

'Afrological' improvisation, according to Lewis, is characterised by a striving for freedom from commercial and racial oppression, as much as from musical traditions. The music known as 'free jazz', pioneered by Ornette Coleman, Don Cherry and others, was, according to Lewis, foreshadowed by the earlier emergence of 'bebop' in this regard, which 'had a great deal to do with the assertion of self-determination with regard to their role as musical artists' (Lewis, 1996, p. 95). He continues:

'Challenging the assigned role of the jazz musician as entertainer created new possibilities for the construction of an African-American improvisative musicality that could define itself as explicitly experimental. This radical redefinition was viewed as a direct challenge, by extension, to the entire social order as it applied to blacks in 1940s apartheid America...' (ibid., p. 95)

Lewis directly links experimentalism to a freedom from the perceived role of black musician as 'entertainer', positing it therefore as a social and (counter-) cultural assertion as much as a musical one. Entwined with this is the concept of the 'narrative' or communicative within jazz, carrying forward personal and cultural information through variation in and around the musical tradition. For example, jazz drummer Roy Haynes is quoted as saying, 'I like to paint some sort of a picture...you know, tell a musical story according to how I feel' (Monson, 2009, p. 86).

Examples of Afrological experimentalism might also be considered as communicative or signifying as regards their relationship to the broader idiom. As an example of this, the jazz pianist and academic Vijay Iyer quotes an exchange between John Coltrane and his side-men on the recording of the famous 1958 album *Giant Steps*: Coltrane voices some concern over the difficulty of the chord changes, saying 'I ain't goin be, tellin no story...Like...tellin them black stories', but another musician responds, 'Shoot. Really, you make the changes, that'll tell'em a story' (Iyer, 2004, p. 394). Ingrid Monson refers to this kind of stylistic signification as 'metapragmatics' (after the anthropologist Michael Silverstein), explaining that, 'the perception of stylistic (dis)continuities, as well as the more obvious example of explicit quotation, turns exactly on this indexical and hence highly pragmatic aspect of musical communication' (Monson, 2009, p. 188).

### 1.3 Eurological Improvisation

Eurological improvisation, by contrast, is characterised by Lewis as containing ‘a notion of spontaneity that excludes history or memory’. Born out of the influence of the European post-war avant-garde, American experimentalism, as pioneered by John Cage, Earl Brown and Christian Wolff, gave rise to ‘indeterminate’ and ‘aleatoric’ music. Whilst avoiding connections with the world of ‘improvisation’ (perhaps, Lewis suggests, for racial reasons), this kind of music making sought freedom from the domination of any traditional musical forms by utilising spontaneity and chance in performance. Louis Andriessen makes note of this: ‘That was one of the ways in which modernism could free itself from the rules of serialism, by using graphic notation, and ad libitum instructions. But I don’t think it had much influence on the culture of improvisation’ (Uitti, 2006b, p. 543).

This manner of spontaneity is intended, as per its avant-garde European roots, to be a-historical; Lewis writes, ‘in this regard, “real” improvisation is often described in terms of eliminating reference to “known” styles’ (Lewis, 1996, p. 107). It was this approach which would also come to be associated with the ‘Non-idiomatic Improvisation’ of some European improvisers, particularly that of guitarist Derek Bailey. In describing this practice Bailey writes, ‘non-idiomatic improvisation...is most usually found in so-called ‘free’ improvisation and, while it can be highly stylised, is not usually tied to representing an idiomatic identity’ (Bailey, 1993, p. xii).

Cage held a well documented scepticism towards ‘improvisation’ (as opposed to ‘indeterminacy’ or ‘chance’) because of its accommodation of the will of the performer; for example, he is quoted by Kostelanetz as saying, ‘what I would like to find is an improvisation that is not descriptive of the performer, but is descriptive of what happens, and which is characterized by an absence of intention’ (Lewis, 1996, p. 118). Sabine Feisst elaborates on this in her account of Cage’s attitude to improvisation, writing that ‘he did not want to encourage common habits, subjective and ultimately predictable acts, among improvising performers’ (Feisst, 2009, p. 45). In the same article Feisst also quotes from a letter sent from Cage to Leonard Bernstein regarding a concert in which Cage’s works, as well of those of Morton Feldman and Earle Brown, were to be performed alongside an orchestral free improvisation; he writes:

‘Improvisation is not related to what the three of us are doing in our works. It gives free play to the exercise of taste and memory, and it is exactly this that we, in differing ways, are not doing in our music.’ (ibid., p. 45)

Other commentators have echoed this distinction, such as Love who explains, ‘Cage attempts to remove conscious human intention from the roles of the composer and the performer. He aims at nonintentionality. This is not the same as improvisation’ (Love, 2006, p. 30).

Cage clearly dismisses improvised musical practice as insufficient in distancing the self of the performer from the music, and similar sentiments have been heard from other post-war composers; English bassist Gavin Bryars famously turned away from improvising to focus on composition, stating that ‘in any improvising position the person creating the music is identified with the music.... It’s like standing a painter next to his picture so that every time you see the painting you see the painter as well and you can’t see it without him’ (Lewis, 1996, p. 115). This key characteristic of the Eurological approach stands contrasted to the Afrological desire for personal and cultural self-determination, as Lewis succinctly states: ‘it is unsurprising, therefore, that from an ex-slave’s point of view an insistence on being free from memory might be regarded with some suspicion - as either a form of denial or of disinformation’ (ibid., p. 109).

We can summarise, therefore, that according to Lewis ‘free’ improvisation is divided by an appropriation of the self; Afrologic places the expression of the self, as well as all its cultural history, at the centre of the musical practice, whilst Eurologic seeks explicitly to avoid completely the preformed desires of the performer.

An overly simplistic but potentially useful comparison can be made here: Eurologic with ‘composition’, and Afrologic with ‘improvisation’. The composed in this case represents a hypothetical complete ‘exactness’ of musical command, one in which the performer can have absolutely no personal influence on the result, whilst the improvised is created purely from the whim of the performer, with no external influence to provide limitation. It is within this hypothetical framework that the following research will consider various compositional and improvisational boundaries.



#### 1.4 The Problem of ‘Freedom’

Immediately, however, a question must be posed as to what extent these two approaches are feasible as distinct ideologies; whether Cagean ‘nonintentionality’ is achievable for



a human performer, or if the Afrological desire for a self-determined experimentalism is viable without some external influence. It can be argued that these two opposing approaches are in fact interdependent, despite the commitment of their respective practitioners.

This argument is supported primarily by a reflection on how both 'non-idiomatic improvisation' and 'free jazz' have become increasingly stylised through the course of their development and repetition. Emergent characteristics such as atonality, lack of rhythm, and the exploitation of extremes of instrumental technique and dynamic, suggest a level of continuity between performances which stands in opposition to the 'ahistorical' freedom of the Eurological perspective. Exceptions to this have arisen from those performers who have found a unique personal approach through the exploration of exceptional extended technique (such as Evan Parker, Cecil Taylor, Peter Brötzmann and others) or the embracing of technology (particularly amongst pianists such as John Tilbury). However, the emergence of figureheads in this way, as well as the precedents they establish, is again problematic for both Afrological self-determinism and Eurological ahistoricity.

Both of these observations suggest the presence of a cohering process, in which the establishment of new stylistic avenues (Eurological - composed) in turn creates precedential rules for personal exploration (Afrological). This outlook is supported by academic research into the psychology of improvisational practice, which indicates the importance of rule formation and realisation therein. One of the most thorough examinations of this perspective is Jeff Pressing's extensive 1988 article 'Improvisation: Methods and Models', in which he describes a complete model of consequential idea generation and interruption which is based on rules, modelling and decision making. Such rules are heuristically and physiologically constrained:

'Rule models describe the common features shared by a set of rules which form the basis for a 'production system'. If the improvising musician is the production system, the important rules will be largely heuristic and the rules about rules may be termed metaheuristics. Some of these will be culturally and historically based, while others presumably reflect intrinsic properties of the human thinking apparatus.' (Pressing, 1988, p. 152)

This outlook can also be found in academic writing concerning improvisation within other fields; for example, it is succinctly summarised by the philosopher Andrew Haas in relation to the role that improvisation plays in the formation of language:

'Improvisation does not just mean free-play (of subjective imagination or ob-

jective selection); it is neither simply 'extemporaneously doing your own thing' nor 'spontaneously riffing on a theme' (for it is not opposed to composition); but nor is it merely a Heideggerian way of being-in-the-world that feels around for that which is present-to-hand, nor a way of transcending or displacing metaphysics. Rather, following Aristotle, improvising means: self-schematising, auto-schediazein, the action that gives itself its schema – for it is not originally aesthetic, but if it is aesthetic, it is because art too (like philosophy, like science and ethics) comes out of self-schematisation.' (Haas, 2012, p. 341)

Improvisers of varying traditions and approaches have also acknowledged such rule formation within their practice. Prévost recognises this very point when he writes, 'whereas in free improvisation there may be no recognisable expression of an idiom, there might well be an underlying method or structure – and it is the pursuit of, or an engagement with, this structure and method that may well be more important than any determination not to be caught up in other practices' (Prévost, 2004, p. 14). Fred Rzewski even goes as far as to suggest that improvisation 'always has rules and a framework. There is no such thing as a 'free' improvisation' (Rzewski, 2006, p. 494).

Testaments from Afrological experimentalism also suggest issues arising from uncontrolled 'freedom', for example Dyer recounts an instance of Charles Mingus taking part in an experimental improvisation: 'You can't improvise on nothing, man, he'd said shaking his head at the shambles around him. You gotta improvise on something' (Fischlin, 2010, p. 2). Drummer Elvin Jones echoes this viewpoint when he states that 'there's no such thing as freedom without some kind of control, at least self-control or self-discipline... Coltrane did a lot of experimenting in that direction... even though it gave an impression of freedom, it was basically a well thought out and highly disciplined piece of work' (Lewis, 1996, p. 114).

These outlooks pose a problem to the notions of both Euro and Afrological 'freedom' in improvisation, suggesting that we, as listeners and performers, 'self-schematise' our sonic environment – a necessary formation of idiomatic rules in order to cohere a non-idiomatic sound-world. The implication of this is that a truly non-idiomatic improvised music must continually be in a state of flux, inconsistent from one performance to the next, if not from moment to moment, and therefore resistant to schematisation. Derek Bailey, reflecting this, highlights one of the key attractions of the practice, but also its greatest challenge to performers, when he states that 'diversity is its most consistent characteristic' (Bailey, 1993, p. 83); the irony of this position is that this rule becomes a constant, and so indicates an idiomatic schematisation of the practice itself. Adorno, whose writing is so closely linked to the European avant-garde, seems to summarise

this problem in the following passage from 'Minima Moralia':

'Knowledge has no light but that shed on the world by redemption: all else is reconstruction, mere technique. Perspectives must be fashioned that displace and estrange the world, reveal it to be, with its rifts and crevices, as indigent and distorted as it will appear one day in the messianic light.

...

But it is also the utterly impossible thing, because it presumes a standpoint removed, even though by a hair's breadth, from the scope of existence, whereas we well know that any possible knowledge must not only be first wrested from what is, if it shall hold good, but is also marked, for this very reason, by the same distortion and indigence it seeks to escape' (Adorno (1951), quoted in Smith (2010, p. 126))

## 1.5 Another Approach: Creative Displacement

It has been suggested, then, that whilst Lewis's Afro and Eurological approaches are useful in the formation of a hypothetical framework for understanding approaches to 'freedom', they are not exclusively practicable, existing instead on a continuum of interdependence.

However, from the construction of a more mainstream strand of jazz comes an indication of another approach, one in which a (potentially abstract) pre-composed musical element is introduced into an improvised musical environment in order to shift the performer in a new direction, and therefore temporarily 'free' them to explore new possibilities: this is the role of the 'backing' or 'background figure' in big band music (specific examples of which will be considered in the following chapter of this thesis). Berliner describes these as 'dramatic changes in rhythmic accompaniment, like changes occurring in arranged horn riffs, elaborate background lines, and harmonies, [which] build variation into each performance's larger structure and provide different impulses to stimulate the imagination of soloists' (Berliner, 1994, p. 300).

These musical instances are rare examples of where a fully through-composed musical element interrupts or interacts with an improvised line, creating a change in an improviser's musical situation and forcing a re-appraisal of the creative problem at hand. This stimulation must, at least when first encountered, be comparable to a Cagean indeterminate element: unforeseen, and yet potentially indicative of a new sonic schematisation through its interpretation by the performer. The fulfilment of this potentiality, and management of the indication of new schematisations, is a process that will become of

key importance in the research that follows, and following Adorno's concept of 'perspectives...that displace and estrange the world', will henceforth be referred to in this thesis as 'creative displacement'.

It is within this process that the case for compositional intervention in freely improvised music can be made: as an unpredictable interjection which can serve as a stimulus for novel improvised action, simultaneously connecting performer and composer as performative and compositional collaborators. In this way, the 'creative displacement' can acknowledge both Afro and Eurological approaches to improvisational 'freedom', as the performer has no control over the composed changes they encounter (Eurological), but has complete control over their response to them (Afrological). Imperative to the effectiveness of this approach will be not only the form and content of such 'displacements', but also their manner of delivery and ongoing management; it is these aspects which will form the central investigations of this research.

The forthcoming chapters will evaluate three different approaches to 'creative displacement', alongside a discussion of several relevant areas of significance in contemporary improvisation research. The second chapter will consider the composition of several pieces for big band, in which composed backings interact with improvisation within varying levels of notational limitation. Through a reflection on the implementation of these pieces with the Mirrors of Hall big band, including analyses of the rehearsal process and development of specific notational approaches, this chapter will examine theoretical associations between improvisation and non-linear systems or 'chaos' theory. The question will be asked to what extent composed materials can interfere with an improvisatory 'system', and whether such interference is enough to cause as a 'displacement' of improvisational choices, provoking a performer towards exploration of unfamiliar creative responses.

The third chapter investigates the possibilities afforded by technology for creating 'displacing' forms of notation, and evaluates a practical application of this in the form of the 'M-Word Engine' - a semi-random real-time score system for improvisers. This is framed by a comparison with key concepts from the writings of the philosophers Gilles Deleuze and Félix Guattari, whose philosophy has been closely associated with both systems theory and the dynamics of improvised music. The metaphysics which they outlines in works such as 'A Thousand Plateaus' will provide a second framework for a potential model of 'creative displacement', and will be applied and tested in the creation of indeterminate improvisational scores within the aforementioned system.

Finally, the fourth chapter will present a practical model of 'creatively displacing' leadership, with examples drawn from two school-based workshop composition projects and

the collaborative pieces created therein. This practical work will shed light on a surrounding investigation of how leadership can interact with creative novelty or difference, examining the psychological implications of exploratory improvisation such as groove, entrainment and risk.

Throughout all of the following chapters there will be documented examples of how these theoretical approaches have been tested in workshop pieces and compositions by the author, including those that make up the submitted portfolio and appendices.

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# Displacement Through Composition

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Reflection before a performance. A musical score is a logical construct inserted into the mess of potential sounds that permeate this planet and its atmosphere. That puts Beethoven and the rest in perspective!

Cornelius Cardew, *Treatise Handbook* (1970, p. vii)

## 2.1 Non-Linear Dynamic Systems and Self Organisation

### 2.1.1 Introduction

This chapter will seek to examine how pre-composed backings in big band music might affect improvisatory action in a manner described in the previous chapter as ‘creative displacement’. It will be asked whether the changes to the musical environment which are affected by such composed materials can present the improviser with novel avenues for exploration, and whether such novelty can be sustained through rehearsals and performance.

The adaptation of improvising musicians to sudden changes is documented by Ingrid Monson in her book ‘Saying Something: Jazz Improvisation and Interaction’ (Monson, 2009). She suggests that ‘at any given moment in a performance, the improvising artist is always making musical choices in relationship to what everyone else is doing’ (ibid.,

p. 27); also, particularly in relation to the rhythm section, she writes that ‘they must listen closely because they are continually called upon to respond to and participate in an ongoing flow of musical action that can change or surprise them at any moment’ (ibid., p. 43).

Following this framework of interaction, therefore, it can be supposed that an improviser may react to composed elements in a similar way, and, in a jazz setting, the rhythm section will respond to the changes by the improviser. Arguably, under certain circumstances these changes in the rhythm section may affect the performance of the written backings themselves, establishing a performative ‘feedback loop’ back to the soloist.

As was mentioned in the previous chapter, an important historical precedent for such interaction can be found in big band music, and several examples of this will be examined throughout this chapter. The first case study below represents one of the most common shapes of big band backings: starting quietly before gradually building up in volume, register and instrumentation, and often resulting in the soloist’s improvisation following a similar shape. Within this it will be useful to consider significant moments of interaction between the soloist, rhythm section and composed backings, and the degree to which it can be said that changes in one part affected a noticeable change in another.

#### **Case Study: Interaction within Big Bands - example 1**

##### **‘So What’ from In My Time by the Gerald Wilson Orchestra: Tenor Saxophone solo by Kamasi Washington (see audio example 1)**

*The very beginning of the saxophone solo presents an interesting case of interaction between the soloist and an instrument in the rhythm section, in this case the guitar. The soloist begins broadly with a soft repeated riff at a relaxed pace, which is mirrored by a spacious chordal accompaniment in the guitar. With the chord change to E minor, after 16 bars (0’15”), comes a shift in the guitar part to a more upbeat repeated rhythmic pattern; 4 bars after this change (0’19”) the soloist appears to respond with a faster pace and higher pitch range, occasionally aligning himself rhythmically with the guitar (0’20”). When the underlying chord changes back to E $\flat$  (0’23”) the soloist begins his own repeated rhythmic pattern around that of the guitar, which also recalls the opening of the solo through the emphasis of the 9th (F). This latter motif of the soloist can perhaps be seen, therefore, as the transformation of the saxophonist’s opening idea, having undergone the rhythmic changes introduced by the guitar.*

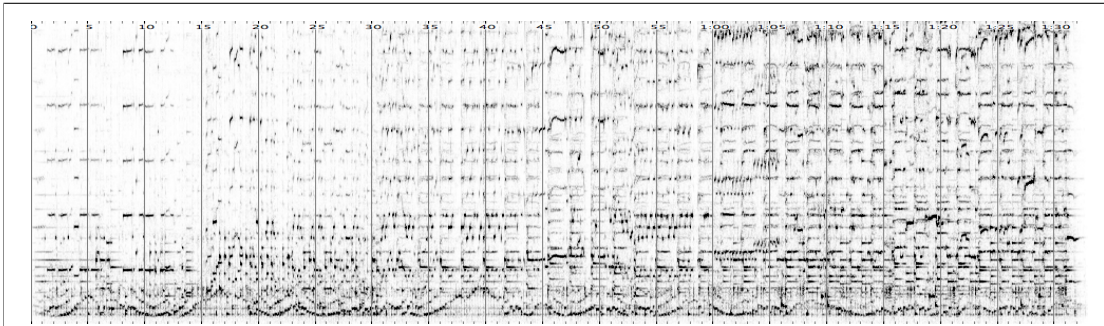
*The first entry of the brass backings (0'30") provides an opportunity to evaluate the effect of these composed elements on the action of the soloist. The backings, characterised by a snappy offbeat rhythm extended with a long note, are immediately responded to by the soloist with a contrasting stream of quavers - this shift is also mirrored by the drummer, who now accents the 4th beat of each bar with a rim-shot on the snare drum. However, perhaps in response to the insistence of the repeating backings, the soloist subsequently transforms his string of quavers into a repeated rhythmic figure that moves upwards in pitch (0'38").*

*Whilst it is problematic to establish a direct link of cause and effect between backing and soloist in the preceding example, an examination of the remainder of this 32-bar chorus suggests that the level of repetition in the backings has a similar effect on the soloist throughout the rest of the solo. For example, the chorus is characterised by a similar shift between dextrous strings of quavers (0'49") and repeating patterns that rhythmically align with the backings (0'54"); this effect is even more pronounced in the third chorus of the solo (1'00"), during which the previous brass backings return with greater intensity an octave higher, and, significantly, the solo is constructed almost entirely of short repeated figures. It could be argued, therefore, that there is a correlation between the textural prominence of the repeating backings and the level of repetition present in the solo. This hypothesis is strengthened by a comparison of this recording to other solos by Kamasi Washington from the same album which are notably less repetitious (for example, compare his solo in 'A.E.N.', which is included as audio example 2 alongside this thesis).*

*It can also be argued that the soloist's tone and use of extended techniques is affected by not only the pitch and rhythmic material of the backings, but also through their structuring. This is particularly evident at the final upward chord shift 16 bars into the third chorus (1'15"): just before this point (from 1'00" onwards), both the soloist and backings have already reached an exciting climax of register and dynamic, and accordingly the soloist can only match the further increase in intensity through the use of extended techniques such as growling, detuning and use of the altissimo register. This is immediately evident in the high E and F (1'17") that closely follow this chord change, and the even higher B<sub>b</sub> shortly after that (1'27").*

*Whilst this specific change in backing is a harmonic one, it is arguably the relentless drive towards increasing intensity throughout the orchestration and voicing of the backings that pushes the soloist towards this exploration of extended techniques and extremes of register. Another comparison with Washington's solo on 'A.E.N.' would seem to support this hypothesis, in which, whilst there is some use of reg-*





**Figure 2.1:** Melodic Range Spectrogram of the tenor saxophone solo by Kamasi Washington, on 'So What' from *In My Time* by the Gerald Wilson Orchestra.

*isteral and technical extremes, the backings lack the same growth of intensity and therefore do not elicit the same degree of exploration from the soloist. Figure 2.1 is a melodic range spectrum<sup>a</sup> analysis of the solo from the recording, which enables a graphic representation of the upward intensifying movement in both the ensemble writing and Washington's solo. Such spectral analyses are well suited to illustrating large-scale changes of texture and register over time, and will be used for this purpose throughout this thesis.*

<sup>a</sup>All spectrograms incorporated into this thesis were produced using 'Sonic Visualiser'; for more information see <http://www.sonicvisualiser.org/doc/reference/1.0/en/>

### 2.1.2 Systems, Complexity and Chaos

From this example it can be seen that there are different levels of interaction occurring between the musicians and the composed backings; specifically, these are interactive relationships in which changes in one part can subsequently affect each of the others in unpredictable ways, be it specific rhythmic or gestural alignments (such as between the saxophone and guitar), or more cumulative structural influences (such as the rising register and repetition).

It is from this starting point, regarding the interaction of improvising performers, that contemporary academic discussion on improvisation has introduced parallels with 'systems theory', in particular 'non-linear' systems and the associated ideas of 'chaos' and 'emergence'. By relating an ensemble of improvising musicians to a system of connected nodes that affect each other through the exchanging of information, it becomes possible to analyse the ensemble's dynamics with models borrowed from scientific and

mathematical disciplines; key writers in this area include David Borgo, Stephen Nachmanovitch, Alfonso Montuori and Robert Keith Sawyer.

Perhaps the most useful starting point for such comparisons, however, is the definition of 'information' given by Gregory Bateson, one of the most prominent figures in the early history of 'systems theory':

'A "bit" of information is definable as a difference which makes a difference. Such a difference, as it travels and undergoes successive transformation in a circuit, is an elementary idea.' (Bateson, 1987, p. 321)

A change in one part of the system, therefore, affects other parts of the system and so becomes an 'idea', embodying the culmination of a series of changes which is irreversible and irreducible, and becoming, through transformation, an emergent entity distinct from the differences that shaped it. A system's interaction with greater numbers of external influences increases the complexity of the changes that take place, as David Borgo writes: 'Complex systems are those in which the future emerges out of the interaction of innumerable forces, each leaving its indelible trace on the course of events' (Borgo, 2005, p. 62).

Such systems are referred to as 'dynamic', as the input of external differences feeds through the system and leads to an emergent change in the nature of the system itself. Crucially, these large-scale changes can also create differences for other interconnected systems, leading to a continuous 'domino-effect' from the micro to the macro level and back again; in this way, the resulting changes become increasingly unrecognisable from the original difference. This continuous disorder within systems is what came to be defined by James Gleick (1987) as 'chaos theory', and is most simply summarised in the frequently cited concept that a butterfly can flap its wings in one part of the world and subsequently change the weather in another (Kauffman, 1996, p. 17).

However, the unpredictability of these changes can mean that, under the right conditions, areas of stability can be established within a chaotic system; the study of this phenomenon has given rise to 'complexity theory'. Borgo describes the difference between 'chaos' and 'complexity' in his 2005 book 'Sync or Swarm':

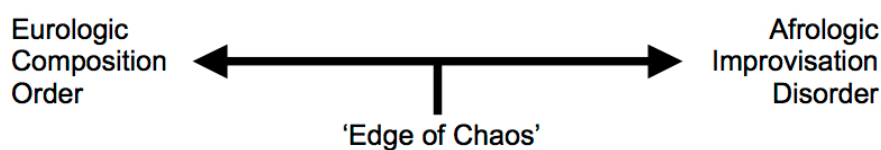
'Put another way, chaos theory deals with systems that rapidly become highly disordered and unmanageable, while complexity theory deals with highly interconnected systems that may, at certain times and under certain conditions, self-organise in a way that produces emergent forms of order.' (Borgo, 2005, p. 84)

The evolutionary-biologist Stuart Kauffman gives the useful example of a whirlpool in a bathtub to illustrate this kind of emergence. He describes such systems as 'nonequilibrium structures', explaining that 'once formed, the non-equilibrium swirl can be stable for long periods if water is continuously added to the tub and the drain is left open'; because of this 'continuous dissipation of matter and energy' they can also be called 'dissipative structures' (Kauffman, 1996, pp. 20-21).

Relating such dynamics to the intake and output of energy by living cells, Kauffman writes that 'equilibrium corresponds to death' and proposes therefore that 'life exists at the edge of chaos' (ibid., p. 21) - balanced between the threat of equilibrium from a lack of external input, or tipping over into a chaotic state due to an excess of external disruption. He uses the example of nuclear explosion compared to a nuclear reaction: the former is allowed to run away in an explosive chain reaction, whereas the latter is held at a continuous 'sub-critical/supra-critical boundary' (ibid., p. 129). Complexity researcher Alfonso Montuori sums up the balance between these extremes:

'Organization without disorder leads to a sterile, homogenous system where no change and innovation is possible. Complete disorder without order precludes organisation. Only with the interaction of order and disorder, is an organization possible that remains open to change, growth, and possibilities.' (Montuori, 2008, p. xxxiii)

The opposite poles of order and disorder are also perhaps comparable to this thesis's opening comparison between Eurological 'Composition' and Afrological 'Improvisation'; a balance between the two, therefore, is perhaps found in music which straddles the 'edge of chaos' boundary.



In the following example, it is arguable that an 'edge of chaos' balance of order and disorder is achieved in the solo improvisation through responses to a diverse range of composed backings. Some of these are sudden and unexpected, and help to create and sustain new areas of exploration for the soloist throughout. Accordingly, the following example will be considered in the appropriately systemic terms of order, disorder and the movement of 'energy' within the improvisational system.

### **Case Study: Interaction within Big Bands - example 2**

#### **'Monterey Suite: 1. Bring it On' from Overtime by the Dave Holland Big Band: Tenor Saxophone solo by Chris Potter (see audio example 3)**

*In this case study it will be considered how the music could be seen as a system which moves on a spectrum between more ordered and more chaotic passages, depending on the reaction of the soloist and rhythm section to the backings. Disorder will be defined here as a difference, either within a given texture or across a period of time, which is significant in relativity to its surroundings; such a difference might be found in one aspect of the music (for example harmony, rhythm or dynamics), or across several characteristic areas. In this way it will be possible to evaluate how, in Gregory Bateson's terms, such a 'difference' might then 'make a difference' to other parts of the ensemble, and whether the ensuing interactional system can be described as nearing the 'edge of chaos'.*

*From this perspective, the beginning of the solo might be seen as establishing a strong feeling of order. For example, sustained trombone backings at first seem to establish a stable centre around which the rhythm section creates a more fluid rhythmic framework. The correspondingly broad and melodic style of the improvising soloist might be seen as strengthening this order; however, the introduction of shorter backing riffs in the trumpets (0'19"), acting as a countermelody to the sustained trombones, appears to disturb this. This disturbance could then be seen as manifesting itself in the improvisation through two upward arpeggiated phrases (0'23"), gesturally disordered by comparison to the more melodic material that preceded them, and then further into a rapid and undulating line of semiquavers (0'30"). Within this example, therefore, a Batesonian 'difference that makes a difference' might be identified in the introduction of the trumpets to the backings, causing the soloist to stretch the established gestural and textural order, although perhaps not to the extent that this could be described as near the hypothetical 'edge of chaos' given the continuation of the underlying harmonic and metric order.*

*This balance is arguably reached in the next example, however, which could be seen as a continued development of the previous disruption. The soloist leads into a repeated cross-rhythmic motif which is immediately copied by the drums and bass (0'35"), arguably creating, in systemic terms, a new emergent order against which the subsequent sustained saxophone backings become a marked chaotic element. Although still secured by underlying harmonic connections, these cross-rhythms seem to create a metric 'edge of chaos' in which the downbeat becomes*

*unclear; this in turn leads to a greater feeling of ambiguity in the groove of the drums and the harmony of the saxophone improvisation (c.0'49").*

*Further on in the solo, (1'14") the sudden absence of the brass backings appears to result in an exploration of complex harmonic and rhythmic patterns between the saxophone, drums and bass, in the midst of which the vibraphone chords maintain a sole point of harmonic order. In this example, it could be argued that the sudden disappearance of the backings creates a textural disorder, triggering a cascade of changes in the improvisation of the soloist and rhythm section as both seek to negotiate coherence in the sudden influx of energy, and leading to what might be described as an 'edge of chaos' system. Following this, the bass and drums establish a 'double-time' feel (1'31") and the saxophone improvisation returns to a more familiar bebop style, possibly indicating a reestablishment of a new order following the previous disturbance.*

*Following their reintroduction, (1'48") the backings grow in prominence and cohesion, arguably creating an increasingly stable core around which the soloist and rhythm section move. The saxophone moves closer in style to the backings, incorporating longer repeated notes and sequential riffs (c. 2'07"), and, for the first time, drawing melodic material directly from the trombone backings (2'13"); this could be seen as reinforcing the order established by the backings. The backings reach a climax with the inclusion of all the brass and saxophones, to which the soloist responds with a dramatic swirling chromatic shape that is quickly mimicked in the drums (2'23"), perhaps indicating a textural disorder created by the intensifying ensemble instrumentation.*

*However, the sudden shift from a 'double-time' to 'single-time' groove (2'34") appears to cause the soloist to launch dramatically into the altissimo register; this suggests that the disturbance of the temporal and metric order, that had been so strongly established previously, might have created a sudden and significant disorder within the system. When the backings suddenly stop (2'39") the soloist begins to explore wild atonal jumps and altissimo squawks, perhaps indicating that the previous disorder has become magnified and has created a further degree of textural chaos. Following this, the reintroduction of the backings shortly after (2'47") leads the saxophone back to a more ordered bluesy harmonic language (2'52"), and therefore appears to reestablish order in the system.*

It can be seen from this example how an improvisation within a big band can be analysed in terms of the interaction of order and disorder, with composed interjections

able to exert both ordering and disordering influences on the ongoing improvisation depending on their content and relationship with the emerging improvised material. The following sub-section will further examine the nature of how elements order themselves, a process known in complex-systems theory as 'self-organisation'.

### 2.1.3 Self-Organisation

In the continued consideration of how improvisation within big bands might be illuminated by a comparison with complex systems theory, it will be valuable to consider the processes by which new orders within such systems might emerge.

Through the 'edge of chaos' balance of order and disorder, coherent areas of stability establish and dissipate themselves in a continuous loop, with novel outcomes feeding into novel contexts for new outcomes. Such systems are described as 'self-organising'; they are autonomous and 'auto-catalytic', continually reproducing new and unpredictable emergent structures from the interaction of its parts in relation to a constantly shifting environment.

Weber and Varela offer the term 'autopoietic' to describe such dynamics:

'An autopoietic system is organized (defined as unity) as a network of processes of production (synthesis and destruction) of components such that these components:

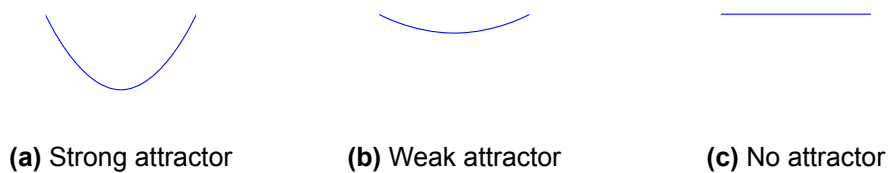
1. continuously regenerate the network that is producing them, and
2. constitute the system as a distinguishable unity in the domain in which they exist'

(Weber and Varela, 2002, p. 115)

Morin suggests the term 'Self-eco-re-organisation': 'eco' because the environment in which the system changes is the source of the external information that changes it, and 're' because the process is continuous and ongoing (Montuori, 2008, p. xxxv).

Kauffman's 1996 book 'At Home in the Universe' investigates the nature and dynamics of this phenomenon; one of the key concepts he outlines is that of 'attractors' - particular characteristics which, due to the nature of the surrounding environment or the limitations of the system itself, become a focus for a self-organised structure (Kauffman, 1996, pp. 78-79) (as will be shown, this concept is a potent one for use in the analysis of improvised music). Even small or weak attractors can create pockets of order within a large system, but these may be destabilised by significant changes from external influences (for example, the movement of water across an almost-flat surface, such as that

shown in Figure 2.2b); equally, the effect of too strong an attractor will overrule other external influences, locking the development of the system into one rigid formation (in the terms of the previous example, this might be considered to be the same water flowing downhill into a lake, for example Figure 2.2a - illustrations of this kind have led to these attractors also being known as 'basins of attraction'). Again, the importance here is placed on the balance between the 'sub-critical' and 'supra-critical', order and disorder: a system with no attractor, such as in Figure 2.2c, is chaotic and unpredictable, whereas a strong attractor like Figure 2.2a can create an overly rigid order.



**Figure 2.2:** Graphic examples of 'basins of attraction'

Through the ongoing analogy between improvisation and complex systems, changes in a musical environment might also be considered as creating attractors, as they can lead improvisers to re-organise their action in a particular direction through the establishment of a particularly 'attracting' degree of order within the system. The strength of these attractors, which could, for example, be harmonic, rhythmic, timbral or gestural, may depend on aspects such as their volume, repetition and register; as will be considered later in this chapter, however, such an outlook may prove to be overly Eurological, with other more personal factors also needing consideration. The establishment of an overly strong attractor, as described above, may prove to be too rigid to be productive and leave improvisers without new avenues for investigation, whilst an attractor which is too weak might be ineffective in establishing order and lead to chaos.

It has already been stated, at the start of this chapter, that the 'comping' rhythm section players in a jazz setting are equally alert to changes in their environment as an improvising soloist, and so for the purposes of this ongoing comparison it can be suggested that musical attractors are equally potent for 'comping' musicians. The following case study will show an alternative relationship between soloists and backings, one that brings into question the boundaries of the 'rhythm section' and its role within a big band; in doing so it also illustrates how this extended improvising group self-organises itself, moving around and in-between complex backings which act as attractors in the musical system.

**Case Study: Interaction within Big Bands - example 3*****'Liberty City' from Invitation by Jaco Pastorius (and the Word of Mouth Big Band): improvisation throughout (see audio example 4)***

*This case study will illustrate how precomposed backings might be seen as having varying levels of 'attracting' force for improvisers playing over and around them. In adopting this perspective, certain comparisons can be drawn with the previous case study which might illuminate the conceptual application of 'attractors' in a musical analysis: as will be shown, it might be said that a strong attractor, which leads to the establishment of order, is equivalent to a lack of 'difference', whilst weak attractors exhibit greater variation and allow a system to slip towards chaos. As with the previous case study, hypothetical levels of order and disorder will be considered in terms of variation within one or more musical parameters (including, for example, register, dynamics and harmony); however, unlike the previous case study, this example will consider broader emergent levels of attraction across larger structural sections of the piece, facilitated by its overtly block-based structure (as shown in Figure 2.3).*

*Whereas in previous examples there has been one soloist improvising against a background provided by the rhythm section and brass/woodwind, in this example there are two melodic players (Randy Brecker on trumpet and Bob Mintzer on soprano saxophone) who improvise throughout, effectively acting as an extension of the rhythm section. The rhythm section itself also contains other melodic instruments - Toots Thielman on harmonica and Othello Molineaux on steel drums - as well as percussion, drums and Pastorius on bass.*

*The piece moves between open expanses of group improvisation from this extended rhythm section, and fully composed material for the whole ensemble over which Brecker and Mintzer take turns to maintain a continuous improvised line.*

*In the sections of group improvisation there are no written backings, and the improvisers appear to move around near-chaotically, only occasionally self-organising into discernible mimetic relationships. This might suggest that the system is operating near the edge of chaos here: Pastorius's bass riff, twinned with the underlying drum groove, creates a strong harmonic and rhythmic attractor, but it is weakened by the sparsity of the texture the two can produce. Therefore, it could be said that the only 'attractors' present, besides the underlying order of Pastorius's repeating bass riff, are created from moments of fleeting gestural and registeral mimicry between*



*Mintzer, Brecker and Molineaux (for example the fast descending lines at 0'46").*

*During the sections of the piece which feature composed backings, however, attractors of different strengths might be identified through a consideration of how the improvisers react to their presence. The exception to this overall organisation is the written section that follows the first open improvised section of the piece (1'01"): during this, Mintzer is the soloist charged with improvising around the material but he leaves a lot of space, saving his interjections, which include a direct quotation of part of the backing melody (1'44"), until the ensemble is reaching its climax. This may be attributable to the repetitious and insistent nature of the backings at this point, with a lack of 'difference' arguably creating an overly strong attractor and rendering the system 'sub-critical'; from this perspective, Mintzer is drawn toward this strong emergent attractor, reinforcing the overriding order with mimicry and only occasional flourishes.*

*The undulating saxophone backings which characterise the following written section (2'10") are mirrored by Brecker with a line of swung quavers, deftly weaving in and out of the backings in an exploration of new harmonic and dynamic connections. Brecker's exploratory unpredictability here could be seen as a response to an 'edge of chaos' dynamic: in contrast to the previous example, the backings here could be seen as creating an attractor which is strong in metric and textural order but weakened by both harmonic and dynamic instability, affording Brecker a connected exploratory freedom. When, in the second half of this section, heavy brass stabs are added to the texture (2'31"), Mintzer's more rhythmically-chaotic response suggest a further weakening of attraction, perhaps due to the fragmentation of the previously sustained backing texture.*

*The fourth and final section of backings (3'00") might be considered as presenting an example of the most chaotic system so far in the piece. Following a third section (2'40"), in which a clear E major tonality arguably established a strong harmonic attractor, the harmony returns to the undulating ambiguity seen in the second backing section described above, and the ensemble writing becomes more dramatic with high stabbing brass chords; this is reflected in the increased chromaticism and screaming altissimo (3'09") of Mintzer's returning improvisation, as well as by Molineaux who joins in with metrically disordering polyrhythmic patterns. The changes in the improvisations here might suggest that the attracting strength of both the harmony and texture is weakened in this section. This is therefore arguably the closest to a supra-critical chaos so far in the piece, with the disordering effect of the backings freeing the improvisers to explore near-chaotic states of disconnection from the*

*underlying metric and harmonic order.*

*However, in the final part of this section the backings seem to coagulate and strengthen with tutti dynamic surges and undulating gestures. Brecker takes over the improvised line here, at first continuing the more chaotic feeling that was established by Mintzer in the previous bars, before being gradually drawn downward, perhaps by the renewed strength of the backings' attracting force, and finally resorting to mimicking antiphonal responses to the ensemble's tutti stabs (3'17").*

*From this analysis it can be suggested that the attracting nature of the backings shifts in strength from one section to the next, depending on a host of characteristic factors including harmony, texture and dynamics. These changes lead to a varying degree of order in the musical system as a whole, with strong attractors eliciting a more coherent response from improvisers, albeit one that is perhaps more creatively restricted than in settings of a weaker order.*

*Figure 2.3 is a diagram of this structure, listing ensemble characteristics and the identity of improvisers at different points.*

*Of additional interest here is the audible level of the improvisers against the rest of the band: they do not dynamically override the ensemble but instead sound at the same level as the rhythm sections have in the previous examples, moving around the written ensemble material as a continuous (or even 'continuo') texture. The implication of this is that the improvisers should not be heard as 'soloing' in the idiomatic jazz understanding of the word, but they are in fact 'comping' as a part of an extended rhythm section, creating an intricate polyphony similar to that of 'dixieland' group improvisation. However, due to the predominantly melodic nature of the rhythm section instrumentation, (which is to say there are no chord playing instruments such as piano or guitar) it is equally possible to hear the rhythm section as an ongoing group improvisation to which the ensemble material is a backing.*

*The audible result of this is an exciting exercise in 'auditory stream segregation'; the listener is constantly tracing the different individual voices amongst larger ensemble groupings, and following how the improvisers organise themselves so as to negotiate the changing musical environment around them.*

	Intro	Improv 1	A	Improv 2	B(i)	B(ii)	C	B(iii)	B(iv)	Improv 3	D	E (intro reprise)
<b>Ensemble</b>	Unison 'shout' intro.		Dark repetitive material, gradually expanding upwards in register.		Quiet saxophones, subtle dynamic shaping through a convoluted chord sequence.	As before but with low brass stabs.	Brighter key and feel, using chord sequence from intro.	Return of B(i) material, but brass stabs are now high and dramatic. Sudden break before next section.	Dramatic reworking of B material with long dynamic sweeps and cross-rhythmic stabs.		Short unison tuba and bass melody.	Reprise of unison 'shout' intro, now with rhythm section backing as at C.
<b>Trumpet (Brecker)</b>					After initial silence a 'bebop' style string of quavers, occasionally rising above the ensemble.		More deliberate and brighter to match ensemble.		High notes and mimicking antiphonal responses.			
<b>Sop. Sax (Mintzer)</b>			Mostly space, develops when band is at climax.			Takes over Brecker's line of quavers, intensifies into demisemiquavers later.		More intense and higher in register, with a screaming high note at the ensemble's break.				
<b>Steel Drum (Moineaux)</b>								Very intense fast polyrhythms.				

Figure 2.3: A diagram of the relationships between improvisers and written backings throughout 'Liberty City' by Jaco Pastorius (from the album *Invitation*)

#### **2.1.4 The Implications for Freely Improvised Music of a Comparison with Complex Systems**

Given this thesis's primary concern with the potential for 'creative displacement' to satisfy both the Euro and Afrological ideas of 'freedom' in improvisation, it is pertinent at this point to further examine how theorists have made the comparison between 'free improvisation' and the concepts of self-organising complex systems as described above.

It is argued by the writers mentioned earlier in this chapter (such as Borgo, Nachmanovitch et al.), that freely improvised music (the examples Borgo focuses on are of Evan Parker and Sam Rivers) inhabits the 'edge of chaos' boundary and consequently leads, through the continual exchange of information, to emergent 'self-organising' structures shifting between chaos and order. The Batesonian 'difference which makes a difference', which in turn lends the system the essential quality of being 'non-equilibrium', is created through each individual musician responding uniquely to the others; as Charles Keil writes, 'what is used becomes fused. And each of us is destined by nature and nurture to do it differently, no matter how passionate we are about imitating' (Keil, 1995, p. 11). Keil is implying that purely by virtue of involving human performers, an interaction of ideas is established in which no two are identical and therefore a sonic 'equilibrium' is not completely possible. An alternative view is offered by jazz pianist Tord Gustavsen, who considers the creative equilibrium to be a danger for improvisers, describing it as 'the fatigue of stability', as opposed to its chaotic opposite, 'the restlessness of overstimulation' (Gustavsen, 1999, p. 28). An appropriate comparison might be made here with the rule of 'yes and', which is central to the successful interaction of actors in improvised theatre; too much 'yes' provides no new avenues for development, whereas too much 'and' can stretch the cohesion of an emerging scene (Crossan, 1998, pp. 596-597).

What is clear from these viewpoints is that it is the quality of interaction between elements (being either performers or, in the big band examples given above, written backings) which determines the 'stability' of the sonic whole at any given moment, particularly the level of similarity or difference between their contributions. For example, if performers are imitating each other closely then the emergent identity of the music will be stable but potentially rigid through a lack of variation entering the system; meanwhile if all performers are producing seemingly unrelated material then there may be no sense of emergent stability. The 'edge of chaos' balance requires that variation is present within the system without completely losing the definition of an emergent area of stability, and it is through this ongoing dialogic process that the proceeding structure

is negotiated between performers.

Sawyer offers a definition of how such interaction gives rise to temporary structures and frames for action:

'In collaborative emergence in small groups - for example, the emergence of an interactional frame from dialogue - it is particularly obvious that the emergent interactional frame is a process rather than a product. At each stage of the simulation, the emergent frame is slightly modified, and in turn, that frame influences the next state of emergence. Thus emergence and downward causation act in a tight feedback loop, resulting in complex and potentially chaotic behaviour. In such simulations, the incremental process of emergence, rather than the endstate, is the focus' (Sawyer, 2001, p. 53)

Sawyer's 'interactional frames' are another way of viewing the aforementioned 'attractors', in that they provide a focus for the improvisational action, and so increase stability - a narrower frame would be equivalent to a stronger attractor, a wider frame equivalent to a weaker one. Such frames can be understood as both framing the creative choices available to a performer and outlining an emergent structural moment, which, if prompted by an excess of 'difference' in one of the interacting parties, may develop into a chaotic state in which no clear frame for interaction can be discerned. Such states are necessary, however, in the formation of new areas of stability: Kossak describes how 'a state of disconnection or confusion is an integral and necessary process leading to relational and musical attunement' (Kossak, 2008, p. 9), and Matthew Sansom makes a similar point, writing that 'through the evolution and dissolution of the tensions observed between these various relationships the music becomes representative of the dialectical and creative process central to the formation of identity' (Sansom, 2007).

These concepts are directly applicable to the notion of 'creative displacements' within improvisation, which this thesis is investigating. If an improvising ensemble is considered as a complex dynamic system, with emergent areas of stability forming and dissipating through the interactions of the performers, then a creative displacement would be the equivalent of the aforementioned chaotic butterfly - flapping its wings and sending shockwaves into the system which, if sufficiently powerful, could drastically alter the nature of the system itself. The composed backings described in the case studies in this chapter could arguably be described as exhibiting this displacing power, directing improvisers towards novel structures and explorations through a sometimes dramatic interruption into the improvisational system.

It is important to note that such external influences could theoretically come in many

forms, indeed any which affects the output of an improvising performer, including not just musical or sonic interjections but the acoustics of the performance space, the nature of the performance itself and the relationships between the musicians. Pressing identifies this as an important part of the link between improvisation and systems thinking:

‘If we recall that the human performance system is non-linear, then...novel, strikingly different behaviour may follow when controlling system parameters assume certain novel combinations of ranges. It can further be shown mathematically that behaviour described as ‘chaotic’ may occur under such conditions..., even for simple systems’ (Pressing, 1988, p. 161)

## **2.2 The Mirrors of Hall Big Band and Self-Organisation**

### **2.2.1 The Band and its Research Objective**

The writing of the pieces for the Mirrors of Hall big band was advised in part by a desire to test the analogy between self-organisation and freely improvised music as described in the previous section, and to explore the extent to which composed backings could act as ‘creative displacements’ within an improvisational system. These two questions are in fact linked, as, if the systemic analogy with improvisation is valid, the self-organisation of improvisers into coherent new formations could be provoked, disrupted or strengthened through an effectively displacing backing figure. If successful this could arguably lead the improvisers into a ‘free’ exploration of novel improvisational circumstances.

The band comprised of a standard big band line-up of four trumpets, four trombones, five saxophones (two alto, two tenor and baritone), and a rhythm section of guitar, bass and drums (a piano was also added for later performances). The musicians were a combination of amateurs and professionals with experience in a variety of practices, including free improvisation, classical and jazz. Over the course of this research the band had a total of six rehearsals and three performances at venues around London.

### **2.2.2 The Extended Rhythm Section**

Inspired by ‘Liberty City’, as performed by Jaco Pastorius’s ‘Word of Mouth’ big band and described in detail in the previous case study, the earliest pieces written for the Mirrors of Hall used the idea of the ‘extended rhythm section’: a self-organising group

**Figure 2.4:** An excerpt of the guitar part for 'Tribute to John Barry'

of instruments creating interacting streams of improvisation, working around and within the written material.

For example, in the very first composition for this group, 'Tribute to John Barry', there is an almost unbroken stream of improvisation between the start of the piece on its first repeat and letter G; this improvised layer moves between instruments, starting with just one performer and swelling to include three between letters C and E (in another piece, 'Tear Gas', this layer increased to include up to six people). By using this orchestration device it is possible to examine how a group of improvisers might organise themselves within an environment of shifting musical backings.

The notation for this improvising group was, in early compositions at least, kept as minimal as possible so as to allow performers to shift their attention away from the sheet music and onto the surrounding soundscape. The staff for these sections was reduced to a single line, with only rehearsal marks and some cues included for general orientation; cues for other instruments joining the improvising group often also included an instruction such as 'adapt to fit', to encourage the player to factor this new voice into their improvisational decision-making. Figure 2.4 shows an example of this from the guitar part for 'Tribute to John Barry'.

In order to assist with the coordination of improvisers with rehearsal marks, a patch was built in the programming environment Max MSP which would display on a screen the alphanumeric label for the current section of the piece. The author was able to control the display of the screen whilst conducting using a 'Wiimote' bluetooth controller, and this extended to creating alerts for when the piece was about to move on to a new section. This enabled improvising musicians, particularly those operating within the 'extended rhythm section', to keep track of their progress through the structure of the piece.

### 2.2.3 The Composition of Backings

For the purposes of testing the self-organisation of the improvising group, a variety of approaches were taken in the designing of the composed backings. The three earliest

pieces written for this research, namely 'Tribute to John Barry', 'Tear Gas' and 'The Number of the Beats', were deliberately distinct in their key stylistic characteristics, such as the qualities of dissonance and pulse, as well as gestural and textural movement.

For example, 'Tribute to John Barry' begins with a slowly evolving cyclic chord sequence, building in instrumentation with a steady pulse in the drums; it then shifts between atonal stabs and occasional returns to the opening consonance, before settling into a relaxed jazz style and ending with long sustained chords. The style of this piece has the most in common with traditional big band music, and will therefore test the attracting strength of shifting backings within this style, as well as how improvisation within such an environment might self-organise around the introduction of more fragmented atonal material.

In a stark contrast to this, 'Tear Gas' is largely lacking pulse, characterised by non-rhythmic sustained noises and dissonances, the only exception to which is the raging modal bass line that underpins a tenor saxophone solo. Therefore, this piece is the furthest removed of the three from a traditional big band style, and so will examine how this stylistic distance, and the textural and harmonic extremes it provides, will influence the improvisations therein.

A final contrast is provided by the third piece, 'The Number of the Beats', which moves between abrasive, rhythmically driven riffs and non-rhythmic swelling note clusters. This piece offers a sound world closer to that of rock through the use of extreme dynamics, and also features most prominently sections of group improvisation; both of these aspects will test the interaction of improvisers with each other and with the backings which create the surrounding environment, particularly in regard to improvisational roles and dynamics.

The overall style of all of these pieces, however, is a mixture of elements drawn from jazz and groove-based musics, such as repetitive drum beats, bass lines and occasional use of chord symbols, with harmonic and rhythmic content derived from serial processes and inspired by post-war modernist composers such as Ligeti, Messiaen and Birtwistle (in particular the use of dissonant chord clusters, irregular cellular repetition, rhythmic augmentation/diminution and micro/macrocosmic pitch schemes). The intent of pursuing this hybrid style, besides the desire of the author to create a personal compositional sound for the ensemble, was to find a sound world which was not exclusively drawing on either jazz or 'experimental' music, but rather opening the way for a 'displaced' improvisational exploration between the two.

The individual backings were designed with the purpose of confronting improvisers with an unfamiliar musical environment in which to respond, often by disrupting an es-



established order with a sudden unexpected change. For example, in 'Tribute to John Barry' there is a dramatic change from the luscious groove-based texture of sections 1 to 4, when at 5 everything ceases except for a stabbing baritone sax; there is then a further disruption shortly after when the saxes loudly re-enter with accented chords, which then lead into a long trombone swell. Through this the guitar continues the improvisation from the previous section, and it will be illuminating to consider the extent and nature of any changes that the backings affected within this.

Another similar example is the suddenly exploding tutti chord which interrupts the trombone solo at figure 4 of 'Tear Gas' (an excerpt of the score showing this moment can be seen in Figure 2.5). As with the previous example, this is designed specifically to provoke the improviser by confronting them with an unexpected musical shift, and again an analysis of the results of this interaction may prove to be significant.

Other backings were designed to unfold more slowly, gradually changing the nature of the texture in which an improviser is operating, and therefore testing the difference in improvised response between sudden and prolonged environmental shifts. For example, the trumpet improvisation in 'Tear Gas' starts just before 7 and continues uninterrupted through until 11, during which time the surrounding musical environment changes from a 'lop-sided disco' groove, to a broad and soft texture centred on a sustained B in the trombones (this is shown in an excerpt of the score in Figure 2.6). Similarly, in 'The Number of the Beats' there is an unbroken tenor saxophone improvisation starting at 7 at continuing until section 16, during which time the rest of the ensemble moves from an aggressive rock groove through to sustained dissonant swells.

This latter example highlights another characteristic of these pieces, which is the use of indeterminate 'open' sections in the scores which have no backings at all; the aforementioned tenor saxophone solo passes through several of these. The reason for employing these 'empty spaces' for improvisation was to explore the effect of allowing the 'extended rhythm section' of improvisers to continue the course of their ongoing improvisations, free from any attractor the backings might provide and therefore at liberty to continue or depart from any order which had previously been established. Subsequent to these sections, further backings would be cued whilst the improvisers continued, again testing the extent to which the introduction of new backings would cohere or disrupt the ongoing improvisation. Other examples of these sections can be seen in 'Tear Gas' at 3 and 8, and in 'Tribute to John Barry' at 6 and 8.

$\text{♩} = 120$   
on cue

36 **4**

The musical score is arranged in a standard orchestral format. The top section includes woodwinds: Sop. Sax., Alto 2, Tenor 1, Tenor 2, and Bari. Sax. The middle section includes trumpets: Tpt. 1, Tpt. 2, Tpt. 3, and Tpt. 4. Below the trumpets are trombones: Tbn. 1, Tbn. 2, Tbn. 3, and B. Tbn. The bottom section includes guitar (Gtr.), bass (Bass), and drums (Dr.). The score is in 4/4 time with a tempo of 120 beats per minute. A rehearsal mark '36' and a circled number '4' are placed above the first staff. Dynamic markings include *ff* (fortissimo) and *p* (piano). The word 'open' is written above the first four trumpet staves. The bass line features a *ff* marking and a *va* (vibrato) marking.

**Figure 2.5:** An excerpt of the score for 'Tear Gas' (early version) showing tutti backing chords (see audio example 5)

### 2.2.4 Results in Early Rehearsals

The early rehearsal period of these pieces focussed on 'The Number of the Beats' and 'Tear Gas'. There emerged through this a general tendency for improvisers to resort to stylistic familiarity, perhaps suggesting a lack of effective 'creative displacement' as a consequence of the composed backings; however, it can also be argued that there were some significant moments of apparent 'self-organisation' occurring between the improvising musicians and the written material.

Some of these successful examples were perhaps to be expected, such as the adoption of underlying harmony in spaces where it was not necessarily dictated in the parts of the improvisers. An example of this is in the opening alto saxophone and guitar improvisations of 'Tribute to John Barry', which appeared to naturally draw on the underlying B $\flat$  major harmony (see audio example 7). Similarly, at section 9 of 'Tear Gas' the sustained B in the trombones was adopted as an impromptu tonal centre by several of the improvisers (see audio example 8). This demonstrates the strength of harmonic attraction at these points, which presents an immediately recognisable point of order for the improvisers to align themselves with.

However, there were also two significant examples of self-organisation which were more surprising, given that they appeared to occur within dimensions that were not harmonic or rhythmic, and as such these offer a greater insight into the 'displacing' potential of composed backings.

The first of these is where the trombones distort their sustained backings in section 9 of 'Tear Gas' to mirror the action of the soloist; although this was suggested in the score ('gradually embellish backings with trumpet/sop/drums improv'), the effectiveness of this interactive relationship was striking and created a texture of unsettlingly subtle fluidity - at once harmonically stable yet insecure in timbre, suggesting the emergence of an 'edge of chaos' balance in the system. The cautiously explorative reactions of the improvisers at this point, albeit broadly anchored to the sustained trombone B, identify this combination of backing and improvisation as one of the more successfully 'displacing' in this early part of this project; it also demonstrates the effectiveness of using limitation within notation to direct improvisers towards a particular attractor, an approach which would become key to later work with the big band. An excerpt of the trombone part at this point is shown in Figure 2.7, and can be heard in audio example 9.

Another notable example of self-organisation was the series of long low trombone and baritone saxophone chords at section 10 of 'The Number of the Beats'. Despite being played very softly, these chords unfailingly seemed to draw even the most raucous

52

(short pause) 7

on cue 8

Sop. Sax.

Alto 2

Tenor 1

Tenor 2

Bar. Sax.

Take this note as a starting point to improvise with Gtr.

Tpt. 1

Tpt. 2

Tpt. 3

Tpt. 4

Tbn. 1

Tbn. 2

Tbn. 3

B. Tbn.

Gtr.

Bass

Dr.

trumpet joins, adapt to fit

Resume groove (ad lib occasional irregular spasms in gaps)

(short pause) 7

was written on cue 8

let ring

1 = 60 on cue

9

join improv with tpt and drums start with only noises, gradually add more pitch...

guitar fades out improv, you continue with drums

(bass+drums join)

soprano joins, adapt to fit

cup muffle

cup muffle

harmon mute

continue solo with backing...

continue solo with backing...

continue solo with backing...

continue solo with backing...

plunger

plunger

plunger

plunger

fade out improv...

fade out improv...

(bass+drums join)

rejoin improv with top-sided half-groove

rejoin improv with similar top-sided half-groove

guitar fades out improv, you continue with trumpet

move away from previous groove if necessary

soprano joins, adapt to fit

Figure 2.6: An excerpt of the score for 'Tear Gas' (early version) showing a long trumpet solo moving through contrasting backings (see audio example 6)

78 *pp* < *mf* > *p* < *mf* > *p* continue adlib wah backings...

84 **tpt and bass tbn backings cued**  
gradually embellish wah backings in accordance  
with tpt/sop/drums improv

10 on cue

sudden stop

Figure 2.7: An excerpt of the trombone part for 'Tear Gas' (early version)

43 10 On cue

Bari. Sax. *p* very slow dim.

Trombone 2 *p* very slow dim.

Trombone 3 *p* very slow dim.

Bass Trombone *p* very slow dim.

10 On cue

Bass Guitar *mp*

Figure 2.8: An excerpt of the score from 'The Number of the Beats'

and chaotic improvisations down in both dynamic and register. It might be argued that this was due to the sustained and repeated nature of the chords, creating an attractor in the system so strong that it could not fail to force a new organisation of the previous disorder (as was discussed in the first written section of 'Liberty City', in the previous case study); an alternative reason for their effectiveness might be the fact that these chords were so different in dynamic and gesture from the loud jagged riffs that had preceded them. Following the success of this backing, those composed for later pieces in this research were designed to have a similar boldness of gesture, with the aim of creating similarly significant attractors for improvisers. A scored representation of these chords can be seen in Figure 2.8, and they can be hear in audio example 10.

These two examples seem to act as unusually strong attractors within the improvisa-

tional system, drawing the improvisers towards a particular emergent characteristic that was not harmonic or rhythmic, and was not born from a desire to play 'over' the dynamic of the band. Such an effect is particularly significant given that many of the improvisers seemed to approach their first encounter with these pieces with an idea of improvisation grounded in experiences of 'jazz', which is to say that much of the resulting improvisation was distinctly soloistic and focussed on melodic lines rather than any textural or timbral aspects. In this sense, therefore, the composed backings largely failed to provide a 'creative displacement' to the improvisers, with many seeming to resort to stylistic familiarity.

Perhaps this reversion to a jazz style is understandable, given that the parts in early versions of these pieces did not specify any stylistic intent (besides that which was discernible from the character of the music itself) and many of the performers were professional jazz musicians; however, it did limit the extent to which the improvisatory layer could move between the foreground and background of the texture, and therefore compromised the extent to which this could be considered an 'extended rhythm section' as had been originally intended. Instead, perceiving their improvisational role to be that of 'soloist', all the improvisers were naturally keen to inhabit the foreground. The volume level of many improvisers simultaneously playing soloistically also became a problem, as the composed elements of the music became inaudible and so lost any power of interaction in the system; this occurred notably with the guitar in the opening of 'Tear Gas' (see audio example 11), and with the saxophone and trombone improvisations throughout much of 'The Number of the Beats' (with the exception of the aforementioned trombone chords).

The audible result of this was either an accumulation of individual voices into a dense polyphony, or a mimicking call and response interspersed with silent gaps; what was largely absent was an exploration of improvisatory roles or associated dynamic levels. This was particularly true in the aforementioned 'open' sections, where the improvisers were given free rein to continue and develop their improvised lines from the previous parts of the piece. However, it was in these sections that a direct mimicry frequently arose, such as in 'Tear Gas' between the trumpet and guitar just before section 7 (see audio example 12). In systemic terms, this suggests a chaotic relationship in which sporadic attractors based on melodic and rhythmic material briefly arise and dissipate, failing to establish a new long-term stability.

So it can be argued, therefore, that the textures and relationships that developed between the improvisers in these early rehearsals often descended into chaos, and, in opposition to the claims of Borgo et al., could not always be relied upon to self-organise

back into a formation of harmonic, rhythmic or textural stability. However, as has been shown above, it is not the case that there was no interaction between the improvisers and backings; rather, these issues suggest a necessity for compositional clarification regarding the focus of, and role within, such interaction (such as was demonstrated by the success of the trombone notation at section 9 of 'Tear Gas'). What was needed, in systemic terms, was the outlining of stronger attractors and a greater understanding of how performers perceive the 'phase space' in which such musical attractors can exist. However, as will be investigated below, to greater understand and manage performer interaction with potentially 'displacing' backings will also require a renewed questioning and critique of the systems analogy itself.

## **2.3 A Critique of Self-Organisation**

In order to achieve a clearer understanding of the efficacy of the examples described above, it is useful at this point to further investigate how a performer might come to see a musical element as a 'strong' attractor for guiding their ongoing action; for example, it could be asked why the presence of harmonic stability was so much more effective an attractor than textural or timbral characteristics. Asking these questions, however, will also lead to a questioning of the Eurological basis of the concept of improvisational self-organisation, suggesting the importance of an Afrological historicity and decision-making within the creative process. To frame this critique it is useful first to consider the concept of the 'phase space' in which an attractor might be located.

### **2.3.1 Attractors in Phase Space**

The language which frames the understanding of attractors is fundamentally spatial: a literal example is the whirlpool or tornado, which has a powerful attractor at its centre, and similarly in mathematical and scientific uses the attractor is portrayed as a point in space toward which results are drawn. The geometric space in which these movements take place is called the 'phase space'; as David Borgo writes:

'The phase space of a system is a multi-dimensional 'map', sometimes referred to as its 'geometry of possibilities', which allows investigators to describe and analyze a system's dynamics. The number of dimensions of a given phase space is based on the degrees of freedom available for change.' (Borgo, 2005, p. 69)



A practical example of phase spaces can be found in displaying the results of iterative equations, particularly those which exhibit 'fractal' qualities or illustrate particular mathematical attractors. Through the use of a two or three dimensional phase space the resultant trajectory of such formulas can create striking images, which since their discovery have become renowned for their resemblance to natural patterns and formations.

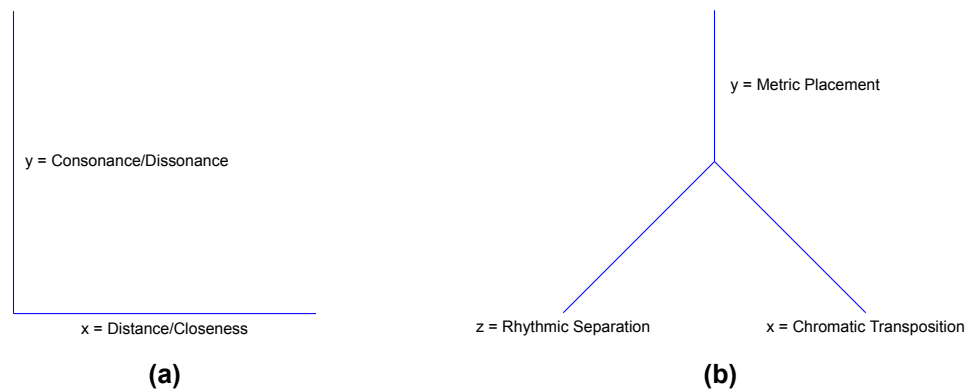
In such mathematical examples only two or three 'degrees of freedom' are used, resulting in two or three dimensional phase space images. Applying this concept to 'free' improvisation, however, raises the question of what exactly these 'degrees of freedom' are in music, and whether in fact they can be quantified or meaningfully represented in such a way. Borgo concedes this, writing that 'free jazz, without a strong allegiance to notation and with an often more flexible approach to temporal, tonal, and timbral dimensions, would seem to imply a huge number of degrees of freedom and an enormously complex phase space' (ibid., p. 70)<sup>1</sup>.

Despite this difficulty, there are interesting examples of the practical and analytical spatialisation of musical parameters. For example, Rod Paton's workshop exercise 'Tone Search' features three 'Tone Journeys', each one projecting notions of harmonic dissonance and consonance onto a plane of distance and closeness. In Tone Journey 3 this idea is developed further, with rules instructing the changing of pitch according to the proximity of performers and their position within the performance space (Paton, 2000, pp. 48-51). A music-analytical application can be found in the work of Milton Mermikides, who has used a three-dimensional 'M-Space' to plot a trajectory of variation in the motivic cells of a solo by John Coltrane, using axes of metric placement, rhythmic separation and chromatic transposition (Mermikides, 2010, p. 26). (The phase-space for both of these examples is shown in Figure 2.9) Another example, Blackwell and Young's 'Swarm Music' project, created a self-organising swarm of MIDI-based musical agents which were driven by a rule-based AI; these 'interacting particles' would take a trajectory through what in early versions was a three-dimensional space (pitch, amplitude and time interval between events), but which ultimately contained six-dimensions in subsequent revisions (Blackwell, Young, et al., 2004, p. 131).

These examples are necessarily reductive, focussing on up to three parameters in order to geometrically spatialise the 'movement' of the music. This is perhaps because in order to understand the 'difference' (or 'non-equilibrium') which drives the process of improvisational emergence, it is necessary to outline a phase space in which the

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<sup>1</sup>The findings of this thesis will ultimately refute the idea that free jazz has more 'degrees of freedom' than any other music.



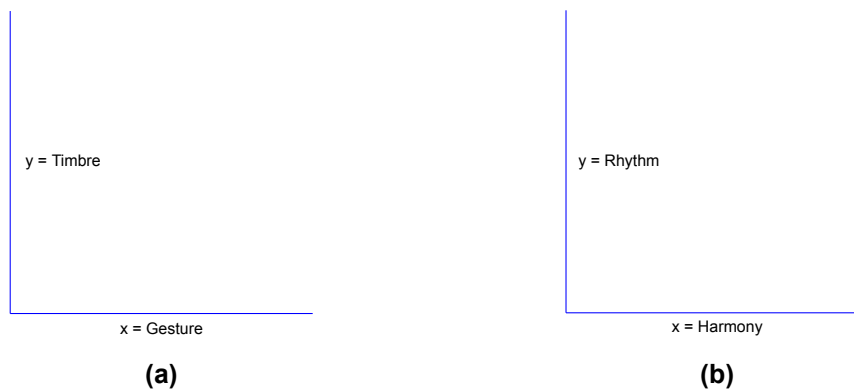
**Figure 2.9:** The phase spaces of Rod Paton's 'Tone Journey 3' (a) and Milton Mermikides 'M-Space' (b)

attractor that is providing stability to the system can be defined; put another way, if the dominant characteristic of the improvised music is understood, then the actions of the performers, and any compositional intervention into that music, can also be understood in those terms.

But given free improvisation's fundamental aversion to musical convention, as Borgo's quote above suggests, it is not necessarily the case that such a focal point will be found in traditional musical language - indeed, it is arguably *required* not to be in order to achieve any manner of 'free' explorative improvisation. A successful 'creative displacement' can perhaps, therefore, be defined in these terms as forcibly relocating the attractor for a performer to a non-musical phase space.

An interesting example of this displacement in action can be found in the early rehearsal of the piece 'Tear Gas', with the entry of the improvising soprano saxophone at section 9 (see audio example 8). The notation instructs that the improviser should 'start with only noises, gradually add more pitch...': from the rehearsal recording it is possible to hear the displacing effect of the first part of this instruction, with the performer exploring 'noisy' extended techniques such as pitch bends and multiphonics. Arguably the attractor for this performer's action has shifted into a gesture and timbre-based space (as shown in Figure 2.10a), as he can be heard mirroring the 'wah' backings of the trombones and responding to the fast muted trumpet scales with high pitch bends. However, the second part of the instruction, which invites 'more pitch', appears to redefine the phase space back into more familiar in harmonic and rhythmic terms for the performer (as shown in Figure 2.10b), and the result is a shift of focus onto the harmonic implications of the ongoing B drone.

From this example it becomes apparent that the location and relocation of an attrac-



**Figure 2.10:** The phase space shift from the beginning of the soprano saxophone's entry (a) to later in the improvisation (b)

tor in phase space will be of prime importance in forming a systems-based concept of 'creative displacement', specifically in relation to improvisers exploring less familiar or non-traditional aspects of their musical environment. Some improvisers have described how a focus on the purely sonic qualities of the music can provide a useful non-musical attractor. This type of interaction could be considered analogous to Schaeffer's 'reduced listening', as Villavicencio et al. have written:

'Free improvisation develops better in an environment based on the idea of reduced listening, which is, according to Schaeffer, a type of listening that tries to escape from both the intention to comprehend any meaning (semantic, gestural or the idea of music derived from a particular idiom) or from an identification with instrumental agents. This kind of listening is directed to the attributes of the sound itself, or in Schaeffer's words, to the sound object.' (Villavicencio, Iazzetta, and Costa, 2011, p. 4)

This approach of trying to avoid 'meaning', however, returns to the Eurological problem of improvising a-historically, which, as explained in the previous chapter, Pressing's rule-based model refutes. Prévost also challenges this when he describes his concept of improvised 'meta-music' as having 'no neutrality... even though it may seem to speak without specificity' (Prévost, 1995, p. 44).

### 2.3.2 The Eurological Problem in Self-Organising Improvisation

It is here that a fundamental criticism can be made of the comparison between free improvisation and complex self-organising systems, as proposed by Borgo, Sawyer,

Nachmanovitch and others. The stability of an emergent structure relies on the presence of an attractor, and for such an attractor to exist the dimensions of the phase-space which it inhabits must necessarily be defined. To make this definition is to pass some manner of subjective judgment on the sounds that are occurring and then *choose* to act on it, a process which essentially contradicts systemic thinking, in which it is predominantly the fundamental interactions of participants, as bound by natural laws, that directs future action.

For example, if all the improvisers in a freely improvised performance suddenly increase in volume, or get higher in pitch, then it is because a point has been identified in volume or pitch space which is higher than where the performers are currently operating and it has been chosen to be an attractor - both the naming of the space and the act of locating an attractor within it are subjective choices, neither are physiologically or environmentally determined.

Villavicencio, despite advocating a seemingly Eurological approach to improvisation, writes of similar concerns with this allegory:

‘An approach that focuses on FIM [freely improvised music] by taking the self-organisation of systems into consideration, and thus disregarding the possibility that the actions produced by the “voluntary agent” would interfere or even make invalid the occurrence of a natural phenomenon, does not seem to offer a complete view of its dynamics.’ (Villavicencio, 2008, p. 4)

In support of this he gives an illuminating quote from Paulo Freire: ‘Integration results from the capacity to adapt oneself to reality *plus* the critical capacity to make choices and to transform that reality’ (Freire, 1974, p. 4, in Villavicencio, 2008, p. 38). This ‘critical capacity’ is what the nodes in a scientific or mathematical system lack; they have no choice in their attractors, rather they are guided by their innate characteristics in relation to the environment.

**Case Study: Attractors and Intention in John Stevens’ ‘Search and Reflect’**

*A useful practical example of this problem arising can be found in a workshop that was run in the early stages of this research, in which a group of musicians undertook a performance of the workshop exercise ‘Search and Reflect’, created by improviser John Stevens and featured in his book of the same name (Stevens, Doyle, and Crooke, 2007, p. 73).*

*This exercise would seem to set up an ideal environment in which to test the*

*self-organisation of a small group of improvising musicians. From a starting point of simple short 'click' sounds, the participants are encouraged to enter into an interactional system by searching for and 'reflecting' the sounds being created by the other ensemble members. The term 'reflect' here is ambiguous, not implying any particular level of difference or similarity to the target sound. In a subsequent step of the exercise, the performers are given the following instructions: 'pick out the most dominant sound and immediately reflect it. While reflecting that sound search for another sound to reflect'. Both these instructions are important to consider in a systems comparison: the 'dominant' sound is equivalent to a strong attractor in the system, whilst the subsequent search for another sound ensures a continual movement in and out of stable states. Encompassed within this exercise, therefore, is a set of rules for creating a non-linear interactional system, and for stimulating emergence therein.*

*However, in the performance of this exercise carried out for this research, one performer highlighted the problematic ambiguity of the word 'dominant', questioning whether it was purely a volume-based quality, or perhaps a choice made out of a personal intention as to where one wanted the music to go; in other words, is a dominant sound naturally so, or is it chosen to be dominant? This question neatly encapsulates the problem at the root of the systems comparison: the role of a performer's future-oriented intention during improvisation.*

## **2.4 The Mirrors of Hall Big Band: Later Work**

### **2.4.1 Displacement through Limitation**

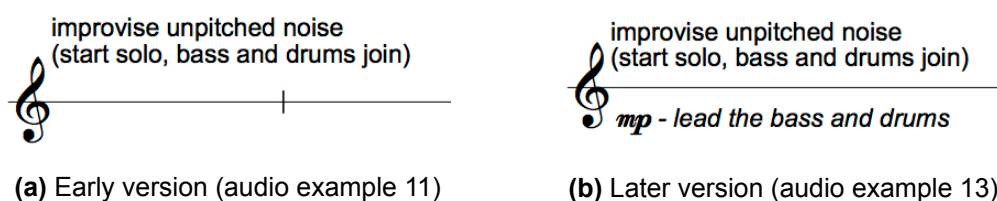
So far in this chapter, analysis of the work with the Mirrors of Hall big band has revealed a much more complex picture of how improvisers might organise themselves: not just in a manner of spontaneous self-organisation within their environment, but rather in a way that is advised by their individual aesthetic preferences and choices. By definition, therefore, the composed backings themselves were not sufficiently displacing to force improvisers into exploring novel creative re-organisations; in systemic terms, they were not strong enough as 'attractors' to disrupt the improvisers' intentions, and so there was no obligation not to respond to them with familiar improvisational patterns.

Accordingly, the rest of this chapter will consider not only the composition of backings, but also how notation can focus an improvisers attention away from habitual re-

sponses to them, and so encourage a reconsideration of the ‘attracting’ characteristics of the surrounding music.

This was explored primarily through the addition of limitations to the existing notation, with the intention of preempting certain characteristics of the improvised responses that had proved unproductive in early rehearsals, such as a tendency towards loud soloistic playing. By giving more specific instructions on certain aspects of the improvisation, the dimensions of the performer’s ‘phase space’ are accordingly reduced, forcing a reappraisal of the improvisational attractor on new terms.

For example, as shown in Figure 2.11, in the original guitar part for ‘Tear Gas’, the opening bars simply indicated that the performer should ‘improvise unpitched noise’, whereas in the later version of the part a dynamic marking is added (*mp*) as well as an indication of an improvisational role (‘lead the bass and drums’). These features are now fixed, and therefore cannot act as dimensions in the phase-space where the performer identifies attractors to guide any future action; along with the restriction to only using ‘unpitched noise’, arguably the most potent dimensions of the phase space remaining for exploration are gestural and timbral.



**Figure 2.11:** Both versions of the guitar part for ‘Tear Gas’

The difference between the two parts in performance is clearly audible between the early and later recordings of the piece (audio examples 11 and 13 respectively). When the piece was first workshopped with the band, the guitar, drums and bass created a loud layer of noise which sat dynamically above the opening saxophone chords, and therefore failed to effectively interact with them; in the later recordings, which used the additional notation, the dynamic was much softer, with the noise subtly moving in and around the saxophone backings. This difference supports the renewed importance of gesture in the decision-making of the improvisers at this point.

Similarly, in the same piece, the soprano saxophone part originally featured the instruction ‘start with only noises, gradually add more pitch...’, but was later changed to ‘use *only* noises’, as shown in Figure 2.12. The addition of a dynamic marking (*mf*), and the indication that the player should enter into a trio with trumpet and drums, adds further limitation, leaving a phase space for attractors generated only by the gestures

and timbres of the other players in that trio.

(a) Early version (audio example 8)

(b) Later version (audio example 14)

**Figure 2.12:** Both versions of the soprano saxophone part for 'Tear Gas' (later performed on clarinet)

As was mentioned in the previous section, in early rehearsals of this section the primary focus appeared to be on the transition from noise to pitch, after which the improviser returned to more familiar major harmonies and accordingly melodic material. With the use of the later notation, however, the restriction to softer noises, and the focus on the gestures of the trumpet, created a distinctive bubbling within the texture which seeped out into the ongoing trumpet improvisation and the trombone backings, creating an audible self-organising feedback loop of ideas.

These two examples show how a tighter limitation on an improviser's actions can arguably lead to a more engaged creative exploration, in turn creating an environment that is more conducive to an intentionless self-organisation than by simply allowing absolute freedom. This is due to the restriction of freedom in the phase space the improviser can use to identify attractors, forcing a displacement away from conventional responses and towards the exploration of novelty.

A third example can be found in the limitations that were introduced into the large sections of 'open' improvisation which featured in the three pieces. In early rehearsals these had been characterised by a chaotic grasping for ordering elements, but with the addition of tighter limitations on action this seemed to be somewhat remedied in later performances. For example, the entry of the baritone saxophone improvisation at section 16 of 'The Number of Beats' (originally marked as section 15, as shown in Figure 2.13a) was, in early rehearsals, largely ignored by the ongoing alto saxophone and trombone improvisations, and little order emerged from their interaction (see audio example 15).

In later versions of the score (as shown in Figure 2.13b), the baritone saxophone part is marked 'ff - lead', with the further instruction 'lead improv into a new upbeat groove'; accordingly, the alto saxophone and trombone are instructed to 'accompany bari, follow into a new groove'. The performance of this piece using the updated notation can be heard to achieve a much closer cohesion because of these changes, with the baritone saxophone transforming the opening riff into a bouncing funk feel, into which the alto

saxophone and trombone follow (see audio example 16).

However, as the open section progresses the focus provided by the initial limitations seems to be lost, and the improvisers revert to the melodically-inclined soloistic familiarity and displays of virtuosity that characterised the early performances of the music. Similar losses of focus can be seen to occur in other 'open' sections, such as section 6 of 'Tribute to John Barry' (audio example 17), and seem to indicate the fragile nature of displacement achieved through notational limitation when the cohering power of a written backing is not present to maintain order. Such open spaces also have the potential to create within a piece a compositional tension, given that they are unpredictable formal elements within what is otherwise a controlled narrative structure; the examples given above highlight this.

The only one of the three initial pieces in which these 'open' sections do not prove problematic is 'Tear Gas', and because of this it is arguably the most successful in terms of engaged creative displacement. This is perhaps due to the sombre tone and subject matter of the piece, which stands as a contrast to the more lively and rhythmically oriented style of 'Tribute to John Barry' and 'The Number of the Beats'. When considered alongside the notational limitations discussed above, it can perhaps be concluded that the success of this piece is attributable in part to the fact that it is the most removed from a conventional 'jazz' style, and that this is itself a stylistically displacing limitation at the macro-level.

To summarise, the later performances of these pieces indicate the importance of greater limitation within the notation, and the effect this has on 'displacing' the improviser's 'phase-space' for decision making. As the above examples show, this led to a greater degree of cohesive self-organisation of the improvisers between the written backings and each other. However, the effect of this limitation was found to diminish over time, and as such the 'open' sections for improvisation saw musicians resorting to familiar responses; the exception to this could be found in the piece 'Tear Gas', the style of which seemed to lead to a level of general stylistic displacement throughout.

#### **2.4.2 A New Sobriety: 'The Calcium in their Bones'**

With the above findings in mind, a suite of four pieces was composed for the Mirrors of Hall big band, entitled 'The Calcium in their Bones'. Every aspect of the composition of the suite was designed to displace the improvising performers into a state of engaged exploration, one in which any tendencies to revert to 'jazz' styles would seem inappropriate. In this sense the suite is a continuation of the style established in 'Tear Gas', and



87 **15** bari joins, adapt to fit

Alto 1  $\frac{18}{8}$

improvise around the theme below, adapt it to fit with alto and tbn improvisers - gradually develop away from this with alto and tbn

Bari. Sax.  $\frac{18}{8}$

Tbn. 1  $\frac{18}{8}$  bari joins, adapt to fit

Detailed description: This musical score shows three staves: Alto 1 (treble clef), Bari. Sax. (treble clef), and Tbn. 1 (bass clef). The key signature has one sharp (F#) and the time signature is 18/8. A box highlights a melodic theme in the Bari. Sax. part. Annotations include 'bari joins, adapt to fit' for the Alto and Tbn. parts, and a large instruction for the Alto part: 'improvise around the theme below, adapt it to fit with alto and tbn improvisers - gradually develop away from this with alto and tbn'. A circled number '15' is placed above the staff.

(a) Early version (audio example 15)

87 **16** Open bari joins, adapt to fit

Alto 1  $\frac{18}{8}$  *mp* accompany bari, follow into a new groove

Improvise around main riff lead improv into a new upbeat groove

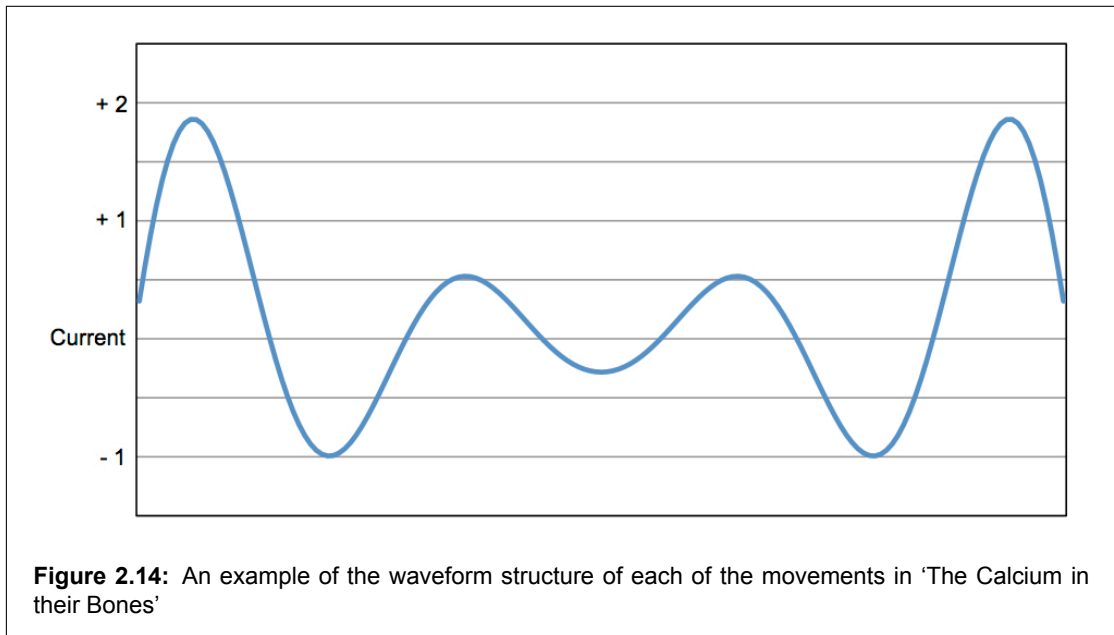
Bari. Sax.  $\frac{18}{8}$  *ff* lead

Tbn. 1  $\frac{18}{8}$  bari joins, adapt to fit accompany bari, follow into new groove

Detailed description: This musical score shows three staves: Alto 1 (treble clef), Bari. Sax. (treble clef), and Tbn. 1 (bass clef). The key signature has one sharp (F#) and the time signature is 18/8. A box highlights a melodic theme in the Bari. Sax. part. Annotations include 'bari joins, adapt to fit' for the Alto and Tbn. parts, and specific performance instructions: '*mp* accompany bari, follow into a new groove' for the Alto part and '*ff* lead' for the Bari. Sax. part. A large instruction for the Bari. Sax. part reads: 'Improvise around main riff lead improv into a new upbeat groove'. A circled number '16' is placed above the staff.

(b) Later version (audio example 16)

**Figure 2.13:** Both versions of the alto saxophone, baritone saxophone and trombone parts for 'The Number of the Beats'



is therefore characterised by a similar sobriety of tone and subject matter.

The inspiration for the suite came from Patricio Guzmán's 2010 film 'Nostalgia for the Light', a documentary which compares two ongoing searches in Chile's Atacama desert: the first of astronomers searching the stars for clues to the origins of the universe, the second of women searching the desert for remains of loved ones who disappeared under the dictatorship of Augusto Pinochet. The four movements of the suite take key themes from the film as characteristic starting points: 'Celestial Bodies' is characterised by long sweeping chords, 'Remains of Remains' by roughly-pitched noise, 'They Shot Him Twice in the Head' features fast jagged gestures, and 'The Fragile Present Moment' is more contemplative and spacious.

The composition of the pieces themselves was 'displaced' by the assumption of particular structural limitations inspired by the film, in particular the idea of 'focussing'. For example, the structure of each movement was based on a symmetrical waveform pattern that would decrease in amplitude, settle on a focal point and then expand again. As the waveform passed through particular ranges it would indicate the assumption of the attributes of one of the other movements of the suite, whilst movement to the central focal point represented a focussing on the mood of the current movement; a graphic representation of this can be seen in Figure 2.14, although it should be noted that the structure of some of the movements were modified in subsequent revisions.

Pitch and harmony was treated with a similar idea of 'focussing', with a harmonic

32 **B** improvise around harmonics  
based on pitches given (any 8ve)

coughing/spluttering

4 duet w/ trombone

**Figure 2.15:** An example of limitation in the notation of the clarinet part for 'The Calcium in their Bones', mvmt. II 'Remains of Remains'

scheme for the whole suite created from layered strata of pitches, each using different rhythms and therefore cycling at different rates; through the composition process this led to the emergence of recognisable melodic motifs which repeatedly arise under different instrumental and harmonic guises, and unexpected harmonic alignments which could suddenly dissipate.

The music that resulted from the following of this systemic process of composition was stark and dramatic, moving unexpectedly between levels of consonance and dissonance, and therefore created the perfect environment for the sobriety of displaced engagement which was desired. To further this effect, the first movement of the suite, 'Celestial Bodies', was entirely composed and featured no improvisation. Just as the established mood of the three early pieces had influenced the open improvisation sections within them, so this opening movement of the suite acted as a 'palate cleanser' in preparation for the improvisation which would be undertaken in the following movements.

Notation for the subsequent improvisations utilised a combination of limiting factors include specific pitch sets (sometimes even reverting to only a single pitch), specific instrumental techniques and descriptive words (the full importance of which will be discussed in Chapter 2). An example of this, taken from the clarinet part, can be seen in Figure 2.15.

It is also important to note that there are only two short 'open' improvisation sections, both of which are in the final movement; instead, most of the improvisations are presented to the performers within tighter structural bounds than in previous pieces, with specific bar lengths given as well as cues and rehearsal marks. Within this the concept of the 'extended rhythm section' is still present, albeit more limited in freedom than what was originally conceived at the start of the research. An example of this is in the second movement of the suite, 'Remains of Remains', in which a continuous improvised line can be traced from the first trombone at the very start of the piece, via a duet with

the clarinet in sections B to E, into a trumpet and second trombone duet which only stops at H; this is not to mention the parts for guitar, piano, bass and drums throughout these sections, which move between tighter and looser forms of indeterminacy and improvisation throughout.

The lack of 'open' sections means that the improvisations throughout the four movements of the suite were almost continually interacting with composed backings. Accordingly, the backings that were composed for this suite, as well as maintaining the relevant character for each movement as described above, were designed to be as gesturally bold as possible so as to maximise their displacing force: the dramatic climax in bar 60 of movement two is a good example (shown in Figure 2.16 and audio example 18), as are the sustained swelling tutti chords at bar 88 of the same movement (shown in Figure 2.17 and audio example 19). Following the examples of successfully displacing backings from 'Tear Gas' and 'Number of the Beats', many of these backings sought to create strong attractors of register, gesture and timbre, often sustaining and developing these over extended periods of time (for example, the registeral extremes of rumbling bass and squealing saxophones in sections C to E of the third movement, which serve to both extend and gradually subdue the climax at C [see audio example 20]).

It is also notable that the third and fourth movements feature lengthy solo improvisations for the tenor and soprano saxophones respectively, the presentation and role of which are much closer to traditional big band jazz solos (the soprano solo even uses chord symbols throughout) but with the addition of further limiting factors like those described above. Particularly in the case of the soprano saxophone solo in the final movement, this more conventional style of writing was used to match the necessity for a similarly soloistic approach to that improvisation, and was written in the knowledge that the performer in question would fully explore the limitations of the chords as well as the associated descriptive words. An example of this is shown in Figure 2.18.

### **2.4.3 'The Calcium in their Bones' in Performance**

The manner in which the ensemble performed this suite was arguably very different to that of the original three pieces. There appeared to be a heightened sense of concentration, both on the part of the performers navigating the technical complexities of the piece, and the improvisers who worked to adapt their own sensibilities to this stark sound-world and its implications. Four examples which support this hypothesis will now be considered.

From the same performers who, at times, had lapsed into displays of overt virtuosity

Cl  
Alto 2  
Tenor 1  
Tenor 2  
Bar. Sax  
Tpt. 1  
Tpt. 2  
Tpt. 3  
Tpt. 4  
Tbn. 1  
Tbn. 2  
Tbn. 3  
B. Ten.  
J. Org.  
Pno.  
Bk.  
Dr.

4 8 12 16 20

follow building intensity (add to harmonics with flutter/noise)  
become frenzied with piano  
open  
follow building intensity  
become frenzied with piano  
dim. behind trombone fade  
frenzied  
random irregular attacks on B  
frenzied with piano  
no ring

Figure 2.16: An excerpt of the score for 'The Calcium in Their Bones', mvmt. II 'Remains of Remains' (audio example 18)

The musical score is a complex orchestral and vocal arrangement. It features the following components and annotations:

- Vocal Parts:** Sop., Alto 2, Tenor 1, Tenor 2, Bass (Baritone), and various vocal parts (Tpt. 1-4, Tbn. 1-3, J. Ch., Perc.).
- Instrumentation:** Tpt. 1-4, Tbn. 1-3, J. Ch., Perc., and other instruments.
- Dynamic Markings:** *p*, *mf*, *f*, *sfz*, *cresc.*
- Performance Instructions:** "reflect growing intensity of bass", "lean rhythm completely into of suspensions (pitches any line)", "clean, light", "slight bend down", "slight bend down", "slight bend down", "maximum noise", "no fls".
- Annotations:**
  - G:** multo aceti and is detected very pure (reflect bass)
  - G:** maximum noise
  - H:** no fls

Figure 2.17: An excerpt of the score for 'The Calcium in Their Bones', mvmt. II 'Remains of Remains' (audio example 19)

**B A bit faster** ♩ = 70

30

solo  
Fmaj7(#11) ish

harmony wanders, darken slightly

4

*mf* pure, clear, refreshingly light

The musical notation shows a soprano saxophone part starting at measure 30. It begins with a rest, followed by a series of slanted lines representing improvisation. The tempo is marked 'A bit faster' with a quarter note equal to 70. The key signature is F major with a sharp 11th. The dynamics are marked *mf* with the instruction 'pure, clear, refreshingly light'. The harmony is noted as 'Fmaj7(#11) ish'. The piece concludes with a section where the 'harmony wanders, darken slightly' over measures 4, 5, and 6, which are marked with slanted lines and repeat signs.

**Figure 2.18:** An example of the notation of the soprano saxophone part for 'The Calcium in their Bones', mvmt. IV 'The Fragile Present Moment'

30

6

**Open**  
improvise around this rhythmic idea and develop with gtr

7

**On Cue (NOT open)**  
Drums join, adapt to fit

*f* lead

*mf* duet with drums

The musical notation shows a baritone saxophone part starting at measure 30. It begins with a rest, followed by a series of slanted lines representing improvisation. The piece is marked with a circled '6' and the instruction 'Open: improvise around this rhythmic idea and develop with gtr'. The dynamics are marked *f* with the instruction 'lead'. The piece concludes with a section marked with a circled '7' and the instruction 'On Cue (NOT open): Drums join, adapt to fit'. The dynamics are marked *mf* with the instruction 'duet with drums'. The notation includes repeat signs and a final double bar line.

**Figure 2.19:** An example of the notation of the baritone saxophone part for 'Tribute to John Barry' (see audio example 17)

in the early pieces, came a level of contemplation and focus that resulted in a feeling of deep improvisational exploration of the composed textures. The subtle inflections of the baritone saxophone at the beginning of the fourth movement demonstrate this well, and are a marked contrast to the same performer's spectacular displays of technique in the earlier three pieces. A comparison of the notation for the baritone sax part to 'Tribute to John Barry' (shown in Figure 2.19 and audio example 17), in which an 'open' section elicits a wild display of multiphonics from the performer, with the aforementioned passage from 'The Calcium in their Bones' (shown in Figure 2.20 and audio example 21), highlights the difference in notational approach described above. Through limitation of pitch choice, dynamic and gesture, the performer in this latter example is guided to an exploration of a timbral and rhythmic phase space (although potential dimensions for such a space could arguably include the words 'anger' and 'stutter', which are also given in the notation). The result of this was a considered exploration of a mid-texture role, with a dynamic which rose and fell around the composed backings, and occasional growls that subtly destabilised the order established by the sustained brass melody.

Perhaps because of this deeper improvisational focus, instances appeared to emerge of the improvisers 'self-organising' around the composed backings, particularly throughout the second movement which was perhaps the most successful of the four. For ex-

6 improvise around this idea using these pitches only 4

*p*

*very soft, almost silent - occasional stuttering echos of anger from previous movement...*

**Figure 2.20:** An example of the notation of the baritone saxophone part for 'The Calcium in their Bones', mvmt. IV 'The Fragile Present Moment' (see audio example 21)

ample, the trombone improvisation in section C of this movement closely follows the growing intensity of the ensemble backings, whilst also reflecting the gruff timbral distortion of the clarinet; however, the empty aftermath of the band's subsequent climax, characterised by irregular bass plucking and floating piano lines, sees the trombone sustaining the tail of the tutti chord with an unsettling hollowed-out 'scream' effect, whilst the clarinet breaks down into single points which become gradually more spaced out (an excerpt of the score in Figure 2.16 shows this example, and the latter part of it can be heard in audio example 18).

To return to the language of complex systems, it becomes hard to identify an obvious strong attractor in musical terms in the latter part of this example; the trombone 'scream' could arguably be considered at odds with the more resigned clarinet and piano, and yet equally arguable is the coherence of the texture that results from their combination. It will be suggested later in this thesis that there is a more metaphoric level on which attractors may emerge, and on which the cohesion of this texture, and other similar moments from the performance of this piece, may indeed be based.

A further example of what can be described as self-organisation occurs in the same movement at sections I and J, with the tenor saxophone improviser moving from a soloistic position in I to becoming almost completely submerged in the texture at J. The notation for this, shown in Figure 2.21, shows how the performer here is instructed to change from a more pitch-centred approach to using only 'soft noises'; in the exploration of these noises the performer is also confronted with a greater surrounding textural density, as the ensemble backings build towards K. Arguably a tension is created, therefore, between the restriction to 'soft noise' and the desire to present a distinctive voice within the thickening texture of the backings. The performer solves this creative problem with an exploration of soft whistling tones and multiphonics, notably rising above the lower register of the ensemble backings as section I progresses (see audio example 22).

This improvisation restarts in section M and continues until the end of the piece (shown in Figure 2.22), and it is interesting to note that the performer responds similarly



112 solo on these pitches (any 8ve)  
*p* very sparse, airy tone, ghostly...

120 **J** lose pitch, focus on soft noises  
 (cue: band chord)  
 (drums join as duet)

Figure 2.21: An example of the notation of the tenor saxophone part for 'The Calcium in their Bones', mvmt. IV 'The Fragile Present Moment' (see audio example 22)

here to thickening backing textures at bar 160 and at N (see audio example 23). This might suggest that this is in fact a habitual response from the performer, or that it is a re-deployment of his previously successful approach in section J. Equally, it could be argued that this is the result of a similar tension between dynamic limitation (this time given via a 'pianissimo' marking) and the renewed swelling of the ensemble backings.

A final example of possible self-organisation arising within this same movement can be seen in the trombone and trumpet improvisations in sections E, F and G. The notation for these improvisations features perhaps the strictest limitation of action in any of the big band pieces written for this research, with the performers limited to using just one pitch with a 'wah' effect added by a plunger mute (the notation from the trombone part for this can be seen in Figure 2.23, and the performance can be heard in audio example 24). What is particularly significant here is how the trumpet and trombone begin as an improvising duet, mimicking each other's rhythms and 'wah' gestures, but with the later instruction of 'reflect growing intensity of bass' they turn their attention to mirroring the gestures of the ensemble backings; in systemic language, it could be said that the change of focus equates to a movement of the attractor within this tightly fixed phase space, and the subsequent changes are indicative of an ensuing self-re-organisation in reaction to a changing environment.

In summary, these examples show that the performance of 'The Calcium in their Bones' was arguably more creatively focussed and improvisationally explorative than the previous three pieces, leading more frequently towards 'edge of chaos' systems and thus resulting in a greater degree of self-organisation by improvisers. This can be attributed to both the increased limitation on the actions of the improvisers and the starker atonality of the backings, which resulted from the 'creative displacement' of the

147 **on cue (tbn)** **M** Slow ♩ = 60  
 5 resume previous improv around these pitches (any 8ve)  
*pp* very sparse, airy tone, ghostly...

157 4 (cue: tbn/sax chord)<sup>8</sup> 12

166 **N** **On cue** (muted tpts) 16 (drums) 20 noises fade...

Figure 2.22: An example of the notation of the tenor saxophone part for 'The Calcium in their Bones', mvmt. IV 'The Fragile Present Moment' (see audio example 23)

76 **E** improvise occasional short pop 'wah' with tpt, gradually become improv duet  
 plunger  $v_{o+}$  4 8  
*mp* sporadic

85 **F** reflect growing intensity of bass 4 8  
*mf* cresc.

Figure 2.23: An example of the notation of the trombone part for 'The Calcium in their Bones', mvmt. IV 'The Fragile Present Moment' (see audio example 24)

compositional process itself.

## 2.5 Conclusion

It would seem that the comparison of 'systems theory' with improvisation can be useful in understanding the role of difference and similarity in idea formation, which will be examined further in chapters to come. This is achieved through drawing parallels with order and chaos, and the 'edge of chaos' balance which allows for a flexible degree of self-organisation.

However, such a comparison can also be problematic in capturing the nature of the practice due to its difficulty in accommodating aspects of choice and intention. The concept of the self-organisation of systems through the presence of attractors, which can create order from disorder in natural and scientific systems, becomes complicated in this comparison by the suggestion that freely acting human performers are not naturally drawn to one particular attractor, but rather that they pass a subjective judgement on the attracting characteristics they encounter and make decisions therein. This can be seen in the early work of the Mirrors of Hall big band, where freely improvising performers, unrestricted by notational limits, appeared to rely on familiar approaches to improvisational creativity.

The most significant conclusion of the work with the Mirrors of Hall big band, therefore, is only partly to do with the displacing power of composed elements; rather, it is that the area of greater compositional interest may actually be in understanding how individual improvisational decisions are made, and interacting with them through notational design. The concept of 'phase space' - the multi-dimensional space in which attractors are located - has proven to be useful in this regard, as it provides an effective analogy for the limitation of degrees of freedom within decision making. For example, in the later work of the big band, instances where the dimensions of pitch, dynamic and textural role were fixed seemed to provoke in the performers an exploration of other attractors, such as those in gestural or timbral space.

It might be argued, therefore, that the limitation of improvisatory freedom paradoxically affords performers a greater freedom for exploration, since it denies the option of reverting to familiarity. Whilst the presence of composed backings in the examples above largely failed to achieve this independently, perhaps because of the initially free choice of the terms on which performers would interact with them, greater notational limitation forces a novel interaction with both backings and other performers. Following this

kind of limitation, a manner of self-organisation around composed backings appears to manifest itself which is more subtle and complex than that based purely on harmonic or dynamic changes, and in which it becomes less clear how constituent parts of the resulting texture are linked - the examples given from 'The Calcium in their Bones' indicates this.

This appraisal would fit into this thesis's ongoing consideration of the 'creative displacement', following Adorno's concept of 'perspectives...that displace and estrange the world' (Adorno (1951), quoted in Smith (2010, p. 126)); in this way these examples differ from other forms of notational limitation (such as chord symbols in jazz, for example) because they expressly seek to divert the performers attention away from familiar responses and towards an exploration of less familiar forms of expression.

However, a potential problem arises with the rehearsal and repetition of such 'displaced' music, in that over time its novelty may cease and, in turn, its displacing power will diminish. As successful improvised responses to composed backings are found there may emerge a tendency towards retaining the same responses for future performances; indeed, this can be heard to an extent through a comparison of the different performances of 'Tear Gas' (consider in particular the evolution of the largely improvised guitar part). Another important consideration is that what comprises novelty for one performer will arguably not be the same for another; whilst the process of creative displacement outlined in this chapter had some success in regard to an ensemble comprised mainly of jazz musicians, the same process might not be repeatable with musicians of a different background, who would bring with them their own training and tendencies.

Accordingly, the forthcoming chapters in this thesis will consider how both technology and leadership might allow for the creation and management of more fluid and unpredictable forms of displacement. These will continue to draw on the concept of improvisational limitation, as outlined in this chapter, and will also make reference to the 'complex systems' analogy in other theoretical comparisons.

## CHAPTER 3

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### Displacement through Technology

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One launches forth, hazards an improvisation. But to improvise is to join with the World, or meld with it. One ventures from home on the thread of a tune.

Deleuze and Guattari, 'A Thousand Plateaus' (2004, p.311)

### 3.1 The Philosophy of Gilles Deleuze

#### 3.1.1 Introduction

The writing of Gilles Deleuze, in particular his work with Felix Guattari, has been closely linked to the scientific theory of complex systems, and has been interpreted in such a way by writers such as Delanda and Massumi. Heylighen et al., for example, suggest that Deleuze and Guattari's work has 'an innate sensitivity to complexity', as 'many of their post-Freudian insights... deny reductive strategies' (Heylighen, Cilliers, and Gershenson, 2006, p. 16).

Through these similarities, they have also become an important reference point for the study of free improvisation. Academics and practitioners in this field who have drawn on their ideas include Gilbert (2004), Allen (2002), Cee (2010) and Costa (2011).

The reason for this enthusiastic appropriation of Deleuze and Guattari's ideas is their emphasis on the interaction of forces, ideas and identities, leading to the emergence of forms and content which are not fixed but vary in ontological stability. For example,

one of the notions central to their writing is that of rhizomatic structure, as opposed to aborescent; he writes, 'unlike trees on their roots, the rhizomatic connects any point to any other point.... It has neither beginning nor end, but always a middle (*milieu*) from which it grows and which it overflows' (Deleuze and Guattari, 2004, p. 21). This concept serves to illustrate the fundamental interconnectedness of specific points or 'plateaus', none of which can be described as singularities but rather 'multiplicities' formed by 'machinic assemblages'. Just as in complexity theory's notion of self-organised emergent structures, external environmental influences are intricately linked to internal processes in the formation of identities:

'The distinction to be made is not at all between exterior and interior, which are always relative, changing and reversible, but between different types of multiplicities that coexist, interpenetrate, and change places.' (ibid., p. 36)

The consequence of this is that every utterance and idea can be viewed as the consequence of an interaction with a vast number of connected factors. This is particularly relevant to freely improvised music, in which it is frequently argued that the collective (or, in systems language, emergent) voice is more important and ultimately more prominent than that of the individual. Deleuze and Guattari elaborate on this point, using as an example the linguistic principle of the 'proper name':

'There are no individual statements, there never are. Every statement is the product of a machinic assemblage, in other words, of collective agents of enunciation (take 'collective agents' to mean not peoples or societies but multiplicities). The proper name (*nom propre*) does not designate an individual: it is on the contrary when the individual opens up to the multiplicities pervading him or her, at the outcome of the most severe operation of depersonalisation, that he or she acquires his or her true proper name.' (ibid., p. 37)

The 'proper name', then, is really a signifier for the multiplicity of interactions which form the individual. The 'true' proper name, however, is something more elusive, discovered only when such multiplicities are recognised and discounted. It could be argued that the most extreme end of this 'depersonalisation' might be comparable to a Eurological 'non-intentionality', a chaotic state which Deleuze and Guattari refer to as the 'Body without Organs'.

### 3.1.2 The 'Body without Organs'

The reaching of a state of emptiness, a blank slate or 'tabula rasa', in which to experience the world clearly has long been a philosophical preoccupation. It is comparable to the 'pure reason' which Kant wrote of, and formed the pre-conscious world that Husserl sought to illuminate through 'phenomenology'. This can be reached, Husserl suggests, through a process of reduction or 'bracketing out' of conscious judgments and associations, summarised in the greek term 'epoché' (Mingers and Willcocks, 2004, p. 65); this is comparable to Pierre Schaefer's 'reduced-listening', as has been shown by Kane (2007).

The term 'Body without Organs' is borrowed from Artaud's 1947 radio-play 'To Be Done With the Judgement of God':

'For tie me down if you want to, but there is nothing more useless than an organ. When you have made him a body without organs, then you will have delivered him from all his automatisms and restored him to his true liberty.' (Artaud, quoted in Scheer (2009, p. 42))

Deleuze and Guattari's 'Body without Organs' is the result of a reduction, similar perhaps to Husserl's 'epoché': 'The BwO is what remains when you take everything away' (Deleuze and Guattari, 2004, p. 151). The process of breaking away from 'automatisms' leads towards a space in which no intention exists, with a maelstrom of potentialities of which all are equally likely; they refer to it as the '*field of immanence* of desire, the *plane of consistency* specific to desire (with desire defined as a process of production without reference to any exterior agency, whether it be a lack that hollows it out or a pleasure that fills it in)' (ibid., p. 154). This metaphor of 'hollowing out' is comparable to the aforementioned idea of 'basins of attraction' in a complex system: if the 'plane of consistency' is a surface deformed by desire, making one choice of direction preferable to another, then the Body With Organs is completely flat and therefore chaotic by comparison.

But unlike the Husserlian phenomenon, 'you never reach the Body without Organs, you can't reach it, you are forever attaining it, it is a limit' (ibid., p. 150). This might be considered a departure from Artaud, who in the quote above suggests that an action achieving this state is a restoration to 'true liberty' - it is unclear if this should be understood as a complete 'depersonalisation', the kind of which Deleuze and Guattari compare only to the annihilation of drug abuse (ibid., p. 152) or masochism (ibid., p. 156): 'a body without organs that shatters all the strata, turns immediately into a body of nothingness, pure self-destruction whose only outcome is death' (ibid., p. 162).

Deleuze and Guattari's view of the Body without Organs as an unreachable horizon can also perhaps be considered as supporting Cage's scepticism that improvised action can be without intention, and therefore also echoing the critique of the self-organisation analogy described in the previous chapter; however, it could equally be read as a criticism of Eurological 'non-intentionality' itself. The findings of the previous chapter give weight to this perspective, showing that any 'empty spaces' were quickly filled with familiar responses.

But despite the apparent impossibility of its realisation, there is no doubt in Deleuze and Guattari's writing of the importance of pursuing the Body with Organs; they identify the three strata 'that most directly bind us' as being 'the organism, signifi-ance, and subjectification', and state that against these 'the BwO opposes disarticulation (or *n* articulations) as the property of the plane of consistency, experimentation as the operation on that plane (no signifier, never interpret!), and nomadism as the movement (keep moving, even in place, never stop moving, motionless voyage, desubjectification)' (Deleuze and Guattari, 2004, p. 159). This 'nomadism' of movement is again comparable to the features of a self-organising system, specifically the need for a continual flux or 'disequilibrium' to maintain the system's flexibility.

### 3.1.3 The Refrain and (De)Territorialisation

Deleuze and Guattari outline an approach to reaching the Body without Organs which bears a significant resemblance to the 'edge of chaos' dynamics described in dynamic complex systems by Kauffman and others. Just as a self-organising structure requires a balance between continuous change and a degree of stability, so 'the BwO is always swinging between the surfaces that stratify it and the plane that sets it free' (ibid., p. 161). They describe the caution that should be taken to avoid 'that which pertains to static proliferation, or else too-violent destratification' (ibid., p. 161), and in doing so imply a continuum comparable to that which was described in the introduction to this thesis - between composition (Eurologic, that which limits the performer's will) and improvisation (Afrologic, that which relies solely on the performer's will). The route to an effective Body without Organs is to be found balanced between these two extremes, and therefore any compositional 'creative displacement' which seeks to direct improvisers towards this intentionless state must be judged with similar caution.

They suggest that close connections with the existing strata are essential as a starting point: 'Lodge yourself on a stratum, experiment with the opportunities it offers, find an advantageous place on it, find potential movements of deterritorialisation' (ibid., p. 161).



'Territories' are perhaps comparable to Sawyer's 'interactional frames', emergent unities which become signifying through constancy and acquire proper names; 'territorialisation', therefore, is defined as 'an act of rhythm that has become expressive, or of milieu components that have become qualitative' (ibid., p. 315) - it is a thickening of the 'plane of consistency', the definition of an organisation of elements that has become (at least partly) fixed. 'Deterritorialisation' is the opposite process, described in terms of 'lines of flight' which extend from and deform territories by making new connections with other multiplicities, and which in this way can form 'strange new becomings, new polyvocalities' (ibid., p. 191).

A territory of familiarity and consistency is referred to by Deleuze and Guattari as the 'Refrain'. This is 'home', a controlled delineated space which is opposed to the chaotic unknown exterior to it (ibid., p. 311). Schmidt provides a useful definition of the Refrain:

'In a song, the refrain is that element which returns; it is comfort, the familiar. Therefore, the refrain can easily become that which identifies, that which is routine. Alternatively, the refrain can also be seen as the repetition that affords elaboration, change, adaptation, and risk.' (Schmidt, 2012, p. 161)

In the pursuit of a method of 'creative displacement' which can find a path between the familiar and the unknown, the concept of the Refrain would seem to be essential; Schmidt goes on to emphasise this importance, describing it as 'the identifier that balances expansion and recognition' (ibid., p. 162).

#### **Case Study: The Re-territorialisation of Musical Interaction in 'Volcanicity'**

*For the purposes of this research, a derivative of John Stevens' 'Search and Reflect' was devised in which the exercise was to be undertaken within a particular cognitive frame; specifically, performers were instructed to evaluate other performers' output on a scale of light-dark and hot-cold. In Deleuzian terms this re-framing can be considered a deterritorialisation of the performer's understanding of musical interaction, leading to its subsequent reterritorialisation on a plane of 'heat' and 'light'. The intention of this action was to 'displace' the performer's regular musical focus on pitch, rhythm and harmony, and instead to invite a new metaphorical focus.*

*This exercise was first workshopped with a group of undergraduates at Brunel University (this can be heard in audio example 25), many of whom commented that it was useful as an aid to improvisational decision making. One participant described how 'it stops you focusing on playing the same notes' as others, while another de-*

*scribed the framework as being like an 'idea generator'.*

*Later the same exercise was undertaken several times by the vLookup improvisation ensemble, as can be heard in audio examples 26, 27 and 28. Through these performances an interesting phenomenon became noticeable, in that similar textures would crop up from one performance to the next; this is shown in Figure 3.1 by three waveforms, each from a different recording of a performance of 'Volcanicity', which are divided into colour-coded segments to display similar textures between performances<sup>a</sup>. The most commonly occurring are the textures coloured grey and red on the waveforms, generally representing periods of high-pitched airy sounds and dense low pitches respectively.*

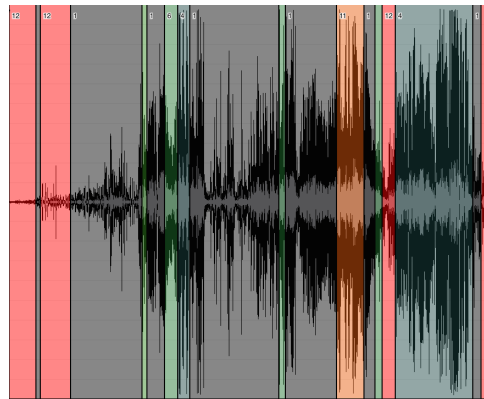
*This occurrence is perhaps attributable to the reterritorialisation of the interactional 'Refrain', that is to say that the process of listening and responding on a plane of heat and light was becoming familiar to the performers. Where the deterritorialisation may have brought them closer to the Body without Organs, whereby lack of familiarity might lead to a greater freedom of decision making, the repetition and subsequent reterritorialisation will have created preferred solutions to this particular creative problem. In addition, it is notable that one of the performers commented that heat and light were, for him, not such unusual metaphors for understanding music, and this might also explain the repetition of textures in performance. The question must be asked, therefore, where the limits of 'creative displacement' lie in relation to a performer's understanding of musical interaction, and at what point such compositional interjections are either ineffective or overly abstracting.*

<sup>a</sup>This timbral 'segmentation' was carried out with the software 'Sonic Visualiser'; for more information see <http://www.sonicvisualiser.org>

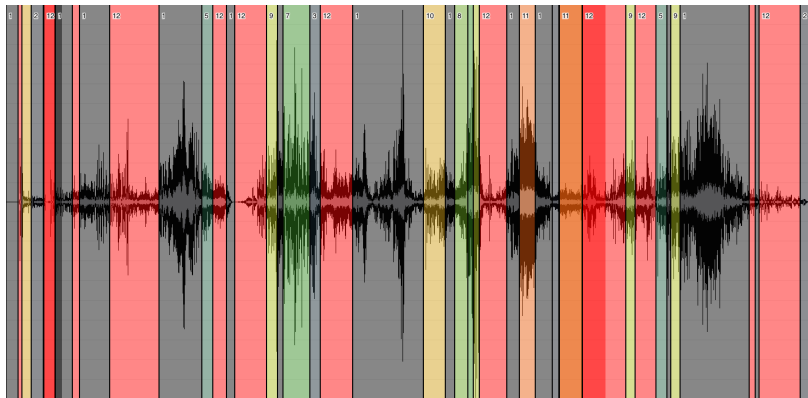
## 3.2 Replicable Indeterminacy: The M-Word Engine

### 3.2.1 'Nomadism'

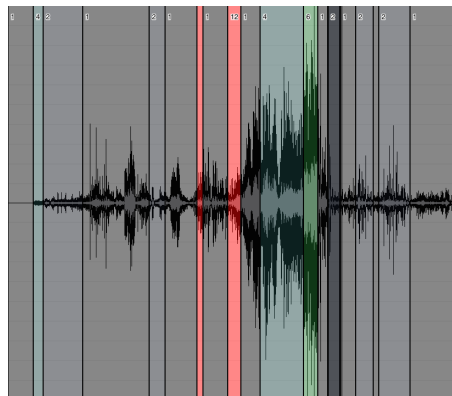
In a statement quoted above, Deleuze and Guattari describe the 'Body without Organs' as displaying 'nomadism as the movement (keep moving, even in place, never stop moving, motionless voyage, desubjectification)' (Deleuze and Guattari, 2004, p. 159). They present 'nomadisms' as the opposite of 'sedentarities' (ibid., p. 61), characterised by a difference in the qualities of movement and therefore of deterritorialisation of the refrain; 'nomadism' is a continuous exploration outside of the known or the regulated,



(a) Audio example 26



(b) Audio example 27



(c) Audio example 28

**Figure 3.1:** A colour-coded segmentation of three difference performances of ‘Volcanicity’, highlighting similar textures between recordings. For example, areas which are shaded grey were characterised by sustained high pitches or airy white-noise, whilst red areas indicate textures featuring lower pitches and bass rumbles. Light green shading signifies jagged and disjunct textures of fast sporadic movement around all registers.

and represents a parallel of Derek Bailey's conception of non-idiomatic music when he writes 'diversity is its most consistent characteristic' (Bailey, 1993, p. 83).

As has been shown in the previous case study, a creative displacement or deterritorialisation can become reterritorialised through familiarity, just as a nomadic line-of-flight can become sedentary. In order to reach a nomadism of movement, therefore, a replicable indeterminacy is needed so as to sustain the effect of displacement. The utilisation of indeterminacy by the postwar musical avant-garde has been described in the introductory chapter of this thesis, but is worth reconsidering from the perspective of how repeatable such indeterminacy is from one performance to the next.

Indeterminate graphic and text-based elements in scores offered a creative displacement to the interpretation of traditional musical instructions, deterritorialising the conventional approach to notation and forcing performers to find musical articulations of unfamiliar stimuli. Cornelius Cardew's 'Treatise' (1971) is one of the most significant graphic scores from this tradition, and his accompanying handbook is illuminating in the potential difficulties of engaging in such a manner of music-making. For example, he writes of how a performer's interpretation of a graphic score can develop (or territorialise) gradually over the course of the piece: 'Orientation is slow, in proportion to the length of the piece, but it is spontaneous, since no specific orientation is prescribed' (Cardew, 1971, p. xi). However, he also reflects on how a performer, bringing 'all his prejudices and virtues' to the process of interpretation, can jump to conclusions regarding the meaning of graphic notation without engaging actively with the notation and its instructions (*ibid.*, p. xv). The solution, he suggests, lies in the construction of the notation itself:

'Ideally then, we should while composing strive to eliminate all mere interpretation, and concentrate on the notation itself, which should be as new and fresh as possible (hence less likely to arouse preconceptions in the interpreter)... and should contain implicit in its internal structure, without any need of instruction, all the implications necessary for a live interpretation.' (*ibid.*, p. xv)

What is needed therefore, according to Cardew, is a notation in which the deterritorialisation of the initial encounter with the material can be repeated on each performance, denying a reterritorialisation to the Deleuzian 'Refrain'. Stockhausen's 'process' compositions, such as those based on his 'plus-minus' notation system, offer an interesting solution to this problem. Included amongst these complex graphic symbols are indications for a performer to apply a process of increase or diminution to a particular parameter

of the preceding material, leading to subsequent transformations in register, dynamics, duration and rhythmic segmentation (Toop, 2008). Thus the performer works actively on the preceding material as 'found objects' (Maconie, 2005, p. 101), although through these processes the resulting material is still potentially fixable (through reterritorialisation) and repeatable; this has led to composers such as Christopher Fox (2000) to create realisations of pieces like 'Plus-Minus' which can then exist as composed-interpretations in their own right.

Stockhausen's 'Kurzwellen' and 'Spiral' (1968) are examples in which this processual notation system is applied to an aleatoric starting point, and therefore, although the structure of the parametric transformations will remain from one performance to the next, the musical material to which this process is applied will always vary. The basis for the material in both pieces is imitated from a shortwave radio transmission live in the performance, providing a continuous source of displacement to the creative actions of the performer and therefore fulfilling Cardew's desire for a 'live' interpretation; Stockhausen described how using radios in this way 'opens the musicians to a whole universe of sounds... to always be on the alert to the call of the unknown' (Bergstein, 1992, p. 517). However, it could also be argued that the continuous use of radios in performance may lead to a consistency on a higher level, possibly limiting its power of displacement with repetition over an extended period of time.

If the radio in this piece truly does represent the 'unknown' then it is arguably also akin to the true 'Body without Organs', given that it is an intentionless and indeterminate voice in the creative process. Stockhausen's use of technology to this end effectively introduces a replicable indeterminacy into the performing situation, limiting the extent to which a performative 'Refrain' can be established by creating a potentially chaotic space for creative action, and, as a consequence, provoking a 'nomadism' of exploration between performances. In doing so, he also sets a precedent for contemporary composers and improvisers to exploit the increasing power of new technological developments to similar ends.

### **3.2.2 Indeterminacy and Real-time Scores**

As with Stockhausen's use of the radio in the creative process, described in the previous subsection, technology has continued to be used to provide an indeterminate factor within scores, often with the aim of achieving a Deleuzian 'nomadism' in performance; perhaps the most significant recent example of this is the creation and manipulation of a score in real time, enabled by increasingly powerful computers running software such as

Max MSP<sup>1</sup>. The potential indeterminacy of computerised score systems, such as those created by Pedro Rebelo, Arthur Clay and David Kim-Boyle, implies a state of performative attention beyond that required by traditional scores, given that the performers are effectively continually ‘sight-reading’ their musical instructions (although, as will be shown in practical examples later in this chapter, care must be taken to avoid a sense of arbitrariness or abstraction within this intense performing environment). Kim-Boyle writes:

‘Not only the order of events, but the typography with which events are described can be transformed in ways not entirely predictable. While performers may have a general expectation of what they may be asked to perform, they can never anticipate exactly what that may be. Such anticipation creates a heightened awareness and tension on the part of the performer that forces a reconsideration of the traditional norms of musical interpretation.’ (Kim-Boyle, 2010, p. 5)

The emphasis in this quote on the changing ‘typography’ of events recalls Cardew’s desire for notation that is ‘as new and fresh as possible’, with the live creation of new notational challenges potentially leading to a truly ‘live’ interpretation, in which the territorialisation of a performative Refrain is prevented. Whereas Stockhausen achieved this through the application of a fixed score to an aleatoric ‘found object’, real-time scores would appear to offer the possibility of an indeterminacy of the notation itself.

However, the nature of the notational limitation will be of key importance in the de-territorialisation and displacement of creative action resulting from a real-time score (as was seen in the later work of the Mirrors of Hall big band, described in the previous chapter). A manner of notation which lacks a displacing effect would perhaps remain lacking even with the addition of a technologically driven indeterminacy. To return to the language of complex systems, as used in the previous chapter, if the notation does not require an adjustment of the dimensions of a performer’s creative ‘phase space’, then that performer may still draw on familiarity in responding to that notation, regardless of any indeterminacy.

For example, Didkovsky (2010) has created a real-time score system for improvisers in which a piece is structured by only allowing certain performers to play at particular times. The score is generated in real-time within preset parameters, and varies in detail with each performance, creating a similar balance of fixed form and indeterminate content to that of Stockhausen’s ‘Spiral’. Unlike Stockhausen’s piece, however, this ex-

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<sup>1</sup>See [www.cycling74.com](http://www.cycling74.com) for more information

ample would not seem to suggest a strong displacement of the creative decisions of the performer; only the improviser's 'Refrain' of interactional timing is deterritorialised in Didkovsky's system, whereas in 'Spiral' the performer must explore indeterminate interactional limitations on aspects such as register, dynamics and duration. One can imagine, therefore, that performances using this score system might not offer much in the way of novelty to a creative performer, given that no displacing actions are undertaken on the improviser's interaction with, or creation of, the musical material.

Other examples can be found in Kim-Boyle's pieces 'Music for 2' and 'Music for 4' (Kim-Boyle, 2010), both of which present performers with a real-time graphic notation specifying the pitch and duration of 'sonic events' (ibid., p. 12). Whilst this is a more limiting notation than in Didkovsky's piece, perhaps initially deterritorialising a performer's exploration of these elements, it could be argued that the unchanging grid-based notations used in these pieces do not fulfil Kim-Boyle's own desire for an unpredictable 'typographic' transformation (ibid., p. 5), and are therefore susceptible to reterritorialised interpretations upon repetition.

It would seem, therefore, that a challenge emerges in using the power of computers to provide an effectively deterritorialising system of notation (potentially including aleatoric 'found objects'), whilst also maintaining a real-time indeterminacy within the notation itself to ensure that reterritorialisation is prevented; only in this way might a Deleuzian 'nomadism' be created and sustained. The remainder of this chapter will explore the creation and implementation of a new real-time score system called the 'M-Word Engine'; it was designed so as to address the notational challenges laid out above, whilst also seeking to provide a stimulating compositional environment, and, as with the examples above, its success will be evaluated in Deleuzian terms of 'nomadism' and 'detrterritorialisation'.

### **3.2.3 The Development of the M-Word Engine**

The 'M-Word Engine' is a computerised system which aims to generate a series of consistently unpredictable creative problems for an improviser to respond to, whilst also adhering at the macro-level to a precomposed structure of pitch schemes and textures. A composition for the engine will therefore retain its indeterminacy for the performers across performances, even though it is only randomised within a series of parameters that determine its structural characteristics. Because of this, performer interaction with the engine and its instructions is far removed from a traditional relationship with a score, or even with an indeterminate graphic piece such as 'Volcanicity', and so, as will be

shown, extensive testing of the system was undertaken with performers throughout its development.

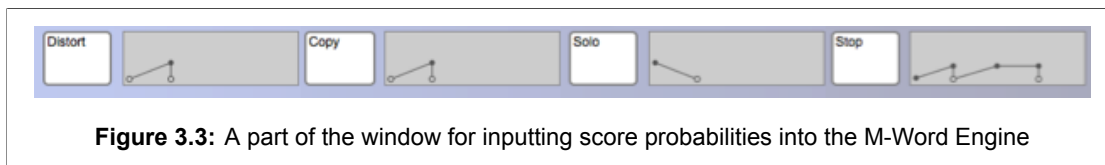
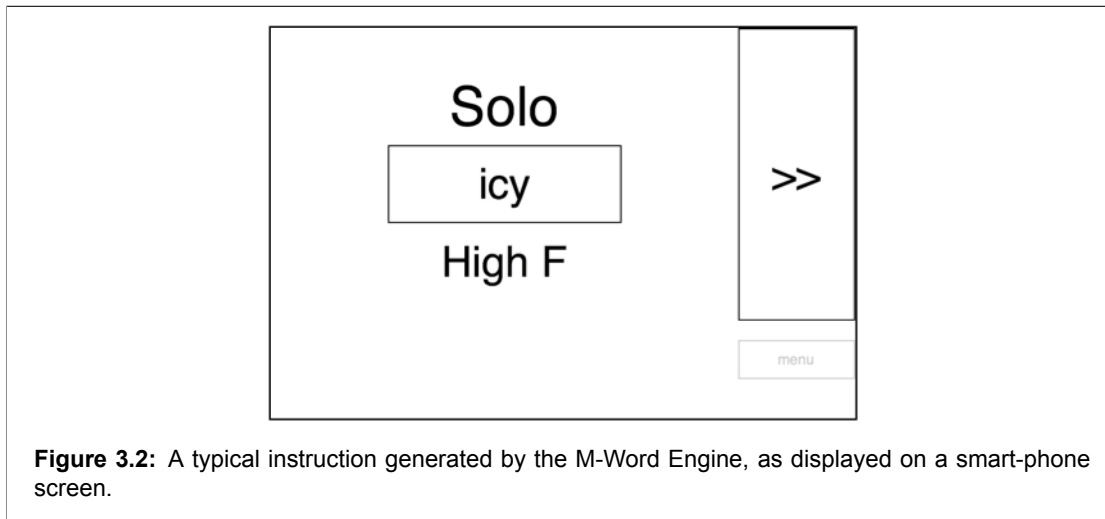
Work on the engine started as a desire to find a 'nomadistic' notation for a fixed underlying form, so that a piece might retain its explorative potency and freshness with each interpretation. In achieving this, the engine was deliberately intended to challenge traditional compositional notions of notation, form and the performer's role therein. In the process of developing these ideas, the theories of Deleuze and Guattari emerged as a parallel supporting strand of research, particularly in the aforementioned ideas of 'nomadism' and the 'Refrain', and so became the theoretical framework for the practical work that followed.

In response to the challenge outlined in the previous sub-section, the notation that the M-Word Engine creates for the performers seeks to establish a nomadism through a combination of semi-aleatoric elements and indeterminate 'found objects' (in the form of interactions with other musicians and sound-sources). The instructions given are similar to those limitations which were given in the later pieces for the Mirrors of Hall big band (as described in the previous chapter); the most basic of these is comprised of a simple text instruction, which might instruct a performer to create a new idea, draw on the output of another performer or stop altogether (although the text element of instructions is input by the composer, and so could comprise of anything). In addition to this the engine also offers the option of adding to this instruction a set of pitches to use (up to five at a time), a specific register, a descriptive word and the name of another player (as a target for the given instruction). Figure 3.2 shows the format of a typical instruction from the M-Word Engine, as displayed on a smart-phone screen; in this case the performer is instructed to play a 'solo' using a high F, and is also given the descriptive word 'icy'.

Several of these notational elements, such as the basic text instruction, pitch and register, are generated semi-aleatorically from a precomposed structure. Elements which are available for compositional structuring within the system, therefore, are pitch bands (including changes of these over time and their general register), and the likelihood of particular instructions arising at different points throughout the length of the performance.

The latter of these is controlled through the composition of probabilities for each instruction, a key concept within the engine which ensures that the process is only semi-aleatoric; for example, at the start of a piece it might be desired that a 'stop' instruction has a 0% chance of being given to a performer, increasing to a 100% chance by the end of the piece. This would create a simple piece structure in which a busy 'tutti' texture gradually reduces with increasingly fewer performers as the 'stop' instruction becomes

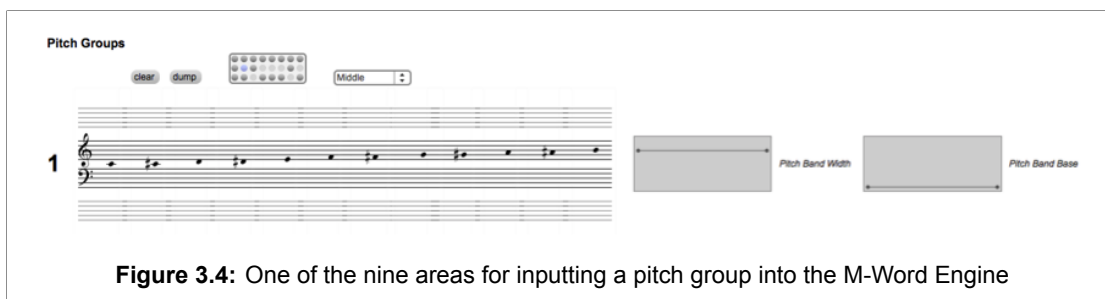




more likely, although importantly the improvisers themselves would not be able to predict exactly when they would be asked to stop. A part of the window for inputting such structural detail into the M-Word Engine is shown in Figure 3.3.

Other semi-random processes which contribute to the indeterminacy of the engine include the pitches presented to the performers, which are chosen at random from the precomposed pitch-bands (the input of which can be seen in Figure 3.4), and the target name for an instruction, which is drawn from a 'like' table, constructed in real-time by votes from the performers (for more information on this and other interactive elements of the M-Word Engine see appendix section A.4).

One of the most significant notational elements, however, is the descriptive word



given to the performers, which aims to deterritorialise improvisational decisions at a qualitative level rather than a musical one. These words are generated from a built-in thesaurus function which makes available a series of synonyms to a single 'global' word, which can then be distributed to performers.

The thesaurus is based on the Princeton 'WordNet' project, an open-source thesaurus and dictionary which, with the use of the 'Shell' external for Max MSP<sup>2</sup>, can be operated as part of an interactive Max MSP patch. From the starting point of a single global word, which is input prior to performance, a range of connected synonyms are produced and distributed to performers as a part of certain notational instructions. The global word then gradually changes over time, progressing at random through a path of connected synonyms which in turn create further subsets of words for inclusion in the instructions (see Figure 3.5). This allows for the creation of a continuously unfolding network of descriptive words which is unpredictable in each performance, even when the same starting global word is given.

The use of qualitative words to deterritorialise in this way was examined in the workshop piece 'Volcanicity', as described in the previous case study, but, as this case study also showed, such a displacing element can quickly become reterritorialised through repetition. In the M-Word Engine, this problem is avoided through the possibility of a continually changing word, in which coherence is maintained by the presence of the overarching 'global' word which is at the source of the ensuing synonyms (for more information on the construction of this function and the built in thesaurus; see appendix section A.2). To understand the significance of this aspect of the notation, it is important at this point to further explore the power of words and metaphor in providing an accessible yet effective creative displacement to composers and improvisers; this will first be contextualised by a consideration of the Deleuzian notion of the 'figural'.

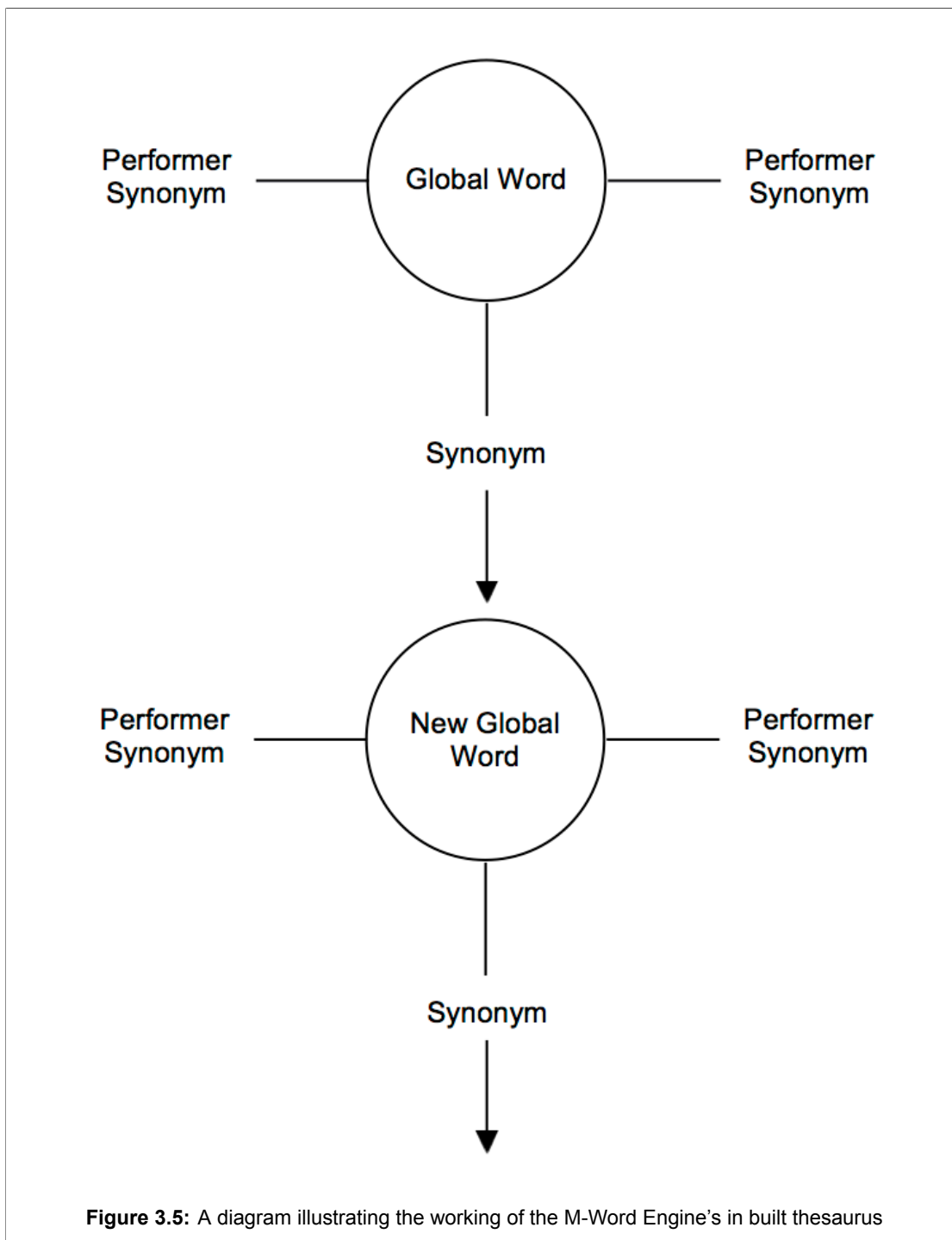
### 3.3 Metaphor and Abstraction

#### 3.3.1 The 'Figurative', 'Figural' and 'Abstract'

As was determined from the self-organisation analogy in Chapter 2, it is the qualities of difference and similarity between elements which define emergence, or in Deleuzian terms, the degrees of familiarity and novelty which decide to what extent the Refrain is deterritorialised and expanded. A continuum of identity again presents itself: the rigid territory (or tight 'interactional frame', strong attractor, composed) at one end, and the

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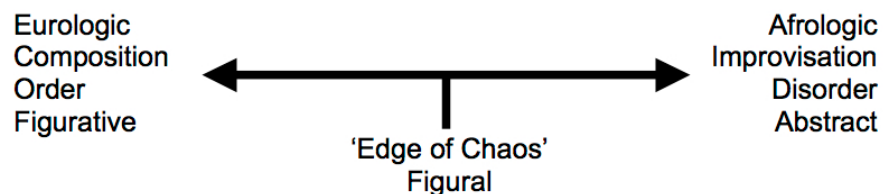
<sup>2</sup>For more information see <http://cycling74.com/toolbox/bernstein-shell/>



deterritorialised (or chaos, unknown, improvised) at the other. As has been outlined above, the Body without Organs can be found between these two, moving from the composed Refrain to an improvised 'line-of-flight' which deterritorialises the known.

In a text on the art of Francis Bacon, Deleuze adds two further terms to this spectrum: the 'figurative', implying a complete artistic recreation, and the 'abstract', a lack of any realistic representation (O'Sullivan, 2009, p. 256). The space between these is described as the 'figural', distorting the known to an extent that renders the result novel yet comprehensible. O'Sullivan describes this as involving a 'not-too-fast but also a not-too-slow deterritorialisation of the figure', reflecting the language of the 'edge-of-chaos' balance necessary for novel emergence in complex systems (ibid., p. 257). The 'figural' is therefore directly related to the 'Body without Organs', and the process of achieving both is a cautious deformation of the familiar. 'Mimic the strata' is the advice given by Deleuze and Guattari: 'You don't reach the BwO, and its plane of consistency, by wildly destratifying' (Deleuze and Guattari, 2004, p. 160). Caution and 'sobriety' are key words used repeatedly by Deleuze and Guattari in relation to this careful balance; 'discernability' is as important as novelty.

'A fuzzy aggregate, a synthesis of disparate elements, is defined only by a degree of consistency that makes it possible to distinguish the disparate elements constituting that aggregate (discernability)' (ibid., p. 344)



#### **Case Study: Distortion, Reflection and the Figural**

*The notion of the Deleuzian 'figural' was explored in two specific ways in the pieces that accompany this research. The first is in the interaction between performers, using words such as 'distort' and 'reflect' to encourage improvisers to not copy other players outright but to undertake an imprecise half-imitation, thus avoiding too great a feeling of stability in the texture. As will be shown later in this chapter, 'Distort' was used as a key instruction in the M-Word Engine, whilst 'reflect' was used in several of the scores written for the Mirrors of Hall big band; for example, throughout the second movement of *The Calcium in Their Bones* - in the trombone part at letter C,*

*and the piano part just before letter J.*

*Particularly successful was the execution of this instruction by the clarinet player at letter C in this same movement (see audio example 18). The pointillist stabbing semiquaver figures in the composed material are reflected back in his improvisation, but are then transformed into a dramatic squawking ascent as the band reaches a climax. In the aftermath of this climax the clarinet invokes a softer pointillism with short notes at the extremes of the instrument's register; this is in opposition to the bass, trombone and piano, who extend the tail of the climax with a more prolonged slowing down of movement. The result of using the instruction to 'reflect', therefore, is a lively texture in which the improvisers are free to explore the implications and affordances of the composed backings, retaining a sense of coherence even when their improvisatory choices seem to push in opposing directions (such as in the aftermath of the climax just described).*

*The second exploration of the 'figural' can be found in the use of metaphor to 'deterritorialise' the frame for creative action. In all of the projects which contributed to the accompanying portfolio, the use of qualitative adjectives and metaphors as bases for decision-making was central to the process of displacement; this has already been shown in the later pieces for the Mirrors of Hall big band and the workshop piece 'Volcanicity'. The displacing power of metaphor will be considered in the following subsection.*

### 3.3.2 Metaphor

Linguistically, metaphor acts as a non-specific link between the known and unknown, and in this way can be seen as closely linked to the Deleuzian 'figural'. The Oxford English Dictionary defines metaphor as 'a figure of speech in which a word or phrase is applied to an object or action to which it is not literally applicable' (Oxford English Dictionary, 2014); it differs from simile, stating not that things are alike but rather that one thing *is* another.

In his 1936 text 'The Philosophy of Rhetoric', Ivor Armstrong Richards defines two concepts to aid the understanding of metaphor (Richards, 1936, p. 96): the tenor (the word which is being acted on) and the vehicle (the word whose meaning is connected to the tenor in order to form a new aggregated meaning). For the purposes of this research, these terms might be seen as analogous to the Deleuzian 'refrain' and 'line of flight' respectively, with the 'vehicle' deterritorialising the 'refrain' of the 'tenor'.

When using metaphor to describe music, it could be said that the 'tenor' is always 'the music' itself; for example, 'the music is fast', or 'the music is sad'. Arguably, music's nature as an abstract emergent construct, our understanding of which is uniquely individual and advised by cultural and historical factors, requires that universalised descriptions of it take the form of metaphor out of necessity. For example, music itself has no physical presence, but the use of spatial metaphor such as 'height', 'speed' and 'movement' form key concepts in its descriptive framework.

In addition to these familiar terms of reference, Adlington (2003, p. 307) suggests that metaphors of heat, pressure, tension and weight are equally valid musical descriptors. In explanation of this he quotes George Lakoff, who writes that 'metaphor is the main mechanism through which we comprehend abstract concepts and perform abstract reasoning' (Adlington (ibid., p. 303)); following this, Adlington theorises that 'the point of conceptual metaphors is to achieve a firmer grasp of relatively unfamiliar or abstract phenomena by employing patterns of experience - often referred to as 'image schemas' - drawn from more familiar, concrete domains' (ibid., p. 302). In this way, therefore, Adlington's suggested 'image schemas' are just as viable as any others in framing an understanding of the 'abstract phenomenon' of music.

Whilst it is commonplace for metaphor to be applied to a retrospective description of a piece of music, it is important for the purposes of this research to note that written music has long featured metaphor within notation, specifically in the form of expressive directions such as 'appassionato', 'risoluto' or 'dolce'. However, it could be argued that less familiar musical metaphors, such as Adlington's suggestions of heat, pressure and weight, might form the basis for musical directions which carry an innate deterritorialisation because of their apparent ambiguity. A performer, in realising this unusual direction, may be required to undertake a Deleuzian 'line of flight', potentially expanding their performative 'Refrain' to include new expressive approaches.

When viewed in these terms the importance of metaphor in creative displacement becomes clear: as a novel perspective on the familiar, a fundamental link to the Deleuzian 'figural', or, in systems terminology, an attractor which is weakened by its essential subjectivity, but is strong enough to remain cognitively accessible and unifying. As Rosenberg (2003, p. 163) writes:

'Why bother to employ metaphors (or tropes generally), or even attempt to cross disciplines, if all that happens is to turn distinct orderly domains into a maze? Perhaps that is the point. When questions become unanswerable in a single domain, innovators seek analogous questions in foreign realms in order to resituate their

lines of enquiry, and even to pursue several lines simultaneously, hoping, through juxtaposition, to find answers or more powerful questions in between, or beyond.'

For this reason, metaphor has been used throughout the compositional projects that accompany this thesis. For example, in later work with the Mirrors of Hall big band metaphors with recognised musical associations, such as speed, height and familiar emotional descriptors, were deliberately avoided in favour of more ambiguous choices, such as bodily functions ('coughing and spluttering', in the trombone and clarinet parts at the start of the second movement of 'The Calcium in their Bones'), and combinations of different references (such as 'pure, clear, but also uncertain', or 'stuttering echoes of anger', in the soprano and baritone saxophone parts respectively of the fourth movement of 'The Calcium in their Bones').

Also of practical compositional use were spatial metaphors of depth and density, such as direction to 'sink behind trombone fade' (in the clarinet part), or 'spaced out, expansive' (in the piano part), both of which can be seen in the second movement of 'The Calcium in their Bones'; these proved useful in directing improvisers to explore textural boundaries, and helped to prevent overly soloistic or virtuosic playing (as was shown in the previous chapter through a comparison of improvisations by the baritone saxophone in the pieces 'The Number of the Beats' and the fourth movement of 'The Calcium in their Bones' - see figures 2.19 and 2.20).

All these examples stand in opposition to notation from preliminary work with the big band: for example, 'The Number of the Beats', one of the early pieces for the Mirrors of Hall big band, featured 'big', 'nasty', 'wild' and 'savage' amongst its expressive directions. Arguably these are relatively familiar metaphors for music, and were therefore less successfully displacing of a performer's response, as was described in the previous chapter.

In the final works written for The Mirrors of Hall Big Band, metaphoric frames for action were built into the score itself and were therefore fixed from one performance to the next (although the author, through the role of conductor, could help to manage the realisation of these in rehearsal). The effect of the metaphoric displacement is therefore strongest (least familiar) upon a performer's first encounter of it, although this is sustained to an extent between performances by added interactivity between improvised layers (for example, 'ghostly' is accompanied by 'reflect tenor sax noises', in the piano part of 'The Calcium in their Bones', movement 2, mm. 162).

However, the M-Word Engine's in-built thesaurus generates a continuous progression of random synonyms from a single starting word, distributing these to performers as

part of particular performance directions. Over time, the 'global' starting word changes, and so the synonyms that it generates also change; in this way the engine aims to create a 'nomadism' of expressive direction in each performance. It is also important to note that a filter was applied to the output of the in-built thesaurus to prevent overly obscure descriptive words from featuring in notation; this was introduced after tests in which performers were presented with words they did not know the meaning of, and so were ineffective in achieving displacement or deterritorialisation.

### 3.4 Performing with the M-Word Engine

Throughout the development of the M-Word Engine, tests were carried out with varying groups of improvisers, in which simple piece structures dictated the distribution of instructions of differing levels of complexity. Tests involved performers of varying backgrounds and training, all of whom were working at professional levels in their field and had some experience of free improvisation.

It is important to note that in these tests, and in subsequent recordings and performances, the system was constructed so that each performer would only see their own instructions and none others. This was due to the essential uncertainty of interactions between performers: for example, it would be unproductive for an improviser to copy another performer's interpretation of an instruction which featured an unfamiliar descriptive metaphor, as this would close off the creative system by reducing the essential 'edge of chaos' dynamic.

This is a considerable technical challenge in the construction of a real-time score, most of which are displayed on shared scores provided to performers via a screen or projection. The M-Word Engine, however, distributes instructions primarily via a smartphone interface produced by the mobile app 'Control'<sup>3</sup>; by constructing interfaces based on messages sent directly from Max MSP, it is possible to create and modify an array of interactive text-based interfaces for this app in real time. A global overview of the system was also observable from the user interface on the computer hosting the engine, as shown in Figure 3.6.

#### 3.4.1 Early Tests

Performer reactions to the M-Word Engine have been varied and complex, attributable as much to the specific design of the instructions as the nature of the system itself. A

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<sup>3</sup>See <http://charlie-roberts.com/Control/> for more information.



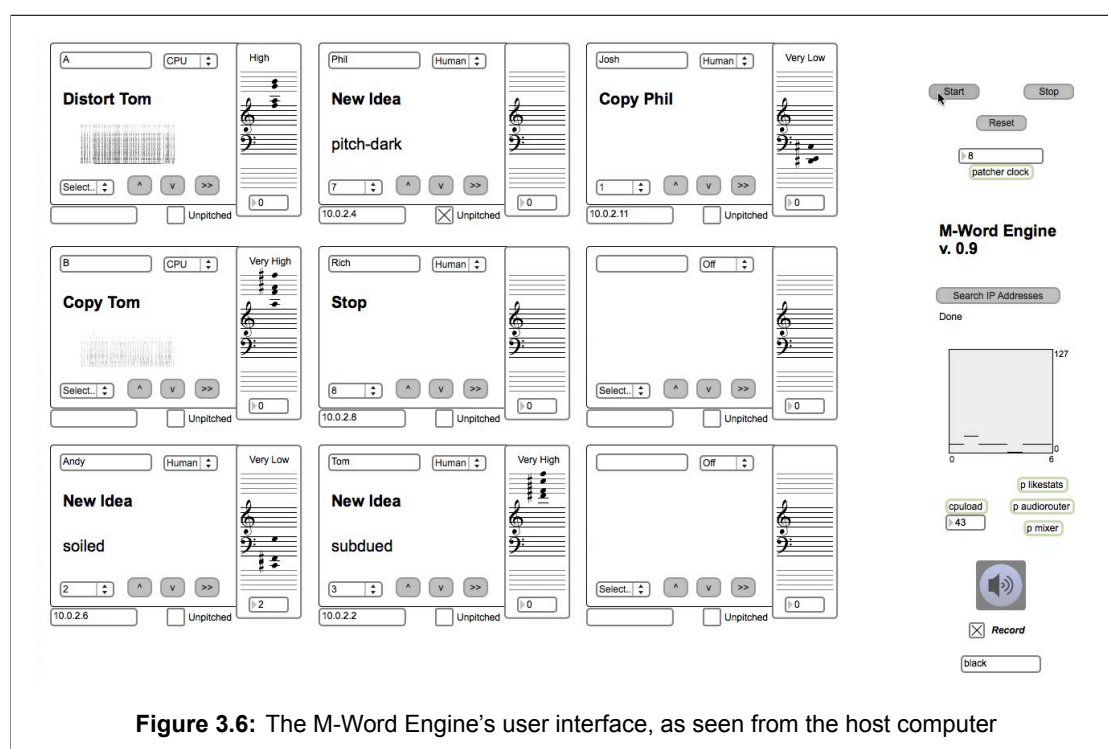


Figure 3.6: The M-Word Engine's user interface, as seen from the host computer

significant early workshop with the engine tested differing combinations of notational elements through a series of performances, and in doing so highlighted some of the key points of tension in the engine's use.

The first test involved the performers receiving only sets of pitches, which were being generated from a precomposed pitch band; the structure of the piece, therefore, was created solely through changes to the content of this band (specifically, its intervallic width and lowest pitch). This trial can be heard in audio example 29.

The resulting music was at first chaotic, but became more coherent as the piece progressed. This may have been attributable to this being the first time the performers had encountered such real-time electronic notation; some commented that the indeterminate and transitory nature of the information on the screens required a greater level of attention, and so distracted them from normal levels of interactional listening and responding. This was also perhaps exacerbated by the nature of the notation, with performers noting that they had become so focused on exploring the pitches that they ceased any interaction with the other improvisers (resulting, perhaps, in the chaotic start to the piece).

In addition, there was a notable tendency towards familiar 'Refrains' in the interpre-

tation of pitch groups, most commonly resulting in arpeggiated patterns or sustained notes; these patterns, once established, appeared to be unchanging, reiterating the 'locking in' effect mentioned above, and suggesting the importance of interaction in effective deterritorialisation. In this way, perhaps, the results of this first test can be considered to represent the Deleuzian 'figurative', with familiar musical information (pitches) leading to an assumption of familiar creative responses by the performers.

A second trial, this time involving just descriptive words as instructions, was also unpopular with some performers, who described not only a similar sense of detachment from the other musicians but also a feeling of discomfort or dislocation at the apparent abstraction of the words (which in this case were centred around the starting word 'foggy'). One performer remarked that he did not have anything in his 'musical vocabulary' to realise some of the words he had been provided with, although in response to this another performer commented that this was perhaps the fault of the performer and not the notation. The results of this trial can be heard or viewed in audio/video example 30.

It is possible, therefore, to consider the outcome of this second test as embodying the Deleuzian 'abstract', with the attempted realisation of apparently nonsensical stimuli leading to a sense of dislocation and discomfort from the creative process and from other performers.

A third trial, which can be heard or viewed in audio/video example 31, tested the use of text-based instructions only. The instructions were 'lead', 'like', 'copy' and 'stop', the first three of which were deliberately based on the Deleuzian 'abstract', 'figural' and 'figurative' respectively. This was due to the desire to create a balanced and flexible 'edge of chaos' system, in which new ideas are input by the abstract 'lead', strongly supported by the figurative 'copy', and potentially transformed by the figural 'like'.

This trial was greeted with much more enthusiasm by performers, with one commenting that, whilst improvising solely on words or pitches was 'liberating', the inclusion of role-based instructions was 'more conducive to music-making'. The musical result was more coherent than in previous trials, with textures emerging and dissipating quickly as a network of interactions became established, and at times a clear sense of foreground and background was created between 'leaders' and 'followers'. There was some questioning of the choice of words and their precise meaning, with 'impose' and 'solo' suggested as better instructions than 'lead'; also, in reviewing the recording of the trial, it is difficult to hear a difference in approach between the 'copy' and 'like' commands, and for this reason the word 'distort' was substituted for 'like' in later versions of the engine.

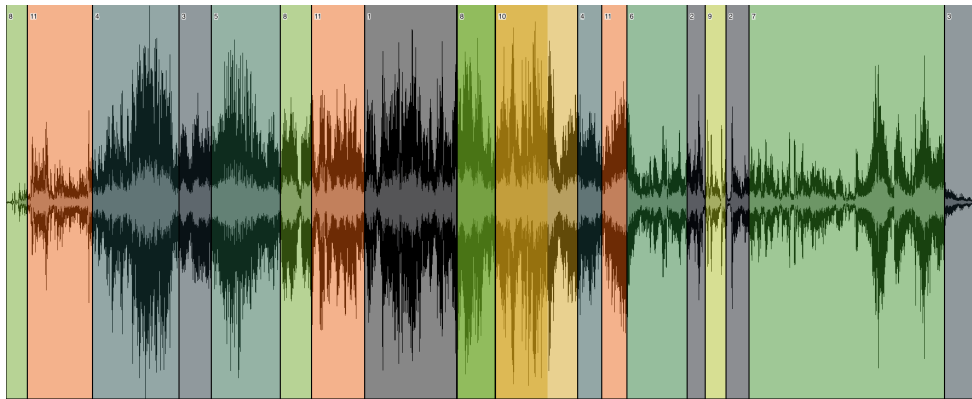
As with comparisons made with the previous trials, perhaps this final test can be seen

as representing the Deleuzian ‘figural’: the language of musical interaction is familiar to the performers, but the music these interactions applies to is indeterminate, arguably leading to a malleable ‘discernability’. However, it could be argued that the only part of a performer’s Refrain which is deterritorialised here is the focus of their interactions, and therefore much of a performer’s habitual responses will not be ‘displaced’.

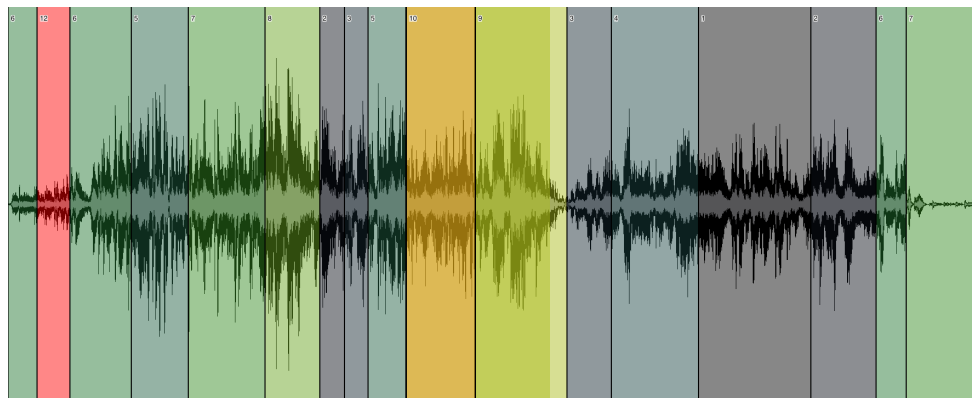
The degree to which these tests can be considered to have stimulated a ‘nomadistic’ exploration from the performers can be examined through segmentation analyses of each trial, similar to the analysis that was conducted on performances of ‘Volcanicity’ earlier in this chapter (although colour-coding similar textures within each recording, not across all three trials); these can be seen in Figure 3.7. The second trial, which used only words for notation, appears in this analysis to be the least nomadistic, suggesting that the improvisers’ dissatisfaction with this manner of notation was reflected in a failure to deterritorialise their performative ‘Refrain’. The third trial, which solely utilised interactional instructions for notation, can perhaps be considered the most varied of the trials; this is arguably attributable to the deterritorialising ‘figural’ effect of being directed towards the copying and ‘distortion’ of other performers’ output.

The final tests of the workshop involved combinations of all three notational elements, with the most successful resulting from the combination of an interactional instruction with both a pitch set and a descriptive word (this trial can be heard or viewed in audio/video example 32). This final piece was arguably the most coherent musically, with the structured unfolding of the pitch band adding a sense of form to the emerging textures and melodies; particularly noticeable in this regard were moments when the pitch band narrowed to just one or two pitches, before broadening again. It is interesting to note that this piece used the same simple structure to control the distribution of instructions as with the third trial mentioned above: a two-part form, in which ‘like’ is the most probable command at the beginning of the piece, with ‘lead’ and ‘copy’ gradually becoming more likely towards the end. Whilst the specific content of each piece differed, it is significant that both pieces saw a shift from more coherent ensemble textures towards contrapuntal mixtures of ideas. This phenomenon, and others resulting from such structural changes, will be considered in the next section.

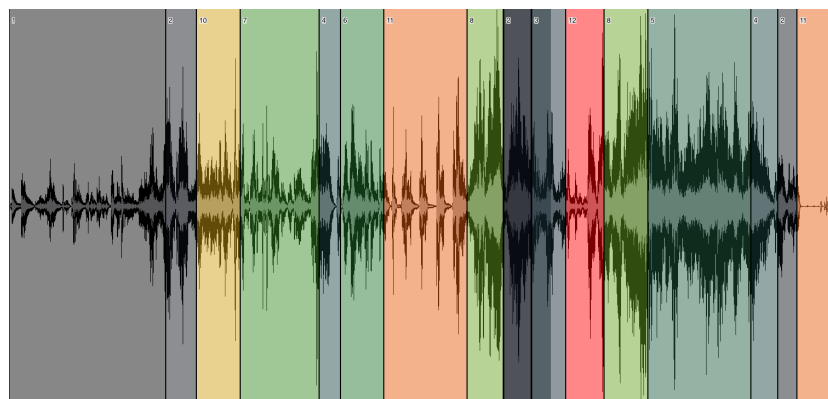
Another segmentation analysis shows this final trial to be arguably the most ‘nomadic’ yet, with a wide range of textures explored within the performance; this can be seen in Figure 3.8. However, a further comparison (Figure 3.9b), this time of textural similarities between both this trial and the aforementioned third trial, shows that many of the textures explored in this final performance are also found in the earlier performance, and that the level of ‘nomadism’ appears diminished when considered in this manner.



(a) Pitches only

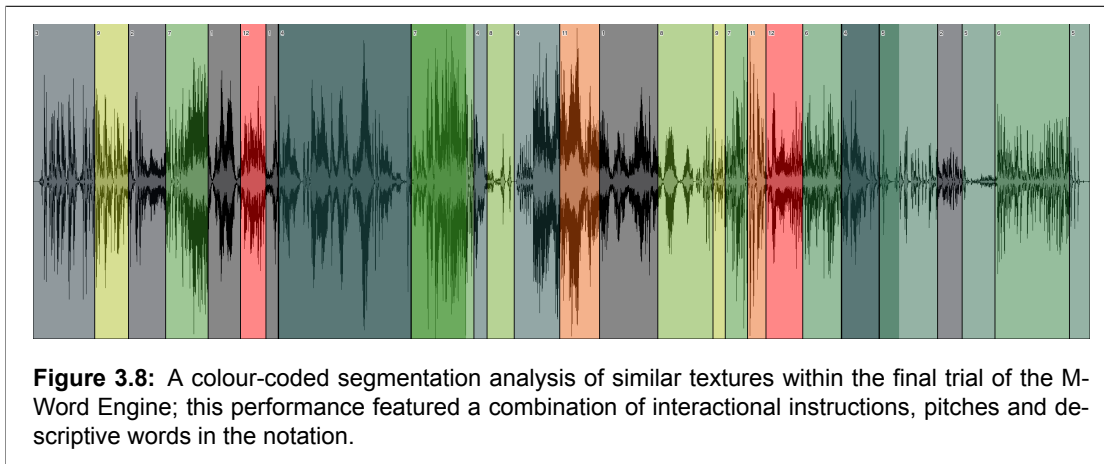


(b) Words only



(c) Interactional instructions only

**Figure 3.7:** A colour-coded segmentation analysis of three different trials of the M-Word Engine, highlighting textural changes within each recording.

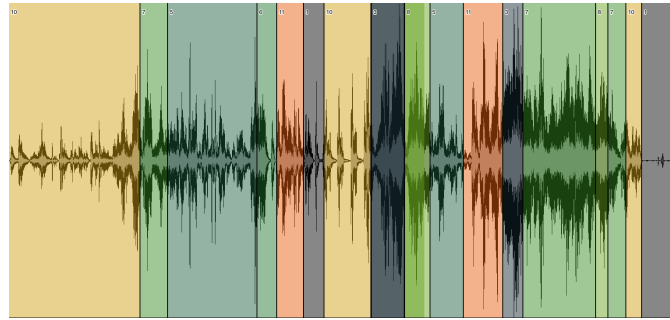


This may suggest a lack of deterritorialisation within the system, possibly resulting from the nature of the descriptive words, which some performers claimed were sometimes obscure or incomprehensible; this and other associated issues will be addressed in the following subsection.

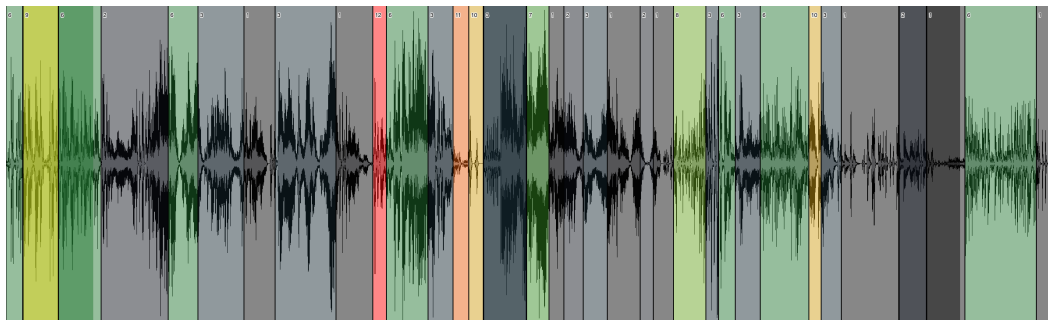
### 3.4.2 Electronic Leadership, Randomness and Abstraction

By distributing instructions from an underlying score in this way, the M-Word Engine can perhaps be seen as a virtual leader: giving instructions that are indeterminate but which construct a piece that follows a determined course. The fundamental difference between this 'electronic leader' and a human equivalent is that it has no bias of any kind in its decision-making (within the parametric boundaries that are set for it). It is the Deleuzian 'Body without Organs', having no stylistic or formal propensities beyond the limits of its construction; it therefore lives on the 'plain of consistency', whereby any future action is as likely as any other. As a leader, this gives the M-Word Engine a particular power of displacement as no performer can predict its actions based on empirical experience, and in this way it creates an innately unpredictable Deleuzian 'nomadism'.

Such an 'electronic leader' also has many disadvantages, of course. It cannot, for example, judge the effectiveness of an instructional displacement, or if any adjustment or clarification is needed for a particular performer. Similarly, it offers no validation to a performer's actions, being as indifferent towards the actions or future actions of individual performers as it is to the instructions it gives them. It does not listen to what is being played and therefore cannot react to it in any way; however, if it were to be con-



(a) Trial 3: Interactional instructions only.



(b) Trial 6: Interactional instructions, pitches and descriptive words.

**Figure 3.9:** A colour-coded segmentation analysis of both the third and final trials of the M-Word Engine, highlighting textural similarities across both recordings. For example, areas shaded grey represent sustained mid-range dissonant clusters, whereas areas with green shading illustrate sporadic and pointillistic textures.

structed so as to desire a development of particular responses, this would compromise the system's inherent neutrality towards the direction of the music, and it would instead become a virtual representation of the tendencies of its creator.

Accordingly, an important issue that arose from early workshops with the engine was that of perceived arbitrariness of instruction. In early tests of the M-Word engine performers had no option for interactivity with the system; it distributed instructions completely at random, often causing awkward moments such as when a performer was instructed to 'copy' a player who had been told to 'stop'. The perceived randomness of the system created a strongly displacing abstraction of the music, leading to a sense that the performers' input was arbitrary. They were allowed no aesthetic judgement on what should or should not be happening at a particular moment, and many of the performers remarked on a distinct discomfort with this. Another problem that arose in earlier versions, as mentioned above, was that the complexity of the descriptive word in the instruction was completely unregulated, and so presented performers with creative problems that they could not understand.

The implication of these issues is that the displacing power of the system was too great in its initial form, and tended towards the Deleuzian definition of 'abstraction'. In order to render the system more approachable, elements of performer interaction were implemented into later versions of the engine. The most important of these was the empowerment of the performers to choose when they received their next instruction; this was accomplished using a button in the performer's interface which, when touched, would generate a new individual instruction. In practice this meant that the performers no longer waited for the delivery of an imposed change of direction, but instead requested one when they felt it appropriate and could submit another request if that new instruction was still deemed inappropriate. A similar button was also introduced for the changing of the descriptive word, presenting the performer with another synonym of the same word upon request. For more information on the construction of these elements see appendix section A.4.

### **3.4.3 The Electronic Improviser**

Another important part of performing with later versions of the M-Word Engine was the optional inclusion of computerised performers. This 'electronic improviser' can perform in place of, or as well as, human improvisers. The reasons for creating this aspect of the engine are three-fold: firstly, so that parametrically programmed piece-structures can be tested with electronic performers before being presented to humans (this will

be examined further in the next section of this chapter); secondly, in order to allow a continually displacing 'Body without Organs' performer within an otherwise familiar group of human players; and finally, to allow the engine to act as an improvisation trainer, presenting the possibility for one human performer to develop skills of listening and responding to multiple improvisatory voices in a private environment.

A reflection on the second of these reintroduces the challenge of 'nomadism' in a creative environment, as discussed in section 3.2. Besides the approaches to deterritorialisation mentioned in this section, another way to add novelty into an interactive improvisatory system is to introduce a new performer, giving other improvisers a new musical voice to interact with. For example, Derek Bailey, who endeavoured towards a non-idiomatic improvisation, established his 'Company Week' retreats in the 1970s as a means of regularly combining new and unusual groupings of improvisers (Borgo, 2002, p. 174); in doing so he aimed to ensure that novelty within the practice was consistently refreshed through the forging of new interactions.

In a similar vein, improvisers embracing new technology in recent decades have turned to unpredictable electronic processes which can offer a new artificial interaction; examples include George Lewis's 'Voyager' (Lewis, 1999), David Behrman's 'Acoustica' (Uitti, 2006a) and Tim Blackwell's 'Swarm Music' (Blackwell, Young, et al., 2004). In each of these examples the performer's input is analysed as the basis for a synthesised response, although importantly the response is not simply a mirroring of the performer's input but an unpredictable development of it. Lewis, describing his 'Voyager' system, explains that the computer's own musical 'personality' is actually the result of internally generated random numbers, and that its output can be considered not simply a 'transformation' of existing material but rather as one of two 'parallel streams of music generation' (Lewis, 1999, p. 04). Similarly, Blackwell's 'Swarm Music' uses the principles of self-organisation to approximate parametric 'attractors' from an external source and direct a 'swarm' of synthesised voices accordingly (Blackwell, Young, et al., 2004, p. 124).

Such concepts seem to reflect again the notions of difference (disorder) and similarity (order) as expressed in the previous chapter: it would not be of use to the improviser for the computerised music to simply parallel his own, as this would create a closed system and would not afford any new direction for exploration, but similarly the computer must base some degree of its decision-making on the human input so that its responses do not appear musically 'chaotic'.

As with these examples, the M-Word Engine's in-built improviser seeks to provide other performers with new material to draw on and transform, whilst maintaining a level



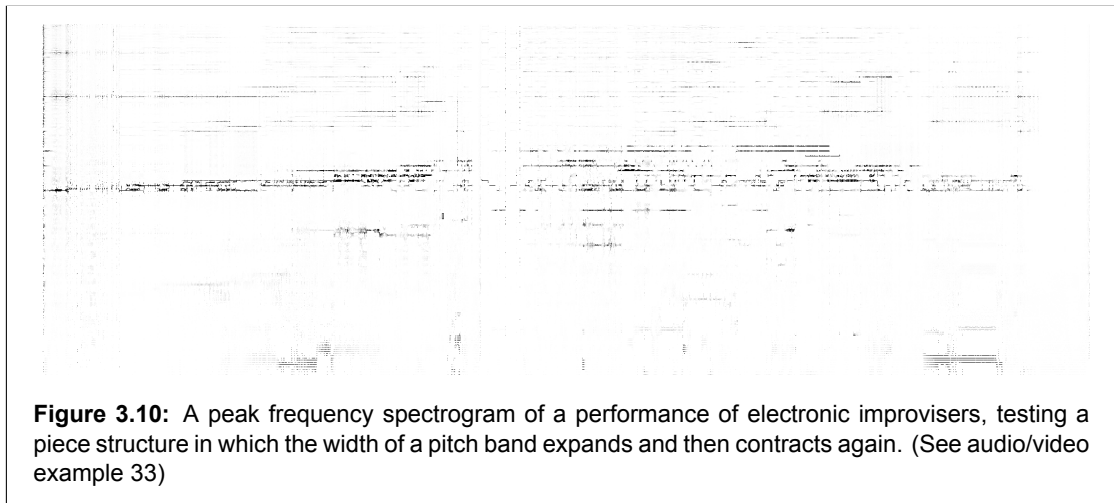
of interactive connection with the output of these performers. To this end it was designed to interpret the same instructions as the human performers, which, as was shown in the previous subsection, were based on the three Deleuzian degrees of abstraction: the figurative 'copy' (a direct sampling of another performer), the figural 'like' or 'distort' (a distorted sampling of another performer) and the abstract 'lead' or 'solo' (a completely new synthesised sound).

It has been built so as to produce a wide range of different sounds, tuning these (where necessary) to any given pitch information; the process of sound selection is random, and in this way the electronic improviser is similar to the score-generating system itself in that it has no bias in what it produces besides that which is created through the limits of its construction. It therefore has the potential to create a different performing voice each time it receives a new score instruction, and so maintains the possibility for a displacing interjection at all times throughout a performance. For more information on the construction of the M-Word Engine's electronic improviser, see appendix section A.4.1.

As was mentioned in the introduction of this subsection, the inclusion of the electronic improviser gives the M-Word Engine a potential use for creating a training environment for musicians who seek to 'practise' improvisation; this is due not only to the potentially displacing and 'nomadic' nature of the electronic audio, but also of the score generation system itself. A case study earlier in this chapter on the workshop piece 'Volcanicity' explored how displacement could be achieved through reterritorialisation of the frame for creativity, with some users describing that particular piece as an 'idea generator'. The instructions created by the M-Word Engine could potentially have the same effect, creating a creative springboard to engagement with the advantage that both the content of the instructions and the electronically-improvised soundscape is continually in flux. An exploration of such an educational use for the system is beyond the scope of this thesis, but remains an interesting route for further research.

### **3.5 Composing for the M-Word Engine**

One of the motivations for the creation of the M-Word Engine was to allow for a fixed compositional structure to underlie improvisational action, albeit in a way that would be consistently unpredictable in detail to the performers. The consideration of how such structured pieces might be created within the engine must therefore draw attention to questions of compositional craft, specifically how best to achieve structural movement



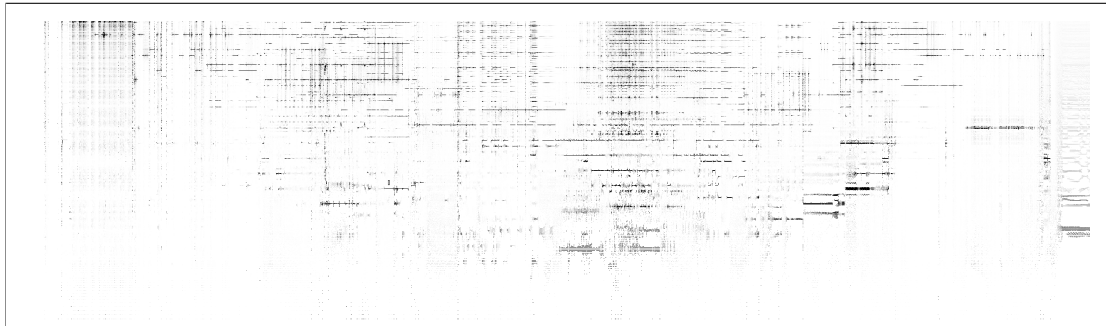
solely through manipulating parameters of pitch, register and inter-performer relationships. With the use of the electronic improviser, such parameter-structures can be tested, recorded and analysed before being presented to human performers.

The most audible and compositionally useful parametric changes were found to be created by transformations of the size of a given pitch band, the register of that pitch band, and also through the creation of different textures from varying levels of inter-performer imitation. The examples given below show the different tests that led to these conclusions.

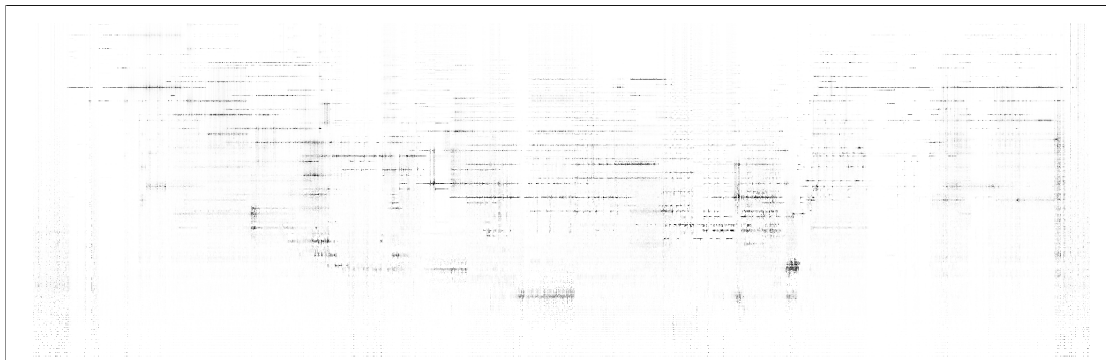
The first of these tested a structure in which the width of the pitch band was the only parametric change, gradually unfolding from one note to twelve before shrinking again; in the resulting performance the structural change was perceptible until the band reached a width of around four notes, after which it became difficult to discern. Figure 3.10 shows a peak frequency spectrogram of this recording, in which the expanding range of pitches can clearly be seen; this test can also be viewed or heard in audio/video example 33.

Another test, in which the register of the pitch band was the singular parametric change, created a far more audible structural movement: a significant tension was created by all the improvisers shifting gradually downwards in pitch, which was resolved with the final recession to the higher register. A similar spectrogram for this trial recording can be seen in Figure 3.11, in which the gradual downward and upward shifts in pitch are discernible, and the test can also be viewed or heard in audio/video example 34.

A further trial tested the compositional potential of combining structural changes in



**Figure 3.11:** A peak frequency spectrogram of a performance of electronic improvisers, testing a piece structure in which the register of a pitch band moves downwards from a very high starting point and then returns again. (See audio/video example 34)

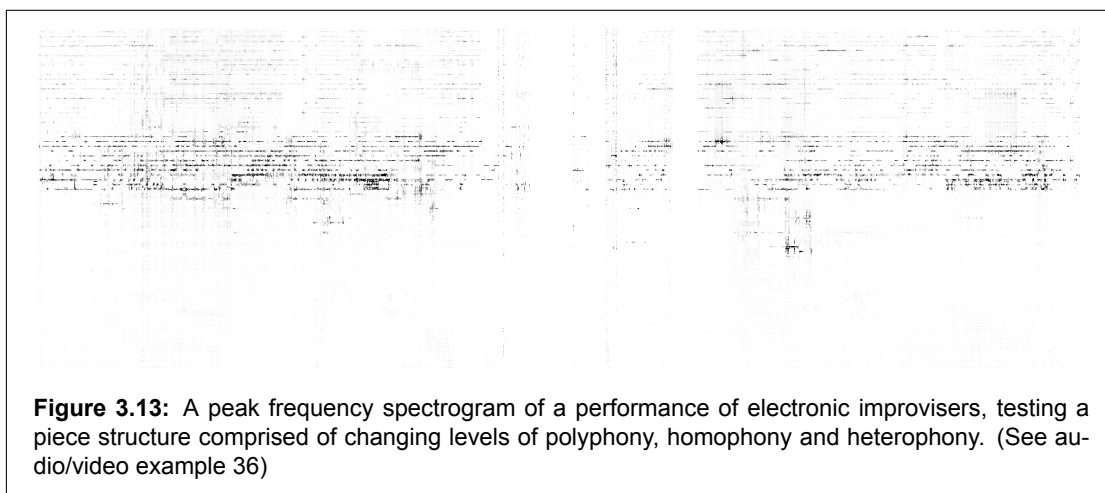


**Figure 3.12:** A peak frequency spectrogram of a performance of electronic improvisers, testing a more complex piece structure combining changes in pitch band width and register. (See audio/video example 35)

pitch band and register, the results of which can be seen in Figure 3.12. This more complex structure is based on a pitch band of just four notes moving downwards at first, before suddenly expanding to include twelve pitches across a wide register, and finally receding to back to the highest pitches. This test can be viewed or heard in audio/video example 35, and is the first which also features human performer input (the author playing piano) alongside the electronic improvisers.

In addition to these pitch-centered structures, significant results were found in tests which explored the shifting of relationships between performers: a continuum of textures, from homophony to heterophony to polyphony, was created by manipulating the extent to which performers are copying existing ideas, 'distorting' other performers, or creating new ideas.

For example, in one of these trials the abstract 'solo/lead' instruction began as the

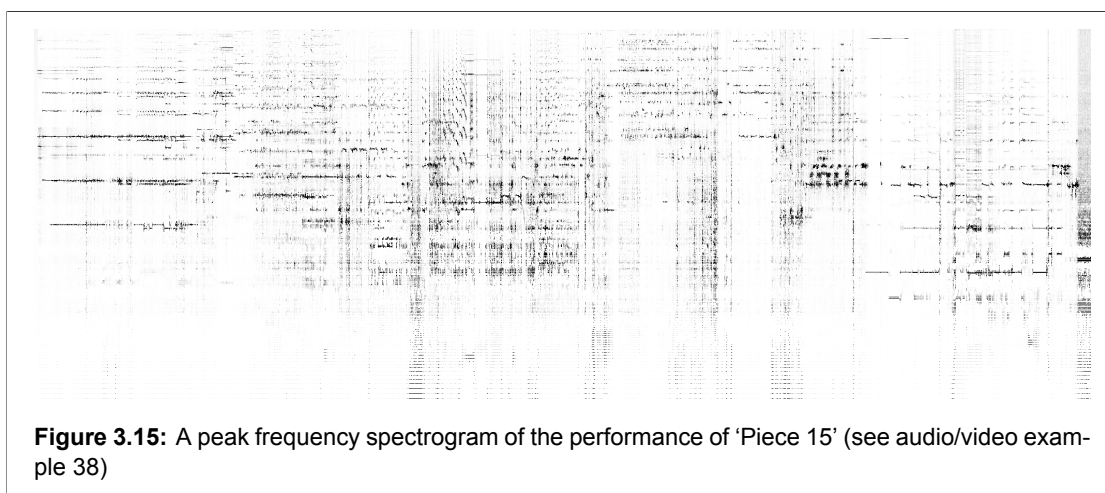
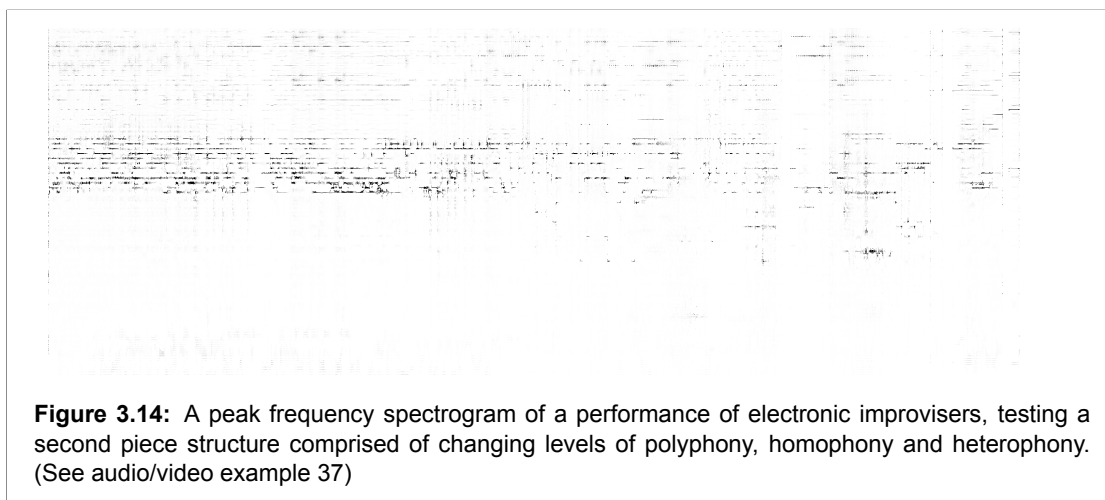


most likely to be given, which was then overtaken by the figurative 'copy', and then again by the figural 'distort'. The 'stop' command briefly became the most likely, before the structure ended with a return to the prevalence of the 'lead' command. The outcome of this was a distinctive two-part piece, in which the increasing probability of the 'distort' and 'stop' instructions created a period of near silence between two contrasting blocks. Within these two parts, the changes between 'lead', 'copy' and 'distort' can be identified in shifting textures as described above; these changes can also be seen in Figure 3.13, and heard or viewed in audio/video example 36.

In a second similar test, the 'lead' instruction is most dominant at the start of the piece but gradually diminishes until it is not given at all by the end of the piece; inversely, the 'stop' command does not feature at all at the start of the piece but gradually becomes the prevalent instruction. Within this, the 'distort' command rises to become the most likely instruction at one point, before diminishing and being replaced by 'copy', which remains the most probable command until near the end of the piece (where it is overtaken by 'stop'). Figure 3.14 shows clearly how the resulting piece begins with a dense polyphony which gradually dissipates as it moves towards a 'figural' heterophony; the ensuing prevalence of the 'copy', as well as the occasional 'lead' and 'distort' command, helps to maintain movement in the system for a short period, but this gradually fades as the 'stop' instruction takes over (also see audio/video example 37).

These ideas were put into practice in the production of further test pieces which mixed human and computerised performers, such as 'Piece 15', recorded as an additional piece for this thesis with trumpet, organ, flute and two electronic improvisers.

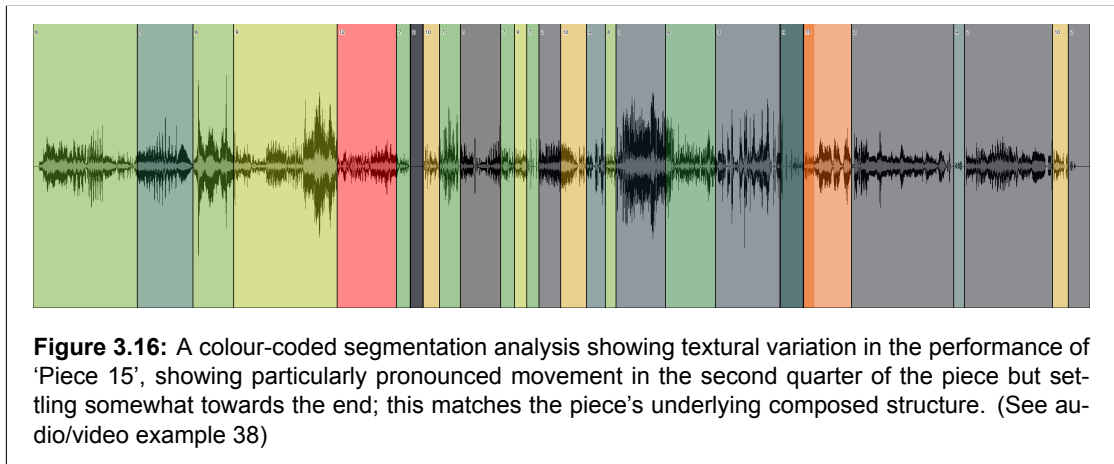
The structure of this piece is divided into four parts, each featuring distinct registeral



and textural characteristics, and these sections can indeed be heard in the resulting performance of the piece (see audio/video example 38). Figure 3.15 is a peak frequency spectrogram of the performance of 'Piece 15', which illustrates the presence of four distinct structural areas within the piece.

In addition, a segmentation analysis of 'Piece 15' (shown in Figure 3.16) arguably shows an explorative nomadism of textural exploration, with movement particularly pronounced in the second quarter of the piece but settling somewhat towards the end. This would appear to match the structure of the piece, in which the 'solo' and 'stop' commands are most prevalent in the second quarter, whereas later it is the 'distort' and 'copy' which are the most likely instructions.

This piece was also the first in which the fully interactive interface for the system was

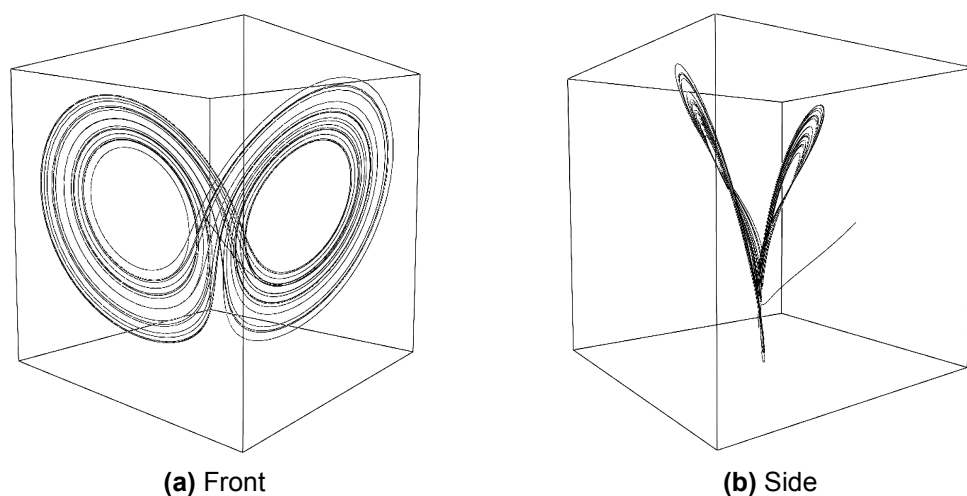


used, allowing performers to request new instructions and different descriptive words. Because of this there were fewer comments regarding performers' understanding of the words, and the previously mentioned feeling of arbitrariness, created by the old system's random delivery of instructions, was no longer felt to be an issue.

### 3.5.1 Complex Structures: 'Three Lorenz Perspectives'

The final and most ambitious piece written for the M-Word Engine was 'Three Lorenz Perspectives', a suite of three pieces each of which shared the same structure but featured different descriptive words as starting points ('dark', 'quiet' and 'icy' respectively).

The structures of the pieces were created from imagining three of the dimensions available for composition (consonance of pitch-set, level of homophony or polyphony, and register) as the axes of a three dimensional phase-space, and then plotting the course of the piece along the course of the Lorenz attractor, as illustrated in figure 3.17. The instructions would mark particular points in 'instruction-space' as the piece progressed, creating a structure which continually swings between consonance and dissonance (as the two 'arms' of the Lorenz attractor), and cycles within this between registeral and textural extremes. The consonance of pitch-sets was, in this case, determined by the extent to which pitches were arranged in triadic formation or as dissonant clusters; as will be shown, however, the extent to which dissonance or consonance was created relied on the randomised pitch selection of the instruction generating system, and the interpretation of this by the performers.

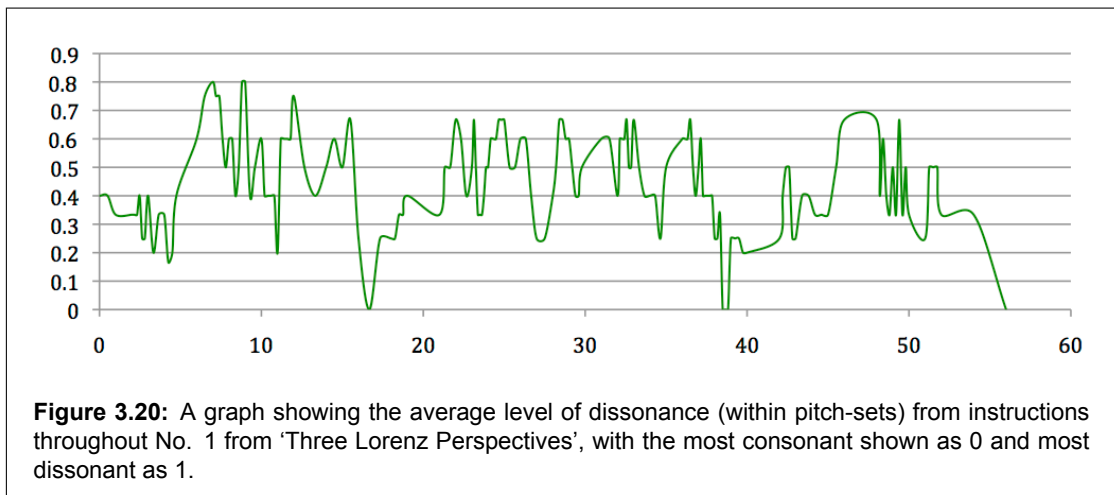
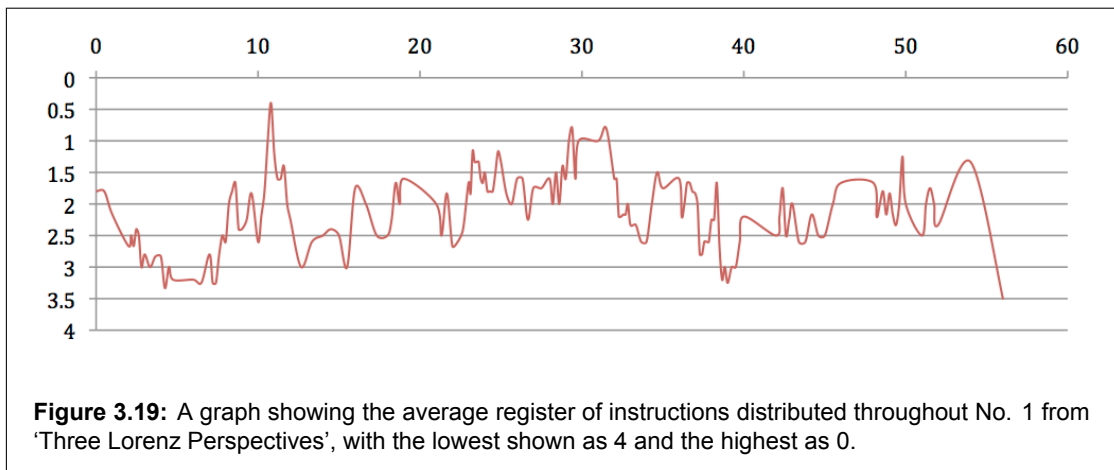
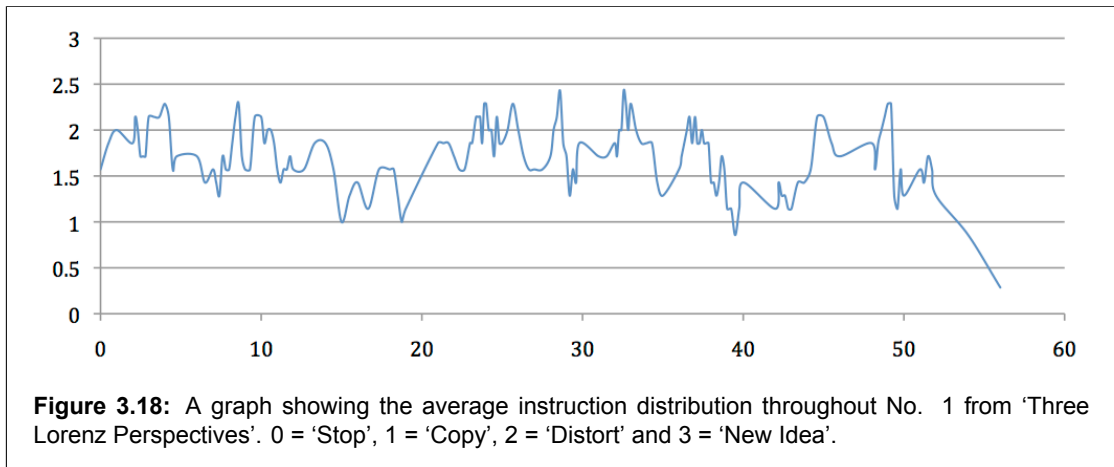


**Figure 3.17:** A front and side view of a Lorenz Attractor.

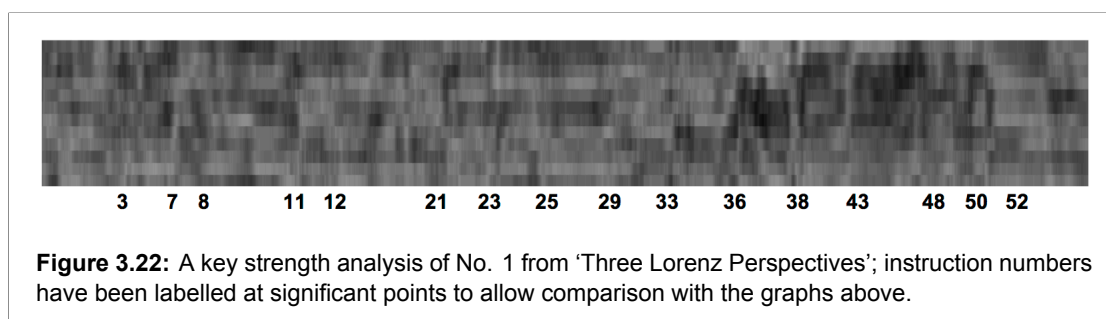
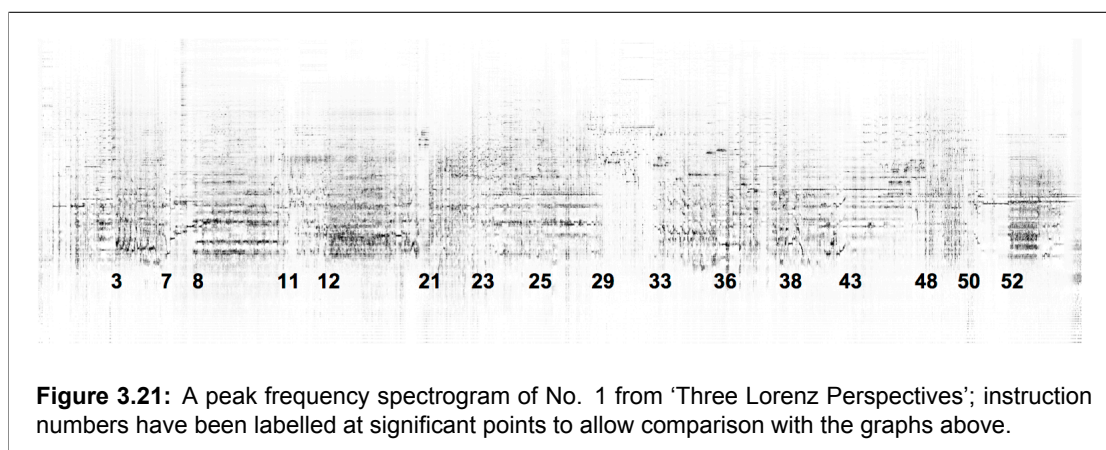
The extent to which such this structure is audible in performance is questionable, since it is mediated by the performers' choices of how often to request a new instruction. In the recording of this piece which accompanies this thesis the performers retain some of their instructions for long periods of time, distorting the shape of the structure and creating a 'pedal' effect against other changing textures. Significantly, this also led to moments when many of the human performers would choose to change instruction at the same time, as the effect of cumulative changes in direction were felt to mark a new part of the structure. The M-Word Engine tracks the linear progression of a piece according to the average number of instructions requested by each performer, and so this sudden massed movement would force the structure of the piece forward several stages, resulting in a loss of definition in the structural curves underlying the piece.

Figure 3.18 is a graph showing the average distribution of instructions throughout the first piece from 'Three Lorenz Perspectives' (arranged so as to highlight the movement between the figurative 'copy' [1] and the abstract 'new idea' [3]). Similarly, figures 3.19 and 3.20 outline the average distribution of different registers and levels of dissonance respectively. From these graphs it is possible to discern the underlying structural curves that shape the piece. For comparison, figure 3.21 is a peak frequency spectrogram which graphically shows the sonic structures that resulted from this underlying shape; instruction numbers have been marked on at significant points to facilitate comparison with the aforementioned graphs.

For example, around instruction 43 there is a thinning of the texture shown in figure 3.21, which might be attributed to the downward instructional trend as shown for the







same period in figure 3.18. Similarly, the trend towards the figurative shown between 15 and 20 may have played a part in the dissipation of the strong texture that begins around 12. In addition, periods of sustained shift towards the figural and abstract instructions can be credited with prompting the creation of new textural blocks, such as around 23 to 25 (leading to the texture which continues until 29), and around 3 and 8.

The structural use of registeral changes, as shown in figure 3.19, can also be seen in figure 3.21 in the upward trend towards 29, and the brief high-pitched spike between 11 and 12. Similarly, the move from low to high between 40 and 50 can be seen, particularly in the rising texture between 43 and 48.

Also of interest is the extent to which the level of consonance in the given pitch sets created a comparable audible result. Figure 3.22 is a key strength analysis of the same recording, with horizontal bands representing the twelve major keys (grouped in terms of harmonic similarity) and in which darker shading represents a stronger sense of that key being discernible.

According to this technique of analysis the strongest harmonic coherence can be heard around 30, and subsequently between 36 and 48; this is supported by the data in

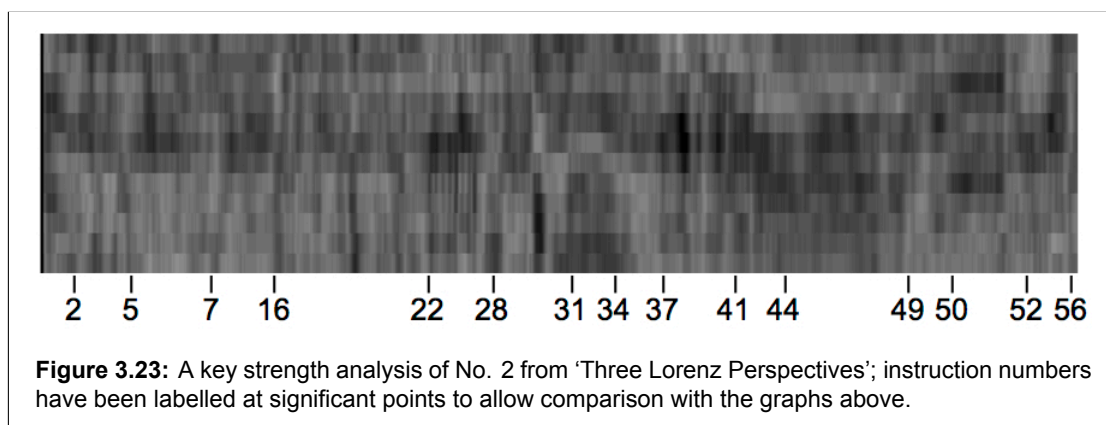


figure 3.20, which shows a moment of consonance just before 40, followed by a gradual shift back towards dissonance around 45.

A similar dip at 16, however, is only noticeable as a short occurrence of consonance in figure 3.22, which may lead to a questioning of the discernability of such harmonic movement. Another interesting example of this can be found in a similar analysis of the second piece from 'Three Lorenz Perspectives' (as shown in figure 3.23), in which the period between 22 and 28 is highlighted as having noticeable harmonic strength, when in fact the performers were working largely from dissonant pitch sets.

This analytical anomaly highlights the fundamental unpredictability of the outcomes of using the M-Word Engine: in this latter case it is the strength of the guitar entry which creates a feeling of a key centre (B minor), which is due to the guitarist's choice of pitch arrangement from the set he was given (focussing on D-E-B, and largely forgoing the C also in the set). There is nothing in the instruction that indicates the pitch set should be used dissonantly, and there were no indications from the author at the time as to stylistic intention, so it is for the performer to choose how to best improvise within that frame. In this way, it can be argued that the system represents a reconciliation of the Eurological and Afrological, combining composed (yet semi-random) limitations with personal exploration to create an individual articulation of a novel creative problem. However, this also highlights a complex relationship between performer choice and indeterminate notation. It is significant that the performers in this recording were frequent collaborators of the author, and had undoubtedly developed an understanding of what kind of music they might be expected to produce; this cannot be discounted in any analysis of the music that resulted from the use of this system.

The further question of the degree to which subsequent performances of the same piece can be described as 'nomadic' in the Deleuzian sense can be answered through

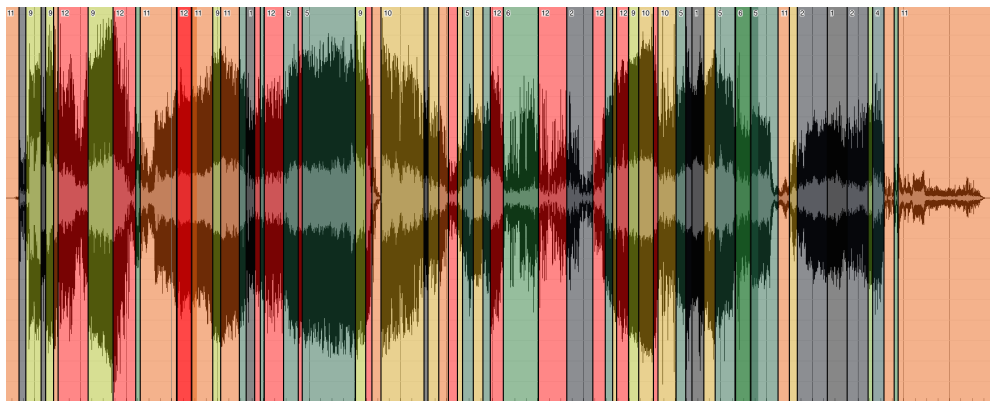
a comparison of all three of the 'Three Lorenz Perspectives' pieces (shown by Figures 3.24a, 3.24b and 3.24c respectively). By using a segmentation analysis of each recording to compare timbral characteristics, it can be seen that whilst within each piece there is a great timbral variation, there is some repetition of similar textures from one performance to the next. This indicates that, despite the 'nomadic' nature of the notational content delivered to performers, an improviser's 'Refrain' continues to be influential on 'abstract' and 'figural' creative decision-making. The implications of this will be discussed in the conclusion below.

### 3.5.2 Recording and Potential Technical Issues

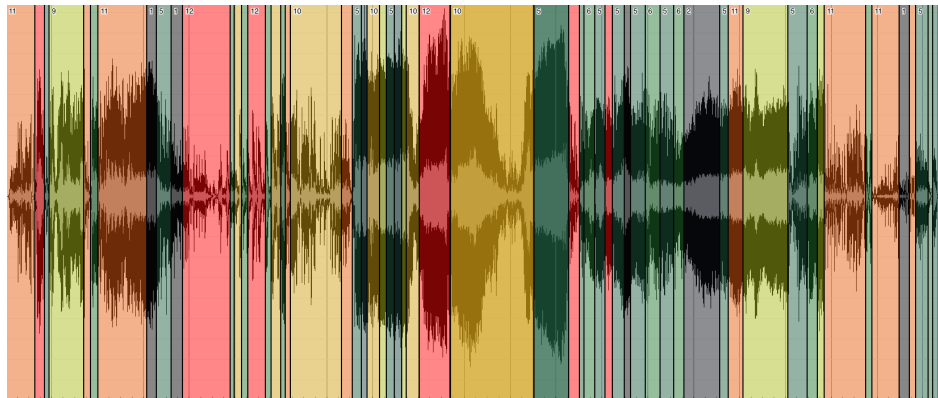
As a consequence of the complexity of the M-Word engine, care has to be taken in its implementation to avoid technical issues. Some of these issues can be seen in the recordings which accompany this thesis, and will be described below.

The first of these arose due to the manner in which the artificial improvisers use live sampling as a means of distorting the input of another player. When the artificial improviser receives a message requiring it to either copy or distort another performer it immediately begins to directly sample that voice and output it, either directly or after processing. If the artificial improviser's output is then picked up by the same source from which it is drawing then a feedback loop occurs, resulting in a single high tone or similar harmonics. Effectively, therefore, every use of the system has to be approached as a combination of a studio recording situation and live amplified performance, ensuring that microphones are positioned correctly to collect sound from acoustic players, but are not at risk of feeding back from the monitors outputting the electronically treated sounds of the artificial improvisers.

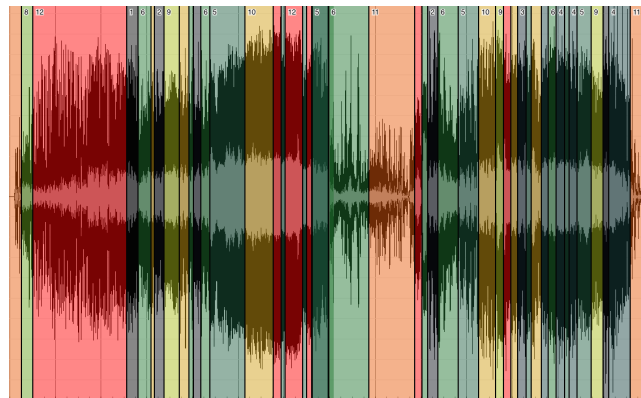
The second potential technical problem with the system is the weight on the CPU of the hosting computer, which occasionally led to crashes in live situations and unpredictability in the connections between the networked instruction-displaying screens. In the recording of the pieces that make up 'Three Lorenz Perspectives', the audio-unit which drives the artificial improvisers appeared to crash after a certain amount of time (this can be seen in the accompanying video by the visualisation of synthesised sounds also freezing), although the part of the improviser which interprets instructions remained online; this caused the improviser to presume a lack of input from other sound sources and therefore re-request instructions whenever it was directed to perform any sampling, resulting in the piece structure suddenly being driven forward due to a surge of unnecessary instruction requests. However, such problems would be alleviated by



(a)



(b)



(c)

**Figure 3.24:** A colour-coded segmentation of the three parts of 'Three Lorenz Perspectives', highlighting similar textures between the recordings.

the use of a more powerful computer to host the system, as smaller-scale performances with the system such as the aforementioned 'Piece 15' demonstrate (see page 94). It is also worth noting that the added processing weight of documenting these performances through audio and video recording may also have compromised the performance of the system in these cases.

### 3.6 Conclusion

The findings that are laid out in the conclusion of Chapter 2 appear to show that the analogy of complex systems with improvisation cannot be accurately applied to human performers; this is due to its insufficiency in accommodating the fact of human 'will', or, put another way, that each improvisatory action is a future-oriented choice constructed from the personal and cultural history of each improviser. Accordingly, it can be argued that for the systems analogy to be truly effective the performers have to be in a Cagean state of non-intentionality; this is comparable to Deleuze and Guattari's concept of the 'Body without Organs', a chaotic space in which there exists a maelstrom of potential outcomes, all of which are equally likely or preferable.

However, they have written that such a state of complete 'depersonalisation' is not practically achievable, except in extraordinarily self-destructive cases such as drug abuse and masochism, but that it is instead a goal to strive towards through a continuous process of 'deterritorialisation'. From a known starting point (the 'Refrain') the Body without Organs is glimpsed through expansion into the unknown; not so fast as to become 'abstract', and not so slow as to be trapped in the 'figure', but finding a middle-point known as the 'figural'. A constant movement away from the known is described by Deleuze as 'nomadism', and is perhaps comparable to the 'disequilibrium' necessary for the continuation of complex systems, as described in the previous chapter.

This nomadism represents a continuous exploration of the unknown, and has been explored in this chapter through the replicable indeterminacy of the M-Word Engine. By creating instructional frames for improvisation which combine musical elements (pitches, register), interactional instructions and metaphoric or descriptive words, the notation generated by the engine sought to displace the creativity of the improviser towards the 'figural', and maintain this exploration through performer interaction with quasi-random structures.

Results from early tests with the system highlighted performers' differing reactions to varying levels of notational displacement and indeterminacy, including a feeling of ex-

cessive abstraction at seemingly arbitrary or random instructions. This was alleviated by the increased interaction in later versions of the engine, which placed more choice of instruction length and content at the hands of the performer. Through this it could be argued that a significant reconciliation of the 'Afrological' and 'Eurological' is achieved, resulting in a figural deterritorialisation of performative 'Refrains'. Analysis of later structural tests, as well as performances with the engine, also show that the engine appears to allow for the creation of compositional structures which underpin the indeterminacy of the improvised surface. This can be extended to include complex piece structures, such as was implemented in 'Three Lorenz Perspectives', described above.

However, it should be mentioned that even the level of nomadism achieved in the above examples can become reterritorialised by performers. As the process is repeated the performers naturally develop an expectation of the *kind* of activity which will be required, and even though the form and content of the ensuing music are innately unpredictable. Deleuze also makes this point in relation to nomadism:

'If the nomad can be called the Deterritorialised par excellence, it is precisely because there is no reterritorialisation afterward as with the migrant, or upon something else as with the sedentary (the sedentary's relation with the earth is mediated by something else, a property regime, a State apparatus). With the nomad, on the contrary, it is deterritorialisation that constitutes the relation to the earth, to such a degree that the nomad reterritorialises on deterritorialisation itself.' (Deleuze and Guattari, 2004, p. 381)

So performers who become adept at performing with real-time score systems such as the M-Word Engine may potentially 'reterritorialise on deterritorialisation itself'. This points towards a drawback of using such electronic systems: they cannot interpret or judge what is new, different or unusual, and so potentially cannot maintain a creatively displacing interaction with human performers due to a lack of ability to surprise them. This ability to judge difference, and to understand what kind of creative displacement will truly surprise a performer, is arguably a fundamentally human one rooted in interpersonal and inter-cultural understanding, and will be the subject of the next chapter.

If the system were built so as to allow for such reflexivity, it would arguably compromise the extent to which it could be considered a true 'Body without Organs'; in this way, it can be argued that such drawbacks are essentially and unavoidably linked to the engine's major advantages of unpredictability and nomadism. By exploring these, the M-Word Engine has arguably highlighted the potential for real-time score systems to create a meaningful and 'creatively displacing' interaction between composition and

improvisation. In addition, the continual advancement of technology, in conjunction with the interconnectivity offered by programme such as Max MSP, allows for the continuous expansion of such systems to include an almost limitless level of interactivity and multimedia output.

## CHAPTER 4

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### Displacement through Leadership

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At best a director enables an actor to reveal his own performance, that he might otherwise have clouded for himself.

Peter Brook, 'The Empty Space' (2008, p.122)

Through an investigation into the notion of 'creative displacement', the previous two chapters have revealed two parallel continua; both of these are scales of similarity and difference, familiarity and novelty. At the macro-level is the scale of difference which can displace the interactivity of groups, with a balanced external interjection able to suggest novel developments of content and form in a self-organising structure. At the micro-level is the individual displacement which makes such interaction possible, drawing individuals into a 'deterritorialised' space which allows for the exploration, and subsequent consolidation, of novelty. It could be argued that the middle point of both these spectra, comparable to the 'edge of chaos' and the 'figural' respectively, are interdependent, and that a realisation of the former is maybe conditional on first achieving the latter.

The previous chapter investigated how real-time notation might create a 'nomadism' of continuous figural deterritorialisation within a fixed form. As was shown, a possible side-effect of this was the potential for the perception of arbitrariness or abstraction from such a semi-random computerised process. Accordingly, this chapter will consider in detail how a process of creatively displacing deterritorialisation can be managed on an interpersonal level through leadership.



The entry of a leader into a creative environment indicates the importance of externality in displacement. This relates directly back to the quote from Adorno from which the idea of 'creative displacement' first arose: he writes that such an idea requires 'a standpoint removed, even though by a hair's breadth, from the scope of existence' else it be marked by 'the same distortion and indigence it seeks to escape' (Adorno (1951), quoted in Smith (2010, p. 126)).

In a performing group such an external agent could arguably be another performer, who, by responding in an unfamiliar manner, challenges an established Refrain. However, in such a case there may be no obligation to respond to such a change if both performers are considered equals in the performative environment. The naming of a leader, however, suggests an external intervener who can be seen not as being equal to the performers but rather inhabiting a position of power within that environment, and therefore able to manage the interaction of differences within a group.

A useful clarification of this is given by Schmidt, who examines the role of a leader in a music-educational setting. He describes how creative frames are engendered in order to manifest 'ethical flourishings' (Schmidt, 2012, p. 151), and places emphasis on the role of the external agent or 'other' in this interaction:

'Essential to an ethics based upon flourishing, therefore, is the invitation to discovery and disruption, which pedagogically requires that we facilitate the unfolding of agency onto *voice*. Voice is placed here beyond the need for outward exertion and recognition, but more simply framed as *replies* to an *other*.' (ibid., p. 154)

It is the leader as teacher that creates the displacement in Schmidt's examples, embodying the 'other' that requires the development of the personal 'voice' through the obligation of the 'reply', even if this leads to 'disruption'. Mirroring the terminology of Deleuze, he writes that 'teaching as a boundary-spanning process places the refrain at a point of convergence for multiple readings, a metaphor for how to interact with the complexity of musical possibilities while maintaining didactic feasibility' (ibid., p. 161). To pursue parallels with Deleuze, it could be said that Schmidt's 'boundary-spanning' is akin to deterritorialisation, with 'multiple readings' embodying rhizomatic lines of flight which expand the multiplicity of the refrain.

As will be shown in this chapter, the success of the relationship between leader and musician will be based on complex factors, such as trust and the management of responsibility and risk, and will necessitate an understanding of the bases on which relationships within a group might be formed. Accordingly, the first part of this chapter

will examine several perspectives on the role of 'difference' within a creative setting, not only in the social interaction of individual musicians but also in the formation of musical meaning; central to this will be a consideration of how a leader can interact with these socio-cultural processes, with an aim to providing a displacing novelty beyond that which internal interactions might be capable of. A second section will then present examples of such interventions, in the working practice of leaders such as Miles Davis and Peter Wiegold.

Based on these findings, a third section will establish a theoretical framework for an interpersonal creative displacement through leadership. This will include a series of practical examples from school and community based work, as well as descriptions of the processes which led to the creation of pieces in the accompanying portfolio.

## **4.1 Leadership and Difference**

This section will establish a terminological framework for the ensuing discussion on leadership, addressing concepts such as the recognition of aesthetic 'difference', and how a leader can assume responsibility for the potential risks of exploring such novelty.

### **4.1.1 Experiencing Difference**

Given the aforementioned importance of the contrast between similarity and difference, for example how a lack of difference or novelty can render an improvisatory system (or individual performer) locked into a 'Refrain' of static familiarity, it is important at this point to consider how we might understand 'difference' or 'novelty' in an aesthetic sense, and how such a perspective is useful in the consideration of a creatively displacing leadership.

In arts throughout the twentieth century there has been significant discussion on the nature of difference between individual aesthetic components. Dewey, in his 1934 text 'Art as Experience', emphasised the importance of 'variation', describing it as 'not only as important as order, but it is an indispensable coefficient of esthetic order. The greater the variation, the more interesting the effect, provided order is maintained...' (Klingmann, 2010, p. 5). Kandinsky similarly described the dynamic of this balance in paintings: 'this "concealed construction" may arise from an apparently fortuitous selection of forms on the canvas. Their external lack of cohesion is their internal harmony' (1977, in (Allen, 2002, p. 7)). Such language is again reminiscent of an eco-systemic 'edge of chaos'

balance, or a Deleuzian ‘multiplicity’, both of which recognise the emergent whole as the product of an irreducible network of relationships.

It could be suggested, therefore, that it is the variation between components, and the subsequent nature of their interrelationship, which defines the characteristics of a whole. In an ensemble situation, a leader is arguably presented with such an array of different musical components in the form of the different musicians, into which he enters as an intervener, therefore creating yet further relationships between himself and the group.

The effect of such an external intervention might entail profound changes in the relationships between parts, and therefore also in the emergent characteristics of the music itself; one particularly immediate manifestation of this might be found in the degree of textural homophony or polyphony. For example, Zagorski-Thomas cites a 1987 essay by Pierre Boulez which suggests these differences form an essential contrast between the performance dynamic in Baroque and Romantic music: ‘the difference between instrumental separation and instrumental unity of timbre... would seem to be central to any study of musical activity that seeks to analyse meaning in terms of gesture, narrative and/or intention’ (Zagorski-Thomas, 2007, p. 329).

In further support of this notion, it has been suggested that the nature of such ‘separation’ or ‘unity’ may in fact be central in the production of meaning in some ethnomusicological cases: for example, Klingmann quotes Chernoff’s assertion that ‘[...] in African music there are always at least two rhythms going on’, and suggests that as a consequence ‘various movement characters, that are connected with incorporated body-emotional states, interact with one another, form new “pictures”, and have to continuously be interpreted and balanced’ (Klingmann, 2010, p. 5). This notion is also mentioned by Zagorski-Thomas:

‘Separate parts will have relationships with each other (or perhaps a perceived / imagined / constructed tactus or pulse) that will suggest forms of interaction which can have meaningful interpretation – lazy, slick, nervous, excited, effortless, tired etc. Individual components may thus have characteristics that are both intrinsic to their internal structure and based on the way they interact with other components.’ (Zagorski-Thomas, 2007, p. 329)

Therefore, the discrepancies between parts, and the relationships consequently created, (in both directed and leaderless situations) are suggested to be central to the creation and understanding of meaning, both in a moment-to-moment interpretation of the music and within a broader socio-cultural continuum.

It is in recognition of this point that the case for a displacing ‘intervention’ rooted in

leadership can begin to be formed. If meaning is taken to be the product of a multiplicity of relationships, then an exploration of novel meanings will require a degree of 'difference' within those relationships which is itself novel. This requires, therefore, a 'deterritorialisation' of a performer's preferred (or expected) level of discrepancy, resulting necessarily from an externally originating displacement.

Such an external source of displacement might be environmental or compositional (as has been the case in previous chapters); however, as has been shown in earlier examples, caution must be used in the framing of such an exploration so as to achieve the 'figural' balance between novelty and familiarity, and a leader, who can take into account personal and cultural factors in this regard, is well situated to judge this. Therefore, it would appear vital for a leader to approach the task of 'creatively displacing' a performer with an understanding of what constitutes his or her 'Refrain' of separation within interaction.

Accordingly, the following subsections will evaluate academic perspectives on how such 'Refrains' might be formed, and the implications of a leader's recognition of, and interaction with, these areas of habit and security.

#### **4.1.2 Entrainment and the Hypothetical Unison**

An interesting starting point is to consider why it should be that such socially formed Refrains exist at all. One answer to this might be found in recent neurological research, which has identified the existence of 'mirror neurons': parts of the brain which create a sympathetic response that mimics the action of another person (Rizzolatti, 2005). In light of this, mirroring of action can perhaps be understood as a physiological human tendency, and an important factor in establishing order (although this may be overly rigid or 'figurative', arguably justifying the intervention of an external 'other' such as a leader in such circumstances).

A connection can be made between this mirroring and the concept of 'entrainment', the process by which two rhythms gradually become synchronised. Clayton et al. have written that such a phenomenon between performers is advised by social and stylistic factors, and that in turn an emergent 'groove' can be defined as 'the socio-musical process of being entrained at the preferred degree of synchronicity' (Clayton, Sager, and Will, 2005, p. 22). Their study also examines the role of this phenomenon in the broader field of general social interaction:

'Warner et al. have shown experimentally that "*moderately* rhythmic social in-

teractions [were] evaluated most positively” (1987:57, emphasis added). It seems that entrainment that is not too ‘perfect’ generally provides a more positive social experience than either entrainment that is too tightly coordinated or not coordinated at all. What is considered a desirable tightness of entrainment seems to vary at a cultural level, and this knowledge is also an important aspect of any musical culture.’ (ibid., p. 13)

Whilst such entrainment might be viewed as a naturally ‘leaderless’ process, resulting from the physiological implications of the ‘mirror neuron’, the recognition of the dynamics of such a state may prove essential to an effective external intervention, particularly in the decision of how and when a leader might intervene. That Clayton gives such weight to this knowledge as a fundamental aspect of a musical culture implies that it might also be essential in achieving the ‘figural’ deterritorialisation of such performative refrains.

Charles Keil echoes the concept of such culturally-tempered entrainment in his theory of ‘Participatory Discrepancies’ (Keil, 1987). Such ‘discrepancies’ are differences in rhythmic timing, sometimes even only at the micro-level; when these are recognised by listeners, even if only subconsciously, they create a participatory ‘urge-to-merge’, inviting further participation (ibid., p. 276). This concept has been investigated and measured by authors such as Prögler (1995), Alén (1995), Iyer (2002) and Mermikides (2010), who have shown that such rhythmic ‘discrepancies’ can at least be proven to exist in jazz and Cuban ‘Tumba Francesa’ musics.

These variations in micro-timing could be considered as micro-level embodiment of the systemic ‘edge of chaos’, with discrepancies creating disorder by pulling away from the ‘attractor’ of the rhythmic unison. However, in an echo of the sentiments of Boulez in the previous subsection, this concept of the unison is expanded by Keil to include differences in timbre; he explains that this aspect was born from encounters with Tibetan music:

‘If you wanted to account for what was powerful about Tibetan music, you would have to have a theory of texture and timbre that was just as powerful as any theory about process or syntax... The monks in Tibet are chanting and playing instruments alternately, but they use the voice with the same purpose of maximizing the overtones and the harmonics. So it was becoming clear to me that texture deserved as great a place in the theory of how music involves people, and draws you into deep identification, total participation, and past the logical contradictions of separation of the other.’ (Keil and Feld, 1994, p. 168).

By implication, therefore, an external intervention into a musical relationship may, if appropriately administered, further deterritorialise such 'logical contradictions', potentially provoking the exploration of new modes of musical symbiosis between individuals.

Following this, Feld theorises the presence of a 'hypothetical unison' at the centre of musical interactions within a group, existing as an understood centre from which 'participatory discrepancies' are perceived (Feld, 1988). A comparison between Feld's 'hypothetical unison' and the notion of an 'attractor' further reinforces the comparison between improvisatory relationships and the 'edge of chaos' balance: too strong an attractor or unison suggests a rigid 'figurative' homophony, too weak implies a nonsensical 'abstract' polyphony. That Feld's suggested unison is 'hypothetical' allows a productive degree of uncertainty, potentially leading to an instability which can maintain a heterophonic coherence.

From the point of view of creatively displacing leadership, it is of vital importance that such a 'unison' between parts be seen as 'hypothetical', since it implies that, unlike purely rhythmic or harmonic unisons, it is not measurable, and can therefore be invoked and 'figurally' transformed as part of the displacement process.

In this way parallels can be drawn between such a 'unison' and the formation of a 'meaning' from differences, as described in the previous subsection. For a leader seeking to displace performers towards the exploration of new 'meanings', it may prove to be more effective to distort the hypothetical unison (which is already 'figural' due its partly abstract nature) than to force a direct reappraisal of melodic, harmonic or rhythmic Refrains. Pressing (1988, p. 162) makes this point in regards to metaphor, writing that 'the image or metaphor enables the coordinated modification and resetting of whole classes of array components in a fashion ensuring spatial and temporal coherence'. A further advantage to this approach is that feelings of 'groove' between performers might still be explored and attained, as performers find new configurations of synchronicity in relation to the new unison.

#### **Case Study: The 'Hypothetical Unison' in the Formation of Metaphoric Heterophony**

*The concept of 'hypothetical unison' can be said to have arisen previously in the pieces performed under the 'electronic leadership' of the M-Word Engine; the complexity and variation of textures which can be heard in 'Three Lorenz Perspectives'*

*can perhaps be accounted for in this way.*

*As was described in section 3.2.3, all instructions in the M-Word Engine have the option of including a semi-random descriptive word or metaphor, which is generated from an in-built thesaurus programme. The programme takes a 'global' starting word, input by the user, and generates a series of synonyms of that word, which are then distributed to each performer within an improvisational instruction; this process creates a 'hypothetical unison' for the performers, with the difference in this case being that the unison does exist in the form of the 'global' word, but remains out of sight of the performers. It can be argued that, by its nature, this process of distributing connected synonyms leads to an 'edge of chaos' heterophony of expressive intention.*

*It is important to note that during the initial workshops with the M-Word Engine, some performers described a degree of improvisational 'discomfort' which could be attributed to the stretching of the 'hypothetical unison'; in a direct parallel of the theories of Feld and Chernoff, as described above, one player described the feeling as being akin to playing a cross-rhythm, saying to himself 'grit your teeth because you have to stick with what you're doing'. This tension might be an example of what can result from a performer exceeding their preferred degree of perceived distance to the 'hypothetical unison'; this tension was somewhat alleviated in later versions of the M-Word Engine through allowing performers greater control over requesting new instructions and new descriptive words (see appendix section A.4 for more information).*

Kossak (2008) defines entrainment at this abstract level as 'attunement', although he also offers terms such as 'affect attunement' and 'intersubjective empathy'. However, in unfamiliar or 'displaced' circumstances such an ambiguous relationship will inevitably be conditioned by the strength with which personal and cultural 'Refrains' are attracting performers' creative choices. The lure of these stabilising Refrains is a factor which must be taken into account when considering how leadership can stimulate creative displacements; whilst a leader can shift a metaphoric 'hypothetical unison', the exploration of how a performer might 'attune' to it could require the deterritorialisation of cultural or stylistic habits. Such exploration might bring with it feelings of creative risk for the performer, which must also be managed by the leader.

### 4.1.3 Difference and Risk

It can be argued that in an improvisational setting, even one in which notational frames for action are limiting a performer's decisional 'phase-space', the extent to which novel action stretches a creative Refrain must be determined by the will of the performer. To undertake such an action might require that a performer transcend their preferred degree of entrainment to others, and this may be the result of having to judge the correct balance between difference and similarity to a novel 'hypothetical unison'; these are 'edge of chaos' judgements, charged with both potential and risk, and must be recognised as such in a model of displacing leadership.

It is perhaps because of this balance that improvisation has acquired an air of danger for some performers, and why Christopher Small described the 'terrifying prospect of being free to play whatever comes to mind' (Small (1987, p. 302) quoted in Lewis (1996, p. 117)). Ford (1995, p. 108) writes how 'one student with considerable experience of playing in pop groups described adapting to free improvisation as being 'like learning to ride a bike having just had the stabilisers removed''.

Kanellopoulos considers this risk through the perspective of philosopher Hannah Arendt, who considered 'free' action to be inevitably bound by its consequences; he writes:

'Thus, action exists in the midst of contradictions; irrevocability and unpredictability of action are the result of its boundlessness, and of the production of new relationships and reactions... There is nothing to guarantee the successful 'execution' of an action, exactly because action, as we have seen, can never be merely 'executed'.' (Kanellopoulos, 2007, p. 105)

In this light, all 'free' or 'boundless' action can be seen as being laden with risk - from 'irrevocability', 'unpredictability' and consequential responses from other parties; this is unavoidable due to the personal manner of its execution, or what Arendt calls the 'the human condition for individuation' (Kristeva, 2001, 76, quoted in (ibid., p. 104)). As will be shown in subsequent sections of this chapter, however, a directed intervention might entail the assumption by the leader of some or all of the responsibility for such action, particularly if its 'individuated' execution is conceived within externally imposed limitations.

If 'free' improvisation can be seen as carrying with it an innate sense of risk, perhaps due to the essential ambiguity of the 'hypothetical unison', then rhythmic 'groove' might represent a contrasting space of safety due to the strongly attracting pull of 'the beat'.



For example, Feld describes a groove as ‘a comfortable place to be’ (Feld, 1988, p. 75), whilst Kossak writes of ‘the importance of the beat in establishing safety’ (Kossak, 2008, p. 119). Turino describes the safety that can emerge from repetitive forms and grooves as ‘the security of constancy’ (Turino, 2009, p. 111), relating this to how beginners can be encouraged into participatory forms of music-making.

‘Individuation’ can arguably still occur within this, but perhaps it can be said that a feeling of ‘safety’ arises from the stylistic threshold for discrepancy being perceived as closer to a ‘unison’ than in other less familiar patterns of interaction. This is comparable to a strong attractor in complex systems theory, or a strongly territorialised Deleuzian assemblage.

These viewpoints can therefore be seen as supporting the notion that explorative creative action, that which stretches away from the familiar, is imbued with risk, whilst repetitive rhythmic beats and ‘grooves’ embody a space of ‘secure constancy’ (although arguably still allowing for degrees of ‘individuation’). A leader who seeks to manage the creative displacement of musicians might draw on both these extremes in order to adapt displacing frames for action according to the needs of individual performers. Exploring a midpoint between these two approaches will be key to establishing a creative displacement which is rooted in the Deleuzian figural, in which risk and security are carefully balanced.

#### **Case Study: Entrainment, Mimicry and Improvisational Security**

*Several of the workshops undertaken for this research demonstrated a variety of approaches to risk taking, with some performers notably reluctant to move beyond a safe degree of improvisational similarity without compositional or directorial intervention.*

*An illuminating example of this can be found in one of the vLookup ensemble’s early workshops (see audio example 39), in which a primary exercise was undertaken where one performer after another added an improvised voice to a texture. Several of the improvisers proceeded to closely mimic the previous performer’s entry: the trumpet’s key clicks were directly mimicked by the saxophone’s pad clicking, and then by the percussive knocking of the harp. Such close textural entrainment is arguably unproductive in a freely improvised setting, since it does not afford any potential new directions for other performers.*

*Similarly, in one of the earliest rehearsals with the Mirrors of Hall big band a section of free improvisation exhibited strong tendencies towards mimicry between*

*the participants. This occurred in the piece 'Tear Gas', at the open section at bar 70 where an improvising trumpet and guitar are joined by drums and bass; this resulted in the drums and bass exploring an appropriately 'lop-sided groove', as requested in the score, but the trumpet and guitar engaging in a call and response that culminates in an exact mimicking of pitches and a humorous high-note battle. The two improvisational voices become locked together and so cannot afford each other any direction of development, leading to an audible aimlessness to the playing that immediately follows (see audio example 40).*

*It is notable that both these examples come from workshops in which freely improvised interaction was attempted without any compositionally derived frame, and in which the players, some of whom were not experienced in the practice of free improvisation, were playing together for the first time. This suggests that in such circumstances close entrainment and mimicry are a source of improvisational security for the performers.*

A leader, therefore, must be mindful of the level of risk or security that a displacing frame for action might present to a performer; this may not be limited to considerations of freedom or restriction, but also of how actions may impact on aesthetics and style. For example, a performer may be reluctant to engage in an exploration which they perceive as too strongly stretching away from an emergent stylistic hypothetical unison, and that the best course of action might be to not fully engage with it, instead employing familiar habitual responses. On this potential difficulty, Patrick Schmidt writes, 'to be able and willing to move away from what we silently think, is the stuff of ethics, and in pragmatic terms it requires that we be able to voice different possibilities for our own practices' (Schmidt, 2012, p. 156).

As will be shown, the deterritorialisation of such preferences can be the result of an external constraining factor which renders an exploration of the unfamiliar a more suitable option than resorting to the familiar. In previous chapters it has been through notational limitation that such displacements have been implemented, although this approach can be inflexible in matching the needs of the individual musician; the process by which a leader can create and implement a frame for action can be considered in similar terms, but with the advantage that limitations can be negotiated and adapted in real time. It is useful in this regard to recall the terminology of Section 2.4.1, which described the limitation of improvisational choices as reducing the dimensions of a performer's decisional 'phase space'; a leader has the power to deform this phase space in response to the performer, reaching a point where the choice to engage in an exploration of novelty

might become viable.

In light of the Deleuzian concept of the Refrain, it can perhaps be assumed that a leader can tailor such principles of displacement to all kinds of musician, from complete beginners to experienced professionals: the same process of managing a 'figural' de-territorialisation of the Refrain could be said to be applicable in all cases. However, engagement with such a displacing frame for action may depend on perceptions of responsibility, as well as the authority of, and trust in, the leader of this process; it is these factors which will be considered in the next subsection.

### **Case Study: Displacement and Creative Choices - Two Trumpet Solos**

*These examples serve to demonstrate the complex individuality of the Deleuzian 'Refrain', and supports this chapter's starting notion that displacements should be managed on an interpersonal basis via leadership.*

*Throughout the course of this research the Mirrors of Hall big band had a variation in personnel with almost every meeting. In some cases this led to a variety of interpretations of the pieces from one performance to the next, but it also revealed a breadth of reactions to the creative displacements which are included in the scores.*

*An example of this can be found in the lengthy trumpet improvisation in 'Tear Gas', which saw numerous interpretations throughout the research. Following the earliest performance of the piece, which resulted in the mimicry described in the previous case study, the score for this section was adapted to include a specific displacing creative task: 'play like a broken disco record'.*

*The first interpretation of this (audio example 41) was by a non-professional player of classical training but with a wide experience of performing in different styles; his interpretation is restrained but effective, smearing and distorting bluesy licks with fragmented stabbing rhythms.*

*By contrast, the second interpretation (audio example 42) was by a professional jazz player who had recently finished training at one of London's music colleges. His interpretation of the solo is drastically different, drawing much more on a fiery and dissonant contemporary jazz style, which then infuses the actions of other improvisers to create a more aggressive texture than in the earlier example.*

*It is important to note that this second performer had reacted with notable uncertainty to the wording of the instruction when he first encountered it in rehearsal; additionally, in performance he does not seem to engage with the limitation of 'use*

*only gliss.’ which occurs in the run up to the improvisation described above. Far from this being any weakness on the part of the performer, it rather suggests a failure in the adaptability of this manner of score-based displacement; whereas the first trumpeter explored the limitations given by the score, the second chose not to adhere to the limitations given because they were too far removed from his own aesthetic, and in such a situation the score becomes arbitrary and ineffective. As has been mentioned above, an implementation and negotiation of limitations becomes possible with the presence of a leader, allowing room for malleability of the displacing task.*

*A similar situation arose in an early workshop with the M-Word Engine, in which some performers deemed the words they received within their instructions as being excessively abstract and were therefore treated arbitrarily. For example, in one instance the trombone player received the word ‘misty’ as part of an instruction, to which he reacted by playing the jazz standard of the same name; hearing this, the saxophone player then began to play another jazz standard, ‘Stella by Starlight’, ignoring the instructions he’d been presented with (see audio/video example 30, from 4’25” onwards).*

*This latter example further illustrates how the realisation of ‘difference’ must be managed by a leader on an individual basis for each performer, since each will have their own Refrain of aesthetic correctness and may fall back into habitual responses if they feel that a compositional ‘creative displacement’ is incoherent or pushes too far towards the Deleuzian ‘abstract’.*

#### **4.1.4 Responsibility and Authority**

A directed ‘creative displacement’ must therefore guide a performer away from their creative Refrain, and consequently toward an exploration that may seem less aesthetically ‘correct’ for that performer.

As the instigator of a creative displacement, there is arguably an extent to which the role of the leader must necessarily include an acceptance of responsibility for the risk of engaging in unfamiliar or seemingly incorrect paths of action. Such a notion raises the issue of perceived authority in leadership, and in this regard the ‘agentic state’ theory of Stanley Milgram (1974) may prove a useful analogy. Milgram’s experiments, in which a researcher asked participants to administer electric shocks of increasing intensity to an unseen test subject in another room, are still renowned today; the surprising level of

obedience of test subjects to the authority of the researcher is attributable, he suggests, to a transfer of responsibility from agent to authority. He writes:

‘When he merges his person into an organisational structure, a new creature replaces autonomous man, unhindered by the limitations of individual morality, freed of humane inhibition, mindful only of the sanctions of authority.’ (Milgram (1974, p. 188) quoted in Russell and Gregory (2005, p. 340))

Although an improvisational setting is unlikely to include ‘sanctions’, it is clear that a negotiation of ‘limitations’ and ‘inhibitions’ is analogous with the objective of the creative displacement. By assuming the responsibility for actions and their associated risks, the authority creates a space of safety in which the less ‘correct’ course of action can be explored without consequence.

The leadership style of Miles Davis, which will be examined in the next section, provides an interesting example of this transfer of responsibility through the assumption of an external power: Chris Smith (1998, p. 262) describes how ‘Miles intentionally supplied, withheld, and distorted performance information because of a quality of attention that such an environment evoked from his players’. Davis was able to achieve this by establishing his absolute authority in his working practice, the effect of which on musicians was described by producer Teo Macero:

‘...it’s like God coming - “Oh, oh, oh, here he comes.” They stop talking, they tend to business and they listen, and when he stops, they stop.’ (Quoted in Smith (ibid., p. 263))

It is important for a leader to consider the effect of a subject’s relationship with authority, and how this might influence their readiness to enter into a Milgram-esque ‘agentic state’. Milgram himself indicated the complexity of how circumstantial factors might affect responsibility transfer, describing the subjects in his own experiment as having a ‘situational obligation’ to follow the commands of the authority (Russell and Gregory, 2005, p. 344). As the example of Miles Davis shows, such an obligation is no doubt attributable to the qualities of the subject’s encounter with the authority, including the degree of trust that is engendered between them (this has also been suggested by Milgram’s contemporary Don Mixon [see Blass (1999)]). An appreciation of such ‘situational’ factors can therefore be seen as forming an important part of any analysis of improvised or collaborative music-making.

However, it is interesting to note that even in Milgram’s experiments, subjects adapted

their responses to the task in order that it might closer align with their own sense of the ethical. Termed by Milgram as 'strain resolving mechanisms', these included subjects offering to return their fee for participation, expressing increasing concern for the wellbeing of the victim, and demanding to know who had ultimate responsibility for the effect of the electric shocks (Russell and Gregory, 2005, pp. 329-330). This suggests that the transfer of responsibility cannot be absolute, and that such 'mechanisms' represent a personal articulation in response to the subject's apparent obligations, similar to Schmidt's aforementioned conception of the 'voice' developing in response to the 'other', or Arendt's 'individuation'. This is perhaps also comparable to the impossibility of reaching the Deleuzian 'Body without Organs', due to the unavoidably subjective nature of 'reterritorialisation'. Again, this was arguably recognised in the practice of Miles Davis and manifested in the ambiguity of his instructions, which will be further examined in the next section.

## 4.2 Leadership and Metaphor: Miles Davis and Peter Wiegold

Several examples of leadership in improvisational settings will be now reviewed, drawing parallels between the practice of music-leaders past and present with the theories outlined in the previous section.

Improvisers have frequently turned to the creative leadership of others to provide new points of departure for their improvised explorations; notable examples of this include Lawrence 'Butch' Morris's 'Conduction', Walter Thompson's 'Soundpainting', the later work of Miles Davis and Peter Wiegold's work with the ensemble 'Notes Inégales'.

Thompson's 'Soundpainting' boasts over 1200 gestures with which to dictate musical material to performers and subsequently transform it, using a taxonomic structure of 'Who, What, How and When' <sup>1</sup>. Thompson explains that by using these fixed gestures, 'the Soundpainter develops the responses of the performers, molding and shaping them into the composition then signs another series of gestures, a phrase, and continues in this process of composing the piece'. However, despite the apparent aleatoricism of certain gestures, it could be argued that such fixed semiotics might lead quickly to reterritorialisation within a performer's refrain, and therefore not provide the displacement that other leadership styles might offer.

Morris (2006) has described his 'Conduction' as thriving 'on ambiguity and encounter'

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<sup>1</sup>This and more information can be found at [www.soundpainting.com/soundpainting](http://www.soundpainting.com/soundpainting)

to create an environment in which 'musicians must prepare for a different way of thinking, working and knowing' (ibid., pp. 534-535). It is made up of 'a vocabulary of ideographic signs and gestures' on which performers then base their improvisational choices of 'harmony, melody, rhythm, articulation, phrasing or form' (ibid., p. 533). These gestures are less directly prescriptive than in Thompson's 'Soundpainting', but retain some levels of specificity, such as indications to sustain, to go back to previous events, and to invite 'literal' mimetic copies of the conductor's movement (Morris, 2014).

This latter example highlights a potential shortcoming of such instructions, in that it appears to do little in the way of encouraging performer exploration, instead simply (and, perhaps, arbitrarily) requiring that the performer respond in any desired way. It should be questioned, therefore, to what extent these instructions fulfil Morris's desire for 'ambiguity'; in the case of responses to mimetic conducting, it would appear there is little in the process to subvert a simplistic realisation, such as, for example, high or low movements relating accordingly to pitch or dynamic.

#### **4.2.1 Miles Davis**

One of the most interesting approaches to creative direction was that of Miles Davis, whose leadership of his groups throughout his career has led to much illuminating anecdotal evidence of his mastery of creative displacement.

For example, Dave Holland describes how 'he was always trying to put you in a new space all the time where you weren't approaching the music from the same point of view all the time, or from a preconceived point of view' (quoted in Bergstein (1992, p. 512)). With statements such as 'don't play what's there, play what's not there', and, to John McLaughlin, 'play it like you don't know how to play the guitar', Davis sought to displace his performers' creative tendencies through a sustained sense of ambiguity and exploration. In a parallel of the linguistic and metaphoric comparisons made in previous chapters, Chris Smith (1998) places such ambiguous 'incompleteness' at the centre of Davis's direction, the result of which, according to Schieffelin, is that performers must 'make their own moves of creative imagination if they are to make sense of the performance' (ibid., p. 263). This problem-setting/solving approach draws parallels with Schmidt's educational concept of the 'flourishing' of the individual's creative voice in response to an external 'other', and it seems appropriate that the producer Teo Macero describes Davis's leadership in quasi-educational terms: 'they got more out of him than they have given to him. He is the teacher. He's the one who's sort of pulling the string' (quoted in Smith (ibid., p. 263)).

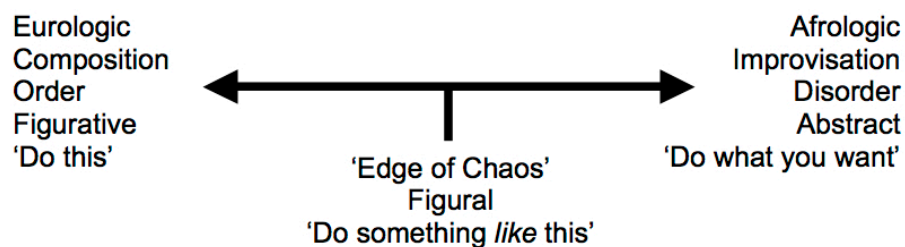
Smith theorises that in this way Davis could invoke ‘a very particular kind of attention from his players’ through this ‘richly ambiguous symbolic experience’ (Smith, 1998, pp. 261-262); Davis himself commented on his process:

‘See, if you put a musician in a place where he has to do something different from what he does all the time, then he can do that - but he’s got to think differently in order to do it. He has to use his imagination, be more creative, more innovative; he’s got to take more risks... So then he’ll be freer, will expect things differently, will anticipate and know something different is coming down... Because then anything can happen, and that’s where great art and music happens’ (quoted in Smith (ibid., p. 262)).

This quote neatly encapsulates many of this chapter’s findings so far: in order to reach a space where ‘anything can happen’ (comparable to the Body without Organs) a musician must be presented with an unfamiliar problem (or, in the terminology of this research, a ‘creative displacement’), the solution to which might require the taking of creative risks (as outlined in the previous section of this chapter).

#### 4.2.2 Peter Wiegold

Peter Wiegold’s method of creative leadership shares Davis’s goal of a state of heightened awareness and attention in performers, reached through proactive creative involvement and often inspired by an invitation through ambiguity. In a direct parallel of the Deleuzian spectrum of ‘figurative - figural - abstract’, Wiegold defines three kinds of instruction: ‘do this’ - ‘do something like this’ - ‘do whatever you want’ (Wiegold, 2001, p. 4). The middle option, as with the ‘figural’, is perhaps the most significant for this research, necessitating a creative investment on the part of the performer in a similar manner to Davis’s instructional ‘incompleteness’.



Melvin (2010, p. 109) gives a detailed account of Wiegold’s working practice, in which gestural instructions invoke various creative frames for a performer to inhabit,



such as 'ostinato', 'solo' and 'harmonise'. A command to play 'like' another performer or 'like' a particular style (ibid., p. 117) is another parallel with the Deleuzian 'figural', a productive distortion of the preexistent or familiar, and is also comparable in this sense to the transformations of indeterminate 'found objects' in Stockhausen's 'Kurzwellen' or 'Spiral', as described in Chapter 3.

Also of importance for Wiegold, however, is a recognition of the balanced application of such displacing instructions through an understanding of the musician's personality. He describes his approach to music-making as being 'people-centered':

'I conduct one oboist differently from another. Because one is tall and tense and one's short and relaxed, and so I don't give the same signal to each player abstractly. I change the signal according to who I'm signalling.' (Hamson, 2002, p. 4)

However, his leadership is not simply concerned with accommodating the performer, nor establishing a fixed image of that player, but rather with challenging them through a dynamic relationship of provocation; in an echo of the Deleuzian concept of 'nomadism', Wiegold describes seeking to create and maintain a sense of 'volatility', in which he tries to continuously 'move the goalposts'<sup>2</sup>. It is appropriate, therefore, that Wiegold places emphasis on the importance of communication skills in music leadership, and the role of simple interpersonal gestures like eye contact in engendering an environment of trust.

'Look at the player and you won't have to do anything, because if you get the vibe of the player, then clarinetness plus Georgeness, or whoever the clarinetist is will get in the circle with you and the ideas will be there between you.' (ibid., p. 2)

In this way, Wiegold, like Davis, seeks to create and manage a highly personalised displacement for performers, in which defamiliarisation is carefully judged for the right person at the right time in order to achieve novel results. Therefore, his approach offers a practical example of how a leader can negotiate the deterritorialisation of performative Refrains, taking account of cultural, personal and stylistic conventions, as well as any situational factors, in order to draw performers into an unfamiliar space for exploration.

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<sup>2</sup>Quoted from a conversation held between Peter Wiegold and the author on 22nd July 2014

### **4.3 A Framework for Creative Displacement in Educational Groups: Two School-based Projects**

An approach to creative leadership was developed through this research, specifically in the creation of pieces within educational workshop environments; it was advised by the leadership style epitomised by Davis and Wiegold, as well as taking into account the displacing notational techniques explored in chapters 2 and 3. As will be shown, a strongly displacing combination of metaphor and limitation, be it on pitch, technique or the physical approach to the instrument, was found to be successful in establishing a displacing frame for action in such circumstances.

Added to these influences was a consideration of 'responsibility transfer', as outlined earlier in this chapter; this provided a framework for allowing the investigation of the unfamiliar by otherwise stylistically inhibited musicians. This was used not only in the development of specific musical content, but also in the establishment of the process which would produce that content, so that ultimately the entire workshop process is a collaborative one.

A three-step framework of managed creative displacement was established through the course of practical research in this area; this can be best represented by an account of its first use, which was in a workshop undertaken with the Essex Symphony Orchestra as part of the PRSF 'Adopt a Composer' scheme.

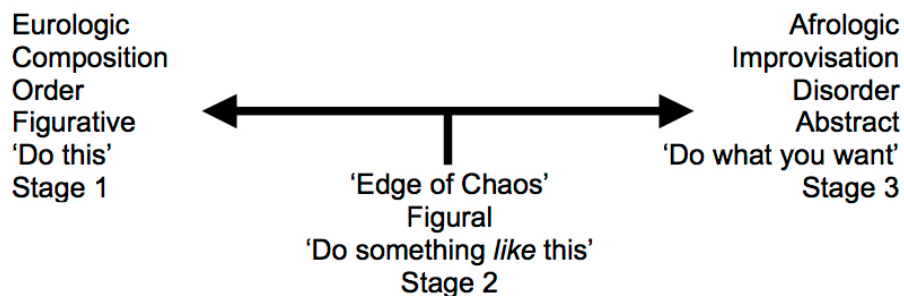
1. The first step in this framework is the imposition of an unfamiliar frame for work, which in this case was the task of reworking the theme tune of the radio serial *The Archers*. This first step is outside the will of the performer, displacing the entire task at hand and seeking to establish a transfer of responsibility to the leader for what follows.
2. Within this imposed frame, an 'incomplete' creative problem is posed to the performers that will seek to elicit a range of creative responses; in this example the question of what dramatic events from the storyline of the radio soap we could draw inspiration from. This second stage of displacement invites the performers to partly reclaim responsibility for the creative action at hand, although they remain free to explore uncertainty because of the sharing of responsibility with the leader who originally posed the question.
3. The third and final displacement is the question of how the goal established in the previous step can be achieved; at this point responsibility for action, although

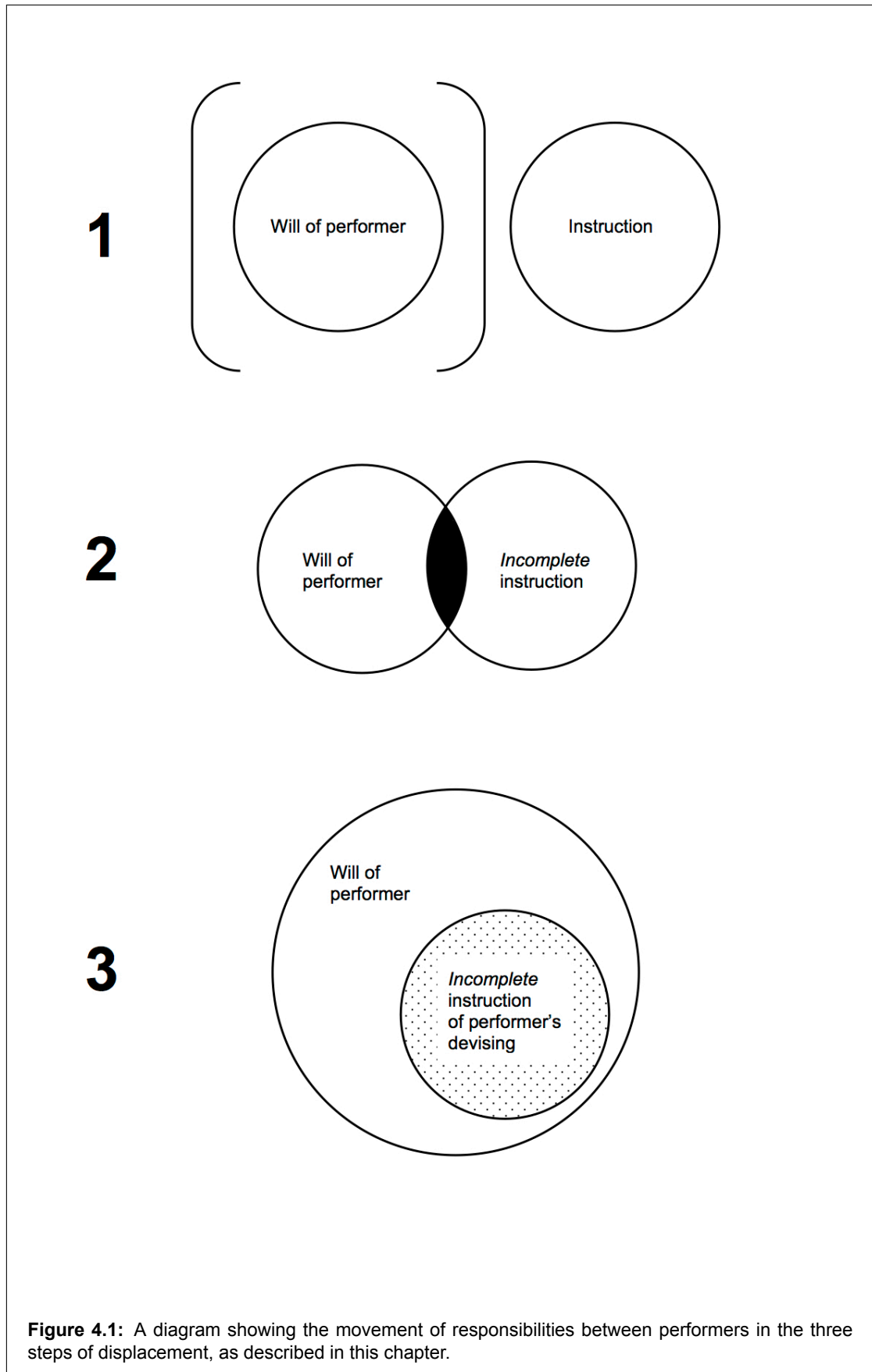
perhaps ultimately still in the hands of the leader who has instigated the whole process, is returned to the performers, who now work creatively to find a solution to a problem of their own creation.

The movement of responsibilities between these three steps are outlined graphically in Figure 4.1.

The result of the workshop described above was the creation of a short piece in several parts, in which each section reflected a particular event from ongoing story-line of *The Archers*. Particularly successful was a suggestion from the orchestra that one character's pregnancy could be embodied by a sustained string chord, occasionally punctuated by soft wind 'heartbeat' rhythms; in reaction to this rhythm it was suggested the strings could then rapidly fluctuate their bowing, before settling again. This led to the creation a subtly interactive and indeterminate string texture, comparable in sound, perhaps, to some orchestral works by Berio or Ligeti. (The full workshop, and the resulting piece, can be heard in audio example 43)

The three stages of displacement described above can perhaps be seen as being analogous to Wiegold's 'three ways', and, by implication, to the Deleuzian 'figurative-figural-abstract' spectrum. The first step is a deliberately displacing imposition which reframes everything that is to follow: 'do this'. The final step in this process is always to hand control of the task to the performer, with the question 'how are you going to realise that?', or 'do what you want' in response to the established task. As with Deleuze, it is the middle stage of the process which is of most interest in this research, presenting the leader with a space in which to negotiate with and provoke the performer; there may be several such 'secondary' displacements before reaching the final third step of realisation, and these might include anything from decisions of formal and structural features (as in the example described above) down to particulars of pitch, rhythm and timbre.





**Figure 4.1:** A diagram showing the movement of responsibilities between performers in the three steps of displacement, as described in this chapter.

The management of these displacements can be seen as crucial to their efficacy, not only in an educational context but also when working with adult performers both amateur and professional. The stability-chaos spectrum in complex systems, and figurative-abstract in Deleuze's writings, is paralleled in workshop practice by the balancing of tasks between the three stages outlined above. One of the duties of the leader, arguably, is to interpret a performer's reaction in a regard as to whether subsequent instruction is needed, and whether this should be more 'figurative' or 'abstract' in order to further their creative displacement; this is where Wiegold's emphasis on the communicational and interpersonal elements of leadership becomes particularly relevant.

In a workshop situation, as well as in the rehearsal process for a notated piece (such as the Mirrors of Hall Big Band pieces), a leader is able to dialogically negotiate displacing frames for action which achieve this balance between precision and abstraction. This might typically take the form of working out the implications of the limitation both verbally and practically with the performer, and tightening or loosening the creative frame appropriately (similar to the manner of notational limitation discussed in relation to the Mirrors of Hall Big Band in Section 2.4.1).

For example, if a tertiary displacement - 'how are you going to realise that?' - is met with a response of 'I don't know', the leader or composer can step in with a rephrased or alternative secondary displacement - 'can you make it more like...' - or, failing that, a primary displacement such as a direct physical limitation - 'just use one note/rhythm/technique'. Once the leader has developed an idea of the limits of a performer's creative 'Refrain', he or she can then work to deterritorialise it through displacements which will be both more understandable and engaging.

In the production of the educational workshop pieces which feature in the accompanying portfolio, the posing and management of creative tasks, as described above, became one of the key points of research interest, as well as the degree to which responsibility for explorative action could be seen to be transferred between performer and leader; specific examples of such negotiations will therefore be detailed in the descriptions of specific projects which follows.

#### **4.3.1 The Abingdon School Lower School Orchestra: 'The Planets Revisited'**

In the first education project of this research, the author worked with the young musicians of the Abingdon School Lower School Orchestra. This was a large orchestra of around 30 performers, all of whom were aged between 11 and 13. The musicians were of

mixed abilities, all undertaking lessons on their instruments and participating regularly in extracurricular musical activities.

In the workshops that led to the creation of 'The Planets Revisited', these musicians were first given the primary displacement that the piece would not involve written music but words and hand signals (an audio and video recording of the primary workshop for this project is included as audio/video example 44, and subsequent timings refer to specific moments within this example). From this starting point the creative problem was posed of naming words associated with summer, which produced suggestions such as 'sun' and 'holidays' (1'00") onwards. The word 'sun' was then taken as the starting point for the next creative problem, 'describe the sun', which led to words such as 'hot', 'bright' and 'star' (1'20"). At this point a tertiary stage displacement was introduced, through asking any of the musicians to create a 'hot' sound with their instrument; a cellist responded with a faster and loud glissando up and down the instrument, and this became the first fixed sound in the composition (2'20"). This sound became the basis for a secondary displacement for the other instrumentalists, who were asked to do 'something like' the cello and accordingly responded with a series of varied glissandi low undulating pitches, leading to the creation of a dense heterophonic texture (2'45" onwards).

For other parts of the composition, variants on the word 'sun' were established and used as the starting point for new idea development (3'30" onwards), each following a similar course of displacements as described above; this process is illustrated in the flow chart in Figure 4.2. Each of these 'metaphoric unisons' (Sun, Moon and Earth) were given hand signals by the participants, so that the author could cue them indeterminately and thus created a structured piece in realtime.

Trust in this process was established and maintained through the use of several stages of gradual metaphoric 'figural' displacement, enabling a significant and meaningful shift away from the participants' expectations of music into a more abstract sonic exploration. In turn, this led the performers to begin exploring the sonic capabilities of their instruments: for example, the brass players tapped their mouthpieces against the metalwork of their instruments in order to mimic a cello's 'col legno' bow tapping, and a flautist explored the effects of different kinds of 'breathy' tone so as to 'darken' his sound.

Subsequent rehearsals led to further development of the original ideas, and, due to the fundamental ambiguity of the metaphoric unisons underlying the piece, the author as leader was able to maintain a degree of 'nomadism' between each interpretation. For example, audio/video example 45 shows a later rehearsal of the piece in which the ideas

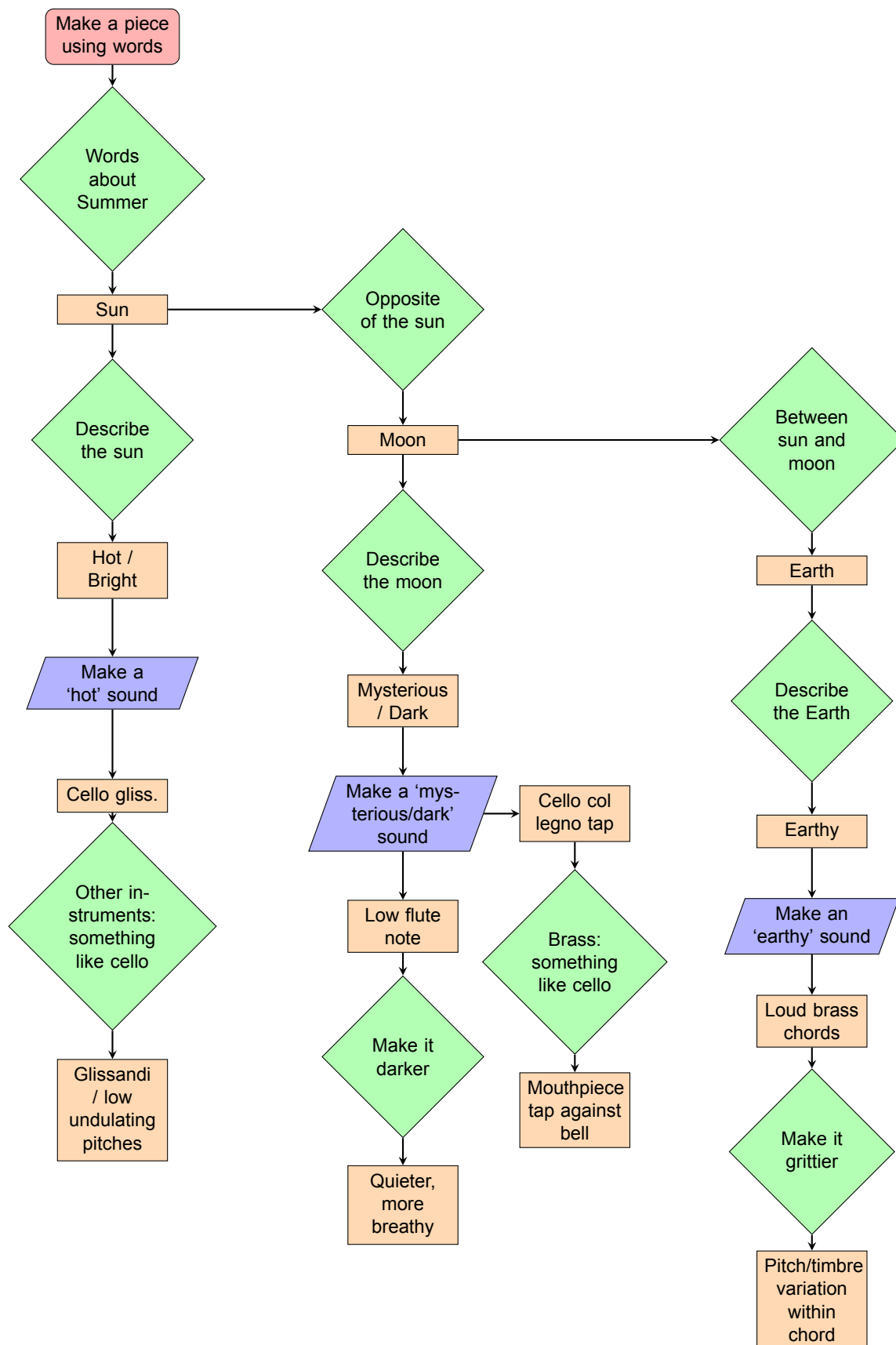


Figure 4.2: A flowchart of idea development through displacement in The Planets Revisited (see audio/video example 44).

were transformed through their sharing between different instrumental groups; this led to the unpredictable emergence of new ideas, such as the rhythmic groove which arises at 5'30" and subsequently spreads into the rest of the orchestra.

Such explorations are arguably indicative of a successfully judged level of displacement, achieving an afro-eurological balance of explorative freedom within a communally derived framework. The compositional presence of the leader would seem to be essential in this, providing a safety net of ultimate responsibility whilst simultaneously provoking the performers through creative problems as outlined above. This process established a framework for the ensuing educational projects, which will be described below.

### **4.3.2 The Rutlish School Band: 'The Lord of the Flies' and 'The International Project'**

Building on the methodology outlined above, a second project at Rutlish School sought to explore similar ideas with a smaller ensemble and over a much longer period of time (a whole academic year was spent at Rutlish, compared to only a six-week half-term at Abingdon School). The band was a new project for the school, which had previously had no extracurricular instrumental ensemble; as such, the participants for the band varied between workshops, requiring a continual reappraisal of creative approach on the part of the leader. This also created a pressure to work quickly in the creation of pieces, since performers might not be in attendance for the following workshops; in addition, as many of the musicians did not read music, the specific content of devised pieces could not be easily recorded from one meeting to the next, although in cases where structural information was recorded this lent the pieces an interesting Deleuzian 'nomadism' of variation.

The first project with the band was to produce incidental music for an upcoming school drama production of 'The Lord of the Flies'. Three short pieces were produced and are included in the accompanying portfolio of recordings: 'Flying', 'Hunting' and 'The Death of Simon'.

Each of these workshop sessions was begun with a short 'body percussion' exercise, intended to introduce to the participants the practice of drawing on each other's ideas and realising incomplete creative problems (such as 'do something with your hands'). The process involved was essentially the same as that which was used in the Abingdon School project, with the exception that all the frames for action were imposed by the leader, and so there were no 'tertiary' frames of the performers' own devising. A further



benefit of using a 'warm-up' exercise such as this was that it allowed the author as leader to get an early insight into the creative personalities of the musicians, in order to better advise the setting of ensuing creative tasks.

A flow chart illustrating the idea generation in an example of this exercise can be seen in figure 4.3, and it can be heard in audio example 46.

As in the previous project, the primary displacement in the creation of the ensuing workshop pieces was the use of words as the basis for the creation of instrumental sounds; a good example is the first meeting of the project, where the initial work on 'Flying' was begun. The starting point for the process was the creation of a piece to represent an aeroplane flying and, after suffering a lightening strike, crashing. From this initial plan words were generated associated with flying or being in a plane, and used as the basis for the creation of a 'high' and 'scary' texture with which to begin the piece.

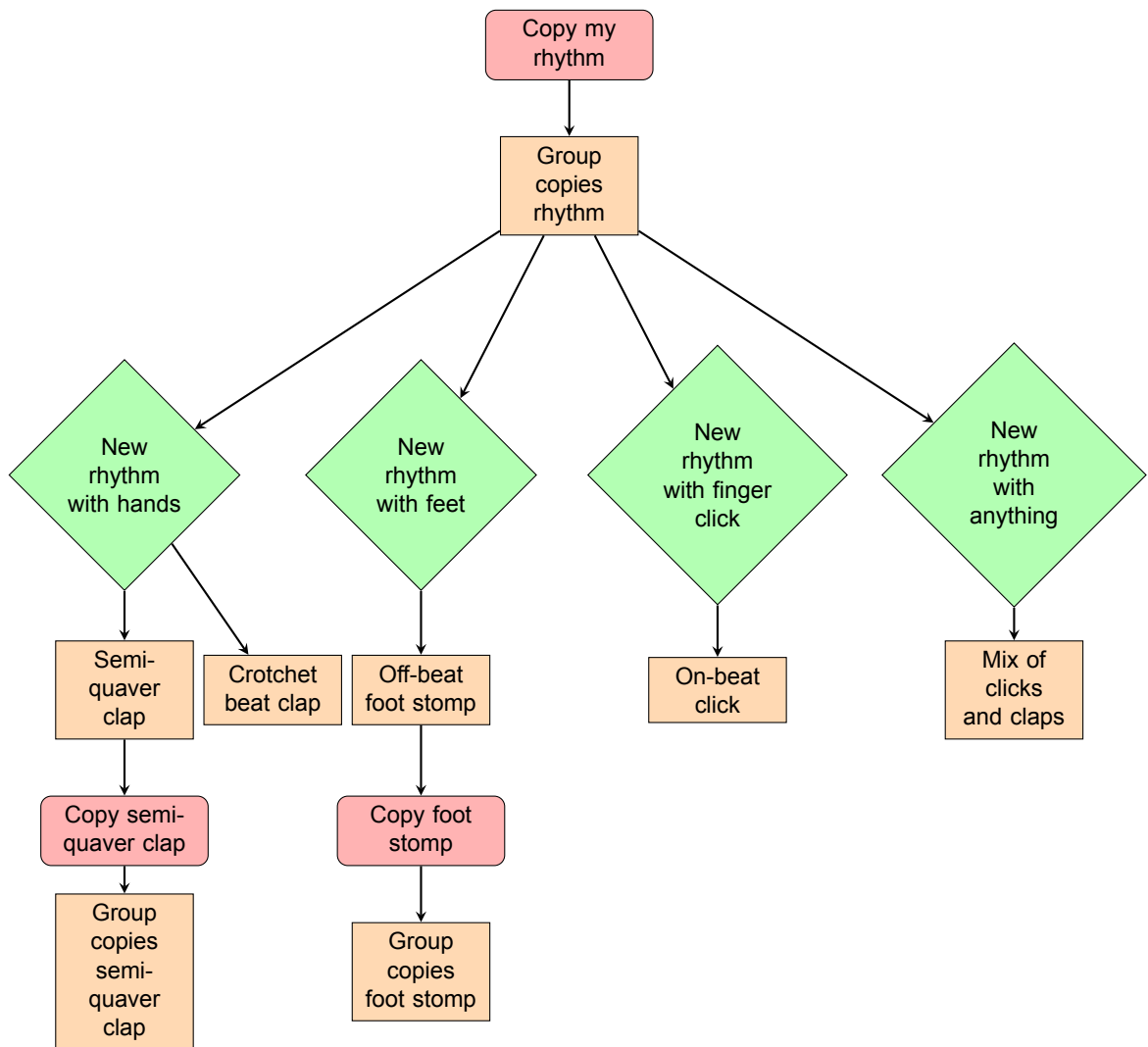
The use of metaphor in this way echoes the possibility of a metaphoric 'hypothetical unison', as discussed in Section 4.1.2. Establishing a metaphoric starting point in a compositional process can arguably lead to a natural 'attunement' at this level, since each individual performer's response shares this macro-level connection.

Figure 4.4 shows the process with which the opening texture of 'Flying' was created, and is comparable to Figure 4.2 in its creative process (as with that workshop, the entirety of this session can be heard in audio example 47). However, as the group was much smaller more attention could be given to each individual response, resulting in a more personal interaction between leader and participant; this is represented in Figure 4.4 by the different approaches to displacement taken with each performer, with some requiring a more direct displacing limitation to their ideas than others. For example, the guitarist did not understand the instructions to 'make it high' or 'use the top strings only', (represented by question marks in the flowchart) so the even more limiting displacement of 'finger it high up on the top string' was required for him to engage with and explore the desired effect (see 2'15" onwards in audio example 47).

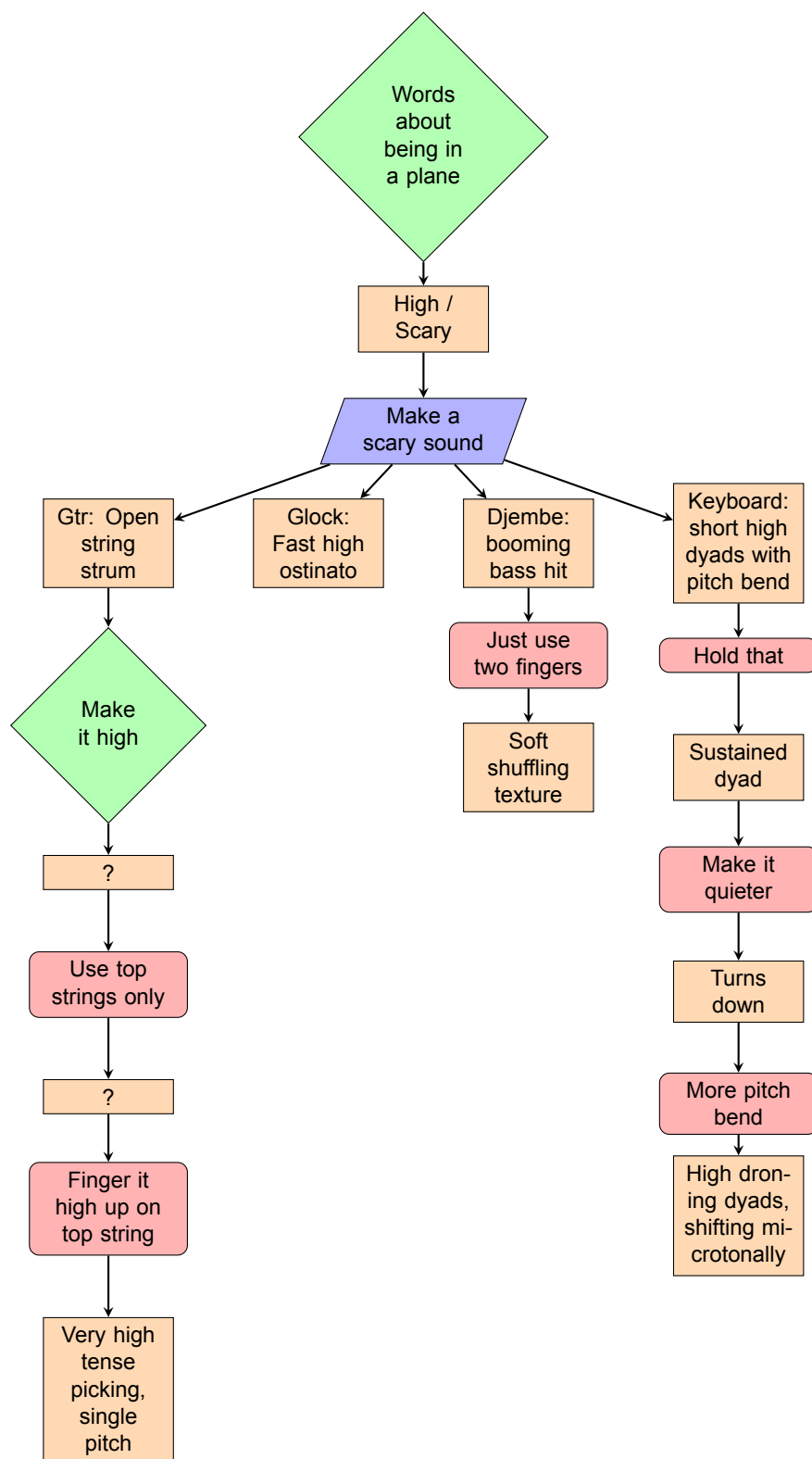
Figure 4.5 shows the process of reconstructing this texture with a different group of the musicians the week after it had originally been conceived (this workshop can be heard in audio example 48). Some members of the group had been present the previous week, such as the two keyboard players, but the trumpet player and violinist were new additions to the ensemble and so required more attention in creating a suitable addition to the texture<sup>3</sup>.

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<sup>3</sup>This diagram is not representative of the final session which produced the recording included in this portfolio, but rather was undertaken in preparation for the recording; for this reason some of the instrumen-



**Figure 4.3:** A flowchart of idea development through displacement in body percussion warm-up exercise (see audio example 46).



**Figure 4.4:** A flowchart of the development of the opening texture from the piece 'Flying' (see audio example 47)

As can be seen in Figure 4.5, the trumpeter was already an accomplished and expressive young musician, as shown by his quick responses to the tasks set. However, his highly developed sense of harmony led him to naturally gravitate towards consonant pitch choices, and so the instruction for him to shift chromatically between two pitches arguably displaced him into an exploration of harmonic tension within the other emergent texture (see 3'30" in audio example 48).

Also of interest in this session, and in the final recording of this piece, is the keyboard player's exploration of a high drone which shifts microtonally. As shown in Figure 4.5, this was reached through a transformation from a single repeated note to a 'shivery' trill, which the performer was then asked to condense onto just one note; his response was the piercing undulating glissandi which sit atop the texture of the final recording (see 0'30" in audio example 48).

The violinist was the oldest member of the group and accordingly had a highly developed personal approach to his instrument, so it is perhaps unsurprising that he required the most intricate process of creative displacement in this session; this involved a number of different methods, including physical limitations like 'on the bridge' and open-ended problems such as 'how high can you get?' (see 1'00" onwards in audio example 48).

It emerged across the course of this creative work that he found strange the idea of playing anything other than 'musically' - with pure tone and vibrato. In a later task, involving the creation of music to accompany the death of the character Piggy, he was asked to play as 'nastily' as possible, to which he responded with a loud low pitch (see audio example 49). Through subsequent physical displacements with his approach to the instrument, however, he began to explore rough scratching tones resulting from excessive bow pressure, a technique he would use again in the subsequent 'International Project' piece based on Aboriginal music. This arguably illustrates a deterritorialisation of his approach to bowing, and a subsequent reterritorialisation in which variations of tone and bow pressure have become a viable direction for exploration.

Other interesting examples of what could be called a 'displaced' creative exploration include the trumpeter's evocation of animal sounds through the use of a plunger mute in the chaotic closing moments of 'Hunting' (see audio example 50), and the percussionist's use of a plastic Vuvuzela horn to emulate the sound of breathing in 'The Death of Simon'. These effects were achieved through similar processes of collaborative creation and negotiation to those outlined in Figures 4.4 and 4.5.

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tation is different on the recording to what is represented here, due to the aforementioned inconsistency of the group's personnel

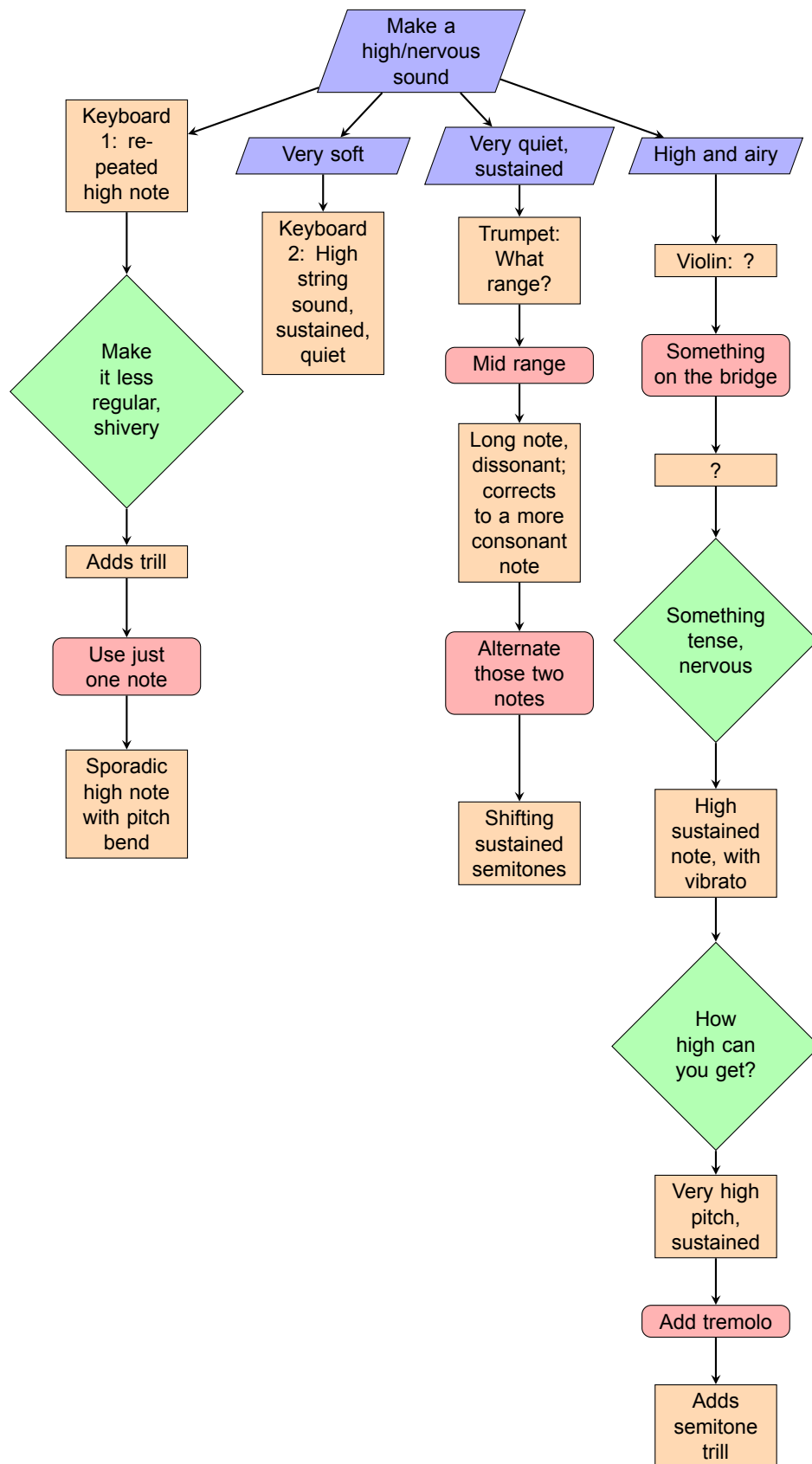


Figure 4.5: A flowchart of the reimagining of the opening texture from the piece 'Flying'

The creation of structures for these pieces followed a similar process of negotiation. In some cases the structures were inferred from the initial ideas of the piece itself, for example 'Flying' is based on a flying plane which encounters a problem and subsequently crashes. From this a three-part structure was inferred, of which the texture created in Figure 4.5 forms the first part; similar processes led to the creation of the subsequent two parts, invoking a lightening strike (this was derived from the question 'what might happen to the plane?', as shown at 5'30" in audio example 47) and the final descent and impact of the plane.

In other cases, structures were created based on knowledge of events from the story itself. For example, the chaotic ending of 'Hunting' was inspired by a scene from the novel in which a hunt ends with the discovery of a den of wild pigs; this led to the creation of a two-part structure, in which the repetitious rhythmic groove of the 'hunt' is broken by chaotic animal-style noises and hammering drums. However, this was again reached through a process of open-ended questioning, which in this case was 'what might follow the hunting or tracking of something through the jungle?' (as shown in audio example 51, from 15'30" onwards).

The 'International Project' was a subsequent workshop process culminating in the creation of five pieces, each taking inspiration from the traditional music of a particular country: Australia (Aboriginal), America, China, Mexico and Nigeria.

The three-stage process of displacement as outlined above was used to generate the very starting point of the project itself, with the primary limitation being the need to create a suite of several pieces connected by a theme; within this frame the idea of pieces about different countries was suggested by one of the musicians, and this dictated the structure for the ensuing work. This again demonstrates the importance of leadership in the transfer and management of responsibilities and creative displacements: through the imposition of a starting frame by the leader, even one as loose as the need to create a suite of pieces, the participants are free to explore the creative potential within that, with the leader retaining responsibility for deciding the best creative direction to pursue.

The musicians also chose the countries which would become the inspiration for the pieces in the suite, although within this the author was able to choose which elements of each musical culture to present to the participants as stimuli (in the form of recorded examples), enabling a further level of displacement within the process. For example, when America was chosen as the basis for a piece, the musical examples presented back to the musicians were the second movement of Steve Reich's 'New York Counterpoint', 'Gun Street Girl' by Tom Waits and 'Superbad' by James Brown; these were

deliberately chosen so as to immediately subvert preconceived notions of popular styles from America, and instead focus on less familiar examples that might provide a greater scope for exploration.

A further level of conceptual displacement was added by a focus on not only the pitch or rhythmic aspects of these examples, but also on their more metaphoric qualities such as timbre and emotion. In this way, examples of Chinese traditional music generated the metaphoric starting points for a new piece that would be 'peaceful' and 'natural' (see audio example 52, around 6'30"), whilst illustrations from Mexican folk music led to a 'lively' and 'positive' composition (as shown in audio example 53). The flowchart in Figure 4.6 illustrates how metaphoric associations were key to the creative process of the piece 'America', and this can also be heard in the workshop recording in audio example 54.

Also of importance was the identification of significant formal and structural aspects in the musical examples, such as the use of repetition, drones and space. For example, in the piece 'Nigeria', call and response was identified as being an important element of the Yoruban drumming and 'Highlife' examples that were considered, and so were incorporated alongside cyclic plucked and strummed patterns influenced by the sound of Fela Kuti (see audio example 55, particularly the rhythmic grooves starting at 3'15" and 17'00", and the development of call and response from 30'00" onwards). Similarly the use of space in a piece of traditional Chinese music inspired the spacious pointillism of the textures in 'China', which was in fact generated by a rule that only one person could play at a time (similar to John Stevens' workshop exercise 'Click Piece' (Stevens, Doyle, and Crooke, 2007, p. 63)). Particularly striking was the low droning dissonances of 'Australia', recalling La Monte Young in its complex microtonality; due to the process by which this was reached, however, this apparently experimental sound-world was not formed abstractly but was instead the logical outcome of a meaningful creative process, one which, although directed by the leader, was driven by the creativity of the participants (this process can be heard in audio example 56). Figure 4.6 shows the use of such formal elements within the compositional process, through the identification of 'improvised solos' as being a key structural component in the music which was heard.

The structure of the pieces was frequently determined by the identification of such important characteristic traits. For example, in the musical examples that were given consideration when creating 'Australia', the drones of the didgeridoo were found to be contrasted by high-pitched percussive clicks (see audio example 56, 1'45"); when the question was asked as to how these could be combined with the previous drone (now being played by the trumpet and violin), the trumpet player suggested that the guitarist

could introduce them over the top of the texture as the trumpet shifted to higher-pitched material (around 18'20"). From this starting point, the possibility of all players joining in the tapping was subsequently explored, and in this way the middle section of the piece was established (around 20'00").

In addition to the process outlined above, often new structural elements would emerge unexpectedly in performance. For example, continuing the example of 'Australia', from within the aforementioned 'tapping' texture there emerged a brief improvised moment of intertwining dissonant high pitches between the guitar and the author on keyboard (25'15"). This was then chosen to be developed as a new section of the piece, which extended to include a violin solo (29'40"); during the editing of the recordings, this texture was inserted to become the third of the piece's four parts.

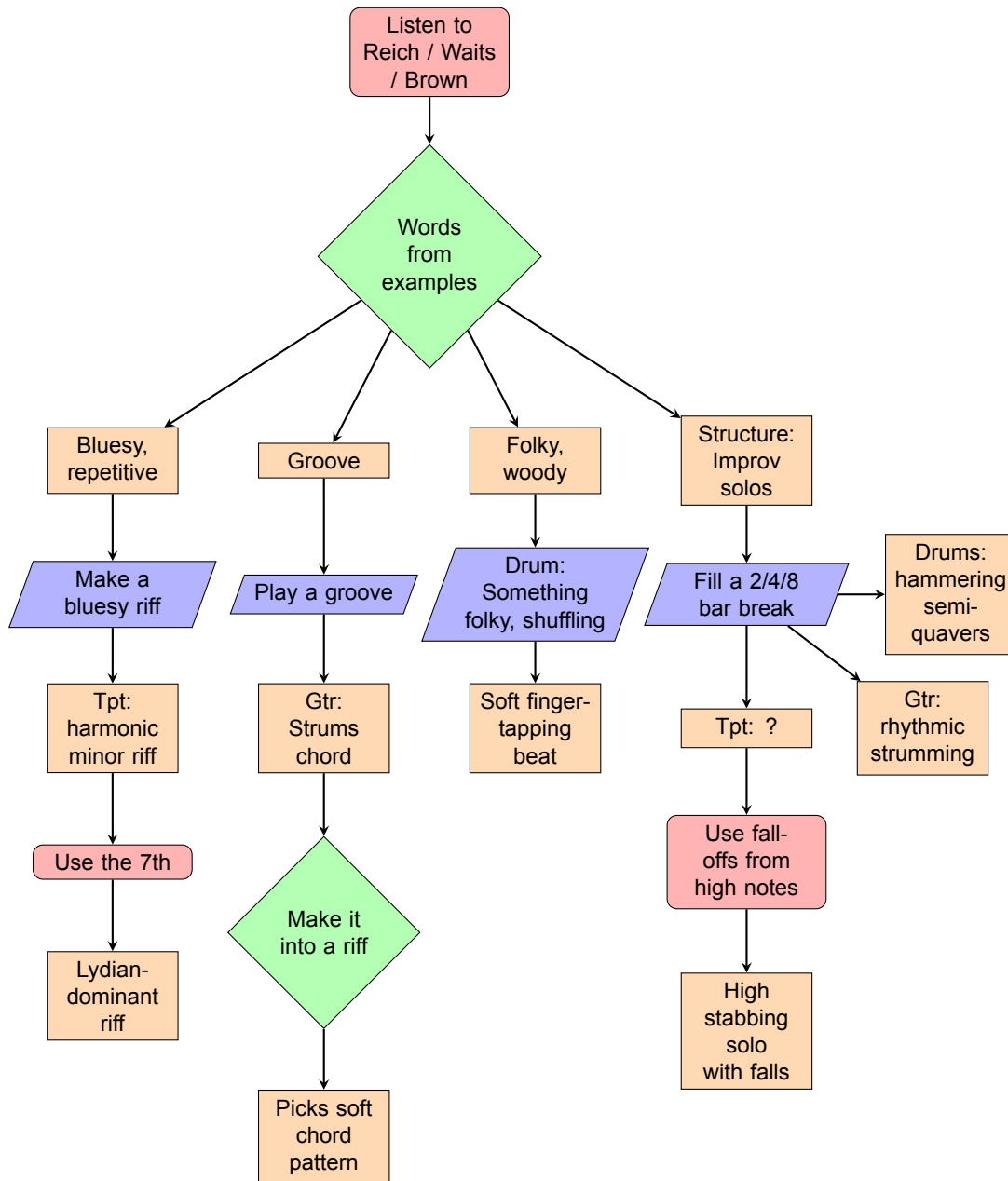
As these examples show, the importance of metaphoric and formal characteristics as starting points in the creation of these pieces illustrates a desire to provoke a displaced musical exploration, resulting from an evocation of the culture in question rather than simply a mimicry of it. This distinction can perhaps be better understood as another parallel with the Deleuzian 'figurative' and 'figural', or Wiegold's 'do this' and 'do something like this': mimicry is restrictive in as much as it implies a simple copying of another musical output, whereas evocation allows for a potentially deterritorialising exploration away from this 'hypothetical unison'.

This is not to say that there are no examples of mimicry present in the recordings, for example the trumpet's pedal notes in 'Australia' are a direct imitation of the didgeridoo. However, such examples can also lead to a displacing exploration, as the mimicry itself requires a different approach to the instrument; this is the case with the trumpeter's ensuing pedal notes in this recording, which arguably represent a deterritorialisation of his technique, rendered 'figural' by its connection to the original sound of the didgeridoo.

Another noteworthy aspect of these pieces is that the author was active as a participant on the piano; this allowed for yet another level of displacement, one in which a particularly unusual harmonic or timbral effect can be introduced in order to move an ongoing texture or groove in a particular direction.

A notable example of this can be found in the middle section of the recording of 'Mexico', in which, following a violin solo, the author introduced a new chord sequence based on a phrygian mode. In response to this the violin finds a high drone and begins to trill sporadically onto a higher harmonic, whilst the trumpet reintroduces a broader solo style, leading the whole group into an unplanned emergent texture. It is particularly interesting to consider that the violinist who is freely exploring unusual timbral techniques in this example is the same musician from the earlier 'Lord of the Flies' project,





**Figure 4.6:** A flowchart of the creation of some of the elements from the piece 'America' (see audio example 54)

in which he required significant displacing limitations in order to begin experimenting with variations of bowing pressure.

This example signifies a return to the theories explored in the Chapter 2 of this thesis: the idea that improvising musicians act as a self-organising system which adapts itself to novel creative influxes. However, as was demonstrated in that chapter, this can only be the case when musicians are brought close to a 'Body without Organs' state of exploration within unfamiliar limitations. Therefore, the progression of the textures in 'Mexico', in which the shift in piano harmonies triggers a change in texture in the whole group, suggests an effective level of displacement might be at work, allowing the emergence and exploration of an entirely new metaphoric 'hypothetical unison' (or 'attractor' in systemic terms) around which the musicians can organise themselves.

A final point should be made regarding the role of editing in the production of these recordings. The case of 'Mexico', as described above, is an example of a piece in which very little editing of the live recording was necessary, since the performance of the piece at the time of recording had a well formed structure. As was mentioned earlier, 'Australia' presents an example where a new addition to the structure was recorded later in the same session and edited in subsequently. However, in the final recordings of pieces such as 'America' and 'Nigeria' editing played a much larger role in realising the structure of the piece, with opposing textures and ideas not finding a coherent structure during the short period of the recording session itself. In such cases, however, the collaborative process was extended by reviewing the editing of the piece the following week in the company of the performers; in this way, displacing questions could still be posed retrospectively, such as whether the piece was too short or long, or whether it sufficiently captured various aspects of the culture in question, and what might be done to rectify any shortcomings.

#### **4.4 Conclusion**

Whilst the previous chapters of this thesis examined the necessity for difference in the displacement of group interaction (through interference with self-organising systems), and the individual creative process (through the Deleuzian concept of deterritorialisation), this chapter has focused on how a leader can interact with such aesthetic novelty as it is judged, experienced and approached by the performer.

It has been suggested that through physiological factors such as 'mirror neurons', participants are naturally drawn into reflecting particular actions, and the level of simi-

larity or difference between subjects might be understood to represent a socio-culturally constructed style. Any venture outside this shared cultural 'refrain' can carry with it a risk that the performer may cause too great a tension with the 'known', thus creating an undesirable level of abstraction; decisions in this regard might also be considered as an ethical-aesthetic decision within perceived stylistic boundaries.

In this way, any conception of 'creative displacement' which seeks to direct performers toward the unfamiliar may have to present that which in the performer's mind is the 'incorrect', or at least 'less good', as a viable route for exploration. However, the difficulty of this may be alleviated somewhat by the possibility of the leader taking on the responsibility for any creative 'risk' which is felt by the performer. Following this, it could be said that the performer enters into an 'agentic state' with the authority of the leader, although, importantly, they might still seek to resolve any 'strain' felt in the unfamiliar through the forging of some degree of connection with the refrain.

In this way, therefore, it could be argued that the performer moves closer to the Body without Organs, the space in which all courses of action are equally preferable (and therefore equally likely), but, due to the necessity of subjectivity in the 'reterritorialisation' of the unfamiliar, it is never truly reached (as was discussed in Chapter 3). For even in the most extreme and unfamiliar of situations the subject does not completely transfer responsibility; rather, as has been suggested by Milgram, they seek a course of action within their 'obligations' which is closest to their own ethical-aesthetic preference.

The two educational projects at Abingdon and Rutlish schools have sought to investigate this aspect of the research, with the establishment of a three-stage system of displacements, similar to Peter Wiegold's 'Three Ways', in which the transfer of creative responsibility is managed carefully by the leader. At Abingdon School this framework was tested over a short period of time and with a large group of musicians, whilst the subsequent smaller projects at Rutlish School enabled a prolonged investigation of this approach.

Perhaps the most significant conclusion of this chapter is that the ability for a leader to negotiate creatively displacing limitations, as has been illustrated in this chapter's examples, might present potential advantages over the presentation of similar instructions through either semi-random electronic means (as with the M-Word Engine in Chapter 3) or fixed notation (as with the Mirrors of Hall Big Band in Chapter 2). One such advantage is the ability of the leader to find an understanding of the Deleuzian 'figural' or 'edge of chaos' level of novelty for each performer, and in doing so avoid both the staleness of the 'figurative' and the randomness of the 'abstract'. This process of careful negotiation and provocation has been illustrated in the flowcharts which feature throughout the lat-

ter part of the this chapter, and can also be heard in the audio recordings of workshop sessions which are included as appendices to this thesis.

This section of the research also appears to highlight the benefits that can come from a sustained long-term collaborative relationship. For example, within the Rutlish School projects it is striking to note the difference between the work for the earlier 'Lord of the Flies' pieces and the later 'International Project' suite: the latter came at the culmination of a year's work, during which a collaborative relationship had been established and, as illustrated by the aforementioned example of the violinist, a level of trust had been established in the displacement process and in the leader, arguably enabling a creative exploration that was relaxed yet engaged. A comparison of Figures 4.4 and 4.5 with Figure 4.6 also highlight this change in practice, with the creative process in the latter being noticeably more compact and efficient.

Again, this development of a creative relationship over a long period of time presents a very different perspective on creative displacements in comparison to the projects described in the previous chapters of this thesis. For example, as has been written previously, the M-Word Engine is designed to appear novel with each performative encounter, and it would compromise its essential randomness were it to have any knowledge of who is using it. In the case of the Mirrors of Hall big band it was often the case that logistical issues would restrict the frequency with which the same fifteen musicians could be assembled, but this in turn lent the pieces a 'nomadism' of interpretation within the complexities of the fixed materials.

But, as has been shown in this chapter, the benefits from establishing a strong working relationship within a group of musicians can be significant; this is in part because the performers' personal 'Refrains' can become more intricately understood, but also because an environment of exploration can be established as a performer's trust in the process increases. This can lead to a level of mutual freedom for both leader and performer which is highly productive.

# CHAPTER 5

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## Conclusion

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We take away from the actor that which shuts him off, but we do not teach him how to create.

Jerzy Grotowski, 'Towards a Poor Theatre' (1976, p.97)

### 5.1 Summary

This research has been concerned with investigating potential meeting points between improvisation and composition. Such meeting points have been evaluated alongside a consideration of 'freedom' in improvised music, for which a frame was provided by George Lewis's concepts of the 'Afrological' (placing emphasis on expression of the 'self') and 'Eurological' (in which the 'self' is explicitly avoided). In the opening chapter of this thesis it was suggested that a model for the reconciliation of these two extremes might be found in the 'backings' of jazz big band music: as a composed element (external to the 'self') which might change an improviser's environment in unforeseen ways, and thus require them to explore novel expressive approaches.

The ability of a composer to influence the creativity of an improviser in this way has been discussed throughout the research as 'creative displacement', following Adorno's description of 'perspectives...that displace and estrange the world' (Adorno (1951), quoted in Smith (2010, p. 126)); this concept has become the core issue of this thesis, and is

at the centre of all subsequent considerations.

Three different approaches to 'creative displacement' have been investigated: through fixed notation, through electronic real-time notation, and through leadership in a collaborative workshop setting. In each case compositional experiments were undertaken and documented, detailing the different methods used in the creation and realisation of the pieces included in the accompanying portfolio.

In Chapter 2 the concept of 'creative displacement' was considered through a comparison with 'self-organisation' within complex systems, as theorised by writers such as David Borgo. The 'Mirrors of Hall' big band was formed to test the idea that freely improvising performers might self-organise in response to effectively displacing 'backings'; however, early rehearsals of pieces such as 'Tribute to John Barry' and 'The Number of the Beats' demonstrated this generally not to be the case, with improvisers often appearing to resort to familiar responses when presented with such 'freedom'.

In response to this, limitations to action were written into the notation for the same pieces, thus reducing the dimensions of the improvisers' 'phase space' and forcing the appraisal of creative 'attractors' within potentially unfamiliar terms. As was shown in later examples, the performers of the big band showed a greater degree of exploration within these displacing frameworks, leading to an increasing sense of an 'edge-of-chaos' re-organisation taking place around the written materials.

These displacing frames were found to be particularly effective in 'Tear Gas', the most stylistically abstract of the three early pieces composed for the band; this indicates that the style of the composed material might also be considered a 'displacing' factor. In light of this, and the aforementioned notational developments, a further suite of pieces was composed to continue testing these concepts. The four pieces that make up 'The Calcium in their Bones' featured a much darker sound-world and tighter notational displacements than in previous pieces, and were judged to be more effectively 'displacing' in performance because of this.

Chapter 3 was based on the creation of the M-Word Engine: a real-time score generator, which creates indeterminate improvisational frames within a fixed precomposed structure of pitch, register and textural changes. Within this, 'creative displacements' were considered through the philosophical concepts of Gilles Deleuze and Felix Guattari, particularly in relation to how such notational displacements as described in Chapter 2 might be prevented from becoming familiar with repetition (what Deleuze calls 'reterritorialising'). For a performer to continue to inhabit a state of creative exploration requires what Deleuze and Guattari define as 'nomadism', a continual movement away from the known.

Inspired by Stockhausen's 'process' pieces, in particular the use of radios in 'Kurzwellen' and 'Spiral', the M-Word Engine explored the concept of 'nomadism' through semi-random notation which could include displacing limitations on pitch and register, as well as indications to interact in different ways with other performers. In addition, the inclusion of words generated from an in-built thesaurus added to the notation a potentially displacing metaphoric frame, which was of key importance in achieving what Deleuze terms the 'figural': that which is only partly known or in the process of becoming something new, as opposed to the entirely new 'abstract' or the known 'figurative'.

Early tests of this system highlighted the most successfully displacing forms of notation available from the system, but also revealed the potential arbitrariness that some performers perceive in response to such electronic randomisation; this was subsequently alleviated through the implementation of greater performer interactivity with the engine, such as the requesting of a new instruction rather than simply being presented with one. In addition, the development of an 'electronic improviser' allowed for the testing of different compositional structures prior to performance, and led to the creation of complex piece structures such as 'Piece 15' and 'Three Lorenz Perspectives'.

Even this level of continuous unpredictability can become familiar, however, with performers potentially becoming accustomed to the nature of the displacements they are presented with and 'reterritorialising on deterritorialisation itself' (Deleuze and Guattari, 2004, p. 381). As the M-Word Engine cannot interpret the difference or novelty that might ensue from a successfully displacing compositional interjection, it therefore is not able to subvert such 'reterritorialisation'.

In light of this, the fourth chapter of this thesis examined how a composer as leader might be able to implement and manage creative displacements with an awareness of individual and cultural 'Refrains'. A framework for such an understanding was first established through an exploration of the human perception of aesthetic or cultural difference, including the notion of movement around an ambiguous 'hypothetical unison' grounded in metaphor. Following this was a consideration of how creative decisions might be advised by a sense of risk from exploring such displaced novelty, and how responsibility can be transferred onto an external agent such as a leader.

Inspired by practitioners such as Miles Davis and Peter Wiegold, the ensuing work in educational projects demonstrated the advantages of applying and managing a process of creative displacement as a leader. A three-step workshop process was suggested, with a metaphor-based ambiguity at its centre but retaining the option of tighter or looser frames according to the situation; this framework enables a composer as leader to negotiate the 'deterritorialisation' of performers on an individual basis, leading to the creation

of complex and innovative pieces within a meaningful collaborative environment. The process was developed through projects at Abgindon School, where an orchestral piece was collaboratively created over several weeks, and at the Rutlish School, where, over the course of an academic year, two suites of short pieces were created. In both cases, under the responsibility and provocation of the leader, the performers in the workshop process could themselves create new networks of creative displacements to explore.

## 5.2 Freedom and Constraint

Through the composition and realisation of the pieces and processes summarised above, this research has demonstrated the creative potential inherent in investigating the meeting points between the 'composed', which is to say external constraints on a performer's actions, and the 'improvised', a performer's personal expression within those constraints. Such constraints, if they direct a performer towards exploring novel modes of expression, can be called 'creative displacements'.

These would seem to necessarily originate somewhere external to the performer, assuming that an internally generated constraint is, to return to the earlier quote from Adorno, 'marked... by the same distortion and indigence it seeks to escape' (Adorno (1951), quoted in Smith (2010, p. 126)). By this logic, therefore, it could be argued that the finding of an exploratory 'freedom' within improvisation necessitates an external displacement, be it composed or environmental; this viewpoint is supported by the findings of the early rehearsals of the Mirrors of Hall big band, in which 'open' improvisation, free from any constraint, resulted in reversions to personal and stylistic 'Refrains'.

Such an approach represents a fulfilment of the desire to reconcile Lewis's 'Afrological' and 'Eurological'. The external constraint embodies the Eurological in as much as it is completely removed from the desires of the performer; however, the performer's expression from within those constraints is imbued with Afrological will and intention. A composer concerned with 'creative displacement' must therefore seek to establish constraints within which a performer will not have preformed expressive intentions, and is instead 'free' to explore novel solutions.

Therefore, it can be argued that displaced 'freedom' is to be found not only in the task but also in its execution within novel and unpredictable parameters. Personal and cultural preferences or experiences on the part of an individual provide most of the rules for executing an action, until, that is, the parameters for its execution are distorted by external factors: this is when, under the right circumstances, a 'figural' explorative



creativity can take over.

Montuori's comparison between playing football on grass and playing on a beach is a good example:

The conditions lead us to modify our game, to deal with unforeseen elements, with the complexity and uncertainty of a new and different environment. We begin to improvise. We explore the constraints created by the new conditions, but also the possibilities they offer. A breakdown in our normal way of practicing the game of football has elicited a renewed challenge to our capacities. It is inviting us to draw on our ability to go beyond the already known, and explore the possibilities of the present. (Montuori, 2003, p. 240)

The compositions created for this research are therefore best viewed in this way: as seeking to create new expressive areas for improvisational exploration, advised by an understanding of notation and leadership as the implementation of creatively displacing constraints.

### **5.3 The 'Completeness' of Notation**

It is significant to note in this thesis a blurring of terminological boundaries between notation and 'constraint': arguably, all written constraints are a form of notation, and vice versa. Therefore, all musical notation can perhaps be viewed in terms of the Afro and Eurological: as expressive freedom within externally imposed limitations.

The discussion on 'incompleteness' of instruction in Chapter 4 also becomes relevant in this consideration, leading to the question as to whether any notation or constraint can be fully 'complete' (in that it could be simply executed without any freedom for personal expression). The findings of this research suggest that such an instruction would not be possible for a human performer, due to the potential for the exploration of an ambiguous 'metaphoric unison' within any musical task.

For example, in Chapter 2 the concept was introduced of reducing the dimensions of a performer's decisional 'phase space' by increasing the specificity of an instruction. By doing so, the performer in question has to find new dimensions in which to locate an interpretive 'attractor'; if commonly notated parameters such as pitch, duration and register are specified then this may instead be sought in the ambiguous zone of metaphor, leading to the possibility of a shared 'metaphoric unison', as discussed in Section 4.1.2. Due to metaphor's innate uncertainty it cannot be specified exactly through linguistic or

notational constraint, and so remains a point of indeterminacy at the root of expressive decision-making when other factors have been constrained. This is particularly noticeable in the tighter notational constraints of the 'The Calcium in their Bones', where, in certain examples, performers demonstrated a creative vibrancy within the boundaries of only a single note or instrumental technique.

In this way, it could be argued that notation can be viewed as existing on a scale of indeterminacy, in which even the strictest limitations retain a fundamental space for personal expression. The invocation of novel metaphoric unisons might then expand the expressive potential of written dynamics, articulations or techniques for the performers, and in turn imbue a composition with a nomadism of expressivity; accordingly, performers and leaders can be considered as engaging in a significant creative collaboration with a composer rather than simply enacting a performance. Certainly in Chapters 2 and 4 there would appear to be a blurring of the boundaries between composer and leader, and between the roles of creating notational displacements and provoking further 'interpretational' displacement within them (which is, in turn, vital for retaining the 'nomadism' of the originally displacing notation). Displacement as a concept, therefore, might be as valuable for conductors and music leaders in stimulating interpretive exploration as it is for composers in the manipulation of notational indeterminacy.

## **5.4 Displacements across Age Groups and Settings**

One of the most striking findings of this research is the value of applying a similar concept of creative displacement to either an ensemble of adult professional musicians or a band of young beginners. For performers of all levels of experience, displacements must seek to provoke exploration of the unknown, be it through subverting conventional practices or encouraging the exploration of new ones.

The process of application is similar in all cases: just as notational and metaphoric limitations helped to push the seasoned performers of the Mirrors of Hall big band into exploration of new expressive territories, so physical and metaphoric displacements gave structure to the creation of collaborative pieces in the Rutlish School educational workshops. In both cases the compositional intention is towards helping the performers be more explorative in their musical responses, whilst retaining the communication of meaning and a feeling of performer ownership in the process. In addition, this perspective allows composers to approach all settings with the same expressive ambition, given that the flexibility of negotiated displacements allows for the creation of meaningful

routes to the most complex musical results.

The findings of this research, particularly as detailed in Chapter 4, suggest that an understanding of the Deleuzian 'figural' would seem to be valuable in the appropriate use of any displacing limitations, given that their effectiveness depends on a careful balance between specificity and abstraction. Chapter 3, and the pieces performed with the M-Word Engine, highlights not only the potential for a provocative nomadism by technological means, but also the danger of perceived arbitrariness in the semi-random nature of such instructions. It can be suggested, therefore, that the role of the leader is an important one in effectively implementing this process, given that such a 'figural' balance might be advised by knowledge of the performers and the performance environment itself, as well as of other situational factors in the music's realisation (as was shown by the projects in Chapter 4). Whilst technology has an important place in providing randomness and unpredictability, and fixed notation enables the consistent implementation of complex musical information, to successfully judge and adapt a creative displacement requires a level of interpersonal communicational skill that these other mediums would seem to lack.

## 5.5 Degrees of 'Nomadism'

It is also interesting to note how the projects in this research have been distinguished by the point at which a piece becomes fixed, which is to say repeatable in terms of form and content, also perhaps definable as its degree of Deleuzian 'nomadism'. In light of the conclusions above, it can perhaps be correct to state that, just as no improvisation can be completely 'free', no composition is entirely fixed; neither extreme can escape the influence of subjectivity. However, it may be desirable for aspects of the performance which begin as unfixed to become more predictable in preparation for performance.

The pieces for the Mirrors of Hall big band were the most fixed, relying on mainly scored materials and precomposed displacing limitations. However, the interactive nature of the 'extended rhythm section' approach allows for a degree of unpredictability between each performance, as can be heard in the different recordings of the pieces which accompany this thesis.

In opposition, the M-Word Engine was designed specifically to be as unrepeatable as possible so as to maximise the 'nomadism' of the displacements, even within a fixed underlying structure. Paradoxically, however, the nature of this system could become familiar to the performers who used it, as was discussed in the conclusion of Chap-

ter 3, and so even though the musical content was not fixed, a familiar approach to the displacements could emerge through repetition.

Between these two extremes sit the educational projects, in which the leader has the power to control the extent to which elements are fixed and open throughout the workshop process. In the examples discussed in Chapter 4, a pattern emerged in which materials were gradually fixed through a negotiation of displacements managed by the leader, culminating in a more repeatable composition. However, the leader retains the power to destabilise any particular compositional fixity through the application of further displacements to particular performers; this allows for an appropriate level of 'nomadism' in rehearsal and performance.

## 5.6 Future Work

The research undertaken in this thesis has highlighted the potential for work which seeks to combine uses of technology with leadership. As mobile technology becomes increasingly prevalent in educational settings, it should be the case that composers and music-leaders utilise these developments to explore sophisticated interactive musical experiences; an understanding of creative displacements will be of prime importance in this work if it is to meaningfully seek to enhance the creativity of participants.

Similarly, such work could extend to professional sectors of music-making; the live interaction of the M-Word Engine has demonstrated the potential for smart-phone technology to provide performers with a personalised and adaptable interface with a leader or real-time score system. This allows for the live collation and processing of data which might influence the direction of an ongoing piece, or could feedback information to a leader for consideration in the planning of future actions.

Creative leaders may also require displacement themselves in order to transcend the development of their own personal aesthetic habits, and future work might explore this through the application of semi-random technological processes. The thesaurus function which was used in the construction of the M-Word Engine is just one way in which leaders could provide themselves with an unpredictable influx of potentially displacing information, with others including manipulation of information drawn from the performance environment, from the sonic attributes of performer responses, or from

indeterminate sources on the internet.

## 5.7 Final Thoughts

'My freedom consists in my moving about within the narrow frame that I have assigned myself for each one of my undertakings. I shall go even further: my freedom will be so much the greater and more meaningful the more narrowly I limit my field of action and the more I surround myself with obstacles.'

Stravinsky, quoted in Cross (2003, p. 152)

The fact that this research, which sought to investigate the stimulation of improvisational creativity through composition, has found that carefully judged limitation is the most effective approach to achieving 'displacement', is highly significant and has far reaching implications. Borgo's assertion that free jazz has 'a huge number of degrees of freedom' in comparison to other musics (see page 43) seems questionable given these findings. Instead, it should be considered that all manner of musical action, regardless of stylistic, cultural or personal convention, has the potential for engaged creative exploration; such conventions are, after all, emergent limitations, and potentially displacing in their own right.

This perspective might entail a redefinition of the commonly understood relationships between composer, leader and performer ('improvising' or otherwise). For example, traditional notions of the composer providing fixed musical instructions for enactment by a conductor or performer are complicated by such concepts as notational 'incompleteness' and the 'metaphoric unison'. Equally, entrenched views regarding the discordances between improvisation and composition, such as those expressed in the introduction to this thesis by Boulez and Prévost, are challenged by the semantic blurring of 'improvisation' and 'interpretation'.

Instead, the work of composers can be seen by improvisers as equivalent to another set of external limitations, which, if carefully managed by the composer, can evolve into a richly engaging interactive process of stimulation and counter-provocation, directing all parties towards a meaningful creative exploration.

For composers, adopting this viewpoint, in which the creation of new music is seen in terms of establishing novel frames for creativity, has the potential to be hugely liberating. In this way, all kinds of notation can exist on the same spectrum of limitation and freedom; performers, rather than simply serving to recreate a fixed piece, can be seen

as conduits of an irrepressible creativity, and compositions become vibrant multiplicities of combined expression. The challenge to composers, therefore, is to establish and manage routes for this creative force, channelling it into new formations and, perhaps, towards the rarified space of 'freedom'.

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*But I have a far more sophisticated, even metaphysical, approach to dam-building now. I realise that you can never really win against the water; it will always triumph in the end, seeping and soaking and building up and undermining and overflowing. All you can really do is construct something that will divert it or block its way for a while; persuade it to do something it doesn't really want to do. The pleasure comes from the elegance of the compromise you strike between where the water wants to go (guided by gravity and the medium it's moving over) and what you want to do with it.*

The Wasp Factory, Iain Banks (1984, p. 24-25)

# Appendices



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## The Construction of The M-Word Engine

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### A.1 The User Interface

The system was built in the MAX-MSP environment<sup>1</sup> and has undergone various iterations throughout its development. A description will be given here of the most recent build of the system, whilst making reference to previous versions to highlight any issues that were encountered.

The M-Word Engine can accommodate up to nine performers, of which any number can be either human or electronically synthesised. The user is first presented with an interface (Figure A.1) containing nine identical 'Instruction Units'; it is in these the information for each performer is entered, such as name, whether they are to be computerised or human, any transposition their instrument requires, and if the instrument is unpitched. For human performers there is also a menu for selecting the audio input channel they are connected to, and a textbox for entering the IP address of their instruction interface (Figure A.2). The information entered here is then relayed to subpatchers, where it will affect the output of instruction data during performance.

Lower down on the main user interface (UI) are areas for specifying the structural details of the piece that is to be performed. The first of these is a window for inputting the precise wording of instructions, along with a timeline graph of where in the piece these instructions can arise (Figure A.3). There is space for sixteen separate instruc-

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<sup>1</sup>See [www.cycling74.com](http://www.cycling74.com) for more information.

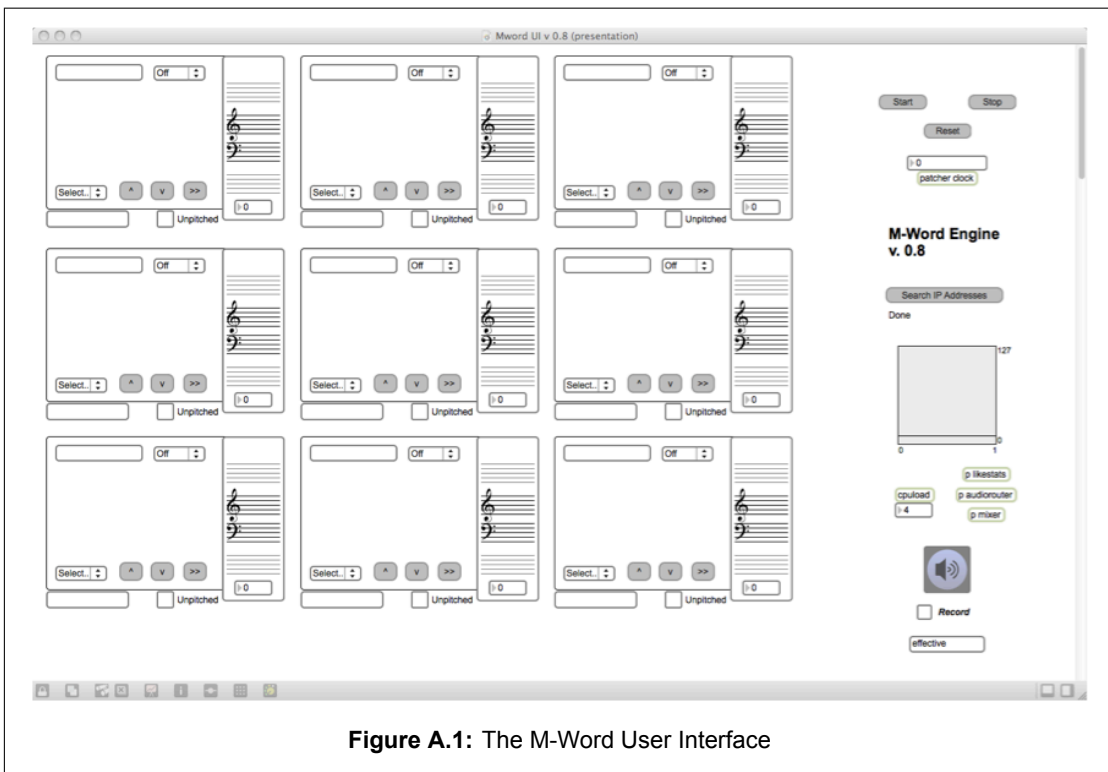


Figure A.1: The M-Word User Interface

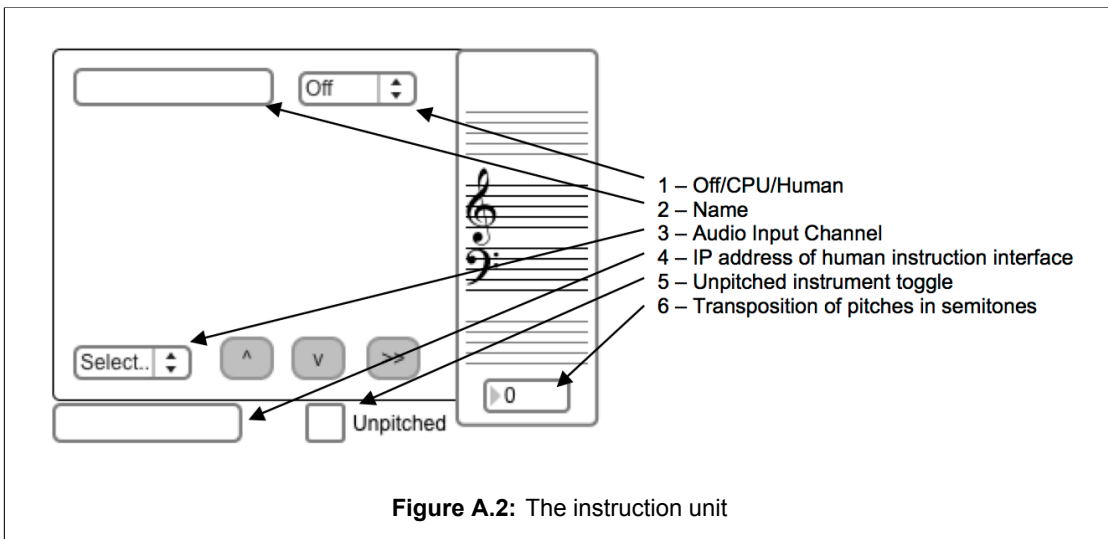


Figure A.2: The instruction unit

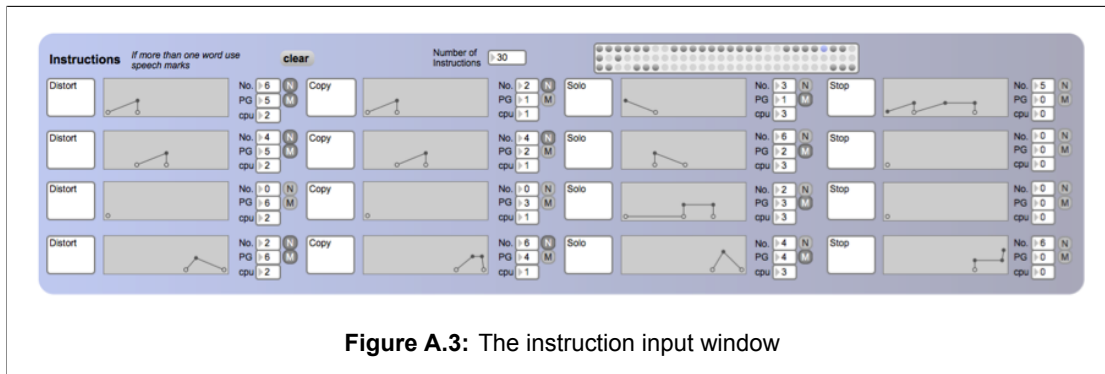


Figure A.3: The instruction input window

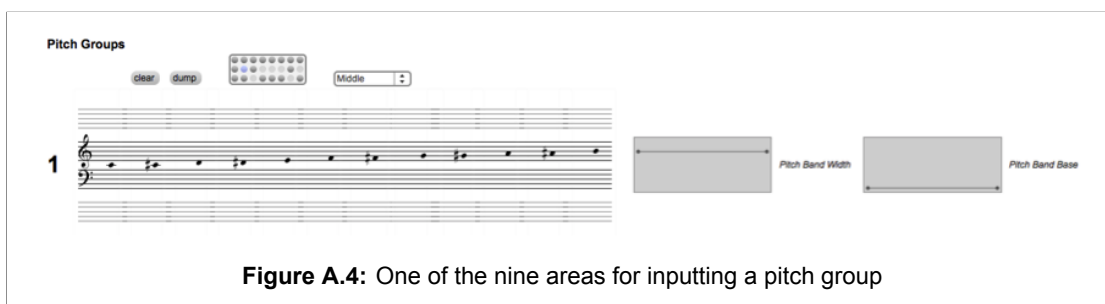


Figure A.4: One of the nine areas for inputting a pitch group

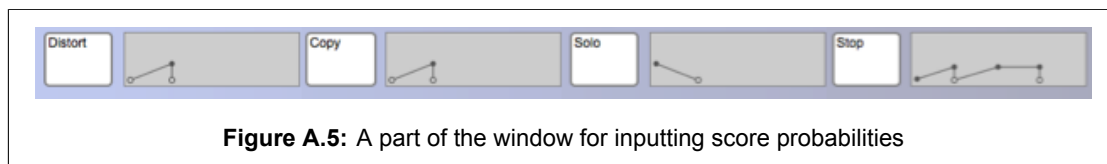
tions, with a text-box and timeline graph for each; there are also areas for dictating how many people can play the instruction at once (No.), the pitch group that is linked to the instruction (PG), the behaviour of computerised players upon receiving the instruction (CPU), and whether the instruction will be accompanied by the name of another player (N) or a randomly generated descriptive word (M). Upon entry, the information is passed into subpatchers within each of the nine Instruction Units and stored for performance.

Further below this on the User Interface are areas for inputting nine separate pitch groups of up to twelve pitches. Alongside a staff interface for entry of pitch information is a menu for specifying register (Very High, High, Middle, Low, Very Low), and two timeline graphs for dictating the width and lowest note of the pitch group across the length of the piece. For example, if there are twelve notes in the pitch group, as in Figure A.4 above, both timeline graphs will have a range of 1-12; in Figure A.4 therefore, the width of the pitch band covers all twelve pitches throughout the length of the piece, with C being the base of this band. If the base of the pitch band started at 12 on the graph, only the B would be available at that point; the width of the band is automatically narrowed in this case. In this way a variety of manipulations of the pitch band is possible, such as a series of single pitches, a small group of pitches moving through a particular scale or mode, or simply a gradually opening and closing band of up to twelve notes.

Each of the sixteen instructions can be linked to one of the nine pitch groups, allowing for a wide range of structures comprising of shifting instructions and pitch bands. The way in which this data is handled to produce a real-time score will now be explored.

## A.2 The Production of the Real-time Score

Three buttons on the user interface control the score production process: Start, Stop and Reset. When the start button is clicked a message is sent to all active Instruction Units to generate a starting instruction for each performer. At this point the information from the timeline graphs that accompany each instruction is taken into account: the lines drawn on these become indicators of the comparative probability of each instruction being chosen. For example, consider Figure A.5 below.



**Figure A.5:** A part of the window for inputting score probabilities

In this case, the instructions 'Distort' and 'Copy' are set to 0% probability of arising at the start of the piece, whilst the 'Solo' instruction is set to around 50%. When the 'Solo' command is chosen in this way the system then checks to make sure that the number of players allowed to receive this instruction at the same time is not exceeded; if it is then it looks for a different instruction, and this is why the 'Stop' command in the above example is set to just above 0% at the start (if this were set to 0% then the system would enter an infinite loop known as a 'stack overflow').

The instruction that is chosen is then tested to see if it requires a name to be added to it; this is determined by the 'N' button next to the instruction in the UI. If a name is required, it is chosen semi-randomly from a list of all the performers names that have been collated from each of the Instruction Units (the semi-random aspect of this choice is important, and is based on a table of probabilities which will be explained further ahead). At this point the main text of the instruction is complete, and it is now added to with pitch material and an optional random 'M-Word'.

Pitch material is gathered from the information provided in the User Interface and is then used to generate a pitch set of up to five notes, based on the parameters set in the 'Pitch Band Width' and 'Base' graphs in the UI. The register of the pitches, as specified in the UI, is also added here.

Finally, the instruction is tested to see if it requires a random 'M-Word' to be added to it. The 'M-Word' is a random adjective which is generated by the thesaurus function of the Wordnet 3.0 framework<sup>2</sup>. When required it can be generated in two ways: the first takes a performer's previous M-Word and generates a synonym of it in a continuous isolated loop, the second applies the same process to a single 'global' M-Word which then acts as a singular point of reference for the words each performer receives. The resulting difference is that the first process can potentially lead each performer in different metaphoric directions, whilst the second has a single 'global' word from which each performer's M-Words are generated. The instruction is now complete and is ready for display to the performer. A flow-chart outlining the process described above can be seen in Figure A.6 below.

### **A.3 The Visual Presentation of the Real-time Score**

The instructions that are generated for each performer can be displayed in one of three ways: as part of the main UI, on a smart-phone interface or on a laptop through a separate Max-MSP based interface.

#### **A.3.1 Instruction Display in the Main UI**

In the main UI instructions are displayed through the embedded instruction units for each performer, formatted as shown in Figure A.7. This is advantageous in that a non-performer can get an overview of what each of the performers is being instructed to do, including their pitch sets and M-Words. However, this display mode is limited in use for the performers themselves, as such an overview eliminates the essential unknown qualities of the interactions that make up the improvisatory system; it is therefore most useful as a kind of score overview which can be recorded for reference.

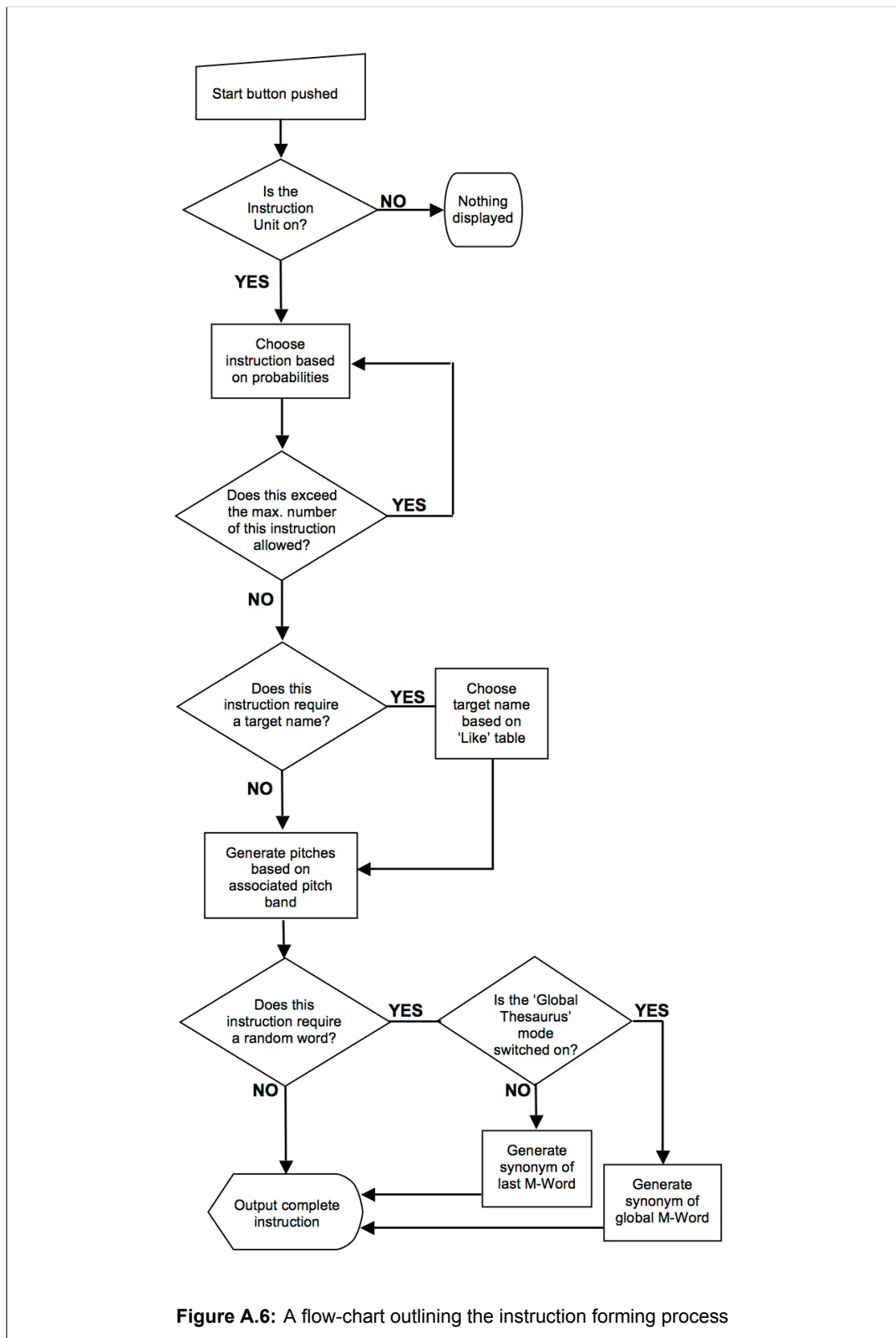
#### **A.3.2 Instruction Display on a Smart-Phone**

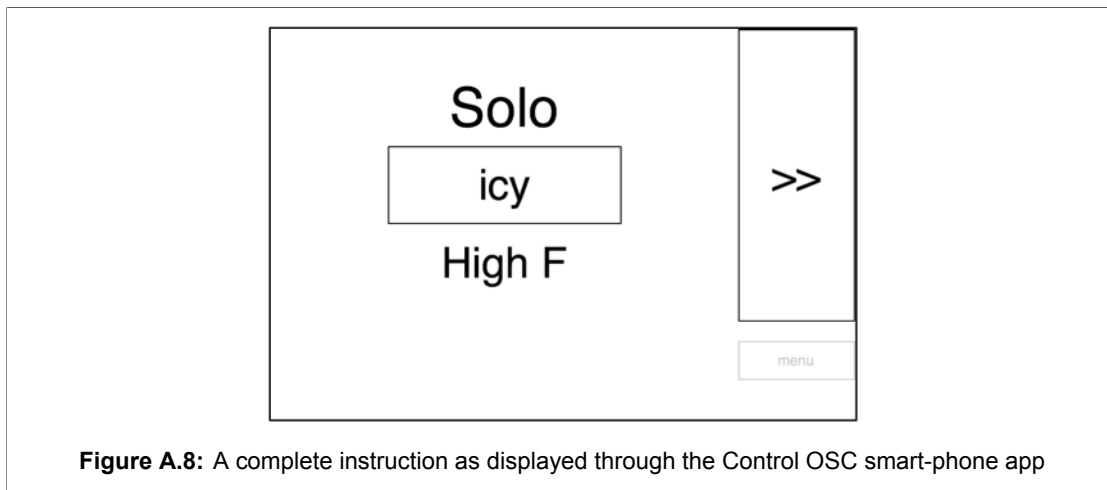
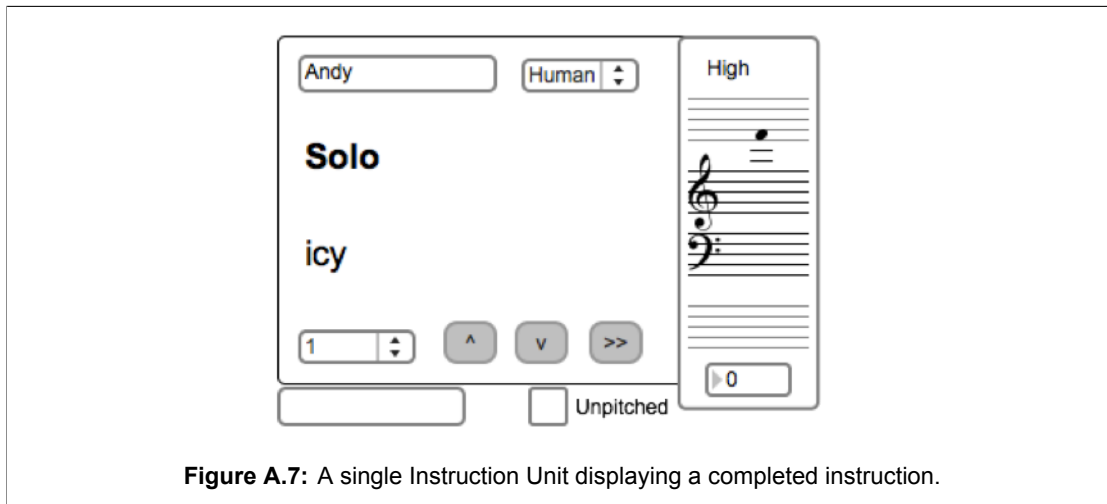
Performers can receive instructions directly to the display of an Android or Apple iOS based smart-phone via a downloadable app called 'Control OSC'<sup>3</sup>. This app enables the exchange of messages between Max-MSP and a smart-phone using a wifi connection and the Open Sound Control framework, therefore allowing the display of text

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<sup>2</sup>See <http://wordnet.princeton.edu/> for more information.

<sup>3</sup>See <http://charlie-roberts.com/Control/> for more information.

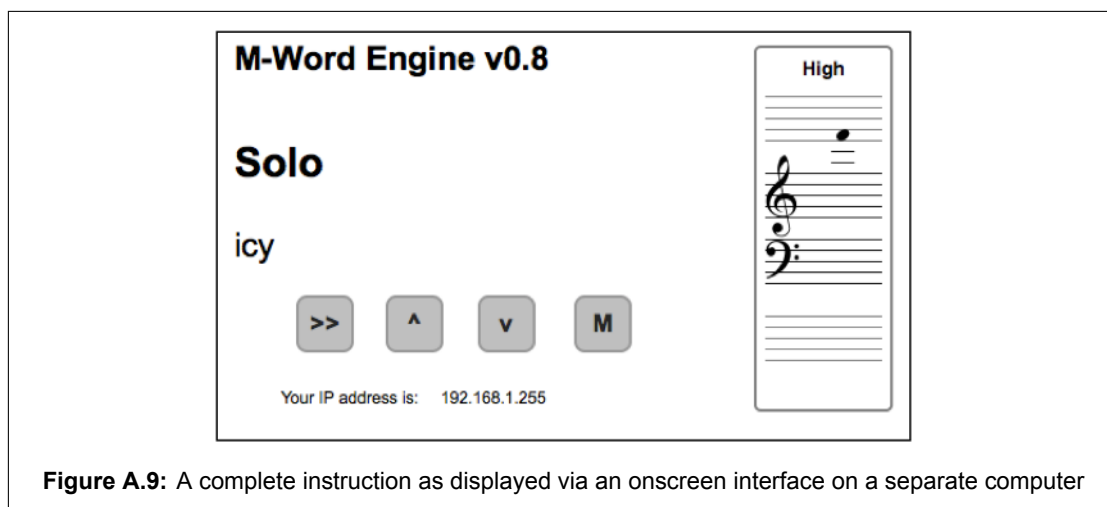




instructions to a performer in a direct and simple format, as shown in Figure A.8. The advantage of this mode of display is that each performer can only see their own individual instruction, and therefore a greater degree of listening is needed in the formation of interpersonal improvisatory relationships. The only disadvantage is the dependence on particular brand of smart-phone operating system, as the 'Control OSC' app is currently only supported by Android and Apple phones.

### A.3.3 Instruction Display on Another Computer

A final option for the displaying of instructions is on the screen of another computer, be it a laptop or desktop machine. This can be particularly advantageous for perform-



**Figure A.9:** A complete instruction as displayed via an onscreen interface on a separate computer

ers utilising laptop electronics, who can use such an interface in combination with their normal on-screen setup. This display, as shown in Figure , is communicated with via Max-MSP’s UDP framework, meaning it is also dependent on a stable wifi connection.

#### A.4 Performer Interaction with the Real-time Score

Once a performer has received their instruction and responded to it they have a number of ways in which they can interact with the system, thereby influencing the direction of the music and the future instructions they will receive.

The first and most important level of interaction with the M-Word Engine is the requirement for a performer to request their next instruction. Whereas earlier versions of the system distributed instructions based on randomised timings, the latest builds of the engine have instead opted to give the choice of when to change instruction to the performer; this means that a particularly enjoyable improvisatory moment can be savoured, or if an instruction is received that is not deemed suitable by a performer they can instantly ask for a new one (doing so repeatedly, if necessary, until an appropriate instruction arises). In all the instruction interfaces, new instructions can be requested by pushing or clicking the button marked ‘>>’.

It is worth noting at this point that it is these requests for new instructions which drive the structure of the piece forward. Each new request from a performer is logged, and the average number of requests across all performers becomes the count of a global structural ‘clock’. In Figure a small number input window can be seen labelled ‘Number of Instructions’ (in Figure it is set to 30); this number dictates the domain of all the

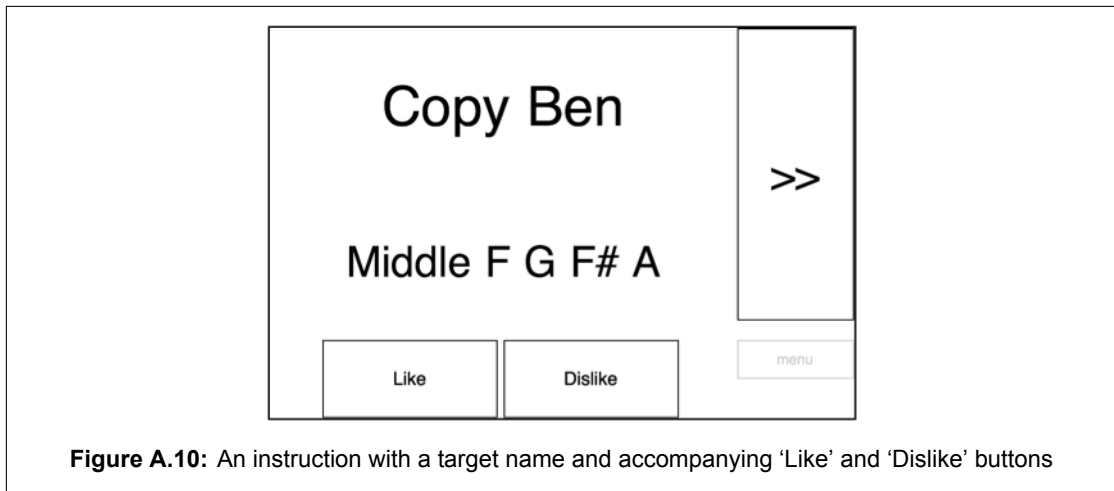


structural timeline-graphs in the UI, and the count of the global clock determines the position of the piece within that domain. Therefore, a user can set up a structure with a length of 30 instructions, but easily reduce the same structure to a length of just 10 instructions; in this way, a composer using this system has the ability to create scalable structures which can expand or condense to fit different performances. (Although since the performers ultimately control the movement through the structure, exact timings will always remain unpredictable) As a different way of presenting this, the position in a piece's structure (if 0 is the start and 1 the end) can be expressed by the following equation:

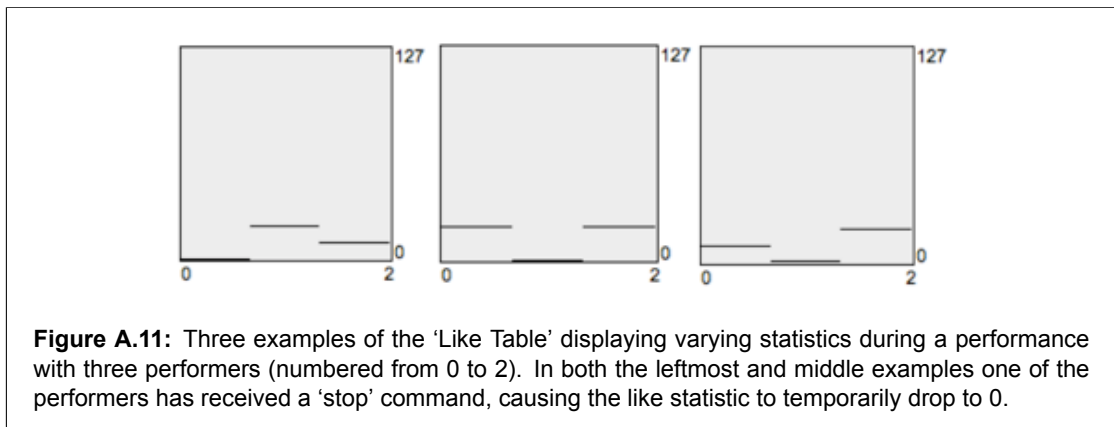
$$\text{Position in Piece Structure} = \frac{\text{Global Clock Count}}{\text{No. of Instructions}} \quad (\text{A.1})$$

Another important level of performer interaction with the M-Word Engine is the ability to request a new M-Word. As explained in the case study above, earlier versions of the system did not regulate the M-Word in any way and so resulted in obscure language being incorporated into the instructions. Subsequent to these tests, a filter has been applied to the Wordnet output which requires it to meet a basic level of linguistic familiarity. However, this still results in the output of some words which do not seem to suit the instruction or are not understood by the performer; a human leader in this situation would be able to judge the reception of such a displacing factor as inappropriate and adjust accordingly, but an unresponsive electronic system can not. For this reason, in the M-Word engine a performer has the ability to request a new word if they are presented with one that is unfamiliar or does not make sense. If using the smart-phone interface this is achieved simply by touching the M-Word itself, whereas using the computer-based interface there is a button marked 'M' for this purpose. (The main UI display does not have an option for this, as it is not intended for performer use, although it could easily be built in if required.)

The final interactive element of the M-Word Engine is the ability for performers to 'Like' or 'Dislike' the actions of another performer. This only becomes available when a performer is responding to an instruction which includes a target name; on the smart-phone interface such an instruction is accompanied by 'Like' and 'Dislike' buttons, as shown in Figure A.10. The other interfaces both feature buttons marked with up and down arrows for like and dislike respectively. Clicking on any of these buttons sends a message to a central 'Like Table' detailing the target performer in question whether they have been liked or disliked; this table, which is displayed visually in the main UI (as can be seen on the right hand side of Figure A.1), acts as a kind of scoreboard for



**Figure A.10:** An instruction with a target name and accompanying 'Like' and 'Dislike' buttons



**Figure A.11:** Three examples of the 'Like Table' displaying varying statistics during a performance with three performers (numbered from 0 to 2). In both the leftmost and middle examples one of the performers has received a 'stop' command, causing the like statistic to temporarily drop to 0.

the most popular performers, and this in turn determines the probability that performers will be told to take the lead (or 'Solo') or be followed by other players. Figure A.11 shows three examples of the 'Like Table' displaying varying like/dislike statistics during a performance with three performers.

In the leftmost example of Figure A.11 it is player 1 in the table who is most likely to be followed by another player or told to take the lead, and in the rightmost example it is player 2; in the middle example it is equally biased to players 0 and 2. The like statistic for each performer is restricted from dropping completely to zero unless the performer has received a 'stop' command, in which case it is temporarily set to zero automatically (as can be seen in the left and middle examples in Figure A.11); this eliminates the chance that a performer will be told to follow such a 'stopped' player. The statistic for each player starts at 10 (on a scale of 0-127), and when shifted higher or lower will gradually move back towards 10 with each count of the global clock, ensuring a particularly high or low

'like' rating does not remain indefinitely. The key implication of this 'liking' process is that the system develops a bias towards making a particular player the focus, but this bias is administered collectively by the performers themselves and is not randomised. The result, therefore, is the creation of a collective intention between all performers, controlling the future direction of the music despite being created by a summation of momentary isolated decisions. Also, in this way the performers are given a greater feeling of control over the 'correct' direction for the music, a larger stake in its outcome and less of a feeling of arbitrariness in the instructions they are given.

#### **A.4.1 Building the Electronic Improviser**

The electronic improviser that is built into M-Word Engine is constructed to carry out four tasks: the creation of new sonic material, the copying of another improviser, the copying and subsequent distortion of another improviser so as to create variations, and stopping playing altogether. The first three of these correspond to Deleuze's 'abstract', 'figurative' and 'figural' respectively.

The creation of new material is achieved through a polyphonic synthesiser mixing a variety of sine, sawtooth and triangle waves as well as white noise to create a range of potential timbres, which are subsequently subject to random amounts of distortion and downsampling. In order to allow for even greater diversity, the sounds produced can also be combined with pre-recorded samples that are drawn from a folder of the user's choosing. This enables the creation of more harmonically and rhythmically complex timbres, which can be, for example, more percussive or vocal in their nature. The receipt of MIDI pitch numbers, which are used to produce the fundamental tones at the correct pitch, triggers the sound production within the synthesiser; these numbers are drawn from the pitches that have been generated from the instruction's associated pitch band, and are sent on the click of a local metronome. The tempo of this metronome is set either by a global metronome, which monitors the output of all players for any indication of tempo, or is set semi-randomly using the Max MSP 'drunk' object, which generates random numbers within a particular distance of the current number.

The 'copying' function of the electronic improviser samples the output of another player, retunes the sample to pitches generated from the instruction unit, and then outputs the resulting audio. The retuning is accomplished with a Max MSP object called 'pvtuner'<sup>4</sup>, which enables spectral retuning to any given collection of pitches. The 'dis-

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<sup>4</sup>Part of the 'FFTease' collection of externals by Eric Lyon and Christopher Penrose. For more information see <http://www.somasa.qub.ac.uk/elyon/LyonSoftware/MaxMSP/FFTease/>

torting' function follows much the same process as 'copying', except that the sample is played forwards or backwards at a randomly determined speed (using the 'diracLE' object<sup>5</sup>), and there is also a randomly allocated level of distortion applied to the audio.

Figure A.12 is a flowchart of the electronic improviser's three processes.

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<sup>5</sup>An external object created by Timo Rozendal. For more information see <http://www.timorozendal.nl/?p=434>

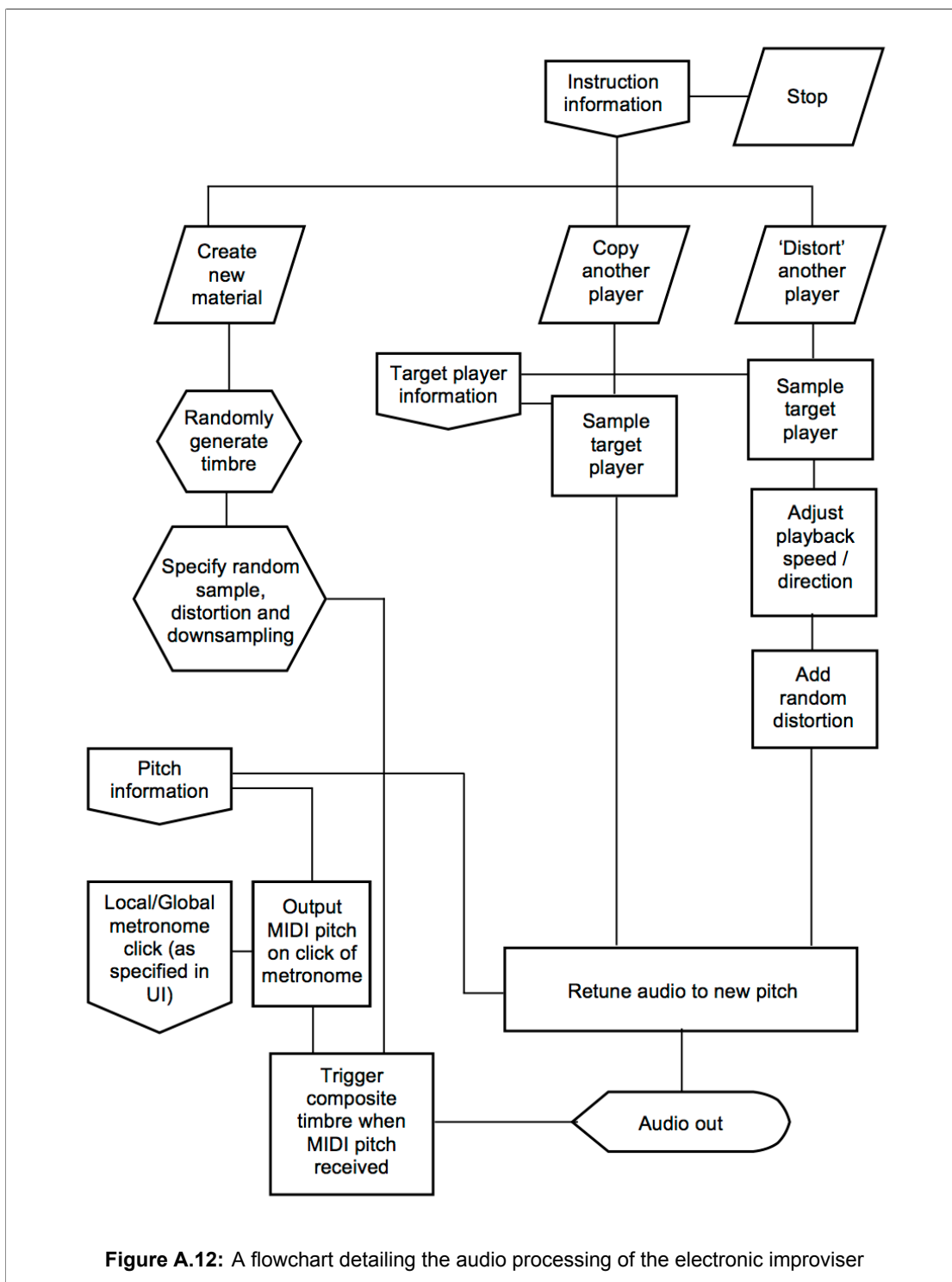


Figure A.12: A flowchart detailing the audio processing of the electronic improviser

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