The role of imagination in violin bow technique

Applying imagination theory to Flesch and Galamian’s pedagogy

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Declaration

I, Sonia Wilson, hereby declare that this submission is my own work and that it contains no material previously published or written by another person except where acknowledged in the text. This thesis contains no material that has been previously accepted for the award of a higher degree.

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Date: 1/07/16
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Abstract

The theoretical concept of violin bow technique requires a differentiated understanding of what is involved in bow movement. The aim of this thesis is to develop the diversity of phenomenological explanations of violin bow technique through the application of imagination theory to the visual paradigm employed in Flesch and Galamian’s treatises.

Imagination theory is defined through a survey of the pertinent, available literature from various disciplines including: sports psychology, education psychology, music psychology and works by lesser-known pedagogues. Analysis of documents and texts was used to identify common themes and compile a list of fundamental elements underlying the application of imagination theory. A contextual analysis of Flesch’s *The Art of Violin Playing* and Galamian’s *Principles of Violin Playing and Teaching* was conducted to understand the shift in philosophies of violin pedagogy from a visual paradigm to incorporating the temporal and kinaesthetic aspects of imagination theory. These two approaches to pedagogy were then combined and applied to some fundamental concepts and strokes of violin bow technique: bow hold and bow change, detaché, spun note (*son filé*), legato, martelé, and springing and thrown strokes – spiccato and sautillé.

The present study successfully illustrates the application of imagination theory to violin bow technique as an effective method for developing a holistic, temporal and dynamic description and approach to violin bow techniques. This thesis shows that the combination of a visual paradigm with kinaesthetic sensations and imagery, the main type of motions involved (ballistic or continuous), muscle activity and limb movement
required (what is active/passive, are they continuously- or actively-innervated), and the
inclusion of impulses and understanding of the complete cycle of the technique
successfully inspires and stimulates the imagination to understand and conceptualise the
technique in its entirety.
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Chapter 1 - Introduction

Violin bow technique is the most important and also the most abstract aspect of violin technique. The bow and its use determine the tone and affect the sound of the violin. While much emphasis is given to the development of left hand technique, bowing technique is far more complex and intangible due to the fact that the right arm only comes into contact with the string through the medium of the bow and its hair (Flesch, 1924). That is to say the player can only imagine the actual sensations of this point of contact, informed through feedback from the fingers of the bow hold. In their treatises, pedagogues such as Flesch and Galamian begin to discuss the benefits of mental imagery in learning a technique, showing a shift in the underlying ideologies of violin pedagogy. However, their approaches are still very much grounded in a visual paradigm, preferring to address techniques with bio-mechanical descriptions of the placements and functions of specific body parts. This paradigm results in incomplete descriptions that leave the player with potentially only a basic comprehension of what is required in the performance of the technique. The theory of imagination in violin bow technique aims to instead provide the player with a holistic understanding of all aspects of a technique that might be adapted and applied far easier. The term “theory of imagination” is used in this thesis to encompass principals of mental imagery and visualisation, most commonly found in sports and education psychology, and will be explain and defined in further detail in Chapter 2.

In violin pedagogy there have emerged certain traditions in the approach to the presentation and description of bow techniques. A paradigm is a set of conventions, concepts, values and practices that combine to create an approach to the views of a
subject by a community, it creates a framework as to how physical aspects may be presented (Kuhn, 1977). Similarities of the works by many pedagogues have contributed to a, perhaps unintended, formation of a paradigm. The notion of a paradigm has most famously been developed by the work of Thomas Kuhn. In the world of science, paradigms are used to provide a model of problems and solutions that aid in the realisation of a scientist’s goals (Kuhn, 1977). Many of the reasons for the use of a paradigm in science may also support using the notion of a paradigm in violin pedagogy. This aids in the development of skills by focussing the attention on a limited number of features of the relevant matter, so that one is not overwhelmed in the learning of skills. However, this narrowing of attention can prove highly detrimental when a long-accepted paradigm is employed for too long and can cause conditions that make a shift in the approach to pedagogy difficult to accept, resulting in important aspects of newer theories being overlooked (Brad Wray, 2011). A shift in paradigm requires the discontinuation of many aspects of the original paradigm, which are replaced or improved, by aspects of the new one. The long trusted use of the visual paradigm in violin pedagogy, while undoubtedly beneficial in many aspects, is not sufficient in its presentation of certain dynamic and temporal aspects of bow technique. To keep up with the many developments and advancements in psychology, human movement and modern violin technique, it is imperative to present concepts in a way that incorporates all aspects of a technique so that this is easily conceptualised and applied through the application of imagination theory.
Visual paradigm vs. imagination theory

The primary use of bio-mechanic descriptions with little or no incorporation or sense of temporality and energy of movement means the descriptions of violin bow techniques are firmly rooted in a visual paradigm. Many pedagogues begin their discussion of violin bow technique with a clarification of the specific positions and placements of various parts of the right arm, right hand and fingers of the bow hold. This means that the majority of the fundamental work in setting up the mechanism of the right arm may be spent in trying to mimic exactly the outward appearance of these positions with little thought given to how these positions will actually function when put into action. There is a trend, particularly in violin bow technique, of describing the active techniques through the analysis and specification of positions of the arm, hand or fingers at any given stage of the technique\(^1\). Although this may give the impression that movement is incorporated into an explanation of technique, it in fact only presents the player with frozen snapshots in time; a sequence of positions that must be achieved, but with no understanding of the type of motion or energy required to transfer from one state to another. The visual paradigm imports elements of reactive behaviour, an altogether unproductive approach that requires the student to work from fixing a mistake after it has occurred rather than preventing the occurrence of a mistake in the first place. This approach has severe limitations when it comes to the holistic comprehension of technique that is required for it to become implicit knowledge.

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\(^1\) For example, in Galamian’s discussion on the drawing of a straight bow stroke he describes the movement through the description of three specific positions of the right arm, designating a shape to each of these positions: triangle, square and point (Galamian, 1964). Flesch’s discussion on the bow hold begins with specific instructions on where the individual fingers must be placed: “The index finger touches the stick at the line separating the second from the third joint, and in addition embraces it with its first and second joints. There is a very small interval between the index and middle finger. The index finger assumes the guidance of the bow, and the little finger only touches it at its lower half while playing.” (Flesch, 1924, p. 51)
Imagination theory on the other hand is a much more complete approach to the instruction of bow technique. Rather than present concepts in terms of a detailed description of the positioning of different body parts, it aims to incorporate temporality and sensations into a holistic conceptualisation of violin bow technique. The bow is essentially the soul of the violin – it is what actually produces the sound (Capet, 1927). Without the correct understanding of how the bow may be used, it is impossible to achieve the full potential of sound production on the violin. As mentioned before, the concept of bow technique is a somewhat abstract one due to the indirect, imagined contact with the string. It is vital that the concepts that form the basis of violin bow technique be presented in a way that makes this intangible notion easily understandable.

For the purpose of this thesis, imagination theory can be referred to as no more than a theory when it comes to violin pedagogy. There has been very little written on the specific application of imagination to violin pedagogy and bow technique. Whatever can be found on the subject has come indirectly from other disciplines such as sports psychology, educational psychology and music psychology. The sources available that deal with the specific application of imagination to instrumental pedagogy are nowhere near as common or thorough as the treatises of pedagogues such as Galamian and Flesch that deal primarily with the visual paradigm. Through a survey and synthesis of the available and pertinent literature from all disciplines mentioned, Chapter 2 will present the different elements that comprise the theory of imagination and will present

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an overview of the core fundamentals that underlie its application to begin to fill this gap in the literature.

The aim of this thesis is to develop the diversity of phenomenological explanations of violin bow technique through the application of this imagination theory to the visual paradigm employed in Flesch and Galamian’s treatises. To be able to provide a holistic conceptualisation of violin bow technique, aspects from both the visual paradigm, such as the detailed descriptions of the positioning of body parts, as well as temporality and kinaesthetic imagery will be combined to present a comprehensive description of the techniques. To be able to teach this abstract aspect of violin technique, we must present a differentiated understanding of what it involves to move the bow. With this thesis I hope to begin the discussion on incorporating imagination into the way pedagogy is presented today. It is my belief that the inclusion of this theory will help to present techniques in a way that may clarify many of the gaps left in the pedagogical literature by a predominant use of the visual paradigm.

Research questions:
What is imagination theory? What are its key aspects and underlying fundamental approaches?
How has violin pedagogy progressed and developed through time? How do Flesch and Galamian’s treatise illustrate this progression? Are there elements of imagination theory present in their pedagogy?
What is the best way to present a technique in a holistic phenomenological way? How do these translate to violin bow techniques?
Methodology

Dealing with a concept as abstract and elusive as imagination means that an approach to researching and applying the theory presents certain complications when settling on a methodology and underlying philosophy. Ask any professional, student or layman what the term “imagination” means to them and we are sure to get as many different answers as people asked. This also applies to approaches in researching the subject. For the purpose of this thesis I have decided on a methodology that centres mainly on documentary research and textual analysis. Documentary research has significant benefits in allowing researchers to understand and explore non-scientific concepts from an empirical scientific foundation by marrying methods from diverse disciplines. However, it may still pose certain limitations and so it is important when dealing with an evolving imagination theory to provide an overall neutral stance and as un-biased an opinion as possible. Instead of dealing with contemporary experiences and thoughts on the topic, I will be using relevant written texts available on aspects of the two approaches to pedagogy to inform my own interpretation and stance.

As there is no official treatise applying this theory to any type of music pedagogy, the data to support and define imagination theory is being gathered through a quantitative analysis of the themes present in a survey of a number of different contemporary sources that deal with imagination theory in a range of different disciplines in a literature review. These will include texts from the following disciplines: sports psychology, education psychology, music psychology, human movement, and works by other lesser-known instrumental pedagogues such as Auer, Capet, Rolland, Steinhausen
and others. As it is still a relatively undefined approach to violin pedagogy, I am aiming to provide a solid theoretical groundwork on the basis of which empirical work may later become possible. My textual analysis will be used to form a general understanding of the fundamental elements underlying the application of the theory for use in this thesis and will be presented in chapter 2.

There is also a need to include a contextual analysis of Flesch’s *The Art of Violin Playing* (1924, 1930) and Galamian’s *Principles of Violin Playing and Teaching* (1964). These two pedagogues and their treatises are considered the pillars of the modern day violin technique. A contextual analysis of their works will help to understand the development of the violin bow technique but also the progression of the ideologies underpinning the way in which violin pedagogy is approached. These two treatises are perfect examples of the fluid approaches to teaching such highly developed skills and pave the way for a shift towards a pedagogy that includes imagination theory. It is in determining the intended meaning of the treatises where we must take care to approach the analysis in the correct way. Interpretation is often seen as a very individual and subjective concept that can vary greatly between each person and it can also vary greatly depending on the time and place the text was written or read. There are two ways of approaching the meaning of a text – literal or interpretive. A hermeneutic approach to interpretation involves “interpretive understanding of individual concepts, appreciation of the social and cultural context through which the various concepts are related in a particular discourse, and a judgement on the meaning and significance of the text as a whole.” (Scott, 2014, p. 35) It is of utmost importance to gain a clear understanding of the conditions and context in which a text was written. We must then
approach the analysis from this frame of meaning. To achieve this, a contextual analysis must be made surrounding the time frame in which both Flesch and Galamian’s treatises were written. Historical environment and popular ideologies of the time may have greatly influenced the underlying ideologies of the authors and so have affected their approach to their pedagogy and the paradigm that they have adopted. This contextual and historical analysis will be presented in chapter 3.

The two main approaches to hermeneutic textual analysis are ‘semiotic approach’ and ‘content analysis’. Either approaches the text from very different angles. Semiotics, or the science of signs, analyses the text from the system of rules that structure the text and try to decode the hidden meaning that may be underlying the text (Scott, 2014). Content analysis, an older tradition, uses quantitative techniques to figure out how often certain ideas, phrases or words are employed to determine the significance placed on them by the author. On the other end of the spectrum is grounded analysis, which does not start with a defined set of terms, phrases or ideas and instead allow the themes to emerge from the text as the analysis progresses through it. A mixture of content and grounded analysis will be used in this methodology.

When interpreting a text there are three aspects that must be determined:

1. The intended content – what the author intended to produce
2. The received content – the meaning construed by its audience
3. The internal meaning – a more transient meaning that may or may not have been intended by the author. (Scott, 2006, p. 39)

It is not possible to produce a wholly objective interpretation and understanding of a text, it is only possible to offer an interpretation that pays close attention to the
perspectives of its author in the context it was written in and the interest of all of its potential audiences, both in the same context as the author was in or in whatever form the context has taken since.

Jupp and Norris (1993) divide textual analysis into three traditions: positivist, interpretative and critical. A positivist approach entails the “objective, rational, systematic and quantitative nature of the study.” The interpretive approach stresses “the nature of social phenomena such as documents as being socially constructed”, and the critical tradition is “heavily theoretical and overtly political in nature, emphasising social conflict, power, control and ideology” (McCullogh, 2004, p. 46). By using both a content/grounded analysis as well as a historical/contextual analysis I will be employing positivist and interpretative traditions in my research.

For the application of imagination theory to the visual paradigm in chapter 4, I have had to develop my own method of presenting the descriptions supported by the findings of chapter 2. It is not merely a matter of saying, “use your imagination to picture the stroke before you do it”. I have decided to approach the development of the descriptions and definition of techniques so that they are presented in a way that lends itself to immediately and actively stimulate the imagination of the player. I have chosen to focus on two basic principles of violin bow technique – the bow hold and bow change – and six fundamental strokes from which many others are derived – detaché, spun note (son filé), legato, martelé and the springing and thrown strokes, spiccato and sautillé. Each description and definition will include the following aspects:

- A description of the acoustic qualities of the stroke
The aim of the application of imagination theory to the pedagogy of violin bow technique is to be able to present the techniques in a way that allows one to conceptualise and anticipate the technique wholly. An important aspect of learning different bow techniques is in understanding what it takes to produce the desired sound. Keeping this in mind, there may be a stage of ‘back and forth’ between what is perceived and what actually occurs before the desired sound is produced. The inclusion of acoustic, visual, kinaesthetic and temporal aspects in the descriptions of technique is designed to immediately inspire the imagination of the player in a way that the energy and sensations of the movement can be clearly understood and conceptualized in anticipation of the stroke.
Chapter 2 – What is imagination theory?

Imagination is an abstract concept that has been given many different meanings from different underlying philosophies throughout history. We often hear that it is the imagination of a performer that is his/her true genius, so why is it then disregarded when it comes to pedagogy? Perhaps the evasiveness of the concept has deterred pedagogues from incorporating it into their teaching, even though the notion that music and musical performance must be imaginative and involve the imagination seems to be commonplace. In this thesis, imagination is discussed in terms of its relevance to technical concepts and how beneficial the development of the relationship between imagination and technique is to the teaching of violin bow technique. This chapter will review and synthesise available literature from a number of different disciplines in an effort to understand key elements to help make the application of imagination in violin bow technique pedagogy successful.

Imagination, as it is most commonly referred to, is the ability to form images and sensations in the mind. In history it has had the reputation of being a distraction for children and adults with “lower-level intellectual functioning” (Egan, 1992, p. 34). It is gradually becoming more accepted as a useful mental tool with which to enhance the learning of difficult skills. Like most abstract concepts, the attitudes towards imagination have changed drastically over the centuries depending on the social and philosophical trends of the time.
The earliest instances of imagination can be traced back to ancient traditions such as Greek and Hebrew (Barth, 2001). In these cultures the term was synonymous with foresight or planning, however as the creativity was deemed a prerogative of the divine in these times it was often associated with threats to divide God from His people or an attempt to usurp His power (Barth, 2001). Imagination was often denounced as being “unproductive thought, reasonless, like the unconscious rambling of a demented dreamer” (Egan, 1992, p. 10). Although this may have been the attitude held at the time, imagination was vital to the longevity of a tribe’s lore. It was the need to memorise things that developed our capacity for imagination; the more vivid the images, the more secure their history.

In classical Greek times, Plato considered the imagination to be one of the lower parts of human nature (Barth, 2001). He believed the development of the imagination took away from the development of the higher functions of our minds. His student Aristotle, however, considered the imagination to be consistently involved in our intellectual activity (Egan, 1992). To both Aristotle and Plato, the imagination was still a mostly reproductive activity, instead of the productive mental process we understand it to be today. In medieval times, St Thomas Aquinas, influenced by Aristotle, believed the imagination to act as a facilitator between body and mind: “it passes up to the reason in the form of images what it takes from perception, and the intellect then purifies these images into abstract ideas” (Egan, 1992, p. 17). The official church opinion of this time still believed the imagination to be of the weak part of the mind, susceptible to leading to confusion between reality and fantasy (Bundy, 1927).
With the arrival of the Enlightenment, it was found that the imagination could be used to understand abstract ideas and concepts that could not be recreated in a concrete form, such as the idea of infinite space or endless numbers (Engell, 1981). The Romantics inherited a concept of imagination that involved three functions (Egan, 1992, p. 23):

1. It was involved in perception, creating particular kinds of order and making sense of experience for us;
2. It was a conjuror of images of what we had in the past perceived or of images made by combining elements from past perception into new forms;
3. It was tied to our emotions, evoking responses to what was not present as though it was present.

In the twentieth century, philosophers sought to disentangle imagination from imagery. Sartre formed a theory of imagination that “must account for the spontaneous discrimination made by the mind between its images and its perceptions and [it] must explain the role that images play in the operation of thinking” (Egan, 1992, p. 28). After several experiments conducted where it was found that women, children and people of the labouring class were able to visualize images more vividly than people of a more intellectual profession, psychologists believed imagination to be associated with “lower-level intellectual function” (Egan, 1992, p. 34). This opinion has now been completely disregarded in the field of psychology where it is believed to be the key to unlocking many facets of the human intellect and psychology.

The field in which imagination in practice receives the most prominence is in sports psychology. Using terms such as mental rehearsal, visualisation, imagery, being ‘in the zone’ and peak performance, sports psychologists have been investigating and campaigning for the benefits of supplementing and balancing actual physical training programs with mental exercises and visualisation. Much of what has been applied in
this field can be taken and applied to violin pedagogy, particularly if one agrees with the opinion that musicians are elite athletes in their own right.

Mitchell Page and Andrew Vande Moere (2006) from the University of Sydney have done a study in the role of visualisation in team sports and have come up with the following settings where the term may be applied:

1. Scientific visualisation is the use of visual images that aid the understanding of complex scientific concepts.
2. Information visualisation is the visual representation of abstract data to amplify cognition.
3. So-called non-visual visualisation is the use of human senses other than sight to convey data, such as sound and touch. (Page & Moere, 2006, p. 1)

All three of these points are applicable to violin pedagogy: (1) the use of visual aids and descriptions so often employed through the visual paradigm, (2) the use of diagrams and illustrations and (3) the kinaesthetic sensations present in the successful execution of a technique. It is this last point that is most important for the use of imagination in instrumental pedagogy. To be able to fully understand the motions and movements involved in executing a particular technique or stroke, the kinaesthetic sensations must inform the appropriate imagery.

Garfield and Bennett (1984) attribute the introduction of mental training to elite athletes’ training programs to the Soviet space program. The need for astronauts to have an ability to control various psychophysiological processes while in space without the use of laboratory equipment or drugs led to Alexander Romen exploring the application of yoga techniques in a field of inquiry that became known as self-regulation training or psychic self-regulation (Garfield & Bennett, 1984). Romen proved that humans are able
to voluntarily control their autonomic functions such as heart rate, temperature and muscle tension as well as being able to regulate emotional reactions in highly stressful situations, for example, zero gravity. Twenty or so years after these advancements, sports psychologists became central to elite athletes’ training programs in the Soviet Union (Garfield & Bennett, 1984). In other countries at a similar time, sports psychologists were most commonly employed to help correct problems already present in athletes’ techniques. In the Soviet Union, the sports psychologists were active in an athlete’s training from the very beginning of their program, working to maximize their performance from the onset (Garfield & Bennett, 1984). The Soviets had a specific term for this sort of training, equivalent to psychophysical, psychokinetic or psychosomatic, but the closest we have to the correct meaning is anthropomaximology, which means “the study and practice of peak performance” (Garfield & Bennett, 1984, p. 16-17).

The basis of the Soviet Union’s sports psychology was the imagination. They were taught to employ mental rehearsal techniques that required the athlete to use their imagination to visualise themselves performing at peak and optimal levels, providing them with valuable neuromuscular practice. The aim was to “build confidence, accelerate reaction times, and improve physical coordination and accuracy…[by allowing] you to work out complex strategies before executing them” (Garfield & Bennett, 1984, p. 127). All of these benefits of applying imagination to physical training in sports are readily applicable to musical performance and the techniques and concepts used in sports psychology are potentially transferrable to instrumental pedagogy.
In their development and analysis of the Soviet Union’s sports psychologists’ techniques, Garfield and Bennett observe that one of the most important requirements of successfully practising mental rehearsals is that “the mental images must include movement” (1984, p. 129). This is equally relevant to the development of violin bow techniques, or indeed any aspect of violin technique, as they are dynamic and active concepts. The entire violin bow technique is based on the coordination of different muscles and actions that move in particular ways to create the desired stroke or sound produced. Garfield and Bennett mention that the temptation for many when first beginning to apply mental rehearsal is to form “still shots” of the positions they are trying to master. This is very common in the visual paradigm of violin pedagogy. While these images may indeed be technically correct, this has the effect of freezing the mental image. By working from these frozen images, the athlete (or musician) removes the changing circumstances that are created by the movement when actually executing the technique and so do not incorporate practice of one’s response or reaction to said circumstances (Garfield & Bennett, 1984).

Another important aspect of imagination theory in pedagogy is proprioception, or perspectival self-consciousness, that is “the ability to keep track of one’s relation to the world around one” (Noë, 2004, p. 2). Noë believes that employing perception is more complicated than has previously been thought. It is not simply a process in the brain or a matter of drawing on the sensorimotor knowledge stored there. Rather it is better used as a guide for action. He agrees fully with Garfield and Bennett’s belief that a moving mental image is the only way to successfully employ mental rehearsal as it allows one to fully respond to any changes and movement necessary. He takes this further by
insisting that the timing of the images created must be as close as possible to the actual duration of the action when performed physically. Noë also stresses the point that simply rehearsing the beginning, middle, end or any other segment of the action by itself is nowhere near as effective as rehearsing the complete action in its entirety (Noë, 2004). Electromyograms taken of subjects during testing show that when mentally rehearsing an action, muscles would actually have performed the exact motions they imagined on a subliminal level (Noë, 2004). This results in a feeling of restlessness when mentally rehearsing for too long particularly when done properly, the visualisation process sends impulses to the muscles, and so makes them feel a need to move (Noë, 2004).

Barbara Montero (2010) has done some research into the question on whether bodily awareness interferes with highly skilled movements such as those performed by elite athletes or musicians. It is common to hear that during a peak performance, the body feels as if it is functioning by itself and intrusion of actively thinking about what is happening be it in the present and immediate future will interfere with this sense of being “in the zone.” Montero proposes that for well-developed rote skills, such as climbing stairs, this may indeed be the case, however, for those who wish to achieve excellence, such as performing artists or expert athletes, it is not typically detrimental (Montero, 2010). In her article “Thinking in the Zone: The Expert Mind in Action” Montero (2015) critiques many of the studies that suggest that thinking hinders optimal performance and proposes that “even highly-practiced skills can remain in part under an expert athlete’s conscious control, [and that] thinking does not hinder expert performance” (2015, p. 126). She does stress that it must be a positive form of thinking.
Any thoughts of loss of confidence or a mental process that has no relation to what is being performed will be harmful to performance.

Montero categorises the different ways to notice what the body is doing into two different types of awareness: sensory bodily awareness and cognitive bodily awareness (2010). She defines sensory bodily awareness as:

…awareness of your body through your senses, either because your senses are (top-down) directed at your body, such as when you visually focus on your hands grasping the gold club, or because the sensory experience itself captures your attention (bottom-up), such as when you become aware of an unusual tactile sensation in your fingertips when hitting a chipped piano key. (Montero, 2010, p. 107)

Under the umbrella of sensory bodily awareness comes proprioception. Montero (2010) defines proprioception as the process whereby the body provides information to the brain about how the body is positioned or the action it is performing through various receptors from different points of the body.

Proprioception is considered to be a largely subconscious activity that can help immensely with mental rehearsal when attended to. Cognitive bodily awareness on the other hand is the (mostly) deliberate thinking of what your body is doing; for example, what you are doing, what you are going to do, or what you are supposed to do (Montero, 2010). These two types of bodily awareness do not always function completely separately and it is when sensory bodily awareness is used to inform cognitive bodily awareness that the best results are in seen in employing imagination in practice through mental rehearsal. Montero stresses that this type of bodily awareness is only feasible during performance if it has been present throughout the entire journey of
practice and development of the skill. This has important consequences for the practice of violin techniques. This type of awareness must be consistently employed while in the practice room and not only during performance otherwise its sudden appearance on stage will result in its undoing. Montero makes special mention of conscious awareness during performance in the arts to achieve that “glimmer of artistry” (Montero, 2010, p. 116) of the great performers, it requires being able to create while in action, involving attention to your movements.

In the article “Your musical performance ability”, in *American Music Teacher* from 2004, Lesley Sisterhen discusses the book *The inner game of Tennis* by Timothy Gallwey and its identification of “[athletes] seeing and feeling themselves performing key actions successfully in their mind’s eye” (2004, p. 32). She explains the following two similarities between athletes and musicians that make it possible for visualisation to be translated so readily between the two fields:

First, both athletes and musicians depend on the trained response of their muscles to function in their skill. Secondly, performance in both fields requires concentration, focus and the ability to allow the mind to control physical reactions when the body is under stress (Sisterhen, 2004, p.32).

Visualisation has only really become popular in sports psychology since the 1980s and many musicians believe this is where the concept originated but we have had the same theory available to us since the beginning of the twentieth century in the works of lesser-known pedagogues and music psychologists. As the theory of visualisation has become more popular amongst athletes, it has become more common in modern musical training.
There has been some study as to how imagination can be used in the classroom to help promote easier learning, in both young students and adults alike. Broudy (1987) proposes that imagination has been at the root of all scientific advances yet has never really been acknowledged in modern education. He says the following three aspects are involved in learning any skill:

1. A set of rules for identifying the task,
2. A selection of the proper rule to be applied, and
3. Repetition of these procedures to a high level of dependable performance, sometimes called overlearning. (Broudy, 1987, p. 8)

The way in which to test these is being able to execute what has been practiced through learning on demand, a type of learning that Broudy calls replicative (1987, p. 9). This approach to learning skills is most dominant in the teachings of Galamian and Flesch. For example, in Galamian’s discussion on the drawing of a straight bow stroke he describes the movement through the description of three specific positions of the right arm, designating a shape to each of these positions: triangle, square and point (Galamian, 1964). Flesch’s discussion on the bow hold begins with specific instructions on where the individual fingers must be placed:

    The index finger touches the stick at the line separating the second from the third joint, and in addition embraces it with its first and second joints. There is a very small interval between the index and middle finger. The index finger assumes the guidance of the bow, and the little finger only touches it at its lower half while playing. (Flesch, 1924, p. 51)

There is a difference between analytical representation after the fact and anticipation of an action. Thinking, in the context of learning a technique, can mean a number of things: analysis of what has been performed or imagining ahead. The neglect of these two temporal perspectives of imagination is responsible for some ambivalence and perhaps practical ineffectiveness in Flesch, Galamian and others.
Broudy defines imagination as being “the image-making function of the mind” (1987, p. 14). When applied in education it grounds the possibility of knowledge by providing the mind with a way to organize the knowledge it is absorbing. Gestalt psychologists insisted that learning involves “the discernment of a pattern or design” (Broudy, 1987, p. 10). Imagery and images are made up of sensory patterns. The most common images used in the visual paradigm of violin pedagogy are visual images, patterns produced through the eye and brain. There are also olfactory, kinaesthetic and tactile images and auditory images, which serve to tell us what an experience may taste, feel or sound like (Broudy, 1987). Both auditory and kinaesthetic images are crucial when comprehending bow technique as they provide the basis for the temporal imagery. This resonates with the work done by Page and Moere (2006) and the three settings they believe visualisation may be applied: scientific visualisation (visual), information visualisation (diagrams) and non-visual visualisation (kinaesthetic sensations and imagery).

Egan (1992) describes the imagination as being “at a kind of crux where perception, memory, idea generation, emotion, metaphor, and no doubt other labelled features of our life, intersect and interact” (p. 3). He believes that the imagination can be an invaluable tool in education once we realise that it can be used not only as a capacity to form images, but also as a tool to help us think in particular ways: “It is a way that crucially involves our capacity to think of the possible rather than just the actual” (Egan, 1992, p. 4). This is a particularly poignant view when considering that the concept of how the bow interacts with the string is a rather abstract one to a student as there is no physical contact between the player’s right hand and the string unlike in the left hand,
which comes in direct contact with the strings. As the student is unable to directly feel the contact of the bow hairs on the strings, the descriptions and instructions of how to successfully execute a technique and produce the desired effect must be presented in a way that makes this relatively abstract concept easily accessible and conceptually clear.

From looking back to the writings of the great educational thinkers such as Plato, Rousseau and Dewey, Egan (1992) believes that the purpose of education in the modern era is now focussed on ensuring the accumulation and ability to recall and reproduce exactly a mass of knowledge and skills, instead of being “a process meant to awaken individuals to a kind of thought that enables them to imagine conditions other than those that exist or that have existed” (p. 47). Imagination in education gives the ability to be flexible and creative beyond the results of a replicative type of learning, attributes that are essential in music performance. However, Egan (1992) observes that being able to take imagination seriously in education will result in the possibility of having to forgo elements of the currently dominant concepts of learning. This is exactly what Kuhn (1977) described in his explanation of what occurs in a paradigm shift. Egan (1992) proposes that the elements of education that promote the accumulation of knowledge and skills completely separated from emotions, intentions and human meaning prove inadequate to create anything more than conventional thinkers. Why then, if the goal of educating young musicians is to create individual and inspiring performers, is the cultivation of imagination not more common in technical pedagogy?

The recognition of different aptitudes or ‘intelligences’ in the school education system has led to the development of different types of learning and pedagogy. Howard
Gardner’s *Theory of Multiple Intelligences* is widely regarded as one of the most important advancements in the approach to pedagogy and education. In his discussion of the various types of intelligences he mentions that when studying the development of skills, it is important to acknowledge a distinction between “*know-how* (tacit knowledge of how to execute something) and *know-that* (prepositional knowledge about the actual set of procedures involved in execution)” (Gardner, 2011, p. 73). This is also known as *implicit* and *explicit* knowledge. The transference of explicit knowledge to an implicit and tacit knowledge is the ultimate goal in violin playing as it means the technique is so successfully organised and programmed into the mind that it requires very little active thought from the player to successfully execute. Once an action is performed above a certain speed, feedback from the individual kinaesthetic sensations cannot be relied upon and so the formation of ‘chunks’ or cycles is necessary. Once the sequence has become implicit knowledge, it will only require the slightest adjustment to respond to what little sensory information can be discerned (Gardner, 2011).

Fitts and Posner (1967) also talk about this transference of knowledge in their proposed three-stage model to the accomplishment of complex skills, with the ultimate goal being the achievement of making explicit knowledge implicit. In the first phase, “the cognitive phase”, the aim is “understanding and intellectualising the task and what it demands” (p. 12). During this phase one pays attention to cues, events and responses through kinaesthetic and visual information, which will ideally later become automatic. The second phase, or “associative phase”, achieves formation of and mastery over the movement. The final, or “autonomous” phase is the ultimate goal for most performers or athletes where they feel “in the zone” (Fitts & Posner, 1967, p. 12). Once reaching
this phase the movements should be able to be executed without any conscious thought about the action – the knowledge has become implicit (Fitts & Posner, 1967).

Howard Gardner’s discussion of bodily-kinaesthetic intelligence is highly relevant to much of what is involved in imagination theory. The core of this bodily intelligence is “the ability to use one’s body in highly differentiated and skilled ways, for expressive as well as goal-directed purposes” (Gardner, 2011, p. 218). Gardner explains that in much of what we do, there is a disjunction between the mental and physical aspects of our being. He attributes this divide to the notion that regards problem solving and abstract reasoning as superior to what we physically do with our bodies. Timing is also seen as a necessary attribute in developing bodily-kinaesthetic intelligence:

...All skilled performances include a well-honed sense of timing, where each bit of a sequence fits into the stream in an exquisitely placed and elegant way; points of repose or shift, where one phase of the behaviour is at an end, and some calibration is necessary before the second one comes into play; a sense of direction, a clear goal to which the sequence has been heading, and a point of no return, where further input of signals no longer produces a result because the final phase of the sequence has already been activated. (Gardner, 2011, pp. 220-221)

This is similar to Alva Noë’s (2004) discussion when he explains that in mentally rehearsing a movement, strict attention must be paid to timing, not only to speed and duration of the movement but to the relation of the timing of the different sequential aspects of a movement.

There are several studies about the potential of mental imagery rehearsal in enhancing memorisation and performance in musicians. There is some experimental evidence of the benefits; however, precise definitions and methods vary. This means that although
many musicians know that mental practice and imagination are beneficial, they do not understand what exactly the methods involve. Davidson-Kelly, Moran, Schaefer and Overy (2015) comment that while deliberate ‘imagery rehearsal techniques’ are widely accepted by many musicians, there are very few appearances of them in instrumental music pedagogy. Perhaps the most notable example of pedagogy that uses mental imagery is the Alexander Technique. Alexander technique is a system that uses deliberate body imagery for the preparation of the action, for the action itself and its intention and execution. According to Alexander technique the body can be trained to work more effectively and avoid damaging unconscious movements (Davidson-Kelly, et al., 2015).

Davidson-Kelly, et al. prefer the term “mental imagery rehearsal” to the more common mental practice or rehearsal so as to express “a vivid sense of the activity as an imaginative and constructive act” (Davidson-Kelly, et al, 2015, p. 83). They define mental imagery rehearsal as:

The deliberate internal generation of imagery in the absence of self-generated sensory feedback in the missing modality or modalities … may therefore occur with or without a score, instrument or auditory model, and in the presence or absence of overt movement. (Davidson-Kelly, et al., 2015, p. 84)

This is the first clear and concise definition that details the many situations in which mental imagery rehearsal, mental practice or imagination can be applied to musical practice. The specifics of how mental imagery is applied can vary greatly from musician to musician. Some musicians depend on certain images more than others; for example, some may vividly recall the score whereas others don’t feel the need to consciously imagine a visual image (Davidson-Kelly et al., 2015). The depth of these images used
may also vary greatly between musicians depending on the nature of the task and the stage of learning.

In his book *Psychology of Music*, Seashore (1967) talks at length about the importance of the imagination to musicians not only as a pedagogical tool but also as central to the essence of being a musician: “tonal imagery is a condition for learning, for retention, for recall, for recognition, and for the anticipation of musical facts. Take out the image from the musical mind and you take out its very essence” (Seashore, 1967, p. 6). In his book *The Psychology of Musical Talent* (1919) Seashore defines the word ‘imagination’ in two ways: “the power of having mental images” and “the process of forming new ideal combinations, which depends on relative absence of objective restrictions and the consequent freedom of subjective selection” (Seashore, 1919, p. 232). The second definition likens imagination very closely to memory, also referred to in music psychology as “reproductive imagination” (Seashore, 1919,p. 233). Seashore believes that imagination itself is not a mental process, such as perception or sensation, but instead allows for a number of mental processes to be combined to create the imagery needed in music practice and performance (Seashore, 1967).

Written many years before the bulk of the sources represented here, Seashore’s two books are strongly advocating the use of imagination in musicians’ practice and performance. He divides the process into two categories: imagery and sensation. Kinaesthetic imagery alone is the creation of mental pictures of the movement, whereas kinaesthetic sensations are the inclusion of the actual physical sensations the body experiences during the execution of the movements (Seashore, 1967). This corresponds
with the works by Page and Moere (2006), Broudy (1987) and Montero (2010, 2015) discussed earlier. It is only when these two are combined that we are presented with a complete process of imagining movement. Davidson-Kelly, et al. (2015) agree with Seashore in that the imagining varies greatly depend on the person; in some people the image of the movement may be more dominant than sensations and for others it may be the reverse. Auditory imagery is another facet of the imagination that Seashore (1919) deems necessary in the psychology of musicians, one that is inseparable from kinaesthetic sensations and imagery. This was also discussed by Broudy (1987) in the process of discerning sensory patterns using all available sensations. The skills of imagination require constant attention though: “The power of mental imagery may be developed to a marked degree with training. There is also good evidence to show that the power of vivid imagery deteriorates with non-use (Seashore, 1967, p. 6).”

Judith Palac has begun to critique the existing trend of a visual paradigm in violin pedagogical literature with her dissertation An analysis of contemporary pedagogical literature on violin bowing technique according to principles of human movement (1987). She provides an analysis of “twentieth-century pedagogies of violin bowing techniques in light of recent principles of human movement (Palac, 1987, p. vi)” and while Palac’s dissertation does not primarily deal with the use of imagination in pedagogy, it begins the important discussion of examining pedagogical literature with a critical view and from alternative approaches to pedagogy. Palac highlights the fact that violin bow technique studied strictly through scientific method alone and outside the context of a pedagogical situation is not necessarily practically productive, however, stresses the point that an approach to bowing techniques from a human movement
background gives a more realistic basis to the technique (1987). She recommends that future pedagogical works should be “more concerned with the development of an appropriate model for the analysis of movement in bowing than with prescriptions of form (Palac, 1987, p. vii)” echoing the view that teaching through a visual paradigm alone is no longer enough to successfully convey violin bow techniques. Palac’s descriptions of some of the elements of the violin bow technique are invaluable to this thesis as they give detailed descriptions of which muscles are involved in certain strokes and the types of movements and kinaesthetic sensations involved.

Several lesser known pedagogues and treatises in string pedagogy discuss the importance of imagination and mental awareness in learning and performing. Christopher Bunting, a cellist, makes some interesting points about the underlying approach to cello playing in his Essay on the Craft of ‘Cello-Playing (1982). He describes what he calls the ‘psychosomatic attitude’ in many players, a split between the mind and body. He proposes that the development of the mental/emotional dynamic of playing can aid in a better understanding of the physical configurations; that “frame-of-mind and frame-of-body go hand-in-hand” (Bunting, 1982, p. 3). A sign of a mature stage of a successful mental/emotional development is his concept of “differentiation of function” (Bunting, 1982, p. 3), the understanding that each limb has its own function that in turn belongs to a hierarchy of interrelated limb functions. Any instructions of the movement or action of a limb must be specific and sequential to account for this hierarchy (Bunting, 1982). He is also a keen advocate the use of proprioception in executing techniques. Reliance on proprioception will ensure that there is no “usurpation” of one limb’s function over another (Bunting, 1982, p. 12). To test one’s
ability to be able to differentiate between the different limbs and their individual function and the strength of your proprioception he gives the following example and questions:

From an anatomy textbook:
‘The shoulder, or humero-scapular joint, is of the ball-and-socket variety. The hemispherical head of the humerus (upper arm bone) articulates within the glenoid cavity of the scapula. The bones are united by ligaments which form a very loose capsule, which is largely dependent on the surrounding muscles, and the pressure of the atmosphere, in retaining the bones in position. The looseness of the capsular ligament allows free joint movement in all directions.’ (Evelyn C. Pearce, Anatomy and Physiology for Nurses, London: Faber & Faber, 1947. My italics.)

Two questions;
1. Does your psyche allow you to enjoy freedom of movement in all directions at this joint – the propriocept [sic] being accurate?
2. Can you accommodate the thought of two joints, left and right, enjoying differential action? (Bunting, 1982, p. 13)

Bunting also describes the concept of coordination through the use of ‘export’ and ‘import’ channels (1982). The ‘export’ is a projected action, it is what the player plans in relation to assessment of experience (Bunting, 1982), which is very much the root of much of Flesch’s and Galamian’s pedagogy, the reaction after the fact. The ‘import’ is the flow of information that comes from the present situation, a passive learning mode where the player takes cues from the sensations and feedback gained through proprioception and awareness of the moment (Bunting, 1982). Bunting promotes a steady balance between these ‘export’ and ‘import’ channels to maintain control over the mental/emotional state of the player.

Pedagogues such as Steinhausen, Dounis and teachers from the Moscow violin school such as Yankelevich and Yampolsky work from an approach that begins the technical conversation with a clarification of the relationship between imagination and
anticipation (Richter, 2011). They believe in the basic principle of technical violin study as a conception of a series of movements that are preconceived in the mind before they are then made a reality (Lankovsky, 2009). Galamian has mentioned creating a mental image in his texts and some works by Auer and Flesch address certain aspects of this mental preconception but this approach has yet to have been fully translated into the existing pedagogical literature that we have available to us.

Pedagogues such as Demetrius Constantine Dounis and Paul Rolland always stress the importance of the correlation between the training of mental skills and violin technique. In his work *The Artist’s Technique* (2005), Dounis begins his remarks on general technique with the following quote: “The true technical training of the violinist is not merely a training of the arm and the fingers, but principally, a training of the brain and the memory (p. 7)”.

Rolland’s pedagogical works combine both scientific knowledge of human movement (he even includes a section on movement control) with pedagogical experience to provide a holistic approach to many aspects of violin technique (Rolland & Mutschler, 1974). Steinhausen was another advocate of the potential imagination and anticipation has to increase freedom in a violinist’s technique (Richter, 2011). Steinhausen was not a prolific violinist; he was first and foremost a doctor, and then a pianist and a hobby violinist. This meant that many of his theories on violin pedagogy were quickly dismissed by more prominent violinists and pedagogues of the time, including Carl Flesch (Richter, 2011). Steinhausen’s approach to violin pedagogy and technique is important as it incorporates scientific investigations into the actual techniques to understand them more completely. Unfortunately, only one of Steinhausen’s two works has been translated into English and is not easily available.

It is apparent from this review of the available literature that the merits of the use of imagination are understood and applied in various fields of education and training to much benefit. The most important features of the imagination theory are:

- The combination of both mental and physical practice provides a holistic approach to pedagogy.
- Through the use of mental rehearsal, people are able to better understand and control seemingly uncontrollable actions and movements.
- For the successful application of mental rehearsal, the imagery used must incorporate a sense of temporality of movement. Mental rehearsal and understanding of the movement at only specific points of the technique will not yield a complete understanding of the technique. The incorporation of the timing of all parts of the technique is essential in understanding this temporality.
- Incorporation of proprioception and the kinaesthetic sensations and imagery into the descriptions and teaching of active techniques allows for a better understanding of the coordination involved.
- Through employing the imagination in the conception of new techniques, it becomes easier to retain and recall the information.

These aspects will be applied to some core components of the violin bow technique in Chapter 4 to demonstrate how the development of the multiplicity of phenomenological explanations of bow technique can change the concept from a static to a dynamic one and incorporate a holistic understanding and conception of the temporality of the technique by actively stimulating the imagination.
Chapter 3 – The pedagogy of Flesch and Galamian

The literature available in violin pedagogy gives predominance of attention to violin technique, particularly bow technique, in terms of visual and spatial concepts. As well as this focus, there is a tendency to analyse the technique after it has occurred, requiring a mistake to be made initially in order to then improve the technique. This is not to say that every treatise is focussed solely on reactive behavioural principles of pedagogy, however even those that begin to touch on mental and imagination theories have the basis of their teachings in a visual paradigm. Flesch and Galamian’s treatises are an example of the gradual shift that has been occurring over the past century in violin pedagogy towards incorporating mental imagery and imagination. While their pedagogy is still very much grounded in a visual paradigm they provide an insight into the development of a new approach to teaching violin.

Flesch’s *The Art of the Violin* (1924, 1930) and Galamian’s *Principles of Violin Playing and Teaching* (1964) are two of the most recognised and applied treatises on violin technique available to the modern violinist. Both books are highly beneficial and relevant to students and teachers of all levels and are the authors’ attempts to present their ideologies and approaches to teaching the violin technique as accurately and comprehensively as possible. Although published in the same century, Flesch’s treatise, originally published in 1923 (Volume 1) and 1928 (Volume 2), is considered by many contemporary musicologists as more representative of the 19th century ideologies, whereas Galamian’s, originally published in 1962, is much more indicative of a 20th century approach to violin pedagogy due to the advancements of violin technique in this
period. Flesch and Galamian had very different career paths that would have greatly influenced their individual approaches to pedagogy. It is imperative to understand the authors’ intended meanings in both treatises in their historical context with reference to the authors’ experiences and the prevalent contextual elements of the time that would have influenced their basic view of violin playing and teaching.

**Carl Flesch—*The Art of Violin Playing***

Carl Flesch began his studies in Vienna before attending the Paris Conservatorium at the age of 15 where he was a student under the tutelage of Sauzay and Marsick, both having significant influence on his development as a concert violinist. He began his concert career in 1895 with a successful debut in Vienna, followed in the next year with three concerts in Berlin that would helped establish him as a great violinist of his time. Around the same time he became a professor at the Royal Conservatorium in Bucharest but once his 5 year agreement was ended Flesch left the position to focus on his career as a soloist. When a vacancy arose at the Conservatorium of Amsterdam, Flesch took up the position to aid in his artistic development. While holding this position, he decided to undertake a review of all the existing violin literature, the result of which attracted the attention of many notable musicians of the time. This work cemented Flesch’s reputation as one of the leading violinists of his day (Knapik, 2015). In 1908 he moved to Berlin in order to devote himself more exclusively to performing (Musical Standard, 1911). Flesch’s extensive performance career is considered to have influenced many of his approaches to violin technique and pedagogy as he comes from the point of view of a performing concert violinist, intent on creating performances of artistic-aesthetic consequence. In his writings Flesch often admitted that his approach was not the most
common amongst the other violinists of his time and would go so far as to criticise and belittle some of his more notable contemporaries and preceding pedagogues. For example, in Flesch’s discussion on the distribution of weight of the bow in regards to the function of the fingers on the bow hold, he explains the importance of pronation and supination in the control of this subject, a subject that was investigated extensively by Steinhausen:

The [index finger] is paired with pronation (turning outwards), the [little finger] with supination; yet by no means to the degree accepted as correct by Steinhausen. I even claim that during the finger pressure we must carry out the rolling of the lower arm quite subconsciously. Steinhausen’s theory of the necessity of a conscious supination at the nut is quite untenable, and can only be explained as the result of inadequate practical experience. (Flesch, 1924, p. 53)

Flesch was very much a child of his time; he had a very late nineteenth Century, positivistic approach to his pedagogy that reflected the advancement of medical science and psychology at the time (Knapik, 2015). He presents his teachings in what could now be considered a very ‘behaviourally reactive’ way. Flesch wrote extensively on his approach to everything integral to a violinist’s life and development and his works are used both by musicologists to better understand the performance practices of the late nineteenth and early twentieth centuries as well as contemporary teachers and students in their study of the violin and its technique (Knapik, 2015). His treatise *The Art of Violin Playing*, is split into two volumes: the first details his breakdown of specific techniques such as how to hold the violin and bow before moving onto the right-hand, then the left-hand, and more advanced techniques. The second volume is titled “Artistic Creation and Instruction” (Flesch, 1930). Knapik (2015) suggests that Flesch has a somewhat revisionist approach to modernism in this treatise: there are both discrepancies and similarities in more recent modernist approaches to similar concepts.
Flesch demonstrates a fixation on the specifics of the body, yet also begins to touch on both the psychology and physiology of violin technique, although does not develop them much beyond what was already present in Western metaphysical philosophy at the time (Knapik, 2015).

Flesch’s treatise has many similarities with those that have come before, but the most notable difference is the sheer amount of text, both descriptive and instructive. Where up until this point in time treatises had consisted primarily of notated exercises, Flesch responds to and draws together contemporary scientific insight as well as the discussion of relevant others such as Capet, Steinhausen and Trendelenburg. He employs a startlingly large number of short musical examples, unusual for the fact that the tendency until Flesch was to provide complete exercises to work on the technique rather than examples already present in the repertoire. The Art of Violin Playing in general follows the general structure and developmental sequence of techniques presented in previous treatises, however, reads more closely like an encyclopaedia or handbook that deals with the essential topics of violin playing. It is similar in presentation to Joachim and Moser’s Violinschule (Knapik, 2015), though a larger size, standing at 33 x 26cm, with soft covers. These physical aspects of the publications lend weight to a theory that Flesch’s treatise was intended to be more than a reference book to sit in a library (Knapik, 2015). It was designed to comfortably sit on a music stand and be easily portable. This makes the fact that Flesch’s work is comprised largely of written text even more surprising for students and teachers of the time. When considering all of these elements, the large amounts of text, and the portability of the manual, Knapik believes that Flesch employed these subtle tricks to encourage the reader that “actively
thinking about violin playing is integral to a successful learning experience” (2015, p.568). And this is in fact echoed in Flesch’s opening words of his treatise:

The present work is not meant to be a “School of Violin-Playing” in the current meaning of the term. It is broadly conceived, from the pedagogic standpoint, its intention is not only to advise the teacher how to train his pupils most advantageously, on the basis of the most modern acquisitions in the domain of violin technique, but also – by leading him to think logically, and by cultivating analytical investigation of the problems of violin technique – to bring the violinist to a plane of development which, in time, will enable him to be his own teacher. Hence this work is not addressed to violin beginners, nor to advanced students; but to reasoning violinists, or those who wish to become reasoning violinists. It represents an attempt to raise the art of violin-playing from mere crude experience to a higher plane of logically formed experience. (Flesch, 1924, p. 3)

Although Flesch argues for the involvement of the mind in analysing technique, he does not condone the use of thinking during a performance. Violinists who feel compelled to account for every little detail during a performance are merely causing “hindrances to one’s psyche” (Flesch, 1924, p. 90). The discussion on the violinist’s ‘psyche’ is Flesch’s first true discussion of the mental state of a violinist and how the imagination or conception held by a violinist can influence their execution of technique. This concept of stage fright has been mostly absent from previous treatises, with authors such as Auer, Joachim and Moser attributing it to being solely psychosomatic and having nothing to do with teaching the violin (Shock, 2014). Flesch’s discussion of this mental aspect takes place mostly in the context of how it can affect the tone production, primarily through causing an uncontrollable shake that affects the bow technique. The first step is to determine whether it is a “mechanical” or “psychological” problem (Flesch, 1924, p. 88). If the first, Flesch recommends either ensuring the bow is not held too tight, or altering the tilt of the stick or turn of the right forearm. If a psychological
problem, Flesch simply advises reassuring the student that the problem is minor and will eventually go away (Flesch, 1924). Both of these approaches illustrate Flesch’s reactive behavioural approach to dealing with problems in a student’s technique after they have occurred. Flesch’s conversation about the psychic causes of trembling bow describe the very essence of the imagination theory, albeit from the outlook of it causing negative effects. He explains that most often the cause of the shaking bow is in the violinist’s mental expectation of it occurring: “The mental expectation of shaking precedes always the actual shaking itself. The mind concentrates on the bowing, the eye watches anxiously its different parts, fatalistically awaiting the much dreaded catastrophe” (Flesch, 1924, p. 89). He is basically arguing that, if the violinist’s mental image is one of a shaking bow caused through physical imperfections, it will inevitably occur. This is precisely the negative effect Montero was referring to in her article “Thinking in the Zone: The Expert Mind in Action” (2015). If Flesch had only realised the positive application of this strong mental conception and use of the imagination before the technique, his approach to his pedagogy could have been grounded on a completely different approach and given rise to a transformative paradigm.

Flesch does not strive to align himself with a single approach to playing the violin and nor does he attempt to synthesise the several approaches available to him. Robert Philip (2004) has noted that:

By the time the twentieth century was under way, the spread of new approaches to violin-playing seemed to be due more to the influence of charismatic individual performers (especially Kreisler and Heifetz) than to any particular schools, national or otherwise. (p. 194)

Knapik draws the conclusion that this is the appropriate way of approaching Flesch’s synthesis and his references to the multiple schools of the time; that he be viewed
simply as one such person “paying attention to the texts he himself read, the places where he lived, and the multiple prevailing philosophies that he was likely to have come into contact with in early twentieth-century Europe” (2015, p. 568). Flesch also does not seem to adhere to or align with any particular theory or philosophy. Instead there is evidence of a number of different “models of violin playing” that were present at the time. He is very careful in presenting various different schools’ approaches to some specific aspects of violin playing and then will choose the one he believes to be the most correct, citing personal experience and experimentations as his justification.

Flesch’s treatise is a comprehensive outline of his ideologies of violin pedagogy and is not afraid to draw upon the pedagogical literature that he already had available to him. Yet even though he embraces past traditions, he strives to distance himself from them. He understands that to progress violin method, he must challenge concepts of his present day in what it means to be a violinist and portrays broader swings in approaches to violin pedagogy at the turn of the 19th century. His treatise is still valuable research for a contemporary violinist. Throughout the treatise, his use of lists to explain concepts, and the ease with which he identifies and diagnoses common problems and provides suitable solutions pay tribute to his analytical prowess.

Ivan Galamian – *Principles of Violin Playing and Teaching*

Compared to Flesch, Ivan Galamian had a very different career as a violinist that may have in part attributed to his different approach to violin pedagogy. Sent to Moscow at a very young age, he began his tutelage with Konstantin Mostras, a student of Leopold
Auer. In 1922 he moved to Paris where he studied with Lucien Capet at the Paris Conservatorium, a teacher that had great influence on him in all aspects of music and pedagogy, particularly in regards to bow technique. He made his concert debut in Paris in 1924 but only held a solo career for a few years before dedicating his time to a teaching career at the Russian Conservatory and the Ecole Normale de Musique (Curtis, 1996). In 1937 Galamian moved to New York City and in 1944 was appointed as a professor at the Curtis Institute in Philadelphia and to the Juilliard School in New York City in 1946. He founded the famous summer school Meadowmount and remained on the faculties of both Curtis and Juilliard, teaching from his home in Manhattan. From early on, Galamian decided to commit the majority of his time to developing his pedagogy rather than his performing career (Curtis, 1996). This is greatly reflected in the manner he represents his opinions on aspects of violin pedagogy; his approaches are very well supported by logical and systematic analysis and application rather than the personal experience that Flesch would draw upon to support his own approaches.

Galamian began his treatise Principles of Violin Playing and Teaching after the urging of his students and took him 12 years to finish with the help of his student Elizabeth Green (Galamian, 1964). He was methodical in his approach, subjecting the treatise’s content to repeated tests in his studio. Contrary to the majority of violinists and teachers at the time, Galamian dedicated almost his entire career to developing his pedagogy and established what is now known as the Galamian method: “a unique combination of precision focused on the physical and mental connection” (Curtis, 1996, p. 3). To many his pedagogy is seen to represent a twentieth century American School of violin playing.
through his combination of ideas (Swartz, 2003). Galamian’s treatise and method are very much still seen as current pedagogy and have influenced the way violin is taught today.

His student Elizabeth Green was instrumental in its creation. She, along with many of his other students, believed that his teaching methods were so great that they needed to become “a matter of public record and his practice devices delivered into the hands of the present-day student” (Koob, 1986, P. 31). He was also determined to do it because he was “disturbed” by many of the other methods of teaching in his time: “Many things are being taught by the various present-day methods that I would not care to endorse” (Galamian, 1964, p. 1). He never supposed to his method as being the only correct one either: “The system that I have tried to present in the following pages is the one that I believe to be the most practical, but I do not contend that it is the only right or only possible one” (Galamian, 1964, p. vii). Galamian dictated the majority of the book over the phone to Green and she was adamant that the majority of the writing is “exactly as he said it “(Koob, 1986, P. 31). The treatise is set out in one volume and is similar in size to a single volume of Flesch’s treatise. Again, Galamian follows the general layout of a treatise as used in those that came before and the progression of subjects is very similar to that of Flesch’s. A new development is the end of the treatise, where Galamian includes a chapter written specifically for teachers on how best to apply his methods to individual students, stressing that a teacher must always be flexible and compromising in their approach (Shock, 2014). There have been some studies suggesting that Galamian’s treatise is not a true representation of his actual teaching method. Both Curtis (1996) and Koob (1986) draw on either their own personal
experience or other students’ experiences of his teachings and show that some of what he laid out in his treatise he did not necessarily follow himself in his lessons, particularly the point of approaching each student individually as he would often prescribe regimented technical and repertoire lists that every student must accomplish in order to progress with him. Even if the man himself did not stick to the methods he himself prescribed, it is undoubtable that he and his treatise alike have produced formidable and virtuosic violinists with enviable technique and musical genius. For the purpose of this thesis, we will only focus on the ideas presented in his treatise, as those are the most easily accessible and readily accepted approaches to teaching violin technique today. The question of to what extent his treatise reflects his own teaching is less relevant to our intent to capture the conceptual structure of his thought.

Galamian approaches violin pedagogy from a scientific and empirical understanding. His writing is relatively simple and straightforward and explains his method with a scientific and systematic attention to detail. He admitted to a “life-long fascination with the ‘how-to-do-it’ aspect of violin playing” (Milan, 1986, p. 245) and through his minute examination of exact sequences of technique, he endeavours to present violin technique as an exact science. This logical and heavily analytical approach to teaching may stem from the fact that he did not work as a performing violinist for long and instead dedicated himself to developing his pedagogy and thus felt a need to prove beyond a doubt that he understood what was necessary to be able to perform with a sound technique. Curtis (1996) makes the point that his teachings are more readily applied to the demands of a practice room and the teaching studio rather than to the rigors of a concert violinist’s life, however, Galamian’s goal of creating a method that
can be easily tailored to the individual student may also play a large role in this. In his treatise he is constantly striving to impress upon the teacher that flexibility in the approach to a student is crucial for their development. He strongly advocates against following a rigid set of rules that is then applied to every technique (Galamian, 1964). With this in mind, Galamian’s treatise should be considered a “general guide to violin technique” (Galamian, 1964, p. 1) and that each technique described within the book should be adapted to suit the individual student (Shock, 2014). Galamian’s belief was that a teacher must strive to make the student self-sufficient, a belief that was echoed by Fritz Kreisler: “Too much teaching can be worse than too little” (Curtis, 1996, p. 9).

Galamian proposed two approaches to violin technique:

1. *Interpretative Technique* – where the performer has complete mastery and control over every aspect of his/her technique.
2. *Virtuoso Technique* – where the performer is brilliant but not always under control or a “reliable tool”. (Galamian, 1964, p. 5)

He continues to emphasise that a rigid observance of physical rules can hinder the development of control and will often provide examples of how a technique he is describing can be adjusted to suit the individual player. Galamian addresses the physical actions of violin playing in far more detail and depth than other treatises before him. He is thorough in his descriptions and provides both musical examples and technical exercises to help address particular techniques (Swartz, 2003).

One of his most important values is that a student’s practice time should be divided into three sections: “building time, interpreting time and performing time” (Galamian, 1964, p. 95). This is very similar to the three-stage model of the accomplishment of complex
skills by Fitts and Posner (1967) that was discussed in Chapter 2. It is in Galamian’s
detailing of the “building time” that he presents us with his practical application of the
mind over muscle principle. He understood that physical practice should also include a
degree of mental preparation:

For all types of technical practice, the principle of mental preparation is of
paramount importance. It means that the mind always has to anticipate the
physical action that is to be taken and then to send the command for its
execution. (Galamian, 1964, p. 95)

This mind to muscle relationship referred to as “correlation” by Galamian (1964, p. 6),
is a unique aspect of his pedagogy that demonstrates the beginning of an awareness of
how so called mental phenomena can impact on what we do. Galamian actually makes a
point of beginning his discussion of technique at the beginning of his treatise with a
clarification of the important link between technique and correlation, much like the
Russian violin school of Yankelevich and Yampolsky mentioned in Chapter 2. He
defines the term correlation as “the correct relationship of the mind to the muscles, the
smooth, quick and accurate functioning of the sequence in which the mental command
elicits the desired muscular response “(Galamian, 1964, p. 6). The correct understanding
of correlation is tied closely to what Galamian refers to as technical timing. The mastery
of the timing of a technique is dependant upon the “immediate and accurate response of
the muscles to the directives of the mind” (Galamian, 1964, p. 23) or correlation.
Galamian’s inclusion of the importance of the aspects of correlation and timing shows
the beginning of a fundamental shift in the ideologies underlying violin pedagogy
towards one that encompasses many of the ideals of imagination theory. By
acknowledging that it is not the strength of the muscles alone but also their ability to
react to the mind’s directions, Galamian begins to pave the way towards a more holistic approach to pedagogy that his teacher, Lucien Capet, explicitly aspired to (Capet, 1927).

Galamian’s practical application of this correlation between mind and muscle is to present the mind with increasingly complex problems it must solve; “The question becomes, thus, one of how to improve the correlation. The answer is that the player has to present the mind-muscle unit with problems to solve, problems that proceed from the simple to the ever more complex” (Galamian, 1964, p. 6). An example of this is his infamous A major scale that comprised the majority of the first six months of any new student’s tuition. The student begins with the basic scale at an incredibly slow tempo and as mastery of elements such as intonation become sound, gradual problems are added to the equation. It first begins with increasing rhythmic complexities and then it is combined with increasingly complex bowing patterns, combined with increasing the tempo. The purpose of this gradual introduction of problems is to force the mind to combat habituation and playing through automatism and forces the mind to reconceptualise its challenges all the time: the mind must assess and understand each new addition to the scale and formulate a solution before putting the muscles into action (Curtis, 1996, p. 61). By analysing the problem mentally before attempting to solve it physically, Galamian approaches technical problems in learning the violin from multifaceted and many different directions, with the intent that it will provide a higher degree of security (Curtis, 1996).

Galamian’s treatise is a portrayal of the shift towards a more dynamic and imaginative approach to violin pedagogy, first begun by his teacher Lucien Capet (1927). One of his
greatest assets as a teacher was his ability to be able to logically analyse a problem from its inception to its completion and release. He is still firmly planted within the visual paradigm of the treatises of the early twentieth and late nineteenth century but his innovations and unique descriptions of the correlation between the mental and physical aspects of violin playing suggest a shift in the theory and philosophies in pedagogy of his time.

Through this brief analysis of Flesch and Galamian’s treatises from a contextual point of view, it becomes clear that there are various ideologies and approaches underlying their own individual methods for learning and teaching violin. Both pedagogues are very much products of their time, influenced by the shifting ideologies and paradigms in many different fields, not just music. The methods of both seem to have been somewhat influenced by their own personal experiences of learning and performing, their experiences dictating what the focus of their pedagogy would be. Flesch approached violin playing as an interpreter, whereas Galamian did so from a more functional interest, as a pedagogue. Of the two, Galamian is perhaps the more genuine pedagogue, even though Flesch is more ‘professional’ in his approach. Both treatises are important stepping-stones from the basic descriptions of previous works, which would not do much more than present specific technical problems with some basic solutions, to the gradual emerging of imagination theory in more recent treatises. Flesch and Galamian’s treatises both hold elements of mental power in practice, problem solving and logical analysis of techniques and start to approach the techniques from anticipating instead of purely reacting after the fact.
Chapter 4 – The role of imagination in violin bow technique

Bow hold

The bow hold is the basis of the entire violin bow technique. A lot of emphasis is placed on setting up the bow hold and designating certain fingers to different tasks, however, the bow hold’s most important task goes much deeper than that and is rarely discussed in detail. The right hand is at a disadvantage to the left, which comes in direct contact with the strings. The right hand only has access to the strings through the contact point of the hair of the bow and has no direct physical contact to the strings. This makes much of what is taught in violin bow technique quite abstract and sometimes hard to grasp. It is important to employ one’s imagination to picture the bow as an extension of the body through the right hand and the bow hold. From a purely human movement point of view, the bow hold is the most important part of the entire bowing mechanism that must transmit kinaesthetic feedback from the contact point to the brain of the player (Palac, 1987). Bunting (1982) prefers to think of it as the fingers using an almost prescient intuition to sense what is required to achieve the intended tonal effect through a feedback channel running from the fingers to the mind and back again, which “must always be kept open and functioning” (p. 18). Galamian (1964) also acknowledges the importance of the integration of the bow into the entirety of the right arm mechanism and that the bow-hold has a direct influence on how this is achieved. This approach to the bow hold is not compatible with the visual paradigm presented by some pedagogues, which prescribes specific locations and functions to each individual finger. Instead of separating each composite part of the bow hold into individual and precise roles, using the fingers as a natural feedback loop and listening to and noticing the
sensations registered through them is a far more holistic and easily adaptable approach to the bow hold. Leopold Auer’s statement on the bow hold sums up this approach nicely:

To describe in exact detail just how the bow should be held, just how the pressure of the fingers should be adjusted, and which finger – at a given moment – should stress its pressure upon the stick...all this presents a task of well-nigh insurmountable difficulty. But what holds good in the case of all other arts is true also of the violin. Natural instinct, physical predisposition, the construction of the muscles of the hands and of the bow-arm-each plays a determining part in the ultimate effect. (Auer, 1960, p. 18)

Capet (1927) believes the only true way to create a resonant and flexible tone is for the hair of the bow to truly penetrate the strings and not merely through applying pressure to it. This is first and foremost done through the incorporation of a horizontal flexibility of the fingers in the bow hold. There are two aspects of this flexibility that he believes must be developed. The first is the flexibility of the fingers in the bow hold through the development of vertical finger action, Flesch referred to this as the “finger stroke” (Flesch, 1924, p. 58.). The second is through cultivating the ability to roll the stick from one side to the other between the thumb and middle finger. Capet named this technique “rouillé” (Capet, 1927, p. 28). Application of this horizontal flexibility allows the player to realise better sensitivity to the vertical pressure created by applying pressure to the bow through the arm and bow hold (Capet, 1927).

Galamian’s system of springs is a stepping-stone between a visual approach to the set up of the bow hold to a more holistic and proprioceptive-focussed interpretation of it. He theorises that the entire technique of the right arm is based upon a system of springs, similar to the way mechanical springs may function (Galamian, 1964). There are artificial springs – the resilience of the bow hair and the flexibility of the wooden stick –
and natural springs – the joints at the shoulder, elbow, wrist, fingers and thumb. The springs are able to adjust their degree of firmness – either through the slight stiffening or relaxing of the joints or through tightening or loosening the bow hair – to suit the technique, however, must never become completely rigid as this will then cut off any feedback or sensations and will interrupt the flow of action.

Rolland (1960) proposes an alternative imagery to the stiffening or loosening of springs: the image of a leverage system centred on the junction of the thumb and middle finger’s positions on the bow.

Diagram 1: Illustration of the concept of levers in the bow hold (Rolland, 1960, p. 3)

Through this system the bow arm is able to apply negative pressure, through emphasis on the pinkie and ring finger, or positive pressure, through emphasis on the pointer and
front of the hand (Rolland, 1960). Steinhausen described the entire bow arm as being made up of seven different components to a leverage system, the most important being the two armed lever created by the balance between the contact of the index finger, the playing axis (formed by the thumb and second finger), and the contact of the pinky finger on the bow (Palac, 1987). This imagery of the bow arm comprising a system of levers is supported by the principles of human movement; all parts of the human skeleton that are moved through the activation of muscles function as levers (Palac, 1987). The right arm of the “mechanism” of bowing is thus “an entire system of levers with numerous fulcra” (Palac, 1987, p. 53).

**Bow change**

Changing the direction of the bow stroke, particularly in sustained legato passages, is one of the trickier techniques for students to grasp. There has been much written on this topic with some of it going into unnecessarily fine detail in search of finding the most subtle way to change the bow direction without causing a disruption to the sound. Emphasis on excessive finger and wrist movement can cause confusion and present an unnecessarily complicated solution to the problem. Flesch (1924) goes into great detail about incorporating the finger stroke into the bow change by giving explicit instruction as to the shape and position of the different parts of the hand and fingers at different points of the technique. This is a perfect example of where the visual paradigm can fall short; there is no concept of continuity in these descriptions, they are mere snapshots frozen in time with no real reference as to how to transition smoothly between each of them.
The most successful approaches to this conundrum are when the movement is considered as a whole motion that allows the player to transition seamlessly between the two directions. Galamian suggests drawing inspiration from the image of a large pendulum: “slowing down slightly before its deliberate, smooth reversal of a direction…” (Galamian, 1964, p. 86). The application of this can result in slight bulges in the sound, as it will diminish as the bow is slowed and increase as the bow speeds up again at the beginning of the next swing.

Steinhausen was the first to observe that in some of the shorter strokes, it becomes apparent that the right hand moves in the shape of an ellipse when changing the direction of the bow and in slower, broader strokes moves in the shape of a figure eight (Palac, 1987). Rolland (1960) supposed that this difference could be caused by the location of the impulse of the action; in shorter strokes there is a single impulse at the beginning of the cycle of strokes, whereas in longer, slower strokes there is an impulse at the end of each of each stroke, causing the figure eight motion. Similar to Galamian, Rolland (1960) incorporates the image of a swinging pendulum into his description of a bow change. He also makes the observation that the change in the direction of the bow does not occur at the same time in all the parts of the body that are involved in the movement. The upper arm is the active muscle, initiating the change of direction with a slight looping action, and the wrist and fingers follow passively, creating a type of chain reaction: “…the arm begins its passage upward, the hand and fingers conclude the down-stroke with a downward motion, and follow the arm through a similar loop into the change at the frog” (Rolland, 1960, p. 9). This active description of a technique required to execute a subtle and successful change of bow is an excellent example of the
necessity for anticipation in violin bow technique. The impetus of the forearm’s change of direction successfully anticipates the passive follow through of the hand and fingers of the bow hold. The great detail that Flesch invokes to describe the exact specifications of the movements of the fingers during the bow change are completely unnecessary when it is realised that all they must simply do is to continue on with the momentum caused by the forearm. Galamian and Rolland both agree that the specific movements of the hand and fingers do not necessarily matter; so long as what the student works to achieve a smooth continuation of sound, the specifics are irrelevant.

**Detaché**

The detaché is arguably the most important bow stroke to master and understand. It is more beneficial to begin the approach to violin bow technique with the shorter detaché stroke instead of a long sustained stroke as the tension of both the stroke and the hand is greatly diminished in shorter strokes, making it easier to produce the desired tone and effect (Rolland, 1960). The detaché is a simple bow stroke that consists of moving the bow in both directions without a break in the sound between strokes, where each stroke corresponds to one note. Flesch (1924) believes that there is a very slight, unavoidable pause between each note caused by the change in direction of the bow, yet still includes in his long-bow strokes categorisation that, when executed correctly, he believes the pause is so slight as not to be noticeable in time. Galamian (1964) defines the stroke as smooth and even throughout and devoid of variation of pressure or gaps in sound as each bow stroke continues until the next takes over. He says that simple detaché may be played in any part of the bow and with any length of stroke ranging from the smallest fraction to using the entire length of the bow (Galamian, 1964). Flesch, on the other
hand, believes that simple (small) detaché is best executed in the upper half of the bow, just above the middle, however should be practiced in all areas to achieve mastery of the technique. He also includes separate instructions on whole bow detaché and “the great, broad detaché” (Flesch, 1923, p. 66) that uses at least half of the bow, both of which may only be carried out in slow time.

Detaché comprises a completely continuous and controlled motion that will last the duration of the cycle of strokes, whether that be a complete scale, a study or a passage in the context of a piece of music. Using Rolland’s principles of a swinging stroke (1960), the pendulum action of the arm translates into the stroke as a balanced and repetitious action. The impetus for this and all other strokes comes from the feet, travels through the body into the shoulder girdle and down through the forearm into the bow (Palac, 1987, p. 61). The most active body part in detaché is the forearm, it is continuously innervated, driving the impulse for the stroke from here means that the shoulder, the rest of the arm, the hand and fingers are passive and are moved only in support for or in response to the forearm movements. In simple or small detaché, the stroke remains in the one part of the bow, allowing the motion of the arm to remain very simple and primarily the result of the movement of the forearm. As the stroke of the detaché is lengthened to a broad or whole bow detaché the bicep of the right arm also becomes active along with the forearm; the bicep is alternatively innervated.

To produce a clear detaché, Rolland’s image of the swinging motion is crucial. This kinaesthetic imagery triggers an ever so slight change in sensations and motion of the active forearm that actually allows for a smoother and clearer stroke than if a straight
and flat image is invoked. It is of the utmost importance that the stroke be practised in a cycle. If the stroke is only practiced one at a time, even with the application of the swinging kinaesthetic imagery, there will always be a slight space in between each note when the technique is applied in context. There is only one impulse for each cycle of detaché: at the beginning of the very first stroke. This is where Flesch’s approach runs a fault. His dismissal of the ever so slight pause between each note as unavoidable is due to a neglect of the active continuation and anticipation of the technique. Galamian’s instruction that the bow strokes continue until the next one can take over is the next step towards a continuous and unbroken detaché. By only including one impulse in the technique, that at the very beginning, and conceptualizing and anticipating the entire passage as a continuation of this initial impulse, the result is a much more cohesive and successful simple detaché.

**Spun note (Son filé)**

Another foundation of the violin bow technique is the spun note or *son filé*. The long sustained note can serve as the perfect medium for the study of tone production and bow control as well as being a frequently employed technique in itself. In long sustained strokes, the relationship between the contact point, bow speed and bow pressure is of the utmost importance to maintain an even and sonorous tone. Flesch specifies that a spun note’s duration can vary between 1 and 15 seconds; where if it is less than 1 second it is classed as detaché and any sustained note that lasts longer than 15 seconds would be purely for study purposes (1924, p. 74). The note must be sustained by a single stroke of the bow long enough so that it receives a singing character and the successful performance of the technique comes from the successful coordination of a
number of different elements. Galamian likens the practice of *son filé* to the breath control of a singer:

> What breath control is for the singer – the ability to sing long phrases without having to interrupt them for a new breath – bow control in the long, sustained stroke is for the violinist – the ability to sustain a long tone or musical phrase without having to change bow. (Galamian, 1964, p. 103)

Galamian’s use of *son filé* is focused on learning to “hold back the bow stroke as much as possible without interrupting the continuity of sound” (Galamian, 1964, p. 104) and in fact prescribes to not only begin at an immensely slow tempo but then to aim to play slower and slower still. He advocates using both the ear and the fingers of the right hand, particularly the index finger, to gauge how successfully the technique is being executed through not only the quality of the sound produced but also the kinesthetic sensations of the resistance of the strings and gauging the pressure and friction applied through the bow into the string. Capet’s penetration of the string through the fingers of the bow hold into the strings becomes crucial in spun notes. He stresses the importance of practicing the spun note at the dynamic *pianissimo* (*pp*) to increase the sensitivity of the fingers to the string (Capet, 1927). The ability to observe and apply not only vertical pressure but also horizontal flexibility increases the sensitivity and observation of the vertical pressure throughout the duration of the spun note.

Rolland’s illustration of the leverage of the bow and the bow hold is also important to observe while considering *son filé*. As the bow is travelling the entire duration of the bow, at times at a slow speed, the subtle adjustments to the horizontal plane of the bow hand through the rotation of the forearm (pronation and supination) and the consequential transferal of negative and positive pressure in the fingers of the bow hold are the only way to compensate for the change in the physical weight of the bow itself.
as it travels from frog to the tip or *vice versa*. Through the successful application of the leverage system, the feeling of tense muscular effort so often associated with slow, sustained tones can be greatly reduced. *Son filé* or “spun” tones require clarity and understanding in the conceptualization and anticipation before and during the execution of this technique. It requires the continuous and highly controlled innervation of all the muscles of the right arm that can give the sensation of a gradual pulling of the bow on a down bow or pushing on an up bow. If even one small aspect of the entire cycle is not planned for appropriately, it results in an unevenness or impairment to the tone produced.

**Legato**

Similar to the spun stroke, the legato stroke is characterised by sustaining the bow, however instead of lasting for the duration of a single note it is the combination of two or more notes that must be produced in the same bow stroke without any interruption to the sound produced. Depending on the musical context however; a single legato stroke may be required to produce different shades of tone in the one stroke. In this case the issues of contact point, bow pressure, bow speed, leverage and penetration in the bow hand must be able to become completely variable to accommodate for and produce the desired acoustic effect. Legato strokes may also cover notes that either shift position or change strings. This can lead to lumps in the sounds or an imprecise production of tone that may be rectified through the coordination and clarification of the kinaesthetic imagery and sensations described above in the spun note description.
Martelé

Martelé is another of the fundamental strokes to violin bow technique. The development and mastery of this stroke benefits of other strokes such as detaché, staccato, and so on. It is a fairly percussive stroke characterized by a sharp accent at the beginning of the stroke, followed by a release of pressure and continuation of the stroke and a pause or break in the sound following. The hairs of the bow never leave the string unless it is to create the effect of a “hammered” stroke. Depending on the length of the note following this initial accentuation, martelé can be performed in two ways; as “simple” martelé, which can be played with any amount of bow and at any speed, typically short or fast notes, or “sustained” martelé, where the initial accentuation is followed by a sustained tone (Galamian, 1964).

The martelé is very much a ballistic stroke. It begins with a short, rapid impulse to the bow where a quick contraction is followed by the production of a tone created by the momentum of the active forearm muscle. The successful execution of a martelé stroke requires complete understanding of its timing and coordination of its different elements. There is first a preliminary positive pressure applied to the bow through the leverage of the bow hand towards the index finer through the rotation of the forearm (pronation). This technique is known as piqué or the finger accent (Rolland, 1960). The pressure is applied immediately before the stroke begins and has the sensation of “pinching” the string with the bow. As the stroke begins the pressure is immediately released, producing the necessary accentuation at the beginning of the tone that is so characteristic of the martelé stroke (Galamian, 1964). Although the initial pinching of the string is produced through the rotation of the forearm, the impulse to begin the
stroke is innervated by the quick horizontal movement of the forearm from the elbow followed by an immediate release of the preliminary positive pressure, a short sustained tone that is then halted through braking action of the forearm. There is an individual impulse at the beginning of each stroke due to the necessary preparation to achieve the accent at the front of the stroke. It is possible to practice the martelé stroke through isolating each individual stroke however the real difficulty is in the timing and coordination required between the end of a stroke and the beginning of the next. Each martelé stroke is a cycle in itself: it contains an initial impulse, followed by the release of pressure and a continuation of momentum and halting the motion at the end. Coordinating the movements between this final release and the next impulse requires incredible clarity in the player’s anticipation. This necessity for preparation between each martelé stroke gives a limit to the speed at which the stroke may be performed.

**Springing and thrown strokes**

“Off the string” strokes can fall into two categories; springing or thrown strokes. The two main differences between these types of strokes are where in the bow they can be played and whether the player is active or passive in the continuation of the stroke. In a thrown stroke, the player is active and the bow passive, whereas in a springing stroke the player is passive and due to the part of the bow in which the stroke is played, the bow is active and springs of itself (Flesch, 1924). The tempo is the main factor in determining whether a springing or a thrown stroke must be employed and is limited by certain temporal constraints. If the tempo is fast then the bow is able to spring by itself, if it is too slow the bow will not have the ability to spring and so the bow must be thrown.
Spiccato

Spiccato is a percussive stroke where the bow bounces off the string but in a controlled motion, so as to remain rhythmical. Galamian describes the motion of spiccato as being dropped from the air and then leaving the string again after every note. There is some contention between pedagogues as to whether the spiccato begins as an attack from the air or by starting on the string. Starting the stroke from the air makes it easier to obtain the natural bounce right away but can result in an unclear tone for the first few strokes, whereas starting from the string, while it may take a little longer to master being able to begin the bounce from this position, begins the stroke with a clear articulation. Whichever beginning position is used is up to personal preference of the player and the context of the stroke within the music. Spiccato is best executed at the balance point of the bow so that the springing becomes an automatic reaction to the initial impulse. However, if the tempo is slow and so the bound must be controlled and thrown by the player to achieve the bounce, it is possible to perform the stroke in any part of the bow depending on the desired tonal quality.

The action of the bow bouncing and dropping to and leaving the string while incorporating some horizontal movement creates the kinesthetic imagery of a curve:
The length of the desired stroke will alter this basic shape through emphasis of its horizontal or vertical movement. If a broader stroke is desired then more emphasis will be placed on the horizontal movement resulting in flatter arc:

\[ \text{广阔} \]

If a shorter, more percussive stroke is desired than the vertical movement is emphasized resulting in a deeper and narrower arc:

\[ \text{深} \]

The impulse for the spiccato stroke is given through the movement of the forearm and the motion is ballistic, as it requires the muscles to be alternatively innervated. At a fast tempo and when the stroke is springing, there is only a single impulse at the beginning of the stroke and the movement is continued through the momentum of the initial impulse and elasticity of the bow hair at the balance point. When the tempo is slower, the player cannot rely on the natural rebound of the bow hair at the balance point to lead seamlessly into the next stroke and so they must exert far more control over the movement and throw the bow for each individual stroke, requiring an impulse at the beginning of each stroke and far more active control over the right arm.

**Sautillé**

Also known as bouncing bow and natural or rapid spiccato, sautillé is derived from a fast detaché. Instead of producing the tone through the horizontal movement of the forearm, sautillé instead relies on an oblique movement where the bow is moved up and
down by the vertical movement of the right hand from the wrist. When this action is performed near the balance point of the bow in moderate tempos and in the middle if fast, the downward flipping of the bow will show the resistance of the elastic wood and the bow will begin to bounce. Unlike spiccato, sautille is only achievable at a quick speed and there is no thrown bow equivalent of the stroke. If the vertical action of the hand is considerable, the entirety of the hair will leave the string, if it is only mildly active, only part of the hairs will leave the string and so a crisp spiccato-like effect at considerable quickness will be produced (Rolland, 1960). Incorporating this oblique movement into the ever so slight horizontal movement required in producing a tone, creates the kinaesthetic sensation of the right hand moving in a clockwise elliptical curve. In reality the fundamental source of the stroke is through the continuous and repetitious grip and release of the string through exerting positive pressure onto it via the right hand and fingers. When the movement is amplified by the exaggeration of the vertical movement of the entire hand, it causes the bow to bounce on the string.

The sautille stroke is a result of a continual sequence of ballistic impulses in the right hand that form one entire cycle lasting the duration of the passage. The hand remains continuously innervated in this repetitious movement with the rest of the right arm staying relatively passive unless it must accommodate for a string crossing. The sautille stroke requires a careful balance of the player remaining both active and passive throughout the duration of the cycle. The player must rely on the natural bounce caused by the elasticity of the bow and allow it to happen through the active involvement of the innervation of the vertical motion of the right hand. It is impossible to isolate a single sautille stroke and the end of the cycle may be finished either through lifting the bow
clear from the string or through the application of strong pressure to the bow via the index finger to immediately cease the bouncing of the stick.
**Chapter 5 - Conclusion**

Through a contextual analysis of Flesch and Galamian’s treatises, it is evident that a fundamental shift occurred in the underlying ideologies of violin pedagogy in the twentieth century. Compared to earlier treatises by Baillot and Kreisler, Flesch and Galamian are much more sensitive and open to the inclusion of the mental and imaginative aspects of violin technique. This is evident in Flesch’s discussion of the violinist’s psyche and the possible negative effect it may cause to the bow technique in producing a shaky bow and in Galamian’s insistence of the importance and development of the correlation between the player’s mind and body and understanding of timing in technique.

Flesch’s treatise is ground breaking in its presentation and comprehensive account of the many different techniques and schools of violin playing. His wealth of personal experience in performance has clearly influenced his pedagogy and gives invaluable insights as to what is possible and expected during performance. He was not afraid to dismiss previously held traditions in violin playing if they were detrimental to the progress of the overall technique. His explanation and understanding of the bow technique as being far more abstract than the left hand technique is incredibly important to the development of imagination in violin bow technique. Yet he is still so firmly grounded in the visual paradigm that elements of his descriptions of bow techniques are no longer applicable with today’s understanding of human movement and cannot be easily adapted.
Galamian’s pedagogy is even further developed than Flesch’s. In his treatise we can clearly see a shift towards the incorporation and acceptance of imagination theory into violin pedagogy. His instructions as to the understanding of the correlation between the player’s mind and body and incorporating timing into the understanding of technique began an important discussion on the control a player may have over all elements of the physical body. His early dedication to developing his pedagogy means that his approaches to bow technique are highly logical and easily adapted to both the individual player and any new advancement in the technique. His approach to bow technique is far more holistic than Flesch’s and constantly stresses that the technique must fit the player, not just that the player fit the technique. The next step to achieve this holistic representation of violin bow techniques is the incorporation of imagination theory with the visual paradigm.

Application of imagination theory focuses on highlighting the kinaesthetic sensations and temporality to immediately inspire and stimulate the imagination to understand and conceptualise the technique in its entirety. Instead of presenting still images of positions the player must be able to reproduce, it describes the technique as an entire cycle. The cycle begins with an impulse or impetus, the momentum of which will carry on into the remainder of the cycle until it is finished with either a release or a halting action. This entire cycle must be wholly understood and conceptualised clearly before the execution of the technique; it must be anticipated clearly so that there is no room for an error to occur. If there is a mistake made, it is the imprecision of the anticipation that is at fault, not merely the bio-mechanistic properties of the technique. It is impossible to completely disregard the visual paradigm when dealing with bow technique, as the
correct positioning of the involved body parts is crucial to the correct movement. The visual paradigm provides an ‘aiming’ function; it is necessary to know what straight is to be able to aim for straight and to be able to locate the middle of the bow we must be aware of its spatial co-ordinates. The inclusion of imagination theory into the descriptions of the techniques makes it much easier to apply and conceive a dynamic and energetic movement. It is particularly pertinent when teaching violin bow techniques, as the player must rely on the feedback through the sensations of the bow hold and right hand. Accordingly, the inclusion of kinaesthetic sensations and imagery in teaching violin bow technique is crucial when properly conceiving the intended outcome of technique. It is also important to keep in mind that the end goal is the sound that is produced. It is always necessary to involve the ear in the learning process and include feedback received aurally in the anticipation of the technique. When applying the imagination theory to violin bow technique it also becomes a question of how the overall type of movement is categorised and what is involved in the control and impulse of this movement: is it a ballistic or continuous movement? Are the muscles active or passive? Are they continuously- or alternatively-innervated?

The discussion of this thesis has presented examples of the benefit of applying the imagination theory to specific and fundamental aspects of violin bow technique. Incorporation of these elements in all aspects of violin playing, both left and right hand, allows us to present techniques in a comprehensive manner. Further investigation should be made into how the imagination theory can be applied to re-learning techniques that may have been learnt incorrectly, through upsetting habitual perception or similar methods. Other areas of possible further investigation include the use of
imagery for more advanced players under stress, the use of imagination theory in the
development of both musical and technical weaknesses, the role of imagination theory
in memorization, and the stimulation of aural imagination. As this thesis only deals with
conceptual frameworks as articulated in pedagogical writing, further empirical research
into how imagination theory is being incorporated into contemporary violin pedagogy
by contemporary pedagogues who include the findings of sports psychology and
educational psychology more actively in their methods would be beneficial in the future
and would be able to strengthen the conceptual case.

Imagination is at the very core of what makes a musician. The ability to adapt to
changing conditions and react sincerely in the moment is what violinists, both beginner
and virtuoso, strive to achieve. The incorporation and stimulation of the imagination in
the pedagogy of such a fundamental aspect of violin playing as bow technique is a
natural progression of this realisation.
References


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