Macro-Kinetics:
Creating A Marimbists’ Model for Implementing
Physical Gestures in Solo Marimba Performance

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ABSTRACT

With a span of almost two metres and a requirement to stand while performing, effective marimba performance demands considerable physicality. The visual nature of physicality results in the audience directing emphasis on the marimbist’s physical gestures in live performance. Prior studies have determined that the deliberate manipulation of these gestures for artistic intent tangibly affects an audience’s perception of the music. Additionally, professional marimbists have differing approaches to the use and limitations of physical gesture. This raises questions of whether a system could be created to assist marimbists in harnessing physical gesture while still retaining individuality and efficiency. This research outlines the Macro-Kinetics model, a generalist system for marimbists of all levels to create their own gesture-based interpretations. By identifying four broad elements of the body most favoured by marimbists, this research identifies a range of physical movements on the marimba that could be performed by any marimbist. When paired with perceived effects and potential uses, a marimbist can then obtain a rudimental understanding of the use of these movements. To exhibit this causal relationship and provide a real-world basis for the Macro-Kinetics model, four case studies based on the works of Bach, Cheung and Thomas are examined as significant works that demonstrate the potential of gesture-based interpretations. These case studies demonstrate how the model could be used to varying extents depending on the individual’s requirements. They also express how physical gestures from the Macro-Kinetics model can be loosely applied, retaining the marimbist’s individuality. Although the Macro-Kinetics model is not the sole methodology for creating gesture-based interpretations, it is effective in assisting marimbists with their first gesture-based interpretation. It is anticipated that marimbists will use the Macro-Kinetics model to harness the advantages of the effects of physical gesture on perception of a performance’s musicality, culminating in a total performance experience.
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CHAPTER ONE
INTRODUCING MACRO-KINETICS

Over the last century, the marimba has advanced significantly to place itself at the forefront of classical music. As it evolved from a residency in vaudeville ensemble settings to its now common existence against the backdrop of concert halls, the instrument itself progressed through numerous advancements to broaden the capabilities of its repertoire. Marimbists now perform a wide range of repertoire with varying interpretations defined by the manipulation of technique and musicality. As the modern concert marimba spans five octaves and almost two metres in length, the marimbist requires an increasingly physical approach in order to efficiently reach notes and correctly execute melodic lines as required by the repertoire. When combined with the fact that the marimbist normally plays in a standing position, their physicality becomes highly visible to the audience. Most marimbists agree that gesture in marimba performance should be kept to necessity in an effort to retain efficiency. However, Michelle Colton, Mary Broughton, Michael Schutz and Fiona Manning have affirmed the effectiveness of consciously manipulating physical gesture in marimba performance, with research evidencing noticeable change in audience perception of musicality when gestures were employed with minimal change to efficiency. Despite this, no resource exists in assisting marimbists in effectively implementing physical gesture in their performances.

2 The term economy of motion is often used for this pursuit of efficiency, similar to other activities that require physical movement. See economy of motion in glossary.
For the purposes of this research, it is important to distinguish between the terms ‘movement’ and ‘gesture’. The term ‘movement’ simply refers to ‘the act of moving your body or part of a body’ with no associated connotations.\(^4\) The term ‘gesture’ refers to ‘a movement that shows or emphasizes \(\textit{sic}\) an idea or feeling’,\(^5\) and therefore is used to describe actions that have associated connotations. In this research, the use of physical movement on the marimba is hereinafter defined as ‘gesture’, as the movements are intended to convey a broader expressive idea to the audience.

This research also uses the terms ‘micro’ and ‘macro’ to differentiate between marimba performance’s technical and musical aspects. For example, the performer’s technical fundamentals, such as grip and stroke technique, allow the performer to physically produce sounds on the marimba that accurately and efficiently depicts the musical material. This aspect of performance is referred to as ‘micro methodology’, established by the fact that all technique required for sound production on the marimba utilises the hands in isolation. Similarly, ‘micro interpretation’ refers to a performer’s musical interpretation of a work that is based on technique alone. This includes manipulations of tempi and dynamic levels executed by the performer to acoustically realise their unique interpretation. However, this does not include any physical movements or gestures that are incorporated for stylistic purposes by the performer, whether voluntary or involuntary.

‘Macro methodology’ is used in this research to describe a method of performance that uses abstract gestures with no technical basis. For example, if a performer were to flick


their head rapidly to signify the end of a musical phrase in a solo work for marimba, this would be considered an implementation of macro methodology. This head movement would have no acoustic effect whatsoever and would serve to only affect the audience’s visual perception of the performer. Regardless of whether or not the movement was voluntary, this would pertain to the performer’s ‘macro interpretation’ for greater artistic purposes.

It is therefore argued that a memorable and truly virtuosic performance on the marimba cannot be established without the coexistence of micro and macro methodology. The combination of a technical foundation with gestural manipulation results in a total performance experience, as illustrated in Figure 1.1.1 (below).

![Figure 1.1.1: The above Venn diagram represents ‘total performance’ as a combination of micro methodology and macro methodology.](image)

It is important to note that total performance can only be achieved when the performer has already established a competent technical foundation. Any extension of a performer’s ‘micro interpretation’ with a ‘macro interpretation’ should only be adopted
when the performer can execute a ‘macro interpretation’ with no technique-related limitations.

**Research Aims & Methodology**

With the pursuit of total performance in mind, this research will create a model that can be used by marimbists to create their own macro interpretations of solo marimba repertoire. This model will be referred to as the *Macro-Kinetics* model.

The *Macro-Kinetics* model creates a foundation for integrating basic physical gestures into a marimba performance, similar to a student’s rudiments when first learning the instrument. The model is only used to generate these gestures after the marimbist has created a technically competent micro interpretation. Once familiar with these simplified gestures, personalised macro interpretations can be undertaken by the marimbist to their desired extent. In turn, this will generate marimba performances that will have a greater effect in expressing performative intentions to an audience.

The *Macro-Kinetics* model will be illustrated drawing from several resources. Firstly, the conclusions of existing research will be summarised to provide basis for the generation of the *Macro-Kinetics* model. This will be followed by simplified terminology to refer to key areas of the marimbist’s body, identified as Head, Torso, Mallet and Legs, accompanied by a Laban-style tabulation of generalist movements using these areas of the body. The execution of these physical movements will be

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6 The term *Macro-Kinetics* makes reference to the title of Gordon Stout’s method literature *Ideo-Kinetics*. Stout’s *Ideo-Kinetics* focuses on increasing the performer’s economy of motion through the means of technical exercises and tutorials, making micro interpretations easier to realise. This research’s *Macro-Kinetics* model aims to be the complementary methodology for approaching macro interpretation.

7 See Laban movement analysis in glossary.
detailed through the use of video stills. The perceived effects of these movements will then be succinctly categorised in broad adjectives, such as Broad, Expressive, Energetic and Tight. The effects of these movements allow for the creation of a macro interpretation, transforming movements into gestures. Effective use of the Macro-Kinetics model will then be demonstrated via four case studies of solo marimba works by Bach, Cheung and Thomas, reflecting the author’s own performance experience and detailing the physical gestures used in the author’s own macro interpretations.

**Literature Review**

Percussion literature is dominated by educational method books, designed with the intention of standardising two-mallet and four-mallet marimba technique. Darin Olson’s synopses of fourteen popular method books written from 1968 to 2007 reflects this overarching theme. Resources range from purely exercise and etude based literature, such as Gary Burton’s *Four Mallet Studies* and Gordon Stout’s *Ideo-Kinetics*, to what Olson terms ‘musicality’-based resources, such as Garwood Whaley’s *Musical Studies for the Intermediate Mallet Player* and Nancy Zeltsman’s *Four Mallet Marimba Playing*. These resources prove to be useful when a marimbist is searching for exercises to build their technical ability. However, examination of these popular method resources determines that there is no explicit mention of use of physical gestures that are unnecessary for sound production (hereinafter referred to as ‘ancillary gesture’).  

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9 Ibid., p.39.  
10 Ibid., pp.36-39.  
11 See *ancillary gesture* in glossary.
Leigh Howard Stevens’ *Method of Movement on Marimba* \(^{12}\) (hereinafter referred to as *MoMM*) is an example of method literature that presents a thorough introduction to ‘the mechanical principles of good technique’. \(^{13}\) *MoMM* is credited with being the first to introduce the Stevens four-mallet grip \(^{14}\), one of the most commonly utilised grips. \(^{15}\) Stevens outlines techniques and stroke types in great detail, providing thirty-five pages of text and diagrams before introducing nearly six hundred exercises designed to maximise economy of motion and develop a foundation of technique. As the intention of *MoMM* is for marimbists to learn rudimental technique, there is no mention of ancillary gesture or any other macro technique. \(^{16}\) This sentiment is echoed in other literature written in a similar direction, such as Stout’s *Ideo-Kinetics*, \(^{17}\) Howarth’s *Simply Four* \(^{18}\) and Bobo’s *Permutations for the Advanced Marimbist*. \(^{19}\) Therefore, the existing literature already significantly covers micro methodology, leading this research to complement it by codifying macro methodology to a similar extent.

The need for macro methodology’s existence is confirmed by research that quantitatively assesses the use of intentional physical gesture by marimbists, affirming its effectiveness. Broughton set a precedent in this area with her dissertation *Music, Movement and Marimba: Solo Marimbists’ Bodily Gesture in the Perception and Production of Expressive Performance*. Broughton conducted two major experiments to affirm that ‘bodily movements and gestures can enhance or diminish the perception of

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\(^{13}\) Ibid., p.2.

\(^{14}\) See Stevens grip in glossary.

\(^{15}\) See grip in glossary.

\(^{16}\) Stevens, *Method of Movement for Marimba*, pp. 15, 16, 22.


expression and interest in solo marimba performance when presented audio-visually compared to… audio-only form’,\textsuperscript{20} and whether this theory is applicable to a real-life concert scenario. This research delivers quantitative evidence of the effect on audiences of conscious bodily movement, in what is widely referred to as an ‘embodied interpretation’.\textsuperscript{21} Broughton notes that this research serves only as a starting point and ‘therefore warrant[s] focussed (sic) attention in pedagogy and practice’.

Part of this ‘focussed (sic) attention’ is delivered through Schutz and Manning’s research in a more direct fashion. Schutz and Manning embodied Broughton’s precedent and qualitatively applied it further by video recording percussionist Michael Burritt’s ‘long’ and ‘short’ gestures to determine the existence of ‘causality in audio-visual perception’.\textsuperscript{22} Schutz and Manning’s work focuses on altering perception through conscious ancillary gesture, providing reason for percussionists to explore this area further. Schutz and Manning provide basis to believe that control of these ancillary gestures will lead to a more effective performance:

Consequently, we believe the most fruitful way for percussionists to control note duration is by understanding and employing (acoustically ineffective) ancillary gestures capable of altering an audience’s perception.\textsuperscript{23}

\textsuperscript{21} Ibid.
\textsuperscript{23} Ibid., p.29.
Schutz is also quick to assure that the use of ancillary gesture must come hand-in-hand with ‘good musicianship’,\(^\text{24}\) which reinforces this research’s argument that micro and macro methodology must coexist in a real-life performance scenario.

In prior research, Schutz has targeted Stevens’ idea of a non-causal relationship\(^\text{25}\) between gesture length and ‘duration of bar ring’\(^\text{26}\). By defining the performance-audience communication as a ‘perceptual system’\(^\text{27}\), Schutz uses perceptual concepts to demonstrate that while the acoustic output of the instrument does not change with alteration of gesture length, the audience perceives the note length to be longer as a result of altering the gesture length.\(^\text{28}\) The fact that gesture has such a tangible effect on musicality and the perception of sound affirms the effectiveness of this research’s focus on the performer-audience relationship. Therefore, when looking to improve the relationship between performer and audience, there is reason to believe that the employment of ancillary gesture is equally as important as a technically accomplished sound.

Conducted in a manner similar to Schutz and Manning’s later experiment, McClaren’s summation of a study echoes the sentiment of this research, concluding that it ‘seems appropriate to investigate the possibility of providing systematic instruction in how a performer may control the visual affect of his performance’.\(^\text{29}\) McClaren obtained

\(^{24}\) Ibid.

\(^{25}\) Ibid. Duration of bar ring’ refers to the amount of time a note lasts for after being struck. In MoMM, it is implied by Stevens that this ‘bar ring’ is acoustically unaffected by gesture length.


\(^{27}\) Ibid., p.26.

\(^{28}\) Ibid., p.24.

higher feedback ratings for performances with audio-visual performances than aural-only performances.\textsuperscript{30} This signifies the influence of what McClaren terms ‘visual presentation’ on the audience perception of the overall quality of a performance, and is one of the first research papers to produce a result that clearly affirms the impact of manipulated visual gestures. McClaren reinforces the sentiment of this research by providing these quantitative statistics as a technical foundation for the aims of the \textit{Macro-Kinetics} model:

There is a need to develop a working vocabulary that will assist in identifying and describing these visual aspects of performance, especially as related to a performer's body movements.\textsuperscript{31}

With the support of these statistics, this research aims to provide this ‘working vocabulary’ in a manner that can be easily approached by any marimbist of any level.

Colton has taken all of the above and contributed further to the discussion with research focusing on the habitual physical movements of ten professional percussionists around the world. Colton’s research revolves around analysis of the performance of four excerpts of popular marimba solos that are performed by six professional percussionists.\textsuperscript{32} The results of the research underline the importance of physical movement, while at the same time revealing slightly differing opinions as to whether or not these movements should be actively taught. Colton observes all interviewees agreed that movement is an important consideration when playing marimba.\textsuperscript{33} Furthermore, all interviewees agreed that these movements should not take precedence over musicality.

\textsuperscript{30} Ibid.
\textsuperscript{31} Ibid.
\textsuperscript{32} Colton, 'Typologies of Movement in Western Percussion Performance: A Study of Marimbists' Gestures'.
\textsuperscript{33} Ibid., pp.343-347.
and technical ability. In addition, although the interviewees now deem their movements ‘natural’, most agree that these movements should be ‘trained and taught’ to students. Therefore, it should be noted that whether or not the interviewees observed their conscious usage of ancillary gesture, it is still an important consideration amongst professionals and must be codified in some manner.

Research into the conscious use of physical movement is not restricted to marimba performance. While not a marimba-specific resource, Jane Davidson’s research details the successful implementation of gesture in flute and clarinet, further validating the use of physical gestures in live performance as a whole. By studying a flautist and clarinettist’s ‘expressive musical performance’, Davidson determined that there exists a repertoire of gestures to serve as a means of communication. Subsequently, Davidson studied the movements of renowned pianist Lang Lang to determine that his facial expressions and gestures contributed to an interpretation of ‘articulation of musical structures as well as the narrative of an underlying meaning of the work’. The above is an external verification of the manipulation of physical gesture in live performance, reinforcing the merits of employing macro methodology on the marimba and providing sufficient reason to codify these movements accordingly for performers to use.

Subsequently, few attempts have been made to codify physical movements for percussionists to use in a real world situation. Jeffrey Barudin has a similar ideology aligning with the aims of the Macro-Kinetics model, involving grouping the body into specific sections before creating a notation system that codifies physical movements.

34 Ibid.
36 Ibid.
into symbols placed on the score. Barudin deems this implementation of physical movements, dubbed ‘marimba choreography’, is necessary to obtain ‘increased accuracy, more comfortable playing positions, and a more efficient approach. It is important to note, however, that Barudin implies the movement’s aims are for technical proficiency rather than artistic intent. As they are required for sound production, the movements described are no longer ancillary gestures. ‘Marimba choreography’ is an example of a greater focus on physical movements identified solely for economy of motion purposes. In a similar theme to this, Ruo-Ying Ke also approaches codifying physicality by comparing ‘physical and technical approaches’ on the marimba and the vibraphone. Ke uses multiple references to concepts such as Taoism and tai chi used to express the natural movements a performer must use on both instruments. In addition, sections of Ke’s analysis bear similarity to Barudin’s ‘marimba choreography’, favouring movements that facilitate economy of motion. However, unlike Barudin’s ‘choreography’, there is no clear methodology provided for performers to benefit from the merits of her findings. It is also focused on creating movements that gravitate towards technical proficiency rather than artistic intent. In summary, both of these references demonstrate the importance of physical movement but do not succeed in producing usable material for the everyday marimbist.

The above literature represents core research that has been undertaken to determine the following conclusions. Firstly, although existing method literature fulfils its purpose in

38 Ibid.
40 Ibid., p.42.
41 Ibid., pp.53-55.
teaching the fundamentals of technique, there is none available that assists with physical
gesture on the marimba. Secondly, McClaren and Broughton conclude that use of visual
techniques and physical gesture creates a tangible difference in the audience’s
perception of a performance. Additionally, Schutz and Manning detail the importance of
the performer-audience relationship and how ancillary gesture can be used to directly
manipulate this. Colton’s interviews with professional percussionists demonstrate that
on a qualitative level, professional percussionists do consciously think about physical
movements and call for them to be taught to students. Davidson’s research affirms the
need for physical gesture by confirming that other instrumentalists consciously think
about the use of physical gesture. The above therefore constitutes a need for a
codification of physical gestures in a performer-oriented resource. With this in mind,
Barudin attempted to cover this through a technical-based approach with the use of
specialist notation, while Ke provided thorough analysis into the technical movements
required for certain passages. However, as these methods promote the use of effective
gesture over ancillary gesture, these resources did not align accordingly with the
conclusions of McClaren, Broughton, Schutz and Manning, Colton and Davidson. As
such, the creation of the *Macro-Kinetics* model will result in a performer-oriented
resource that continues on the progress of the aforementioned research. It will provide a
codified methodology that can help build a performer’s macro interpretation with ease,
while promoting the use of physical gesture in a manner that does not inhibit economy
of motion.
CHAPTER TWO
INTRODUCING THE MACRO- KINETICS MODEL

This chapter details the components of the Macro-Kinetics model, using generalist language to promote the ease of implementation of physical gestures. The terminology used to describe the movements in this chapter can be broadly interpreted, allowing for marimbists to retain their individuality when employing these movements. It is important to note that the model should not be used until the marimbist is confident with their micro interpretation of the work being performed. The movements prescribed do not take precedence over basic principles of economy of motion. It is anticipated that any marimbist wishing to utilise this model will begin by adopting these movements in their simplest forms, before experimenting to create their customised movements that will ultimately lead to their own macro interpretation.

Introducing Four Core Areas of Physical Movement in Marimba Performance

The approach of isolating body parts draws from the ‘body’ aspect of Laban movement analysis,\(^{42}\) where areas of the body are specifically defined to describe movements more efficiently. This allows for ‘specific motor training’ in an effort to enhance movements in a certain area of performance.\(^ {43}\) However, in this instance, Laban-style models are not effective to the generalist audience of this research as the terminology is highly advanced. As marimbists have differing levels of self-awareness and do not generally

\(^{42}\) See *Laban movement analysis* in glossary.
focus on physicality, they will not be in the same mindset as a movement specialist.  

Therefore, simplification of the *Macro-Kinetics* model is required to increase the accessibility to the marimbist.

To introduce the *Macro-Kinetics* model in a simplified manner, the human body is divided into four sections. In Stevens’ *MoMM*, the divisions used to create ‘efficient marimba technique’ are listed as ‘the feet, legs and lower torso’, ‘the arms’, ‘the wrists’, and ‘the fingers’. The *Macro-Kinetics* model will summate the last three areas, defining it simply as ‘arms’, which includes the elbow, forearms and hands. ‘The feet, legs and lower torso’ will be divided into two separate areas; ‘legs’ representing feet and the leg area below the waist and ‘torso’ representing the chest and shoulders. The fourth area is the ‘head’, which represents movements in the head and neck area. The following sections will explain broadly defined movements utilising each body section as defined above. For example, when referring to the ‘arm’, such a reference would include the elbow, forearms and hands, not solely the forearms. The terms ‘LARGE’, ‘SMALL’, ‘FAST’ and ‘SLOW’ will be used to define the execution of these movements in a generalist language.

**Exploring Advanced Mallet Movements**

The arm’s influence in percussion performance is superior to all other body parts, warranting specific attention to how it is used. It physically connects the player with the mallet, indicating that all movements made with arms (and parts thereof, such as the wrist and fingers) will subsequently impact mallet movement as well.

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44 ‘Movement specialist’ refers to an individual requiring full-time attention to physical movement, such as a choreographer or a dancer. Generally speaking, a marimbist is not a ‘movement specialist’.


46 The execution of movements will be CAPITALISED for clarity.
For example, altering the speed of the forearm’s movement during an upstroke\textsuperscript{47} will result in slower movement of the mallet. This variable will be referred to as the ‘velocity’ of the movement. Similarly, if the arm is moved upwards at a greater or lesser distance following an upstroke, this will result in a direct change to the mallet’s height. This will be referred to as the ‘proximity’ of the movement, with this term specifically representing the mallet’s distance from the marimba. This change in movement is illustrated with a graph in Figure 2.1.1 (below).

\textbf{Figure 2.1.1:} Four simplified definitions of arm movement in relation to the terms ‘proximity’ and ‘velocity’.

\begin{center}
\begin{tabular}{ccc}
PROXIMITY & W & Y \\
(upstroke’s final vertical distance from bar) & & \\
X & Z & \\
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{ccc}
VELOCITY (duration of movement) & \text{?} = \text{Proximity/Velocity} \\
& W = \text{LARGE}/\text{SLOW} \\
& X = \text{SMALL}/\text{SLOW} \\
& Y = \text{FAST}/\text{LARGE} \\
& Z = \text{FAST}/\text{SMALL} \\
\end{tabular}
\end{center}

\textsuperscript{47} See \textit{upstroke} in glossary.
It is important to note that altering the movement of the arm may also alter the acoustic result of the performance. Stevens acknowledges that strokes from different heights (also therefore involving a greater movement of the arm) are usually associated with changing the dynamic level:

… the student should try to play fortissimo first with a one-inch stroke and then an eight-inch stroke. In fact, there is a “correct” starting height for every dynamic level. Facile players are able to produce greater volume from a given height than inept players.48

It is possible to garner two conclusions from the latter section of this excerpt; that stroke height does indeed matter when manipulating dynamics, and that a refined player can manipulate dynamics without the help of stroke height. Therefore, it is implied that an experienced player’s manipulation of stroke height for the purposes of physical gesture should not affect the sound. Stevens also mentions that mallets should have the lowest stroke height possible for ultimate efficiency:

If the starting point [of the stroke] is too low, the stroke will feel pinched and tense. If the stroke starts too high, it will feel cushioned and restrained.49

This statement, combined with existing research, illustrates two points; artificial manipulation of mallet height may make the stroke feel ‘tense’ and ‘restrained’, but as this is a physically visible effect, an adept performer’s deliberate alteration of the starting height of the mallet allow manipulation of ‘tense’, ‘pinched’, ‘cushioned’ and ‘restrained’ feelings. In summary, although the mallet height affects the dynamic level of the sound, a suitably skilled performer’s manipulation of these variables in appropriate contexts will achieve effects that could not be achieved by sound alone without sacrificing economy of motion.

49 Ibid.
Figure 2.1.2 (below) tabulates these generalist gestures with reference to terminology used in Figure 2.1.1. Change in ‘velocity’ is represented by the terminology ‘FAST’ and ‘SLOW’, with a ‘FAST’ velocity demonstrating a higher rate of speed through a shorter duration of movement, and ‘SLOW’ representing a lower rate of speed through a longer duration in the movement. Change in ‘proximity’ is represented by the terminology ‘LARGE’ and ‘SMALL’, representing the distance between the mallet and the marimba. The third column of Figure 2.1.2 represents the resultant perceived effects of the change in movement, with the first description pertaining to manipulation of these variables on the downstroke, the second description pertaining to manipulation of these variables on the upstroke, and the third description referring to any general stylistic ideas that emerge from these conscious changes in movement.

<table>
<thead>
<tr>
<th>VELOCITY</th>
<th>PROXIMITY</th>
<th>RESULTANT EFFECT ADJECTIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAST</td>
<td>LARGE</td>
<td>Short attack / Short release / Direct, suppressed</td>
</tr>
<tr>
<td>FAST</td>
<td>SMALL</td>
<td>Shorter attack / Shorter release / Direct, suppressed</td>
</tr>
<tr>
<td>SLOW</td>
<td>LARGE</td>
<td>Longer attack / Longer release / Smooth, broad</td>
</tr>
<tr>
<td>SLOW</td>
<td>SMALL</td>
<td>Long attack / Long release / Smooth, broad</td>
</tr>
</tbody>
</table>

*Figure 2.1.2:* The effect of changes in velocity and proximity in arm movements.

As mentioned previously, a recognised example of the above manipulation of arm movements is firmly embedded in Schutz’s experiment with Michael Burritt, where longer and shorter gestures involving extended arm movements were used to perform
acoustically similar notes that were then perceived as longer and shorter respectively by an audience, despite being equal in acoustic length.\textsuperscript{50}

It is this manipulation of perceptive timing that will allow the performer to add an extra dimension to their micro interpretations that involve phrasing and extended musical sentences. For instance, if a performer wished to end a phrase abruptly in their micro interpretation, they could implement a FAST and LARGE arm movement on the upstroke of the final note of the phrase, creating the effect of an acoustically shorter note and ultimately strengthening the performer’s desired ending of the phrase to the audience. An illustration of the author performing this movement can be observed in Figure 2.1.3 (below).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure.png}
\caption{Figure 2.1.3: Four video stills demonstrating the author performing their interpretation of a FAST and LARGE arm movement.}
\end{figure}

\textsuperscript{50} Schutz and Manning, 'Effectively Using Affective Gestures: What Percussionists Need to Know About Movement and Perception': 26.
This simplified manipulation of arm velocity and proximity results in the creation of a more complex gestural language that is able to express the performer’s intent in a given work with greater clarity. Examples of the implementation of these arm gestures are displayed in the case studies of Chapter Three.

**Exploring Advanced Leg Movements**

Marimbist stance is an important aspect of performance physicality, with the breadth and velocity of leg placement creating differing audience impressions. Janis Potter advocated an awareness of body movements as a feature that can define a performance’s integrity:

>For me, the most important part of playing the marimba is not about the hands, but rather the body as a whole. If players are aware of body placement… they will undoubtedly be more comfortable and more effective players.\(^\text{51}\)

Potter describes the ‘marimba shuffle’ as a ‘pattern of stepping to the side repeatedly to get to one end of the marimba’, an ineffective but commonly used technique that is regularly seen amongst marimbists.\(^\text{52}\) Potter’s theory of this ‘marimba shuffle’ being ‘awkward to watch’ and ‘ruin[ing] any sense of “flow” in the music’ forms the basis of the aims of this next section of the Macro-Kinetics model.\(^\text{53}\) By manipulating a performer’s leg and feet movements (hereinafter referred to as ‘leg movements’ only as the parts are interconnected), the potential for greater ‘embodied musical cognition’\(^\text{54}\) is realised. In a similar vein to Barudin’s aforementioned ‘marimba choreography’,\(^\text{55}\) this research differs from Potter’s view in that her prescribed foot movements are set

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\(^{52}\) Ibid.

\(^{53}\) Ibid.

\(^{54}\) Broughton, 'Music, Movement and Marimba: Solo Marimbists’ Bodily Gesture in the Perception and Production of Expressive Performance', p. 117.

indefinitely and tend to be generated more for technical purposes. Potter’s emphasis on leg movements therefore forms a basis for the manipulation of leg movements for the purposes of musical intent. The *Macro-Kinetics* model therefore suggests that leg movements can be simplified into two descriptive dichotomies; slow or fast leg movements between notes, and a broad or narrow distance between legs during the movements. This is illustrated with a graph in Figure 2.2.1 (below).

![Graph](image)

**Figure 2.2.1:** Four simplified definitions of leg movement in relation to the terms ‘proximity’ and ‘velocity’.

The conscious change in leg movements alters the stance of the player, which consequently allows the performer to manipulate relaxation and tension at different levels to convey certain meanings. For instance, when the performer stands with their legs far apart (BROAD proximity) and leans with their legs between notes slowly (SLOW velocity), the resultant impression on the audience is one of focus and relaxation, derived from the low centre of gravity.\(^{56}\) Conversely, if the performer stands with their legs closer together (NARROW proximity) and leans with their legs between...  

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\(^{56}\) Ke, 'Differences in Physical Movement Between the Techniques Used on the Marimba and the Vibraphone', pp. 41-42.
notes quickly (FAST velocity), the higher centre of gravity and narrow stance ultimately results in an increased impression on the audience of tension and stiffness. This is summarised below in Figure 2.2.2.

<table>
<thead>
<tr>
<th>VELOCITY</th>
<th>PROXIMITY</th>
<th>RESULTANT EFFECT ADJECTIVES (Tension / Emphasis / General Stylistic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLOW</td>
<td>BROAD</td>
<td>More relaxed / Greater emphasis / Flowing</td>
</tr>
<tr>
<td>SLOW</td>
<td>NARROW</td>
<td>Tense / Lesser emphasis / Contorted</td>
</tr>
<tr>
<td>FAST</td>
<td>BROAD</td>
<td>Relaxed / Greater emphasis / Energetic</td>
</tr>
<tr>
<td>FAST</td>
<td>NARROW</td>
<td>Very tense / Lesser emphasis / Abrupt</td>
</tr>
</tbody>
</table>

**Figure 2.2.2:** The effects of changes in velocity and proximity in leg movements.

It is suggested that the manipulation of leg movements results in the creation of an overarching theme in sections where the performer desires to have extra definition of musical features, such as customised phrasing and perceived dynamic contrast. For instance, in an area of a work where the performer wished for the overarching theme to be one of tension and awkwardness, the performer could adopt a FAST and NARROW stance to emphasise this greatly in their physical appearance. If the performer desired a free flowing passage to be enhanced by physicality that burnished the impression of relaxed playing, they could adopt a SLOW and BROAD stance. This is illustrated in Figure 2.2.3 by the author.
Figure 2.2.3: Four video stills demonstrating the author performing their interpretation of a ‘FAST and NARROW’ leg movement, and a ‘SLOW and BROAD’ leg movement respectively.

It is understandable, however, that the idea of manipulating a performer’s footwork in a way that goes against economy of motion is often frowned upon by some marimba artists. For example, marimbist Mark Ford is steadfast in reinforcing an ideology of traditional technical foundation as performers become increasingly proficient with the instrument:

Technique should always be focused on delivering the music… [Here] are issues that every student and teacher must address in order to have strong marimba technique:

Shoulders, hips and feet should remain square to the keyboard. Give equal weight to both feet.  

Similarly, Barudin’s ‘marimba choreography’ aims at creating feet movements that produce efficient results, rather than ancillary gestures. This is a common overarching belief that inhibits the deliberate manipulation of leg movements in marimba

performance. In similarity to Stevens’ admission of an adept performer’s ability to control arm movements freely, the *Macro-Kinetics* model is based on the idea that advanced marimbists are able to easily manipulate leg movements without worrying about the restraints of economy of motion. As mentioned at the beginning of this chapter, it is suggested that when a performer is at the point of creating a macro interpretation, they are assumed to have a thoroughly accurate micro interpretation to the point where any ancillary gestures will not interfere with the musicality. Furthermore, if desired, the prescribed leg movements above can be applied at a lesser level as per the individual’s requirements to retain economy of motion and maximum efficiency. The case studies in Chapter Three demonstrate the use of leg movements with example works of significant technical difficulty.

**Exploring Advanced Torso Movements**

When a marimbist stands behind the instrument, the marimba’s resonators obstruct the audience’s view of the marimbist’s lower body, leaving the torso and head exposed (as seen in Figure 2.3.1 below). Therefore, it is important to capitalise on the potential of such a visible part of the body. Moreover, the torso is usually utilised to ease the technical execution of certain passages, indicating that the marimbist should be familiar with using their torso for the purposes of technique. For example, Linda Pimentel states that she will move her ‘body, upper torso and/or lower torso’, while also ‘contort[ing] shoulders, elbows and wrists to execute a passage’. 59 It should therefore be straightforward for the marimbist to add dynamism by manipulating their torso’s movements. With this in mind, the *Macro-Kinetics* model suggests that the use of torso

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movements can be simplified to an outward or inward movement of the elbow, which consequently raises or lowers the shoulders. This movement is hereinafter referred to as ‘torso movement’.

When utilising a torso movement immediately after a mallet upstroke, this will automatically result in the torso expanding or contracting respectively. This is illustrated in Figure 2.3.1 (below).

Figure 2.3.1: Four video stills demonstrating the author performing their interpretation of a SMALL torso movement (top row) and LARGE movement (bottom row).
In similarity with Figure 2.1.1, these movements can be described using the terms SMALL, LARGE, FAST and SLOW, as seen in Figure 2.3.2 (below).

**Figure 2.3.2:** Four simplified definitions of torso movement in relation to the terms ‘proximity’ and ‘velocity’.

![Diagram showing PROXIMITY and VELOCITY with definitions for W, X, Y, Z.]

A new plane of mallet movement can be achieved from the effects of these movements. The resultant gesture allows the player to move their mallets diagonally as well as vertically. This is illustrated in Figure 2.3.3 (above). This new plane of movement

**Figure 2.3.3:** Four video stills demonstrating diagonal mallet movement arising from a torso movement.
allows for gestures that express features of ‘embodied music cognition’ normally inaudible on marimba, such as phrasing and articulation. A summary of the perceived effects of these gestures is described in Figure 2.3.4 (below).

<table>
<thead>
<tr>
<th>VELOCITY</th>
<th>PROXIMITY</th>
<th>RESULTANT EFFECT ADJECTIVES (General Stylistic / Phrasing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLOW</td>
<td>LARGE</td>
<td>Broad, continuing</td>
</tr>
<tr>
<td>SLOW</td>
<td>SMALL</td>
<td>Broad, lesser continuing</td>
</tr>
<tr>
<td>FAST</td>
<td>LARGE</td>
<td>Brisk, abrupt</td>
</tr>
<tr>
<td>FAST</td>
<td>SMALL</td>
<td>Brisk, more abrupt</td>
</tr>
</tbody>
</table>

Figure 2.3.4: The effects of changes in velocity and proximity in torso movements.

The torso movements do not impede a marimbist’s economy of motion as much as the aforementioned leg movements as they are already part of standardised marimba technique. Moreover, intentional elbow and forearm-based strokes are encouraged by marimbists who seek an additional method of sound production.

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60 Broughton, 'Music, Movement and Marimba: Solo Marimbists’ Bodily Gesture in the Perception and Production of Expressive Performance’, p. 117.
For example, Pius Cheung often defines ‘stroke weight’ in his workshops as a form of muscle designation that ‘controls the weight of the sound produced’.\textsuperscript{61} He designates the ‘full-arm-stroke’ in detail:

It is an extremely heavy stroke that I only use sparingly for “special peasante [sic]” moments. I imagine transforming my arm and mallet into a construction hammer when using a full-arm stroke.\textsuperscript{62}

This ‘construction hammer’ movement is one of numerous metaphors Cheung employs to describe bodily movements used strictly for improving sound quality. It is therefore suggested that the *Macro-Kinetics* model’s ‘torso movements’, which are also forearm to shoulder-based movements, will not impede the quality of sound. Furthermore, as Cheung is able to utilise these movements on a regular basis, it is also suggested that these movements should be straightforward for any other marimbist, as they are already part of any advanced marimbist’s skillset. By alternating between the extremes listed in Figure 2.3.4, a marimbist can create a broader sense of ‘musical cognition’.\textsuperscript{63}

**Exploring Advanced Head Movements**

Existing marimba literature tends to overlook the importance of head movement in performance. For example, Stevens’ *MoMM* summarises specific responsibilities are divided by feet, legs, lower torso, arms, wrists and fingers,\textsuperscript{64} but does not mention any role assigned to the performer’s head for technical or gestural purposes. There is, however, a significant body of evidence to suggest the effectiveness of manipulating head movements on other instruments. Davidson identifies specific intentional head

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\textsuperscript{62} Ibid., p.59.

\textsuperscript{63} Broughton, ‘Music, Movement and Marimba: Solo Marimbists’ Bodily Gesture in the Perception and Production of Expressive Performance’, p. 117.

\textsuperscript{64} Stevens, *Method of Movement for Marimba*, p. 7.
movements, such as ‘head shaking’ and ‘[using the] head… to trace the contour of the music being played’ being employed by pianists.\textsuperscript{65} Thompson, Graham and Rosso highlight the example of B.B. King’s ‘rapid head shaking movement mirror[ing] vibrato on individual notes’.\textsuperscript{66} McClaren lists ‘head movement’ as one of the many factors that can be considered ‘affective visual stimuli’\textsuperscript{67} in a performance, but does not generate any instruction on how such movements can be utilised. During experiments with professional percussionists, Colton noticed that basic head movements, such as moving the head backwards and forwards ‘… often occurred with lyrical playing… or intense playing’.\textsuperscript{68} With the above in mind, it is counterproductive to suggest that head movements of marimbists cannot be manipulated to communicate ideas to the audience.

The \textit{Macro-Kinetics} model suggests that head movements can be simplified into the manipulation of distance between the marimbist’s head and the instrument. It is considered normal to have the marimbist’s head at a comfortable distance away from the instrument, usually determined by the performer’s height and whether or not there is sheet music available. This is defined hereinafter as ‘NORMAL’ proximity. Consequently, if the marimbist withdraws their head as far away from the instrument as possible while still being able to play the instrument beyond ‘NORMAL’ proximity, this is defined as ‘FAR’ proximity. If the marimbist’s head is as close to the instrument as possible, this is defined as ‘NEAR’ proximity. This is illustrated in Figure 2.4.1 (below).

\textsuperscript{65} Davidson, ‘Bodily Movement and Facial Actions in Expressive Musical Performance by Solo and Duo Instrumentalists: Two Distinctive Case Studies’: 598.
\textsuperscript{67} McClaren, ‘Focus on Research: The Visual Aspect of Solo Marimba Performance’: 54.
Figure 2.4.1: Three video stills demonstrating ‘NORMAL’ proximity, ‘FAR’ proximity, and ‘NEAR’ proximity.

The aforementioned resources mention highly specific use of the head in situations that portray musical outcomes. However, due to the subjective nature of such applications, the *Macro-Kinetics* model focuses mainly on more visible effects of the extremes of these head movements. For example, if the marimbist’s head is close to the bars, the craning of the neck and unorthodox playing position would imply feelings of tension and focus, extending to create the perception of a lower dynamic level to the audience. If the marimbist’s head is further from the bars, the player’s neck is lifted upward, giving the impression of release and breadth. With its ‘climactic’ appearance in mind, it could also be used to create the perception of a higher dynamic level. These effects are summarised in Figure 2.4.2 (below).
<table>
<thead>
<tr>
<th>PROXIMITY</th>
<th>RESULTANT EFFECT ADJECTIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Tension / Phrase Length / Dynamic Level)</td>
</tr>
<tr>
<td>FAR</td>
<td>Loose / Broad / High</td>
</tr>
<tr>
<td>NORMAL</td>
<td>Normal / Normal / Normal</td>
</tr>
<tr>
<td>NEAR</td>
<td>Tense / Short / Low</td>
</tr>
</tbody>
</table>

**Figure 2.4.2:** The effects of changes in proximity in head movements.

By gradually transitioning through these head movements, the marimbist creates gestures that follow the contours of their micro interpretation of a work. It is also possible to instantaneously employ an extreme head position for sudden effect. The attention drawn to the marimbist’s head adds another dimension of intent to a body part that is overtly visible during performance.

As demonstrated above, the basic movements of the *Macro-Kinetics* model are easily replicated and provide the foundations to building a marimbist’s repertoire of gestures. This is similar to how a sound knowledge of technique rudiments leads to a higher performance standard on the marimba. This rudimental approach aligns with the conclusions of the research in Chapter One, providing factual basis for its existence. In addition, these movements can be applied at varying levels to accommodate technical aspects of the performance, indicating minor disruption to economy of motion. The *Macro-Kinetics* model does not define these basic movements as the only methodologies for implementing physical movements on the marimba. It serves purely as stimulus that encourages the performer to begin exploring these areas of performance, allowing for more marimbists to gradually undertake the task of intentionally applying physical gestures to their performances.
CHAPTER THREE
USING THE MACRO-KINETICS MODEL

The Macro-Kinetics model’s strength lies in its ease of implementation and broad accessibility with its generalist terminology. In order to demonstrate the accessibility of the model, this chapter explores performances of marimba works as case studies in using the Macro-Kinetics model in a real world performance scenario. With their stylistic variance and differing levels of technical difficulty, Johann Sebastian Bach’s Violin Partita No. 2 in D minor and Violin Sonata No. 1 in G minor, Pius Cheung’s Etude in E minor and Andrew Thomas’ Merlin have been selected as the case studies to represent the capabilities of the Macro-Kinetics model. Despite their differences, these works are of significance to the marimba repertory. For example, Bach’s work appears regularly in marimba performances because of its technical demands juxtaposed with the innate simplicity of Baroque period harmonic structure. As seen in many recital programs, Cheung’s Etude is significant because of its pianistic style of writing and broad physical range. Thomas’ Merlin is considered one of the essential marimba masterworks of the 1980s, commissioned at the same time as the likes of Druckman’s Reflections on the Nature of Water, Schwantner’s Velocities, Ewazen’s Northern Lights and Mackey’s See Ya Thursday.

As evidence of the model’s usability, the author performed these works with the assistance of the model in a live recital performance performed entirely by memory. Memorising the work eliminates externalities associated with insufficient knowledge of

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69 When referring to elements of the Macro-Kinetics model, the terms SLOW, FAST, LARGE, SMALL will be indicated in BLOCK LETTERS to link the name of these gestures back to Chapter Two.

the music. For example, if the performer were to read from sheet music, it would be more difficult for them to execute certain gestures because their head would be fixated towards looking at the music. Similarly, not knowing the music to a competent standard would make it more difficult to construct a macro interpretation. It is therefore recommended that marimbists wishing to use the Macro-Kinetics model will have already memorised their works to a reasonable standard of competency.

**Introducing Micro Interpretation and Macro Interpretation**

As discussed in Chapter One, the terms ‘micro methodology’ and ‘macro methodology’ help differentiate the approaches required for technical and gestural purposes respectively. With this nomenclature in mind, this research introduces the terms ‘micro interpretation’ and ‘macro interpretation’ when discussing a marimbist’s interpretation of a written work. ‘Micro interpretation’ refers to acoustic and technical factors of the work, while ‘macro interpretation’ refers to non-technical elements of the work.

Therefore, the ‘micro interpretation’ is constructed from technical methods such as stick height, force and weight, while the ‘macro interpretation’ is constructed from the elements of the Macro-Kinetics model. Examples of possible interpretations are summarised in Figure 3.1.1 (below).
<table>
<thead>
<tr>
<th>Description of a Given Passage</th>
<th>Possible Micro Interpretation using Technical Elements</th>
<th>Possible Macro Interpretation using <em>Macro-Kinetics</em> model</th>
</tr>
</thead>
</table>
| *Fortissimo, pesante, allegro* passage | Greater\(^1\) arm weight  
Higher stick height  
More powerful stroke | FAST/LARGE arm gesture  
FAST/BROAD leg gesture  
FAST/LARGE torso gesture  
FAR head proximity gesture |
| *Pianissimo, dolce, adagio* passage | Lesser arm weight  
Lower stick height  
Less powerful stroke | SLOW/SMALL arm gesture  
SLOW/NARROW leg gesture  
SLOW/SMALL torso gesture  
NEAR head proximity gesture |

Figure 3.1.1: Summary of possible interpretations given to extreme examples of passages.

This chapter demonstrates possible examples of a marimbist’s total interpretation derived from existing micro and macro interpretations built from the *Macro-Kinetics* model. The model’s effectiveness will be demonstrated in case studies that have been chosen for their broad array of stylistic differences. The definitions in the model remain generalist and broad to allow varied interpretations of bodily movement. However, it is not suggested that the given interpretations of the case studies are ‘correct’. There is no absolute micro interpretation that marimbists must abide by. It is therefore anticipated that any marimbist wishing to utilise this model only adopts it as a barebones construct, building on these basic principles to create their own individual macro interpretations.

\(^{71}\) The terms ‘greater, higher’ and ‘lesser, lower’ refer to a difference in degree of intensity from what would be considered standard practice in a normal passage. For example, a ‘greater’ arm weight would be an arm weight that is ‘heavier’ than the normal arm weight required to execute a passage normally.
Case Study I: *Allemande from Violin Partita No. 2 in D minor (1720) by Johann Sebastian Bach (1685-1750)*

The violin partitas and sonatas of Johann Sebastian Bach have long been a staple of marimba repertory, with its transcriptions exhibited on numerous occasions as technical exercises, audition excerpts and recital performances. The innate simplicity in Bach’s rhythms and harmonies allow the performer to be flexible in their interpretation, indicating that every performance can be vastly different depending on the marimbist. Kite reinforces that the sixteenth-note rhythms of Bach’s music should not ‘be approached with the same metronomic precision that a snare drummer would use’. 72

Furthermore, the transcription element of the process also adds many possibilities for the marimbist, allowing the marimbist to further distance themselves from violin-specific conventions. For example, when transcribed for marimba, elements such as four-note chords that are normally played as two sets of two notes on violin can normally be played in any way the marimbist desires. 73 Similarly, violin-specific features such as legato articulation are obsolete on marimba due to the nature of the instrument, instead replaced with marimba-specific techniques including larger gestures or a light roll after a mallet strike. 74 These technical challenges instantly introduce greater possibilities to the performer’s micro and macro interpretation.

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The first bar of the Allemande movement from Violin Partita No. 2 in D minor, as seen in Figure 3.2.1 (below) is an impactful moment, as it serves to introduce the entire Violin Partita. It is important to note that micro interpretations will vary greatly amongst individuals, and as such, this bar often results in wildly different interpretations. For the purposes of this research, the author’s own micro interpretation will be used as an example to demonstrate the use of the Macro-Kinetics model. This is summarised in Figure 3.2.2 (below).^{75}

![Figure 3.2.1: Bar 1 of Allemande from Violin Partita No. 2 in D minor.](image)

| On Point X | Brief pause on the D  
|           | Moderate dynamic level |
| Point X to Point Y | Tempo maintained  
|                   | Slight crescendo through the ascent |
| On Point Y | C-sharp slightly stronger (but not as strong as point X) |
| Point Y to Point Z | Gradual slow down in tempo heading towards Z  
|                   | Slight diminuendo through the descent |
| On Point Z | Brief pause on the E  
|           | Lower dynamic level |

*Figure 3.2.2: Point-by-point analysis of the author’s micro interpretation of Figure 3.2.1.*

With this micro interpretation in mind, the marimbist can now extend their intentions by implementing macro methodology at each of these points. For example, as Point X’s pause and low pitch pertains to an interpreted ‘trough’, the marimbist can use a SLOW

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^{75} It is not suggested that a marimbist should always tabulate their micro interpretation in such detail, as the marimbist would already be self-aware of their own micro interpretation. This is mainly to demonstrate the justification of the macro interpretation.

and SMALL mallet movement, combined with a SLOW and SMALL torso movement to emphasise this ‘trough’. Throughout this passage, the marimbist can adopt a SLOW and BROAD leg movement to give the impression of breadth required by the micro interpretation. Consequently, the marimbist can start with their head at a NEAR proximity and gradually lift the head to FAR proximity upon approaching Point Z, indicative of a ‘peak’ on the high E. This is summarised in Figure 3.2.3 (below).

<table>
<thead>
<tr>
<th>On Point X</th>
<th>SLOW/LARGE mallet movement (on D)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SLOW/SMALL mallet movement (on all other notes)</td>
</tr>
<tr>
<td></td>
<td>SLOW/SMALL torso movement</td>
</tr>
<tr>
<td></td>
<td>SLOW/BROAD leg movement</td>
</tr>
<tr>
<td></td>
<td>NEAR head proximity</td>
</tr>
<tr>
<td>On Point Y</td>
<td>SLOW/LARGE mallet movement (on C#)</td>
</tr>
<tr>
<td></td>
<td>Head proximity changes gradually to FAR</td>
</tr>
<tr>
<td>On Point Z</td>
<td>SLOW/SMALL mallet movement</td>
</tr>
<tr>
<td></td>
<td>SLOW/LARGE torso movement (on E)</td>
</tr>
<tr>
<td></td>
<td>SLOW/BROAD leg movement</td>
</tr>
<tr>
<td></td>
<td>FAR head proximity</td>
</tr>
</tbody>
</table>

Figure 3.2.3: Point-by-point analysis of the author’s macro interpretation of Figure 3.2.1.

Conversely, the marimbist can also choose to limit the macro interpretation to select points of the work, such as in climactic phrases or at the end. This process is demonstrated in Figures 3.2.4, 3.2.5 and 3.2.6 (below).
Figure 3.2.5: Point-by-point analysis of the author’s micro interpretation of Figure 3.2.4.

<table>
<thead>
<tr>
<th>On Point X</th>
<th>SLOW/SMALL mallet movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No torso movement</td>
</tr>
<tr>
<td></td>
<td>SLOW/BROAD leg movement</td>
</tr>
<tr>
<td></td>
<td>NORMAL head proximity</td>
</tr>
<tr>
<td>On Point Y</td>
<td>SLOW/LARGE mallet movement (on A)</td>
</tr>
<tr>
<td></td>
<td>Head proximity changes gradually to NEAR</td>
</tr>
<tr>
<td>On Point Z</td>
<td>SLOW/LARGE mallet movement (on D)</td>
</tr>
<tr>
<td></td>
<td>SLOW/LARGE torso movement (on D)</td>
</tr>
<tr>
<td></td>
<td>NEAR head proximity (on D)</td>
</tr>
</tbody>
</table>

Figure 3.2.6: Point-by-point analysis of the author’s macro interpretation of Figure 3.2.4.

The above example demonstrates that macro interpretation can be omitted in sections that require efficient movement, such as Point X in Figure 3.2.4. However, movement can still be utilised to different degrees in particular areas of significance, indicating it is possible to implement sparingly when required.

Case Study II: Presto from Violin Sonata No. 1 in G minor (1720) by Johann Sebastian Bach (1685-1750)

Despite Bach’s compositional style being open to various interpretations, technical boundaries in certain works may prevent the marimbist from creating an in-depth macro

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77 Ibid., p.28.
interpretation. Bach’s *Violin Sonata No. 1 in G minor* is an example of this, following a similar compositional style to the *Partita*. However, the *Presto* movement is known for its brisk pace and resultant technical limitations when converted to two-mallet marimba. Despite this, the author found that when implementing macro methodology in a subtle manner throughout performance of the *Presto* movement, the audience’s perception of ‘embodied musical cognition’ was significantly increased through the visual feedback. It was therefore necessary for the author to implement macro methodology in a limited capacity to accommodate the associated technical limitations.

![Figure 3.3.1: Bar 1 of Presto from Violin Sonata No. 1 in G minor.](image)

| On Point X | Slow tempo  
Low dynamic level |
|-----------|------------------|
| Point X to Point Y | Gradually accelerating tempo  
Crescendo towards point Y |
| On Point Y | Brief pause on G  
Moderate dynamic level |

**Figure 3.3.2:** Point-by-point analysis of the author’s micro interpretation of Figure 3.3.2.

Figure 3.3.1 (above), a descending passage made entirely up of notes from the G minor chord, marks the beginning of the movement, and as such the author found it necessary to implement a subtle macro interpretation. In the author’s opinion, this is a precursor to the next phrase, which begins in bar four. As described in Figure 3.3.2, the author’s

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micro interpretation consists of starting slowly and accelerating through the descending G minor arpeggios, increasing in dynamic level upon approaching Point Y.

<table>
<thead>
<tr>
<th>On Point X</th>
<th>SLOW/SMALL mallet movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No obvious torso movement</td>
</tr>
<tr>
<td></td>
<td>SLOW/BROAD leg movement</td>
</tr>
<tr>
<td></td>
<td>NEAR head proximity</td>
</tr>
<tr>
<td>Point X to Point Y</td>
<td>Mallet movement gradually becomes LARGE</td>
</tr>
<tr>
<td></td>
<td>Head proximity gradually becomes FAR</td>
</tr>
<tr>
<td>On Point Z</td>
<td>SLOW/LARGE mallet movement</td>
</tr>
<tr>
<td></td>
<td>SLOW/SMALL torso movement (on G)</td>
</tr>
<tr>
<td></td>
<td>SLOW/BROAD leg movement</td>
</tr>
<tr>
<td></td>
<td>FAR head proximity</td>
</tr>
</tbody>
</table>

**Figure 3.3.3:** Point-by-point analysis of the author’s macro interpretation of Figure 3.3.2.

The macro interpretation in Figure 3.3.3 (above) would result in the performer physically ‘articulating musical expression’ through a ‘lean’ that reflects the overarching ideal of ‘descent’ in Figure 3.3.1. This does not interfere with the technical limitations of the G minor arpeggio. Firstly, the mallet height would have to increase naturally due to the dynamic level increase marked in Figure 3.3.2. The resultant mallet movement would already be increasing in proximity from a purely technical perspective, allowing for comfortable execution of the macro interpretation’s mallet movement. Secondly, the arpeggiation from Point X to Point Y in Figure 3.3.1 spans two full octaves. This indicates that the marimbist’s legs would have to be in a reasonably BROAD proximity for technical ease, allowing the marimbist to autonomously execute a SLOW/BROAD leg movement without any difficulty. Finally, a marimbist of intermediate skill level who has memorised the *Presto* movement will not be inhibited by changes in head proximity. With economy of motion remaining unaffected, the above will strengthen the intention of the micro interpretation in Figure

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80 Davidson, 'Bodily Movement and Facial Actions in Expressive Musical Performance by Solo and Duo Instrumentalists: Two Distinctive Case Studies': 599.
3.3.2, resulting in a true audio-visual performance experience for the audience. This aligns with the ideal of ‘total marimba performance’ as discussed in Chapter One.


Written in a pianistic, neo-Romantic style, Pius Cheung’s *Etude in E minor* is a marimba solo that replicates a pianistic style of writing, using straightforward harmonic language and Rachmaninoff inspired orchestration. Although Cheung fervently discourages the use of ancillary gesture to his students,81 it is demonstrated by this research that using macro interpretation at points of interest will not interfere with the technical efficiency required to accurately perform the *Etude*.

![Figure 3.4.1: Bar 23 of *Etude in E minor*.](#)

| **On Point X** | Slow tempo  
|                | Low dynamic level |
| **On Point Y** | Slight deceleration on Point Y (no pause)  
|                | Slight emphasis on D-G in bass line between Point Y and Z |
| **On Point Z** | Resume previous tempo  
|                | Dynamic back to low level |

**Figure 3.4.2:** Point-by-point analysis of the author’s micro interpretation of Figure 3.4.1.

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| On Point X       | SLOW/SMALL mallet movement  
|                 | SLOW/SMALL torso movement  
|                 | SLOW/BROAD leg movement  
|                 | NEAR head proximity  

| Point X to Point Y | Mallet movement gradually becomes LARGE  
|                   | Torso movement gradually becomes LARGE  
|                   | Head proximity gradually becomes NORMAL  

| On Point Y       | SLOW/LARGE mallet movement  
|                 | SLOW/LARGE torso movement  
|                 | SLOW/BROAD leg movement  
|                 | NORMAL head proximity  

| On Point Z       | SLOW/SMALL mallet movement  
|                 | SLOW/SMALL torso movement  
|                 | SLOW/BROAD leg movement  
|                 | NEAR head proximity  

**Figure 3.4.3:** Point-by-point analysis of the author’s macro interpretation of Figure 3.4.1.

It is the author’s interpretation that the *Etude’s sotto voce* section illustrated in Figure 3.4.1 (above) must be of significant contrast to the *Etude’s* heavy introduction. Throughout this section, a SLOW/SMALL mallet movement is used to visually reproduce a singing melody line in the right hand. The SLOW/SMALL torso movement, facilitated by diagonal elbow movements, reinforces this feeling of warmth and airiness. The legs remain SLOW/BROAD to ensure the section does not feel tense. Upon reaching Point Y, a cadential point, the emphasis of the chord change is reinforced by the LARGE mallet movement and LARGE torso movement, briefly drawing the audience’s attention to this point of difference. Subsequently, when reaching Point Z, the movements resume to their normal positions as a replication of Point X. As this section is played with a slight *rubato* through the author’s micro interpretation, these extended gestures are still comfortable to implement. This demonstrates the ability of the macro interpretation’s gestures to strengthen the expressive requirements of the work with negligible adjustment to the marimbist’s technical requirements.
The importance of a macro interpretation remains when the passage is of significant technical difficulty. The coda of the *Etude* consists of four major points where a macro interpretation can be created, marked X, Y1, Y2 and Z in Figure 3.4.4.

![Figure 3.4.4: Bar 55 of *Etude in E minor*.](image)

The author’s micro interpretation is summarised in Figure 3.4.5 (below). Following the climax at Point X, a rapidly disappearing peak appears at Y1, followed by a chord of moderate intensity at Y2, before ending in a nonchalant manner with no sustained presence at Point Z.

<table>
<thead>
<tr>
<th>On Point X</th>
<th>Slight pause</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High dynamic level</td>
</tr>
<tr>
<td>Point X to Point Y1</td>
<td>Accelerando all the way to Y1</td>
</tr>
<tr>
<td></td>
<td><em>Crescendo</em> in dynamic level</td>
</tr>
<tr>
<td>On Point Y1</td>
<td>Start deceleration in tempo</td>
</tr>
<tr>
<td></td>
<td>Very high dynamic level</td>
</tr>
<tr>
<td>On Point Y2</td>
<td>Continue deceleration</td>
</tr>
<tr>
<td></td>
<td>High dynamic level</td>
</tr>
<tr>
<td>On Point Z</td>
<td><em>Ad libitum</em> placement</td>
</tr>
<tr>
<td></td>
<td>Moderate dynamic level</td>
</tr>
</tbody>
</table>

![Figure 3.4.5: Point-by-point analysis of the author’s micro interpretation of Figure 3.4.4.](image)

As the marimba cannot produce sustained phrases in an organic manner, the macro interpretation is required to combine all of these micro components together in a way that can be understood easily by the audience.84 The marimbist begins by using a

83 Ibid., p.6.
84 James, 'Redefining 'Sustain' and the Roll: The Dilemma of the Decay in Percussion': 58.
FAST/LARGE mallet movement on Point X, combined with a SLOW/NARROW leg movement and FAST/SMALL torso movement. These movements together represent a moment of tension and limited sustain, indicating that the passage continues afterward. As the written crescendo progresses to Point Y1, the mallet and torso movements become larger and the head movement becomes FAR to indicate the approach to a climax. At Point Y1, the first of the four final chords, a FAST/LARGE mallet movement is given to indicate its quick release and high dynamic level. The torso movement, facilitated by horizontal elbow movement, becomes LARGE to continue phrasing from Y1 to Y2 seamlessly. The leg movement continues to be BROAD to give the impression of smooth movement between the four chords. Finally, as Point Z is deemed to be nonchalant, all movements become SMALL and NARROW and the head is brought NEAR to the instrument, creating a ‘freeze’ effect that signifies the end of the work. This is summarised in Figure 3.4.6 (below).
**Figure 3.4.6:** Point-by-point analysis of the author’s macro interpretation of Figure 3.4.4.

The macro interpretation in Figure 3.4.6 aligns with the respective difficulties of each section in Figure 3.4.4. For example, the chromatic passage from Point X to Y1 is almost devoid of any gesture that would not already be happening as a consequence of its technical requirements. The marimbist would already be playing with gradual progression towards a FAST/LARGE mallet movement so as to facilitate the written crescendo. Through its lack of density, Points Y1, Y2 and Z are given leading roles in the macro interpretation as most marimbists would be able to accommodate additional gestures in the widely spaced chords. It can be seen that physical gesture can be applied to sections of the Etude without inhibiting its pianistic nature and demanding technical requirements, attesting to the ease that a macro interpretation can be applied to almost any virtuosic passage of music.
Case Study IV: *Time’s Way*, second movement from *Merlin* (1985) by Andrew Thomas (1939-)

*Merlin’s* virtuosic second movement, *Time’s Way*, consists of numerous opportunities where the marimbist’s choice of macro interpretation significantly strengthens their micro interpretation.

![Figure 3.5.1: Bars 25 to 29 of the second movement of Merlin.](image)

The excerpt in Figure 3.5.1 (above) shows an example that ends with nine semiquaver double vertical strokes, immediately followed by one whole bar of rest. With the remainder of this passage being at a relatively low dynamic level, Figure 3.5.1 is a section of importance as it is the first instance of a *fortissimo* combined with double vertical strokes in the movement. Various interpretations of this passage exist, with some marimbists opting to add a voluntary *ritardando*, while others opting to interpret this passage with no tempo change whatsoever. Regardless of the chosen micro interpretation, the implementation of a macro interpretation at this point reinforces this point of interest to the audience.

| Before Bar 28 | FAST/LARGE mallet movement  
|               | NEAR head proximity |
| On Bar 28     | FAST/SMALL to SLOW/LARGE mallet movement on final chords  
|               | FAST/SMALL torso movement  
|               | FAR head proximity |

![Figure 3.5.2: Point-by-point analysis of the author’s macro interpretation of Figure 3.5.2.](image)

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For example, in order to sustain the sound of the last chord in bar 28, the use of a SLOW/LARGE mallet movement on the last chord can visually deliver the impression of a longer release to the audience. By contrasting this with FAST/LARGE and FAST/SMALL movements leading up to it, the result is a relentless, high-density passage that is bookended by a moment of decay. If the marimbist were to employ a FAST/LARGE mallet movement on the last note, the resultant abrupt visual ending would be of great contrast to the author’s macro interpretation.

Figure 3.5.3 (below) demonstrates another example where gesture in bars of silence can be manipulated to suit the author’s micro interpretation. This excerpt is chosen as it is the first passage in the movement to utilise a rhythm other than constant semiquavers. The use of the 4:6 cross-rhythm, combined with multiple beats of rest, ensures that this section is automatically a point of interest.

![Figure 3.5.3](image.png)

**Figure 3.5.3:** Bars 99 to 101 of the second movement of *Merlin.*

For the first 4:6 instance (Point X), the author has deemed these to be notes that should be abrupt in decay on the sforzando, followed by a quieter note with a long release. The second 4:6 instance (Point Y) is interpreted in a similar fashion, albeit with a shorter release. Finally, the third 4:6 instance (Point Z) is interpreted in a similar fashion to the first as it is also followed by one bar of rest. With the author employing the same methodology as in Figure 3.5.2, the resultant macro interpretation is summarised in Figure 3.5.4 (below).

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86 Ibid., pp.3-4.
On Point X

First note:
FAST/SMALL mallet movement
NEAR head proximity

Second note:
SLOW/LARGE mallet movement
SLOW/SMALL torso movement
NORMAL head proximity

During both notes:
No noticeable changes to leg movement

Point X to Point Y
Continuous SLOW mallet movement from Point X’s second note to indicate decay during rest
SLOW/SMALL torso movement
Head proximity resets to NEAR

On Point Y
Same as Point X except for the following:
Second note:
FAST/LARGE mallet movement
FAST/SMALL torso movement

On Point Z
Same as Point X

Figure 3.5.4: Point-to-point analysis of the author’s macro interpretation of Figure 3.5.3.

The above gestural approaches take maximum precedence in the final page of *Time’s Way*, where there are ample opportunities to present a marimbist’s individuality through their macro interpretation.

![Figure 3.5.4](image)

Figure 3.5.5: Bars 204 to 207 of the second movement of *Merlin*.

Figure 3.5.5 (above) is one of the final sections of *Time’s Way*, where a rapid demi-semiquaver chromatic passage is immediately followed by a rapid succession of double vertical octaves. This section bookends the final theme, consisting of a build up in notational density from bars 182 to 201. With a combination of double vertical strokes, 

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87 Ibid., p.7.
a physical span of over four octaves and a *fortissimo possibile* dynamic level, this section requires a high level of micro and macro-based intensity. Therefore, as it is of such high intensity in comparison to the rest of the movement, the execution of this section is pivotal and requires prior thought. The author’s micro interpretation maintains a brisk tempo from Point X to Point Y, before a brief deceleration directly on Point Y. At Point Z, a lengthened breath precedes the double vertical octaves, which begin slowly before accelerating rapidly towards the bottom of the marimba. This ‘bell curve’ effect can be strengthened through the macro interpretation in Figure 3.5.6 (below).

<table>
<thead>
<tr>
<th>Point X to Point Y</th>
<th>FAST/SMALL mallet movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No noticeable torso movement</td>
</tr>
<tr>
<td></td>
<td>SLOW/BROAD leg movement</td>
</tr>
<tr>
<td></td>
<td>NORMAL head proximity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>On Point Y</th>
<th>SLOW/LARGE mallet movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SLOW/LARGE torso movement</td>
</tr>
<tr>
<td></td>
<td>SLOW/NARROW leg movement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>On Point Z</th>
<th>FAST/LARGE mallet movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No noticeable torso movement</td>
</tr>
<tr>
<td></td>
<td>SLOW/BROAD leg movement</td>
</tr>
<tr>
<td></td>
<td>FAR head proximity</td>
</tr>
</tbody>
</table>

**Figure 3.5.6:** Point-to-point analysis of the author’s macro interpretation of Figure 3.5.5.

As the marimbist approaches Point Y, the mallet movements are kept SMALL and stance is maintained through the SLOW/BROAD leg movement. The movements become larger as the deceleration on Point Y is reached. To facilitate the three-octave span between the hands at Point Z, a sudden SLOW/BROAD leg movement is employed, combined with a FAR head proximity and FAST/LARGE mallet movements. With the low stance and enhanced mallet movements, this gives the visual representation that the section following Point Z is of extreme intensity and power.
As mentioned in all of the case studies, the economy of motion required to deliver these passages is unperturbed by the macro interpretation. By examining works of varying technical difficulties, the possibility of employing the *Macro-Kinetics* model in any situation has been demonstrated. It is possible for any marimbist to adopt the *Macro-Kinetics* model at their required level of depth, and it is therefore possible for any marimbist to easily implement macro interpretations in their performances.
CONCLUSION

With its standing position and physical breadth, the marimba is an instrument that must be played with an innate physicality. All physical movements on the marimba are highly visible and therefore must be considered an integral part of the performance. Once the marimbist has achieved a technically proficient macro interpretation, the addition of gesture will then enable a total performance experience for the audience. The Macro-Kinetics model simplifies the pursuit for a total performance that contains ‘embodied musical cognition’, an objective that marimbists often strive for but lack the self-awareness of physicality to achieve it easily.

Chapter One reviewed research that reinforced the necessity of harnessing physical movements in a performance. Broughton, Manning, McClaren and Schutz concluded that deliberate manipulation of physical gesture should be a focal point in a marimbist’s preparation for performance. This research unequivocally placed a higher level of importance on the performer-audience relationship. In addition, it sustained the need for a rudimental approach on gesture, creating a system that assists with building a marimbist’s self-awareness of their physicality. This was despite Colton deeming it uncommon for professional marimbists to use a tangible system to create their macro interpretations, as their performances already encapsulate physical movement in their years of experimentation and experience. However, a marimbist with lesser performance experience may have difficulties in understanding how their body is able to convey intent. Subsequently, Colton’s interviewees also suggested that gesture

should be actively taught and demonstrated to students of the marimba, as it does not always occur ‘naturally’ to students. Therefore, a factual basis for the Macro-Kinetics model’s existence was created, reinforcing the aims of this research.

Chapter Two demonstrated the elements of the Macro-Kinetics model, a causality-based movement model explained with simplified vocabulary. This model was created to fulfil the conclusions in Chapter One, providing the marimbist with a methodology to benefit from the successful findings of the aforementioned research. Its ambiguous terminology allowed marimbists to build their own interpretations that reflected their individuality, instead of opting for a pre-determined strategy that was deemed ‘the correct way’. By dividing the body into sections and using video stills to demonstrate the simplicity of these movements, the marimbist is encouraged to experiment with these movements to familiarise themselves with the perceived effects of certain gestures. Throughout this process, if a certain movement was to inhibit the efficiency of the marimbist’s performance, they could either apply the movement to a lesser extent or discard it completely. In so doing, the marimbist becomes aware of the direct results achieved from simple physical movements while still retaining economy of motion.

Chapter Three demonstrated the real-world possibilities of the Macro-Kinetics model, with the author’s own performances used as case studies to reinforcing the generalist approach of applying simple physical movements with known effects to a marimbist’s chosen micro interpretation, in turn creating a macro interpretation. The works of Bach, Cheung and Thomas indicated that the Macro-Kinetics model could be used in a range of styles and difficulty levels without impeding technical aspects of performance. It was this synergy of micro and macro methodology that would create a total performance for

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90 Ibid., pp.344-347.
the marimbist without sacrificing their individuality. The chapter attests to the *Macro-Kinetics* model’s flexibility and versatility, providing basis for more marimbists to adopt this model as a form of implementing physical gesture into a marimba performance.

The *Macro-Kinetics* model provides a systematic approach to generating a macro interpretation. Its causal methodology simplifies the kinaesthetic relationship between movement and effect, allowing any marimbist to produce macro interpretations quickly and easily. However, it is not the only way to produce macro interpretations, with the existing research in Chapter One indicating some marimbists are able to produce it without the help of a model. As there is no literature published that is similar to the *Macro-Kinetics* model, it can be used as assistance for any marimbist struggling to find a concrete solution to augmenting their physical movements for the purposes of conveying artistic intent. The *Macro-Kinetics* model complements existing method literature, while adding to the conversation surrounding physical gesture in marimba performance, providing a foundation for others to build similar systems that assist the everyday marimbist in producing a total performance experience.
BIBLIOGRAPHY


Thompson, William Forde, Phil Graham, and Frank A. Russo, 'Seeing Music
Performance: Visual Influences
APPENDIX
GLOSSARY

Ancillary gesture: a gesture that is not strictly required for sound production.

Downstroke: a mallet or stick’s upward vertical motion.

Economy of motion: emphasis on necessary movement only, removing all excess motion so as to prevent the use of excess energy.

Grip: the specific technique a percussionist uses to hold mallets or sticks.

Laban movement analysis: a methodology often used by movement specialists to describe body movement with descriptive language.

Musser grip: one of the first modern four-mallet grips, developed by Clair Omar Musser in the 1920s.

Stevens grip: a four-mallet grip developed by Leigh Howard Stevens in 1979. The Stevens grip is a modification of the Musser grip. It remains one of the most commonly used four-mallet grips amongst the international percussion community.

Upstroke: a mallet or stick’s upward vertical motion.