The use of mental imagery and mental rehearsal techniques for optimal performance in string players

by

Ané du Toit

28168268

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Department of Music
Faculty of Humanities
University of Pretoria

Supervisor: Dr C.R. Panebianco-Warrens

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ABSTRACT

Mental imagery and mental rehearsal in music can be described as the imaginary rehearsal of physical activity with the focus on the senses (visual, aural and kinesthetic), aiming to recreate an experience that is similar to a physical event (Ginsborg 2004:224).

The main aim of this study is to investigate whether mental imagery and mental rehearsal techniques can be effective as an aid to overcome possible setbacks experienced by string players during a performance. Three string players, with varying degrees of performance experience, participted in the study. Data was collected through three semi-structure interviews during pre-intervention and intervention stages of the study.

The study uses a qualitative research approach and falls into the interpretive paradigm. It makes use of hybrid research design in order to fully investigate this phenomenon. A multiple case study design is utilised, with elements of action research. The action research component involved the intervention of mental imagery and mental rehearsal techniques based on existing mental imagery and mental rehearsal techniques.

The analysis of the data provided insightful information as to which mental imagery and mental rehearsal techniques were helpful in overcoming setbacks experienced by string players. The study found that the intervention of mental imagery and mental rehearsal techniques are effective in addressing setbacks (insufficient practice time, difficulty performing from memory and poor concentration ability) experienced by string players. However, according to the research findings, the techniques are not a substitute for physical practice. The study found that the application of the techniques is most beneficial when it is applied in combination with physical practice in order to reach optimal performance and the outcome of the intervention of mental imagery and rehearsal techniques was largely postive for all the participants.

Keywords: Mental imagery, mental rehearsal, performance, string players, setbacks, optimal performance, pre-intervention, intervention, case study, action research

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KEYWORDS OF STUDY

Mental imagery

Mental rehearsal

Performance

String players

Setbacks

Optimal performance

Pre-intervention

Intervention

Case study

Action research

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CHAPTER 1

BACKGROUND TO THE STUDY

> "The act of performing a musical work is the physical recreation of a performer's mental representation of the work."
>
> (Allen 2007:2)

1.1 Introduction

> Standing backstage, the familiar waves of nervous excitement race through the pianist's body. She takes a few deep breaths, shakes out her hands and arms, and readies herself. The hall lights are dimmed, a hush spreads through the audience and the stage manager tells her its time to go on. She steps onto stage, taking in the sights and sounds of her surroundings. It is a packed house, yet she is feeling confident and in control. She bows, acknowledging the audience, and takes her seat at the piano, pausing for a moment to settle and feel comfortable, breathing deeply one more time. Gently, she raises her arms and plays. The sound of the first notes ring through the hall, she is pleased with this sound. As she progresses through the piece, she takes note of the physical sensations of performing. She comes to the last section - a demanding passage requiring both agility and precision. She feels her fingers dancing across the keyboard to finish. As the sound fades away into the hall, she notices her heart rate and breathing, elevated through the physicality and excitement of what she has just done. The audience erupts into rapturous applause. The pianist stands, bows, and exit the stage, pleased with her performance. There is a knock on her dressing room door, its time to go. The pianist opens her eyes having finished imagining her ideal performance, and heads toward the stage (Clark, Williamon & Aksentijevic 2012:351).

As an MMus (Performing Arts) violin student, I am active as soloist and chamber musician, performing on stage often, and the extract above provides an apt description of these experiences. My own performance experiences (both as member of a quartet and in solo performances) has led me to the use of mental imagery and

mental rehearsal techniques, which had a positive effect on enhancing my performance, particularly in boosting my self confidence during stressful performances. This might be because the techniques helped to secure challenging repertoire from memory and also helped prepare me mentally for the performance. It is argued that a mental image can be defined as a recollection of a sensory experience, defining mental rehearsal as a special form of mental imagery, involving the mental rehearsal of an action with the absence of any physical motor actions (Kenny 2011:213,216).

Given my positive experience of the efficacy of mental imagery and mental rehearsal, I investigated whether mental imagery and mental rehearsal techniques would be helpful in overcoming possible psychological setbacks experienced by other string players during a performance. I started researching mental imagery and mental rehearsal techniques for my final year BMus essay, focusing mainly on the influence these techniques might have on the memorisation of music. The study involved an auto-ethnographic case study. Through reflexive observation and implementation of new ideas and techniques in teaching violin, I came to two conclusions. Firstly, according to research, memorisation may lead to a more thorough knowledge of the score and more intimate connection with the music. Secondly, the application of mental imagery and mental rehearsal techniques in combination with physical practice helps to secure a performance from memory. Although my study found that mental imagery and mental rehearsal techniques help with memorisation, I was curious to discover whether these techniques might help to enhance other aspects of a performance, and if other string players may benefit from the application of these techniques.

In conversation with other string players (cellists and violinists), I discovered that they, like me, claimed that they perform almost flawlessly during rehearsals, but during their actual performances, experienced setbacks that prevented them from reaching optimal performance. The following questions emerge from the observation of this problem: what are the possible setbacks that can occur during a performance?; what could be done in order to minimise or eliminate these setbacks?; would the implentation of mental imagery and rehearsal techniques play a role in the elimination of setbacks during a performance?

During the final stages of writing this study, I injured my right hand and developed tenosynovitis in my right wrist, forcing me to stop practicing and playing for two months. Because I am actively performing and could not afford two months of no practice, I turned to the mental imagery and mental rehearsal techniques as a substitute for physical practice in a way I may not have sought to do otherwise. According to my personal experience in this regard, mental practice alone is not as effective as physical practice alone, because my muscles became weaker and I became frustrated with the idea of imaginary playing, rather than physical playing. However, during the recovery stage, when combining short periods of physical practice with mental practice, the latter proved itself to be beneficial in expanding possible periods of practice time. Through my own personal experiences I can say that mental imagery and mental rehearsal techniques are not a substitute for physical practice, but enhances physical practice, and deepen the practice and performance experience.

1.2 Aim and objectives of the study

The main aim of this study will be to investigate whether mental imagery and mental rehearsal techniques can be helpful as an aid to overcome possible setbacks experienced by string players during a performance.

The objectives of the study will be to identify setbacks experienced by the musicians. Thereafter, various mental imagery and mental rehearsal techniques will be prescribed and implemented. A series of interviews will be conducted at varying intervals in order to establish whether or not the mental imagery and mental rehearsal techniques were useful in addressing the problems experienced by each musician.

1.3 Research questions

Main research question:

> How would mental imagery and mental rehearsal techniques address setbacks experienced by string players during a performance?

Sub-questions:

- What are the possible setbacks experienced by string players that prevents optimal performance?
- Which mental imagery and mental rehearsal techniques are helpful in overcoming setbacks experienced by string players?
- In what way would a mental imagery and mental rehearsal technique intervention address the problems experienced?

1.4 Methodology

This section gives a brief overview of the methodological procedure followed during this study, where Chapter 3 contains a more detailed acount.

This study uses a qualitative research approach and falls into the interpretive paradigm. It makes use of hybrid research design in order to fully investigate this phenomenon. A multiple case study design is utilised, with elements of action research. The action research component involved the intervention of mental imagery and mental rehearsal techniques based on existing mental imagery and mental rehearsal techniques as suggested by Freymuth (1999:40-80) and Johnson (2004:48-68), but also on some of Ginsborg's (2004) suggestions for the development of imagery abilities, Holmes and Collins' (2001) recommendations for effective imagery, and Greene's (2001 and 2007) techniques for an optimal performance. Specific techniques were chosen to address a wide variety of factors that performers encounter, often in rehearsal and performance situations. The data was gathered during three semi-structured interviews with three participants. The three participants were purposefully selected according to the following criteria:

- All three participants are professional string players, with a professional playing experience ranging from the start of a performance career, to highly experienced;
- All three participants performed on a regular basis;
- All three participants had to perform at least once between each interview.

The study was conducted in two stages, a pre-intervention and intervention stage.

Stage 1: The first stage (pre-intervention) included a semi-structured interview with each participant. The goal of the initial semi-structured interview (Interview A) was to establish the participants' point of view on a musical performance and also to identify possible psychological setbacks experienced by the participants during a performance.

Stage 2: The second stage of the study (intervention) involved the intervention of mental imagery and rehearsal techniques, and one semi-structured interview. Within two weeks after Interview A, a list of mental imagery and rehearsal techniques was given to each participant to apply to their daily practice routine. This study thus assumes a quasi-exploratory approach. A month after the intervention (including one performance), another semi-structured interview (Interview B) was held as part of the intervention stage, so as to establish how the participants were experiencing the influence of mental imagery and rehearsal on their daily practice routine, and to monitor the effects of these techniques. After Interview B, the intervention became filtered, due to the fact that the participants focused more on specific techniques to suit their individual needs. The techniques were applied for another month (including a performance) before the final interview (Interview C), which followed a month after Interview B, to establish whether the techniques were beneficial in overcoming setbacks identified prior to the intervention.

All the semi-structured interviews were approximately 30 minutes long, and recorded with an audio recording device. After each interview, a verbatim transcription was compiled of what was recorded during the interview. The interviews were coded through the process of open coding.

The semi-structured interviews were complied according to the ethical standards of the University of Pretoria. Letters of informed consent were signed prior to the interviews, and participants were assured of confidentiality. It was made clear to participants that they were free to withdraw from the study at any point.

1.5 Chapter outline

Chapter 1 is the introductory chapter and provides an overview to the background of the study, the aim of the study, research questions, an overview of the

methodological process, limitations of the study, and a chapter outline. Chapter 2 presents the literature overview, along with a discussion of literature on research mental imagery and mental rehearsal techniques. Points of discussion regarding mental imagery and mental rehearsal includes its definition, history, efficacy theories and the benefits of the application of mental imagery and mental rehearsal techniques. Chapter 3 shows a detailed discussion of the methodological procedures used for this study, and includes information regarding the research design and paradigm, the sample, data collection, data analysis and ethical procedures. Chapter 4 presents the results of the analysis. Data were analysed during two stages. From Stage 1, three main themes and sixteen sub-themes emerged and from Stage 2, two main themes and four sub-themes emerged. Chapter 5 includes a discusssion of the themes in relation to literature on mental imagery and mental rehearsal. Chapter 6 provides the summary and conclusions of the study along with ideas for further research.

A list of sources and appendices can be found at the end of this study.

CHAPTER 2

LITERATURE OVERVIEW

2.1 Introduction

Mental imagery and rehearsal in music can be described as the "…cognitive or imaginary rehearsal of a physical skill without overt muscular movement. The basic idea is that senses – predominantly aural, visual and kinesthetic for the musician – should be used to create or recreate an experience that is similar to a given physical event" (Ginsborg 2004:224).

Studies into the use of mental imagery and mental rehearsal techniques have been conducted for more than a century, but over the past 40 years, there has been a significant increase in the field of research into mental imagery and mental rehearsal (Johnson 2003:13). Chapter 2 includes a discussion of current literature on these subjects. Firstly, the discussion focuses on literature showing the history of mental imagery and mental rehearsal in music performance and literature defining mental imagery and mental rehearsal. Thereafter, a brief overview of literature related to mental imagery and mental rehearsal are discussed. The chapter is summarised with a conclusion.

2.2 Defining mental imagery and rehearsal

In earlier research, imagery has been defined as the ability to "imagine sounds even when no audible sounds are present", however, further research by Clark et al. (2012) has shown that imagery is not only used to imagine sounds (auditory images), but also the physical actions required to create the sound, the visual images of the instrument or score, and the emotions used for expressive purposes. Ginsborg (2004 in Clark et al. 2012:351-352) define imagery as the: "…cognitive or imaginary rehearsal of a physical skill without overt muscular movement. The basic idea is that the senses - predominantly aural, visual, kinesthetic for the musician - should be used to create or recreate an experience that is similar to a given physical event".

In contrast to Clark et al.'s view of musical imagery as a concept that combines the concept of mental imagery and mental rehearsal, Kenny (2011) defines the concepts of a mental image and mental rehearsal individually. Kenny (2011:213), states that an image can be defined as a recollection of a sensory experience. She defines mental rehearsal as a special form of mental imagery, involving the mental rehearsal of an action, with the absence of any physical motor actions (Kenny 2011:216).

Similarly, Holmes (2003:43) defines mental rehearsal as "the cognitive or symbolic rehearsal of a physical skill in the absence of overt, physical movements", and Johnson (2003:6) states that mental imagery involves the ability to see objects or events in the mind's eye, without involving any physical action.

I believe that mental imagery and mental rehearsal are closely related, because according to Kenny (2011:216), mental rehearsal is in fact a form of mental imagery and the combination of both may result in a better performance. However, I choose to separate the concepts of mental imagery and mental rehearsal, rather than referring to musical imagery, like Clark et al. (2012), because different exercises can be done to enhance both mental imagery and mental rehearsal, respectively. Kenny (2011:216) finds that a combination of physical practice and mental imagery and mental rehearsal techniques results in the best performance.

2.3 The efficacy of mental imagery and mental rehearsal

The two most prominent theories as to why mental imagery and mental rehearsal, when combined with physical practice, are effective, are psychoneuromuscular theory and the central representation theory (Mulder et al. 2003:212).

Psychoneuromuscular theory, also called the peripheral theory, is based on the observation that during imagery of a particular movement, the same muscles are activated as during overt movement execution (Driskell et al. 1994; Boschker 2001 in Mulder 2003:12). Mulder et al. elaborate thus:

> It is proposed that, when a subject is mentally practicing the execution of a movement, impulses are sent to target muscles. Furthermore, it is suggested that the same neuromotor pathways that are involved in the execution of a specific action are activated

> also during mental practice. This activation aids skill learning by improving the appropriate coordination patterns as a result of the strengthening of motor programs in the motor cortex, and by priming the corresponding motorneurons of the muscles necessary to execute a motor task (Mulder et al. 2003:12).

The central representation theory claims that the learning effects of mental practice may be explained in terms of a top-down effect or a central regulation:

> Actions are driven by a centrally stored movement representation. Without earlier experience in the execution of the target movement, however, no representation is available. Thus, if this central view is correct, a totally novel movement cannot be learned by mental practice (Mulder et al. 2003:12).

Both these theories are based on the principle that mental practice ought not to substitute physical practice, but rather, that it enhances it. Clark et al. (2012:352) argue that mental imagery and mental rehearsal function in a similar manner to physical performance at a neurological level, forwarding that the many benefits that are gained by physical practice can also be gained by mental imagery and rehearsal. I argue here that this might be particularly helpful, for example brass instrumentalists or singers, who can't afford extended hours of physical practice.

According to Holmes (2003), imagery has only recently become accepted as valuable within the field of psychology and it has not yet been applied in any organised way to the playing of musical instruments. She further indicates that this needs to be researched, proposing that her study "demonstrates the extensive role that imagery can have at all stages of preparation and performance" where "there might be good pedagogical reasons for encouraging its wider use" (Holmes 2003:70).

2.4 A brief overview of history of mental imagery and mental rehearsal

The concept of mental imagery in music dates back many centuries. According to Johnson (2003:1), Robert Schumann claimed that he saw his compositions as "pictures… clothed in lovely melodies." Mozart heard his compositions in his mind, and could write out a single part, without the help of a score. From these accounts it

is evident that these composers might have incorporated a type of mental imagery into their compositions.

According to Virtue (1996:210), the first record of humans using mental rehearsal goes back to 60000 B.C., when hunters from the ice age painted pictures of animal prey on their walls. They would then throw spears at these paintings, visualising a successful hunt. The ancient Egyptians believed that disease could be cured by the visualisation of perfect health.

Although there has been limited research on the topic of mental imagery and mental rehearsal until the late 1970s, certain musicians already incorporated the use of mental imagery and mental rehearsal in their rehearsals and teaching. According to Clark et al. (2012:353), Anton Rubinstein (1829-1894) was known to develop auditory representation of music by practising on a paper keyboard. In 1921, Jaques-Dalcroze argued: "music training should develop inner hearing - that is, the capacity for hearing music as distinctly mentally as physically". In 1937, Rubin-Rabson noted that mental imagery aided the process of memorisation, and in 1941, he concluded that the combination of mental and physical rehearsal proved to be more effective than physical rehearsal alone (Clark et al. 2012:353-355).

The earliest studies of mental imagery were done in 1909 by G.H. Betts at Columbia University. He conducted three studies to investigate the influence of imagery on piano performance. His initial research showed that 14 out of 18 students employed auditory imagery during aural training exercises, and that this increased their aural recognition accuracy. Then, he conducted a study to measure the use of mental imagery, while participants looked at a passage of musical notation. He concluded that 15 of the 19 participants employed auditory images, 16 kinesthetic imagery and 10 visual imagery. Thereafter he conducted a third study to investigate the use of mental imagery, while listening to a passage played on the piano. Eighteen out of nineteen participants experienced visual or kinaesthetic images while listening to the music. Even though his research was limited due to the small number of participants, it proves that many musicians were already sub-consciously incorporating mental images when seeing a score or listening to music and paved the way for further research (Johnson 2003:13; Richardson 1999:12).

In 1919, violinist Fritz Kreisler discussed his mental abilities in his book *Violin playing from the perspective of mental involvement and physical release.* He would describe learning complete concertos while his violin remained in its case, and was known to study scores and practice mentally on long train rides. According to him, technique is all in the performer's mind (Freymuth 1999:17&18).

In 1937, Rubin-Rabson's *The influence of pre-analytic study in memorising piano music* compared the effects of mental practice and physical practice on memorisation ability. He concluded that physical practice combined with mental practice resulted in a better performance from memory (Clark et al. 2012:355-356).

In the 1970s and 1980s there has been an increase in the research of mental imagery and mental rehearsal in various fields, including music and sport. According to Johnson (2003:2), playing sports and playing an instrument shares many common elements including goal-setting, motivation, and commitment to hours of daily practice, focused concentration, and the ability to eliminate unwanted thoughts. Therefore research that focuses on these aspects of mental imagery and mental rehearsal in sports may also be applicable to music. In 1983, Deborah Feltz and Daniel Landers reviewed 60 studies through a meta-analysis, testing the efficacy of mental imagery and mental rehearsal in sports, music and other tasks between 1930 and 1980, citing Glass's (1977) definition of meta-analysis as "the combination of results of independent studies for the purpose of integrating their findings" (Feltz & Landers 1983:27). The meta-analysis concluded with four propositions that are equally relevant to mental imagery and mental rehearsal in sports, music and other performing arts (Feltz & Landers 1983:45-50):

1. Mental practice effects are primarily associated with cognitive-symbolic rather than motor elements of the task.

2. Mental practice effects are not just limited to early learning – they are found in early and later stages of learning and may be task specific.

3. It is doubtful that mental practice effects are produced by low-gain innervations of muscle that will be used during actual performance.

4. Mental practice functions to assist the performer in psychologically preparing for the

skill to be performed.

According to Proposition 1, mental practice allows a musician to focus on the symbolic representations of the skill, such as the score and score indications. Taking time for mental practice allows the musician to further refine the temporal and spatial aspects of the skill. Proposition 2 is based on studies which found that mental practice is effective for novice musicians, but it is most effective when the musician has prior physical experience.

In the early stages of learning, mental practice may give the performer a rough schema of the cognitive elements of the task and this could account for the mental practice effects in novice performers. With practice on the task, feedback from the muscles and senses develop the schema of cognitive elements more fully, so that performance is more enhanced for the group partaking in mental practice, when compared to the group not partaking in mental practice (Feltz & Landers 1983:46).

Proposition 3 suggests that it is doubtful that mental practice activates muscles appropriate for performing the physical task. For instance, a study done by Shaw (1938) showed that imagining the actions of singing, playing an instrument, and typing, evoked more general than localised muscle innervations. If someone imagined typing with their right hand, then muscle innervations were found in not only the right hand and arm, but in the leg also. More recently, Hale (1981) has similarly found that when he placed electrodes on the right arm of subjects and asked them to image doing the curl, he found that in addition to bicep activity increasing as expected, triceps activity also increased. This fails to support other explanations for mental practice, which assume that covert mental rehearsal mirrors overt practice conditions. Instead, it is more likely that these minute innervations associated with mental practice are more general throughout the whole body, or a whole limb. Therefore, Proposition 4 states that the muscle innervations that occur during mental rehearsal may be preparing the body for the actions and arousal that would occur during the physical action of the performance (Feltz & Landers 1983:49-51).

In 1985, Ross (1985:221-230) conducted an empirical investigation on efficacy of mental training practice on the performance of a college trombonist. He compared

the effect of mental practice and physical practice with trombone students. The practice strategies were:

1. only physical practice;
2. only mental practice;
3. mental practice with simulated slide movement;
4. combined physical and mental practice;
5. no practice.

After three practice trials, the results indicated that the combined physical and mental practice group achieved the most improvements, with the physical practice group second; the mental practice group with simulated slide movement third; the mental practice group fourth; and the no practice group last. According to this study, it seems that mental practice enhances performance, but mental practice cannot be seen as a substitute for physical practice. A limitation of Ross' study was that mental imagery training or the time to apply mental rehearsal was rarely provided. Therefore, a study needs to be done where participants are provided with sufficient time to incorporate mental imagery and mental rehearsal into their daily practice routine.

Because research advocates for the benefits of the combination of physical and mental practice, the current study focuses on the application of mental imagery and rehearsal techniques in combination with the participants' normal daily practice routine.

2.5 A brief overview of recent studies on mental imagery and mental rehearsal

In *Musical imaginations*, Clark et al. (2012) explores theories and findings that research produced on musical imagery. They state that early investigations into the use of musical imagery used self-reporting measures to measure the influence of imagery to enhance physical practice, but current research also considers musical imagery beneficial for: enhancing expressivity during practice and performance; assitance with learning and memorisation; pre-experiencing performances; and assisting in prevention and treatment of playing-related injuries.

There is currently an increase in the use of functional magnetic resonance imaging (fMRI) and Electromyography (EMG) to measure the equivalance that exists between live and imagined performances (Clark et al. 2012:351). Functional Magnetic Resonance Imaging is defined by Beckmann et al. (2005) as:

> …a technique for measuring brain activity. It works by detecting the changes in blood oxygenation and flow that occur in response to neural activity – when a brain area is more active it consumes more oxygen and to meet this increased demand blood flow increases to the active area. Functional Magnetic Resonance Imaging can be used to produce activation maps showing which parts of the brain are involved in a particular mental process.

Electromyography (EMG) is meanwhile defined by Konrad (2006:5) as:

> …an experimental technique concerned with the development, recording and analysis of myoelectric signals. Myoelectric signals are formed by physiological variations in the state of muscle fiber membranes[…] EMG can be described as the study of the voluntary neuromuscular activation of muscles within postural tasks, functional movements, work conditions and treatment/training regimes.

Halpern et al. (2004) used fMRI to explore the similarity between brain activation in live and imagined sounds. Participants with a moderate musical background were scanned while making similarity judgments about the timbre of heard or imagined musical instrument sounds. Their research found that hearing real and imagined sounds engaged similar regions in the auditory cortex. The pattern of judgments in perceived and imagined conditions was similar, suggesting that perception and imagery access similar cognitive representations of timbre.

Lotze et al. (2003:1817-1828) conducted a study using Electromyography (EMG) on professional and amateur violinists. They compared activation maps during actual and imagined performance of Mozart's violin concerto in G major (KV216). The first sixteen bars of the concerto were performed, and the execution and imagination of (left hand) fingering movements were measured through EMG recordings in both

amateur and professional violinists. The recordings found that professional musicians generated higher EMG amplitudes during physical performance and showed focused cerebral activations in: the contralateral primary sensorimotor cortex; the bilateral superior parietal lobes; and the ipsilateral anterior cerebellar hemisphere. It appears that during execution, physical musical sequences in professionals, increased connectivity between the finger sequences and auditory system (auditory-motor loops) can be found, which may account for the superior musical performance.

However, the study found that auditory-motor loop was not involved during imagined performances in either professionals or amateurs. It seems that the motor and auditory systems are co-activated as a consequence of musical training, but only if one system (motor or auditory) becomes activated by physical movement or by live musical auditory stimuli.

Holmes (2003:6) has investigated the roles of auditory, visual and motor imagery in the encoding, storing and retrieval processes of learning music through a study of the integrated roles of emotion, imagery and technique during the learning and memorisation processes. The participants were two contrasting string players: a guitarist and a cellist, respectively. Data was gathered through semi-structured interviews and analysed through principles of interpretative phenomenological analysis and grounded theory. She claims that semi-structured interviews and IPA methodology was the most appropriate research approach because of the richness of the data obtained. The main hypothesis of Holmes' study is that "… in performance at the highest level, technique forms a fundamental part of the memorisation process, and that technical choices and practice will be generated largely from interpretive concept, through the cognitive structures associated with emotion and imagery" (2003: 69). Holmes' study was focused more on the learning and memorisation processes with the integration of imagery, emotion and technique, than on the role that mental imagery and rehearsal play in performance and performance preparation. This study still proved to be instructive, however, due to the casting of imagery as a dominant theme in the learning of music.

2.6 Benefits of the application of mental imagery and mental rehearsal techniques

In 1999, Malva Freymuth published a book *Mental practice and imagery for musicians.* in which she describes her own experiences of mental practice as a violinist, and how mental practice made learning new repertoire possible after severe tendonitis. She mentions how she was limited to very short periods of physical practice, but she combined short periods of physical practice with mental practice to learn new repertoire (Freymuth 1999:14-19). Through this she developed a list of mental techniques. Although her book is based on scientific research, her main focus was the practical application of mental techniques for musicians. This book proved to be very useful for this study, because it describes the vital characteristics of mental imagery and mental rehearsal, providing a programme for training mental skills and a section on mental skills and injury. Many of the techniques chosen for this study were based on techniques from this book (Freymuth 1999:40-80).

Ginsborg (2004:225) provide a list of benefits of mental imagery and mental rehearsal: it improves memory and learning; makes practice more efficient; helps to overcome technical difficulties and develops skills; heightens sensory awareness; improves interest in the music itself; refocuses attention during performance; enhances general confidence; assists with greater control over negative emotions; helps to achieve a greater connection with the audience; and to achieve a peak experience.

According to Clark et al. (2012:355), the studies of both Rubin-Rabson (1937) and Ross (1985) concluded that imagery aided memorisation, after they compared the effects of mental and physical practice. Both studies noted that mental and physical practice combined were more effective than physical practice alone. Clark et al. (2012:356) found mental practice to be a way of enhancing musical performance, but they emphasise it cannot substitute physical practice.

Clark et al. (2012:357) state:

> …not only is imagery beneficial for learning and memorising music, it is also of particular use for the development of and communication of expressivity,

> for refining performance skill, and aiding in the successful delivery of those skills during a performance. Further, it has been suggested that metaphorical imagery is particularly effective for helping develop appropriate emotion and rhythm in musical performance.

This finding is important, as the current study investigates the efficacy of mental imagery and rehearsal on performance, where performance techniques will be employed alongside physical performance.

2.7 Conclusion

The broader body of relevant research supports the benefits of mental imagery and mental rehearsal techniques. In light of this evidence, I propose that the current intervention may lead to a positive effect on performance, as a result of the mental imagery and mental rehearsal techniques it aims to explore.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter includes the methodological process used to address the research questions. An overview of the chosen research paradigm will be given. The data gathering and analysis techniques will be discussed, and ethical implications of this study will be explained.

3.2 Research paradigm

This study uses a qualitative research approach (Maree 2007:50) and falls into the interpretive paradigm. According to Durrheim (2006:287), qualitative researchers study the "feelings, experiences, social situations or phenomena as they occur in the real world". Maree (2007:51) states that qualitative research can be defined as:

> …focus[ing] on describing and understanding phenomena within their naturally occurring context with the intention of developing an understanding of the meaning(s) imparted by the respondents (a seeing through the eyes of the participant) so that the phenomena can be described in terms of the meaning that they have for the actors or participants.

The qualitative research paradigm is the most appropriate when addressing the research questions, because the goal of qualitative research is to understand a central phenomenon. Research questions should be general and broad and should seek understanding of the participants' experiences of a central phenomenon (Maree 2007:265).

This created the opportunity to have a series of semi-structured interviews with a three professional string players, in order establish possible setbacks they experience during performances and, through the application of mental imagery and rehearsal techniques introduced an intervention, to establish whether these techniques enhance their performances and eliminate setbacks identified before the intervention.

Although the self-report questionnaire is one of the most common methods to assess the use of mental imagery vividness in various fields (Clark et al. 2012:358), musicians nonetheless rarely use such questionnaires, because they do not address the sensory nature of a musical experience, which is closely related to the types of imagery used by musicians. Clark et al. (2012) therefore recommend incorporating a post-imagery manipulation check, which involves interviewing participants directly after the use of imagery to gain more insight into their experiences. Semi-structured interviews were selected as the appropriate data collection instrument for this study.

3.3 Research design

A hybrid case study design was utilised for this study. According to Maree (2007:57; 75), case study research is a "systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest" and that "case study research is aimed at gaining greater insight and understanding of the dynamics of a specific situation". According to Willig (2008:88), it is possible to characterise a case study according to its ideographic perspective, where the researcher is concerned with the individuals, rather than the general population. In the case of this study, each musician's individual experience of practice and performance will be examined, and the effect that mental imagery and mental rehearsal techniques have on their practice and performance will be investigated.

However, the study is not purely a case study. It contains elements of action research in the form of an intervention, which will be monitored through semi-structured interviews at various intervals during the study. Action research involves developing solutions to practical problems (Maree 2007:124). This study is conducted in two stages: pre-intervention and intervention. During the pre-intervention stage, possible setbacks will be identified. Thereafter, an intervention of mental imagery and rehearsal techniques will be given to the participants to try and eliminate setbacks experienced prior to the intervention. As a result, this study is quasi-exploratory. Exploratory studies seek out new insights into phenomena through a flexible, inductive and open research approach (Durrheim 2006:44).

3.4 Sample

According to Maree (2007:79) sampling refers to "the process used to select a portion of the population for study". Purposive sampling was used, which means that, the chosen participants all have a particular characteristic that makes them important data holders for the study (Stommel & Wills 2004:303; Maree 2007:79).

The selection criteria for the study was that participants would be professional string players, who perform often. Clark et al. (2012:356) mentions Gabrielsson's (1999) suggestion that the less advanced the musician, the more challenging the music, and the more important physical practice becomes. Gabrielsson is cited in Clark et al. as follows:

> …a novice needs intensive motor practice in order to strengthen cognitive schemas. This process occurs through the joint monitoring of movement and auditory and visual feedback. Once the mental schemas are strong enough they will contain the combined (cross-modal) information. As such they can then guide different sensory and motor functions. Physical practice becomes less important because the cognitive motor schemas are there already. All that needs now is execution… (2012:356).

Therefore, three string players who represented a span of professional playing experience, ranging from those at the start of the professional career to those highly experienced, were chosen for this study. Maree (2007:79) states that the sample sizes in qualitative research are generally small, therefore only three participants were chosen.

3.5 Intervention material

The literature review of this study revealed a limited number of mental imagery and mental rehearsal techniques available for practical application, which includes Freymuth (1999:40-80) and Johnson (2004) on mental imagery and mental rehearsal techniques; Ginsborg's (2004) suggestions for the development of imagery abilities; Holmes and Collins' (2001) recommendations for effective imagery; and Greene's (2001 and 2007) techniques for optimal performance. The mental imagery and mental

rehearsal techniques that were used for the intervention are based on these techniques, and it was chosen because it addresses a wide variety of factors, which performers encounter often in rehearsal and performance situations. All the participants were given the same list of techniques to apply during the intervention. However, after Interview B, it became evident that the intervention became filtered, due to the fact that the participants focused more on specific techniques to suit their individual needs.

3.6 Data collection and preparation

The study was conducted in two stages, viz. a pre-intervention and an intervention stage. The time frame for data collection was eight weeks to allow enough time for the physical application of the techniques as part of the participants'daily practice routine.

Stage 1 (pre-intervention) included a semi-structured interview with each participant. Qualitative interviews are conversations between the participant and researcher, where the aim is to see the world through the participant's eyes and learn about their behaviour, ideas, views and beliefs. Through interviews, it is possible to obtain rich, descriptive qualitative data that will be difficult to acquire in other ways (Maree 2007:87). The goal of the initial semi-structured interview (Interview A) was to establish the participants' point of view on a musical performance, as well as to identify possible setbacks experienced by the participants during a performance.

Stage 2 (intervention) involved the intervention of mental imagery and rehearsal techniques. Stage 2 commenced within two weeks after Interview A, when a list of mental imagery and rehearsal techniques was given to each participant to apply to their daily practice routine. The list of techniques given to the participants can be found in the Appendix C. The researcher explained these techniques to each participant, and the participant then applied these techniques to their daily practice routine. A month (including a performance) after the start of the intervention, another semi-structured interview (Interview B) was held so as to establish how the participants were experiencing the influence of mental imagery and rehearsal on their daily practice routine, and to monitor the effects of these techniques. Stage 2 was concluded with Interview C, which followed a month (including a performance)

after Interview B to establish the outcome of the possible effect the mental imagery and rehearsal techniques had in overcoming setbacks (identified prior to the intervention) experienced during performance.

Table 1: Summary of the data collection process

Stage 1:	**Pre-intervention**
	Pre-Intervention Interview A
	Rough analysis of Interview A
	(Stage 2 begins within two weeks after Interview A)
Stage 2:	**Intervention**
Stage 2a:	Intervention of techniques
	(one month with a performance)
Stage 2b:	Mid-intervention - Interview B
Stage 2c:	Filtered intervention of techniques
	(one month with a performance)
Stage 2d:	Concluding intervention- Interview C

All the semi-structured interviews lasted approximately 30 minutes, and were recorded with a recording device. After each interview, a verbatim transcription (Maree 2007:89) was compiled of what was recorded during the interview. It was taken into account that a written transcription constitutes a form of translation and can never be an exact mirror image of the interview (Willig 2008:27).

3.7 Data analysis

In order to analyse the transcriptions of the interviews, the process of qualitative coding was utilised. Coding refers to the process of breaking data into small, meaningful, analytical units with the intention of grouping/clustering the units together under a code heading and then analysing them both as cluster and in relation to other clusters (Durrheim 2006:325-326; Maree 2007:105). In this study, inductive coding was used, due to the experimental nature of the study. Maree (2007:107) states that inductive coding invloves the process of letting codes emerge while examining the data.

The process of inductive coding was followed after each of the three sets of interviews, in order to analyse the data gathered with each interview. Open coding (Maree 2007:105) was used, which involves examining the data, making comparisons and asking questions. According to Gibbs (2007:45), the purpose of coding is to draw interpretation from the data, and not to base it on pre-existing theories. Through inductive analysis, the codes that emerged were grouped into different theme groups. The themes and sub-themes that emerged are discussed in Chapter 4.

CHAPTER 4

RESULTS

4.1 Introduction

This chapter includes the results of the study and presents the interview data according to two stages: Stage 1 (pre-intervention) and Stage 2 (intervention). All in all, three sets of interviews (Interview A, B and C) were conducted during the study. The first interview (Interview A) took place at the beginning of Stage 1. Interview B was conducted a month after the onset of Stage 2 of the study. The final interview (interview C) took place a month after interview B at the end of the study.Through the process of coding, main themes and subthemes were identified. A top down and bottom up (deductive and inductive) approach was used to analyse the data. Several themes and subthemes emerged. Deductive themes were prompted from literature on mental imagery and mental rehearsal techniques.

4.2 Main themes and subthemes of Stage 1 and 2

Table 2: Stage 1 (Pre-intervention) - Themes and subthemes elicited from Interview A

Pre-intervention Theme i: Musical background and experience	
Sub-themes	**Raw data themes**
a. Performance experience and frequency	*45 years and I perform once a month on average. (Participant 1)* *19 years and I perform about five times a month. (Participant 2)* *36 years, once or twice a month. (Participant 3)*
b. External negative experiences	*The first time I ever felt nervous in my life was when my teacher died.*
c. Emotional experiences	*Whatever baggage* [sic] *you are carrying is going to come out in your playing… something is going to cause you to have an element of conflict in your playing, because of an emotional or mental*

	something [sic].
d. Learning new repertoire	*I move through the piece section by section.*
e. Performing from memory	*Emotional aspects are really important and it gives me extra support in memorizing a piece.*
Pre-intervention theme ii: Conceptions of self in performance situations	
Subthemes	**Raw data themes**
a. Motivation	*A concert will be a motivation, so again, performing as often as possible helps.*
b. Concentration ability	*It (concentration) gets better with time and maturity. I struggled with concentration when I was younger.*
c. Anxiety	*I think to a great extent it is forward projection that causes anxiety.*
d. Mistakes during a performance	*One often makes mistakes in places you would never make* [one] *during a rehearsal.*
Pre-intervention theme iii: Prior conception of mental imagery and mental rehearsal techniques	
Subthemes	**Raw data themes**
a. Existing mental strategies	*I visualise myself right before the performance, how I feel, how I go on stage, how I feel on stage and I see the audience in front of me.*
b. Conceptions of mental imagery	*For me, it's the ability to see my hands playing the music.*
c. Conceptions of mental rehearsal	*Going through your music without your violin, and especially when playing from memory.*
Pre-intervention theme iv: Biggest personal setbacks that prevent optimal performance	
Subthemes	**Raw data themes**
a. Insufficient practice time	*Insufficient practice time, lack of repetition.*
b. Performance from memory	*I have never been taught to memorise, so I would prefer to play from music when given a choice.*
c. Poor concentration ability and wandering thoughts	*I often catch myself during a performance wondering what the audience might think.*

Stage 1 delivered four themes[1] and fifteen subthemes.

Table 3: Stage 2 (Intervention) – Intervention and reflection themes and subthemes elicited from Interviews B and C.

Intervention theme I: Intervention results of applied mental imagery and mental rehearsal techniques	
a. General experience of techniques	*It was very interesting. I found that some of them I already incorporated in my playing unconsciously, and some of it was new.*
b. Detailed expereince of the techniques	*I really like that, that you learn to really, without worrying about the technical difficulties, just concentrate on relaxing your whole body.*
Intervention theme II: Reflection: The role of mental imagery and rehearsal in overcoming subjective setbacks	
Subthemes	**Raw data themes**
a. Insufficient practice time	*It does save time.*
b. Performance from memory	*Two days before the concert I jogged and there was one spot where I could not remember the exact note, how I went down a run, and I figured it out.*
c. Poor concentration ability and wandering thoughts	*I am trying to create also a space around me… and then keep the thoughts* [and] *feelings in it.*

During Stage 2, two themes and five subthemes were identified. After the main themes and subthemes were identified, the data was organised accordingly.
A more detailed discussion of the themes and subthemes will follow in the next section.

[1] For the sake of clarity, the themes in this chapter are numbered respectively according to small and large roman numerals. The themes for the Stage 1 pre-intervention are numbered with small roman numerals (i-iv), whereas the themes identified during Stage 2 intervention make use of large roman numerals (I-II). The decision was taken to use roman numerals to prevent confusion between the stages (1 and 2) and the interviews (A, B and C).

Stage 1: Pre-intervention

The pre-intervention involved Interview A, and was followed by the intervention about two weeks after Interview A.

4.3 Pre-intervention theme i: Musical background and experience

The main focus of Interview A was to gather data concerning the participants' musical background and performance experiences that might influence their concept of performance, learning strategies, and their thoughts on performance from memory. The following subthemes emerged: performance experience and frequency; external negative experiences; emotional experiences; learning new repertoire; and performing from memory.

Subtheme a: Performance experience and frequency

During the interviews it became evident that all three participants perform on a regular basis and they are all professional string players that represent a span of proffessional playing experience, ranging from those at the start of a professional performance career, to those highly experienced.

> Participant 1: I have been playing for more or less[2] 45 years, and I perform on stage probably once a month on average… (Interview A)

> Participant 2: I have been playing since I was five, so its about 19 years… I perform on stage about once or twice per month, solo and with orchestra and chamber performances it's a bit more. About five times a month… (Interview A)

> Participant 3: …36 years… once or twice a month. I like performing; it is a positive experience for me. (Interview A)

Although all the participants are generally positive about performing, it became evident that they all had different experiences, both external and internal, over which

[2] The number of years of playing experience mention here does not refer to years of professional experience, but to the number of years since the person started playing their instrument.

they had little or no control, and which influenced the way they feel about performing. This led to further subthemes.

Subtheme b: External negative experiences

According to the data, it seems that external negative experiences might have had a significant impact on a performer's attitude towards performing and personal performing experience over time. In the case of Participant 1, a teacher passed away when she was sixteen, and her support system faltered. This seemed to have contributed to the experience of anxiety:

> Participant 1: As a child it didn't stress me out [sic] even slightly, and with my teacher it was part of a routine to perform almost every weekend…first time I ever felt nervous in my life was when my teacher died, I suddenly had to do a concert and she wasn't there. I had very strong support from her and I think constant performing made it much easier. (Interview A)

Similarily, Participant 2's negative experience resulted in a loss of focus and concentration during a performance:

> Participant 2: Unfortunately sometimes something happens, like in my last performance I played the Mendelssohn violin concerto's 3rd movement and I chipped a corner out of my violin during the performance and I got [sic] so angry with myself… Luckily, I had a very positive response from the audience, which made up for the few flaws. (Interview A)

These negative experiences were caused by external factors, which the performer had little or no control over. These external negative experiences might result in negative emotional experiences, for instance, Participant 2, who chipped a corner of her violin during performance, resulting in anger, or Participant 1 whose teacher passed away, resulting in anxiety. In the case of Participant 2, the negative experience was overcome by a positive response from the audience, enabling her to continue and overcome the negative experience, and redirect her focus.

Subtheme c: Emotional experiences

Apart from external negative factors resulting in emotional experiences, a variety of other factors can result in emotional experiences that may influence a performer. Participant 1 believes that because performing is a creative process, any personal issues will reflect in one's playing:

> Participant 1: … it is very much a personal journey. Whatever baggage [sic] you are carrying is going to come out in your playing…everybody is going to have a different story but something is going to cause you to have an element of conflict in your playing because of an emotional or mental something [sic]. So for me it is becoming aware of what the mind is doing while you are playing because most of the time we are not aware of the mind…(Interview A).

Participant 3 believes that tension can be avoided by trusting the musical abilities and input of the people you perform with:

> Participant 3: I trust the members of my quartet when playing and I enjoy the performance. It is important to play with members you can trust, if you don't trust the people you play with, it creates tension. (Interview A)

The participants were asked about their thoughts and feelings after a performance.

> Participant 1: I'd say relief, most of the time! I'm glad that I got through it and I find that I haven't had any terrible performances, you know, serious dramas that was such a flop I felt I can never do this again [sic]. (Interview A)

> Participant 2: Well, I always have in mind that there will be something that won't be perfect, and afterwards I try not to obsess too much. If there were… more good than bad things, I am happy and I let the bad things go. (Interview A)

> Participant 3: I try not to think negative thoughts while I play and do not really analyse the performance during the performance, and I enjoy playing; because I do not play too often. Afterwards I do not detangle [sic] it too much. I try to communicate with the people in the audience and not focus on anything negative… (Interview A).

It seems that all three participant experience emotions of happiness and relief after a performance, in spite of mistakes or challenges. This postive mindset is evident in Participant 3, who deliberately tries to suppress negative thoughts and enjoy performing. She accepts small mistakes and aims to correct mistakes during subsequent performances, ensuring a positive attitude before the next performance.

> Participant 3: I will go and work on any problems that might have occurred, but I'll know that I can do it and play it correct [sic] the next time. I have that positive thinking when I play. (Interview A)

Therefore, it seems a positive mindset and attitude is prevalent, regardless of the performance.

Subtheme d: Learning new repertoire

The manner in which a piece is learned may influence the performance in terms of fluency of performance and secure memorisation. The participants were asked how they approach learning a new piece. Participant 1 and Participant 3 seem to follow a holistic approach, in order to form overall concept of the work, before breaking it down into smaller sections. They both identify possible problematic areas and then practice these slowly. Thereafter, they both play through the work again. Through this analysis, it seems that these participants place emphasis on both the work as whole, as well as paying detailed attention to smaller, challenging sections:

> Participant 1: I sight read the piece first to get a basic idea of it and then I make sure that I go through very slowly to make sure I do not set bad habits, which is so easy... I do practice bits and pieces from everywhere and I single out difficult bits, but I will always make sure that I play through it enough to make sure it doesn't put me off during a performance. (Interview A)

> Participant 3: I play through it myself first and also try to study the score… I think practicing difficult areas slowly is very important. I practice structured [sic], I play through the work and then practice the difficult areas slowly, and from different angles…You need to practice problem areas, but afterwards you need to play through to know exactly how everything comes together. (Interview A)

Unlike the others, Participant 2 approaches a piece by breaking it down into smaller sections and working through it systematically.

> Participant 2: I think I move through the piece section by section, but the few bars before I get to a difficult bit, I would try to relax and prepare myself for that. But I try not to worry about the things that are coming. (Interview A)

According to analysis of the data, Participants 1 and 3 seem to follow a holistic approach in initial stages of learning repertoire, and Participant 2 a more part-by-part, or sectional approach.

Subtheme e: Performing from memory

Participant 1 prefers to perform only well-known works from memory, and to perform with music when given a choice. Her strategy is to memorise by repetition, and she claims that she has difficulty memorising new repertoire. Although this participant claims to be drawn to visual images and often imagines pictures with music, she has difficulty imagining other objects than pictures (for instance the score). She states that she uses visual images as an aid for difficult areas:

> Participant 1: I remember practicing a Brahms Sonata, and there was a patch where I just couldn't get enough strength, I just physically couldn't do it. So I thought, 'what does the music remind me of?'; and I thought of this image of horses going into battle, and I held that image in my head and then it was just so much easier. (Interview A)

Because she is drawn to images, this should be explored as a possile aid in memorisation. Images that are evoked by the music could be visualised rather than physical notation to enhance the memorisation process.

Participant 2 prefers to perform some pieces from memory, and some with the music during a recital. She believes that emotional aspects in the music aid her memorisation process:

> Participant 2: I'm an emotional person, so emotional aspects are really important, and it gives me extra support in memorising a piece; then I can relax more and perform efficiently. (Interview A)

She only starts the process of memorising after a few weeks of practicing the work. Gradually over time, she will start focusing on memorising the work.

Participant 3 prefers to perform from memory whenever possible. She prefers to memorise a work immediately after she learnt it, but also mentions the importance of looking at the work as a whole. She seems to approach memorisation in the same way as learning new repertoire – in a section by section approach. She has the ability to visualise playing a passage after she memorised it in order to test how effectively it was memorised.

> Participant 3: I'll play something from memory with my fingers without my violin. I can visualise all the movements. (Interview A)

The one consistent factor that presents a problem is time pressure, which is reportedly a setback that prevents this participant from memorising efficiently.

4.4 Pre-intervention theme ii: Conceptions of self in performance situations

After general background data of each participant were gathered, the interview focused more on the participants' conceptions of themselves as performers in a performance context. The subthemes that emerged during the analysis of the data included: motivation, concentration ability, anxiety, and mistakes during a performance.

Subtheme a: Motivation

The data reveals that all the participants have a positive personal approach to performances, and that they seem intrinsically motivated. It became evident that Participant 1 and Participant 2 believed that performing often serves as motivation:

> Participant 1: …a concert will be a motivation, so again, performing as often as possible helps. (Interview A)

> Participant 2: … I really believe that it depends on how often you perform as well. The more you play, the more motivated you become; for me, personally. (Interview A)

Interestingly, the participants felt that they were more motivated and more competitive when they were younger.

> Participant 2: … when I was younger I was more competitive. But I think some mild competition is good to put you on the edge. (Interview A)

> Participant 3: … I used to be more competitive when I was younger and I challenged myself to play a more difficult repertoire. (Interview A)

Therefore it seems that positive competition had a positive influence on the participants. Participant 3 mentioned the importance of inner competition for purposes of self-motivation.

> Participant 3: In music, I'm competitive with myself. I try to improve every time I play something. I think it is good to set goals during rehearsals. It helps to maintain focus. (Interview A)

Although it may feel easier to prepare for a performance when feeling motivated, Participant 1 emphasised the importance of regular practice, even when self-motivation is lacking.

> Participant 1: …when I practice for a long period of time towards a performance, I'll have days where I call it my really "boring practice" days. Then I'm not motivated at all and I just practice like a machine, which is also fine, because I still do some good work although it is 'slow, no-emotion' kind of practice. (Interview A)

Therefore, the data shows that for these participants, intrinsic motivation (including inner competition and drive) is more important than extrinsic motivation (such as competition and performances).

Subtheme b: Concentration ability

Concentration is vital to successful performance. Interestingly, Participant 1, who has the most performance experience, was particularly eloquent in talking about concentration. According to her, the ability to control your thoughts and concentrate during a performance involves both organising and quietening your mind. She finds that concentration during rehearsal and performance improves with age. She believes that focus and relaxation goes hand-in-hand.

> Participant 1: I think it is life experiences not only related to music. Sorting yourself out [sic] as a human being and developing the ability to meditate. It is a way of stilling your mind and becoming aware of what your mind is doing... I find that years ago when I was younger, I would be practicing while thinking of all sorts of other things, but now I find that I'm totally focused on what I'm doing. The more I can focus on what I'm actually playing and be in touch with what my hands and arms are feeling the more I can relax and the easier it becomes…(Interview A).

She mentioned in an interesting way of dealing with unwanted thoughts through the use of mental images.

> Participant 1: whenever there is a thought that comes in it is almost like it pulls me away from my cello… Flick it away! I see the thought like a little soap bubble. When it comes I say no thanks, I'll deal with you later and I simply flick it away. You don't have to try and kill it because it is also in some sense, what we try and resist, persisting. I think about it gently so it doesn't create extra stress and gently flick it away… it's a decision, according to me [sic]. (Interview A)

This participant mentioned that she does not struggle with concentration now, although she used to struggle with concentration when she was younger.

> Participant 1: It gets better with time and maturity. I struggled with concentration when I was younger… I think a lot of my concentration abilities are born out of terror, because I know that when I don't concentrate things could go horribly wrong! (Interview A)

Participant 2, with the least performance experience of the three, struggles with concentration and wandering thoughts:

> Participant 2: I often catch myself during a performance wondering what the audience might think. I try my best to keep my thoughts with the music, but it sometimes is difficult, especially when, for example, my teacher is in the audience. In the end, you have to try and forget about all else but the music, but it is sometimes really difficult. I can control my thoughts to some extent. (Interview A)

Like Participant 1, Participant 3 also found that her concentration improves with experience. She experiences a direct negative correlation between anxiety and concentration.

> Participant 3: I find that when I'm stressed it happens more. I must say that I feel much more focused while playing than I was when I was younger. I almost go into a meditative state while playing…(Interview A).

It was interesting to find that this participant believes that the ability to concentrate can be practiced during orchestral rehearsal and concerts. She feels that this can be learned when a student is still young.

> Participant 3: …an orchestra is a good way to practice that. Within a group it is easier to sight read with focus, the group pressure forces you to focus. It can easily happen during an individual rehearsal that you let your thoughts go. I think it is good to set goals during rehearsals. It helps to maintain focus… I think that is why it is important to focus during the rehearsal and keep your concentration throughout. I had a percussion teacher at university that told us that she tried to make fewer mistakes in each performance until she played perfectly. So it's like having a little inner competition to see how well you can play. That made a big impression on me and has been my goal during rehearsals and performances. Focus all the time. Its something that also must be learned when you are young. (Interview A)

According to the data, it can be concluded that concentration improves naturally with maturity, but it can also be improved through practice, for instance, during orchestral rehearsals and performances. Stress is a factor that affects concentration negatively. Participant 1 appears to already incorporate mental imagery to address concentration problems.

Subtheme c: Anxiety

Anxiety in musicians can be detrimental to successful performance. According to the data, major contributing factors to anxiety in musicians are a challenging repertoire; lack of time for preparation; negative experiences; and not performing often. The participants shared their experience of coping with anxiety before a performance. Participant 1 claims to often be in a state of tension before a performance. She likes to be in a quiet environment to be able focus beforehand. For her, this process involves affirming positive thoughts.

> Participant 1: I find that I am always in a state of tension before I perform, but I like to have some space where I couldn't [sic] be bothered and try and center myself… find to rehearse a piece with my accompanist and I was feeling terrible on that day. On my way to her I kept saying, "I feel fantastic!" By the time I got there and she asked how I am, I just said 'fine thanks'! And the rehearsal went brilliantly! So I think you can talk yourself into getting rid of negative thoughts. (Interview A)

This participant did not experience anxiety while performing as a child. She finds that forward projection and bad experiences cause anxiety.

> Participant 2… when I was a child, I never had a problem with performing, I was so present and never thought about the future. I think to a great extent it is forward projection that causes anxiety.

Participant 2 remains calm by following the advice of teacher. She visualises the performance, the stage, the audience and being calm. She believes in visualising a positive performance with attention to detail and focuses on breathing. She tries to breathe slower and deeper when she is in a stressful situation (such as a performance). She reports that her advanced repertoire sometimes causes her *anxiety*.

Participant 3 likes to vizualise the concert hall beforehand. When performing in a new venue, she plans to be early to familiarise herself with the concert environment and to feel relaxed in this space. She focuses on breathing when feeling anxious and believes that physical exercise is crucial for maintaining a healthy and relaxed life. She finds that performing often reduces anxiety as well:

> Participant 3: There was a time that I performed very often, I was on stage almost every day, and during that time, I was a lot less nervous while being on stage. (Interview A)

The participant read the book by Alan Solomon (1978), *Why are you so nervous?* and found it a great help in coping with music performance anxiety.

> Participant 3: Alan Solomon wrote a book *Why are you so nervous?* and it influenced me a lot [sic]. You have to be confident on stage, but you can't be confident when you know for instance your technique is horrible [sic], but he told [sic] me to look confident on stage no matter what [sic] and it also aided me in overcoming my stage fright. When I'm on stage I'm like an actress. He also addresses the idea of visualising the stage you are going to perform on. He taught me to make immediate eye contact with the audience and look friendly when I walk on stage. Be open and look like you want to communicate. He was also placed emphasis on physical strength. A lot of that I feel is very true, but you still have to know that your technique is good. You can't be confident if you think that you play and look terrible. (Interview A)

She learned from a teacher at Royal College of Music to have good posture and breathe during performance, which helped in reducing her anxiety. She also finds that the complexity of the repertoire plays a vital role in the levels of anxiety experienced.

According to the data, Participant 1 finds forward projection to be the main cause of anxiety, while Participants 2 and 3 find complex repertoire the main cause for an increase in anxiety experienced. Participant 1 uses centering in a quiet environment, while affirming positive thoughts to reduce anxiety. Participants 2 and 3 visualise the concert environment to help reduce anxiety.

Subtheme d: Mistakes during a performance

The participants were asked what they do when a mistake occurs during a performance, and what their feelings are about it. According to the data, mistakes cause intense emotions.

> Participant 1: It makes me angry, but only momentarily. I just let it go. One often makes mistakes in places you would never make during a rehearsal! (Interview A)
>
> Participant 2: Getting through the music without any mistakes. I'm at war with myself sometimes about mistakes, but I try my best not to work myself up about mistakes. It is all part of the journey. I envision myself playing it perfect [sic] and I keep telling myself I will get there. (Interview A)
>
> Participant 3: I try to think positively, if a mistake occurs I just think that next time it will be perfect. I'm quite a perfectionist in that sense, but I'm not too hard on myself about mistakes. I will go and work on any problems that might have occurred, but I'll know that I can do it and play it correct [sic] the next time. I have that positive thinking when I play… If you have a video tape, listen to it and improve on your mistakes. (Interview A)

The data shows that the participants are all positive while performing, and that even if mistakes upset them momentarily, they try to remain positive and focused during the performance.

4.5 Pre-intervention theme iii: Prior conception of mental imagery and mental rehearsal techniques

Before the participants were given mental imagery and mental rehearsal techniques to apply to their practice routine, their prior conception of mental imagery and mental rehearsal needed to be established. The interview focused on questions regarding understanding of mental imagery rehearsal techniques and the current mental strategies they already incorporate. Thereafter, I was able to guage their openness to the mental imagery and rehearsal intervention. The subthemes that emerged after analysis of the data are: existing mental strategies; conceptions of mental imagery; and conceptions of mental rehearsal.

Subtheme a: Existing mental strategies

According to the data, all the participants have incorporated some form of mental preparation for a performance, mainly visualising a performance and 'projecting forward' to the concert. In combination with forward projection, Participant 1

visualises an ideal performance with only the environment, because she believes if the venue looks different from when it was imagined, it might have a negative impact. This participant seems to be sensitive towards the impact of environmental aspects.

> Participant 1: I have tried projecting forward to the concert, visualising the room and sort of being there and imagining it all going just fine. But mostly only imagining the environment, because I find that you can sometimes be in for a shock [sic] when you play in a new environment, and you arrive and realise that it is not what your imagination thought it would be. That can throw you [sic] a bit. (Interview A)

Participant 2 predominantly uses mental preparation on the day of the concert, to prevent physical strain. She also visualises an ideal performance with more focus on emotions and feelings. She uses mental preparation to control her emotions. This participant seems to be drawn towards emotions.

> Participant 2: …on the day of the performance to not practice much and wear myself out… I visualise the performance beforehand, especially the day before the performance. I visualise myself right before the performance, how I feel, how I go on stage, how I feel on stage, and I see the audience in front of me. Then I visualise myself feeling calm in those circumstances. I try to visualise myself enjoying the performance and I go through the performance in my mind. (Interview A)

Participant 3 also uses mental preparation to visualise a performance, however she tries to imagine every rehearsal as a performance. During visualisation, she places emphasis on the people in the audience, and imagines playing well for them. She seems to be focused on people and communication, through music.

> Participant 3: When I'm in a rehearsal, I always try to imagine that this is the performance. I try to play on a performance level during rehearsals already, and I imagine someone listening while I practice. Sometimes I visualise the concert beforehand. See the venue and myself playing there with certain people I know going to be there, especially the people that I'm afraid off playing for. I imagine playing well before all of them. I think its very important. I try to communicate with the people in the audience and not focus on anything negative. (Interview A)

The data shows that although all three participants visualise a performance as mental preparation for a concert, they focus on three different aspects during visualisation of a performance, namely: the environmental, the emotional and the communicative (communication with the audience). Participant 1 focuses on the environment she performs in during visualisation; Participant 2 visualises her feelings during the performance; and Participant 3 focuses on an imagined audience, and communicating with them.

Subtheme b: Conceptions of mental imagery

After it was established that all the participants already incorporated some form of mental preparation, questions were asked to establish their concept of and capacity to use mental images.

Participant 1 reports regular use of mental imagery and sees it as a strength. For her, the imagery is a means to an end, to evoke a positive, motivating emotion.

> Participant 1: I find it very easy and very helpful to form images. I think mental images is [sic] a way of overriding the mind, because when the mind is going at you [sic], it is usually negative criticism, you won't easily find your mind telling you it is going well. So it is getting into that zone, where you can be "mindless" [sic] and in creative mode and that is also where an image (a picture) helps a lot, an image that evokes a feeling for instance… I remember practicing a Brahms Sonata and there was a patch [sic] where I just couldn't get enough strength; I just physically couldn't do it. So I thought, 'what does the music remind me of?', and I thought of this image of horses going into battle, and I held that image in my head and then it was just so much easier. So in my opinion, it definitely helps! (Interview A)

By way of contrast, both Participants 2 and 3 equate mental imagery with the act of playing. They are not drawn to physical images, but seem to be drawn to abstract moving images and physical movement.

> Participant 2: For me, it's the ability to see my hands playing the music. I see the movements of my hands more than the physical score… my mind works with movements, I can imagine feeling and hearing every note that I play. I remember patterns of movements, like a dance with my fingers or arms… (Interview A).

> Participant 3: For me, mental images are not that visual. It is more movements than colours or pictures. I'm not that visual. For me it is more the feeling or the movement. I imagine movements and gestures, for example movements in water or movements in dancing. I'm not really drawn to colours and pictures…when I was younger, I would drive to a concert and know the whole piece note by note in my head…I couldn't see the physical notes, I know the names and I know where they are on the violin, but I couldn't imagine the physical score. If I try, I can do it to some extent, but I can't for instance tell you whether its on the left or right hand side of the paper. I can write the music I'm playing down, but I do not take photographic "pictures" of the score. (Interview A)

The data shows that the participants have different concepts of mental imagery. Participant 1 is drawn towards visual imagery and Participants 2 and 3 are drawn to kinesthetic images. Interestingly, Participant 1's focus on visual imagery goes hand in hand with her focus on the environment (visual) during visualisation (mentioned in pre-intervention theme iii.a), and in the conceptions of Participants 2 and 3 of mental imagery focused on kinesthetic images. Unlike Participant 1, they are not drawn to visual images. It is important to take their conception of mental images into account when applying and explaining mental imagery and mental rehearsal techniques to them.

Subtheme c: Conceptions of mental rehearsal

Mental rehearsal is the ability to rehearse without an instrument, and sometimes, to memorise without a score. The participants were asked what their understanding of mental rehearsal was, and if they incorporated mental rehearsal in their practice routines. Participant 1 is not positive about mental rehearsal, because she is afraid of imagining it the wrong kind of way, and affecting her playing negatively through doing so.

> Participant 1: Very seldom, I haven't made a habit of that… I don't do it very often. It doesn't keep my attention for very long, because I never actually consciously thought that 'this is going to help!' and did it [sic]. I'm also struggling to imagine where I'm putting down my fingers, its not a smooth experience. And then I think I might be imagining it wrong. (Interview A)

Participant 2 is positive about mental rehearsal and uses this as preparation before performances as well as to measure how well she knows a work from memory.

> Participant 2: …going through your music without your violin and especially when playing from memory, you can go through the music in your mind, actually see your fingerings, and feel yourself playing. When you can do this, you know that you really know the piece well. When I do that, I really feel more confident about the piece… yesterday I saw a video of Daniel Hope playing the Mendelssohn, and I was going through it with him, and I could imagine playing it along [sic]. I could feel my violin. I do this more before performances, not too often. (Interview A)

Participant 3 is notably positive about mental rehearsal and incorporates it often, but unconsciously. She speculated that she might benefit from applying it more consciously. She believes that she practices it during teaching, as this is a time at which she often needs to imagine herself playing a section. She often applies mental rehearsal from memory as well.

> Participant 3: Almost always. I am not deliberately, but unconsciously playing through music in my head all the time before concerts. I'm still working on the music I've just practiced before the interview. My sub-consciousness is working on music even when I do not play. But, I think if you can do it deliberately, it would be much better. Sometimes I do that, but it also takes practice… The more you teach, the more you do it as well, because it is natural during the teaching process for me… to feel what they are feeling when they play and try to analyse what is wrong. Why it is sounding like it is and what they are feeling. Then trying to help them adjust to what I think it should feel and sound like. A physical imagery idea [sic]. I'll play something from memory with my fingers without my violin. I can visualise all the movements. (Interview A)

According to the data, it seems that there might be a link between mental rehearsal ability and memorising ability. Participant 1 believes that she struggles with mental rehearsal and also claims to struggle with memorisation (as discussed in pre-intervention theme 4.3.1 e) and Participants 2 and 3, who claim to enjoy mental rehearsal, and also prefer to perform from memory and use mental rehearsal from memory, as a test to see how well they know repertoire from memory.

4.6 Pre-intervention theme iv: Biggest personal setbacks that prevent optimal performance

According to all the participants, the main setback that prevents optimal performance, is insufficient practice time. Although this seems to be the main setback, the data showed that the there were two other setbacks preventing optimal performance experienced by the participants, namely: difficulty performing from memory; and poor concentration, or wandering thoughts.

Subtheme a: Insufficient practice time

All three participants mentioned insufficient practice time as the main setback preventing optimal performance. When asked what, according to their personal experiences their biggest setback preventing optimal performance was, Participants 2 and 3 mentioned busy schedules as the reason that prevents them from practicing enough to reach optimal performance.

> Participant 2: Insufficient practice time, lack of repetition.

> Participant 3: Time for preparation! [sic]

Participant 1 states that her physical condition, which prevented her from practicing for a few years and currently prevents her from practicing more than an hour or two at a time, prevents her from achieving the practice time she needs for optimal performance.

> Participant 1: seven or eight years ago, I was totally neutralised [sic] with a disc problem in my neck. For a year and a half I couldn't use my arms at all, so I had to stop playing. After a year and I half, I had an operation where my disc was replaced. Three years after that I could start entertaining the thought that I could play again. I was so desperate to play again that I would play for five minutes and then be lying on my bed for three weeks. It got so bad that everyone wanted my cello out of the house and told me I would never play again. After a very gradual process of recovering [sic], I had to re-learn myself [sic] how to play… So my biggest concern is my body and whether it is going to last. (Interview A)

Therefore, it can be concluded that Participant 1's injury directly resulted in insufficient practice time, where she may benefit from mental techniques which she can apply in addition to physical practice, on days that her body allows little or no physical practice. Participants 2 and 3 may benefit from techniques they can apply away from their instrument, as well as techniques that improve the quality of their practice time, in order to eliminate unnessecary repetition and save on practice time.

Subtheme b: Performance from memory

Performing from memory is often compulsory in exams and competitions, and musicians agree that performance from memory has many benefits. Participant 2 had no problem with memorisation and preferred to perform from memory. However, if a person struggles to memorise repertoire, it might have a negative impact on the performance. Participant 1 struggles to perform from memory. She reported performing only well known works from memory and not knowing how to memorise a repertoire.

> Participant 1: I have never been taught to memorize, so I would prefer to play from music when given a choice. (Interview A)

Because this participant states that she is drawn to images, invoking mental images that evoke emotions may improve memorisation. Although Participant 3 prefers to perform from memory, she finds that she sometimes struggle to memorise repertoire due to a lack of preparation time.

> Participant 3: It's the best way to perform. If you are under time pressure, it is not always possible, but I feel much more free when performing from memory. (Interview A)

Therefore, solutions that will benefit this participants in saving practice time might also enhance her memorisation ability.

Subtheme c: Poor concentration ability, or wandering thoughts

A setback preventing optimal performance identified by both participant Participant 2 and 3 is poor concentration ability, or wandering thoughts.

> Participant 2: I often catch myself during a performance wondering what the audience might think. I try my best to keep my thoughts with the music, but it sometimes is difficult especially when for example my teacher is in the audience. (Interview A)

> Participant 3: Your thoughts are extremely dangerous during a performance. You have to learn to control your thoughts... I don't try and get the thought away, I just try and think about something else. Don't let your thoughts wander, think about the music. Maybe you need a mental image in certain sections in order to keep your thoughts controlled. (Interview A)

Although it was discussed in pre-intervention theme 4.4, subtheme b that concentration seems to improve with maturity, the participants may benefit from techniques that can help them to control their thoughts during a rehearsal or performance.

It can be concluded that the main setbacks experienced by the participants prior to the intervention are: insufficient practice time; difficulty performing from memory; and poor concentration ability and wandering thoughts. The list of mental imagery and mental rehearsal techniques given to the participants for the intervention (Appendix C) focuses on relaxation and developing mental imagery and mental rehearsal ability, with the aim of benefitting the participants in overcoming the setbacks identified prior to the intervention.

Stage 2: Intervention

Within two weeks of Stage 1, each participant was given a list of mental imagery and mental rehearsal techniques to apply to their daily practice routine. This was the start of Stage 2. Within a month after the techniques were given to the participants, Interview B followed and a month after Interview B, Interview C followed. The interviews focused on a discussion of each participants' experiences of the

application of the techniques. A similar process of analysis was followed as in Stage 1.

4.7 Intervention theme I: Intervention results of applied mental imagery and mental rehearsal techniques

Through analysis of the data the following subthemes emerged: general experience of techniques; application of mental imagery, and mental rehearsal techniques. The latter involved a detailed discussion about individual techniques.

Subtheme a: General experience of intervention techniques

The participants were asked what their general experience of the application of the given mental imagery and mental rehearsal techniques was.

> Participant 1: I am quite set in my ways about, you know, how I practise. So, I have to force myself to try certain things, and then I think that a lot of them [sic] I do incorporate but maybe just, you know, worded a little bit differently… I found what the most important thing is that came out of it for me, is this thing of having to listen; find a way to actually hear what you are doing… (Interview B).

Participant 1 (45 years of playing experience) found it difficult to change her practice routine according to the techniques. She believes herself to have applied many of the techniques already, before the intervention, and felt more comfortable applying the techniques she felt familiar with and in the ways she had done earlier. She finds the techniques forced her to truly listen to what she was practicing. Although she admitted that she did not apply the techniques with which she was unfamiliar, she does believe it may be beneficial.

> Participant 1: I did go through all of them, but not as part of my daily practice routine… Apart from the things that as you have mentioned here that I have already incorporated in the way that I practise… I must admit: I have not been [sic] rehearsing music in my mind very much, but I do think it does help definitely. (Interview C)

Participant 2 (19 years of playing experience) seems very enthusiastic about the practical application of the techniques.

> Participant 2: When I applied these techniques it was really guiding me to specific points… and I did it now more than before, because I did not have really, you know, these points of exercises. I found it really well-structured. (Interview B)

Like Participant 1, she also mentioned that she did incorporate the techniques before the intervention, unconsciously.

> Paticipant 2: It was very interesting. I found that some of them I already incorporated in my playing unconsciously, and some of it was new. It was a bit like zooming in on these techniques I can use and it is like really concentrating on applying them into my playing… at first it was a bit hard, especially […] this mental leadership, but when applying for [sic] my pieces, I find that you just need to take it really slowly…Over all it was really very fascinating and ja [sic], I understood everything and could see where you are going with everything. (Interview B)

Participant 2 was able to make the techniques part of her daily practice routine and apply the techniques consciously.

> Participant 2: …it is starting to become a part of my daily practice, actually. I am trying to… or I have incorporated parts of the mental exercises that you gave me. So… I am more conscious of them now than I was before. Everything was overall beneficial… I can learn the music more thoroughly by doing these techniques. I am focusing not only on like the physical learning of the notes, but also really incorporating it into my brain and really living the music… (Interview C).

Like Participant 1, Participant 3 also seemed to struggle to adapt to the techniques as part of her practice routine and feel that she ought to have trained her brain to be able to do it at a younger age.

> Participant 3: I battle with the mental imagery. I have tried it, but not enough. Since I saw you last, I did not memorise anything. I only practised and performed quartet music and quintet music. So I never memorised anything... I am thinking what notes and movements to use. I must have probably trained that part of my brain much more… (Interview B).

She also averred that the type of repertoire that is being rehearsed has an impact on the type of techniques that should be used.

> Participant 3: … if I was going to memorise concertos or solo Bach, or something, [sic] then I would incorporate more of that, but mostly I still think ahead, like the miming. ... I am always thinking ahead and I am always hearing in my head what I should be playing next… but I can work on the mental imagery much more. (Interview B)

Although she struggled to apply the techniques herself at first, she believes that they are beneficial.

> Participant 3: A lot of them are good. I think they relax the body in the first place, if you are tense. I think it is wonderful to be able to relax. If you breathe properly, it affects everything positively… it was the mental leadership that I liked most. (Interview C)

According to this data, it seemed that the two participants (Participant 1 and 3) with the most playing and practice experience, found it the most difficult to adapt to these techniques. The participant with less experience (Participant 2) found it much easier and seemed to have enjoyed the application. Participant 3 also stated during Interview A that she believes the techniques ought to be taught from an early age.

> Participant 3: The younger you can learn to do it, the better. Like Mozart for instance, had all the music he composed in his head. I think it is a technique that can be developed, the sooner the better. If one can learn students [sic] from an early age to memorise while hearing the music in their heads and then play it and memorise it straight away. (Interview B)

The data shows that Participant 1 felt the techniques taught her to truly listen to what she is practicing, which will, in return, enhance the performance. Participant 2 also mentioned becoming consciously aware of what she was doing, where, although she struggled in the beginning, it became easier for her, where she felt that she is learning her repertoire more thoroughly with the techniques forwarded in this study, and could face her exam performance with greater confidence as a result. Participant 3 feels that she can work on the techniques much more, but she found them very beneficial, and found furthermore, that mental leadership teaches the mind to

become aware of what the body is doing. Generally, it can be concuded that the participants were open to the intervention, and felt the techniques to be beneficial, aiding mental awareness during both practice and performance.

Subtheme b: Detailed experience of the techniques

After establishing the participants' general experience of the application of the mental imagery and mental rehearsal techniques, the interview questions focused on the participants' experiences of the individual techniques. The mental imagery and mental rehearsal techniques that were applied and discussed during the intervention includes the following techniques:

- relaxing the body;
- imagery development;
- creative images;
- mental leadership;
- enhancing inner hearing;
- miming;
- alternating tempos mentally; and
- imagining an ideal performance.

A detailed description of each technique can be found in the Appendix C.

Relaxing the body

The aims of the technique *relaxing the body* is to physically relax muscles, increase mental awareness, and to imagine performance environments, while focusing on breathing, and staying calm and relaxed (Johnson 2003:32).

The different participants focused on different aspects during this exercise. Participant 1 enjoyed this technique, but also combined it with *miming*, in order to train the muscles to play without tension and to avoid worrying about technical aspects.

> Participant 1: I really like that, that you learn to really [sic] without worrying about the technical difficulties; just concentrate on relaxing your whole body.

Participant 2 mainly applied the technique before performances, due to increased levels of anxiety during that time.

> Participant 2: Yes, I did. I did apply it before I performed. Actually, especially in the week that I played, you know, the few days before the performance; because I found I was still experiencing that anxiety feeling when thinking about the performance. So then I applied… relaxing the body – just like it states in the title – and any signs of tension and stuff [sic], when I felt it… I would just stop and relax everything; and then I would visualise then [sic] the performance, especially the venue. (Interview B)

The data shows that she applied the *relaxing the body* in combination with *imagining an ideal performance*. She also mentions accepting imagined mistakes while applying *relaxing the body*.

> Participant 2: …while I am doing the relaxation techniques, I accept everything that could go wrong and I just let go of it. So, well, I relax everything. I let it all blow away [sic]. (Interview C)

Participant 3 focused mostly on breathing during the application of *relaxing the body*. According to Participant 3, breathing is also a key point of the Alexander Technique, which she learned and applied during her college years.

> Participant 3: I think it is important to be able to really calm down and lie down and I think about my breathing. All of this I think we tend to find myself… and I think people with anxiety stop breathing. I think it is something I only became aware of in my fourth year university to breathe while I was playing, but now I am really subconsciously breathing when I am playing and I only noticed it when I was mic'd up [sic], then I heard this funny sound not realising how I was breathing, sort of against phrases; that was the key point. Also then at the Royal College I did Alexander technique a little bit [sic]. We had to lie down and breathe. When I am starting to [sic] be tense about something I must still make time to lie down and just feel your body again. (Interview B)

Although all the participants were given exactly the same technique to apply, the data shows how they interpreted it differently, and focused on different aspects. Participant 1 focused on relaxing her body, but also combined it with *miming*.

Participant 2 applied the technique to reduce anxiety before performances and combined it with *imagining an ideal performance* and accepting imaginary mistakes. Participant 3 focused mainly on breathing for relaxation.

Imagery development

The second technique the participants were asked to apply was *imagery development*. The aim of this technique is to increase imagery vividness through studying and the imagining different objects (Johnson 2003:48).

Participant 1 did not apply the technique at first, but after Interview B, she began to apply it and noted that *imagery development* can be used in order to recognise musical patterns more easily, and that it may also be beneficial in aiding memorisation.

> Participant 1: especially with Bach, where you get sort of repetitive patterns, there it will be more recognition of the pattern rather than the actual notes… the music on the page is so black and white [sic] and so linear and two-dimensional that this other approach is the dead opposite and can that in fact help you recall something that is two-dimension on paper. (Interview C)

Participant 2 did not apply the technique at first, but she applied it after Interview B when she learned new repertoire.

> Participant 2: Well, I did not focus that much on this one, but for me… I look at my hands and… I see the direction my fingers go [sic] ... I will focus on that a bit now, especially where I am learning new music now. (Interview B)

Participant 3 struggled to apply *imagery development*.

> Participant 3: I battle with the mental imagery. I have tried it, but not enough. Since I saw you last I did not memorise anything. I only practised and performed quartet music and quintet music. So, I never memorised anything. (Interview B)

She found that the repertoire she practiced was not ideal for the application of the technique. She is drawn towards kinaesthetic images, but struggles to imagine static images.

> Participant 3: I think maybe I am visual... I can remember the visual moving things, visually; but not necessarily colour and detail. I can remember a form and a posture and… It would be interesting to know really know how my brain works, because I can never really think of colours when I play music or… like [sic] static images. It is more I think of… of an image it is a moving image or me doing something, or thinking of water moving. (Interview B)

During Interview C, it seems that Participant 3 was still negative about *imagery development,* and said she would apply it when she needs to memorise a work.

> Participant 3: I still struggle with… Maybe my images are more emotional and moving images. I do not know. I am still struggling with colour images… at the moment I am not pressed to play huge work [sic] from memory and I find I would memorise it… but I'm sure it will help me when I need to memorise something really complex…my images are… images which you can feel… like material or something. (Interview C)

Imagery development seems to be one of the techniques the participants struggled with most. Participants 1 and 2 only applied this technique after Interview B. Participant 1 mentioned its advantages when memorising a work during Interview C. She expressed that it might aid memorisation through recognising musical patterns. Participant 2 applied to learning a new repertoire to imagine the movements of her hands when playing the works. Participant 3 was most hesitant with the application of the technique. All three participants mention that they do not imagine the physical score. Participant 1 imagines visual images and patterns, and Participants 2 and 3 recall movements. For that reason, I believe that I should have categorised imagery differently, into visual imagery and kinaesthetic imagery, respectively.

Creative images

Creative images can be used to create and enhance certain moods and emotions within a piece of music, for example, painting with a paintbrush to suggest *legato* passages for string players, or an image of lighting to suggest *sforzandi.* You can focus on the images inspired by the music while rehearsing and performing, as this will influence the character of the piece, and might result in a better performance (Johnson 2003:62).

Participant 2 used *creative images* to help her interpret the music of Debussy. She does not only imagine specific images but also an atmosphere or a scene. She also finds that images evoke certain emotions.

> Participant 2: It is definitely helping the learning process… I rather use… images to help me with the passage on how to interpret it. I love to be creative and… and imagine that really helps… It does create a certain emotion [sic] with each passage… I set myself in that scene that I am creating and ja [sic], many… perhaps the colour is part of it, but I see that… the atmosphere and… ja [sic], for example: in one of the paintings I see myself when playing the beginning of this movement and, you know, everything [sic]… and it is not clear. It is a bit hazy, everything is not clear, as I am trying to create that. (Interview C)

Participant 1 suggested that images that evoke a certain emotion can aid the process of memorisation, because of a possible link between memory and emotion.

> Participant 1: … I feel like I have a block when it comes to memorising. The 'shutters just go down' [sic]. Maybe just that very process would 'open the shutters'… the interesting thing is I think that that might actually bring the visual image of the music, the score, more easily than just trying to visualise the score… It is actually very important because it can happen so often that you play a passage and it just sounds 'dead' [sic]… it does help enormously to visualise something… It makes so much sense, because in fact the essence in music should relate to those type of things, far more than a piece of paper. (Interview C)

Participant 3 claims to use *creative images* while teaching and believes it helps to some extent.

> Participant 3: … one of my students … works quite hard, but… it is like she is a locked door, and so I am using mental images for her… I am thinking of the weirdest little stories. But it will help somehow and sometimes… and then she sort of becomes a bit 'unlocked' [sic]… (Interview B).

When applying *creative images* to her own practicing and playing, she thinks of moving images rather than of static images. She is focused on the smell and taste and movement rather than the actual image.

> Participant 3: When I play I do think [of] 'chocolate sound' [sic] … I cannot draw a picture of it. Like, I would not know… it is like there is not a picture…(Interview C).

Accoring to the data, Participant 2 uses *creative images* to aid interpretation and in a similar way to Participant 1, she finds that the images evoke emotions. Participant 1 observed that due to the emotion evoked, it might be beneficial during the process of memorisation, due to the link between emotion and memory. Participant 3 uses *creative images* when she teaches to help her students incorporate emotions into the music. She is personally drawn to kinesthetic images, rather than to static images.

Mental leadership

Mental leadership is a technique that encourages one to anticipate technical as well as musical difficulties in a piece through playing a simple phrase or scale while thinking about the sound and fingering the next note directly before it takes place. This technique is very effective in helping the mind guide the muscles, rather than using only motor memory (Freymuth 1999:29-35). All three participants seem very positive about the application of *mental leadership:*

Participant 1 found this technique very useful. She practiced this before the intervention, but stayed with the same note. Now, she applies the exercise while anticipating the next note.

> Participant 1: …very useful [sic]. The difference with this between what I was doing and this is that I always try, but what work [sic] for me is to really stay with the note that I am playing, but now the added step then [sic]… that little bit of anticipation of the next note. So you do actually, right at the end, start thinking of the next note, because what I have experienced is that very often, we are so busy thinking about the difficult notes that it is the preceding notes that absolutely lose attention, and you can hear it. And the minute you start noticing the previous note, it 'comes alive' [sic] and makes it easier to play the next note, because then it is like 'completing the thread'. (Interview B)

She believes the most important benefits of the technique are that it enhances the ability to control your thoughts, thereby improving absolute focus.

> Participant 1: Well, I find the one that helps me most as the only anticipation in the next note at the very last minute. Because for me everything is focus and attention to every note and we kind of think we are doing that... When something does not sound right, that is usually the reason why – is that the mind is actually not quite where it should be… Somehow it just calms everything down. (Interview C)

Participant 2 seems to have found *mental leadership* beneficial and she describes how it helped her during a performance exam.

> Participant 2: There was at [sic] one stage, it was in the fast passage and my mind went… I do not know where it went, but it went somewhere. But I carried on, my muscles carried on with it, but I think it is because all the fast… difficult passages I went through one of these techniques…*mental leadership*… I did not have time for everything, but especially in my difficult pieces and the difficult passages I used these techniques: *metal leadership* and *miming*; yes, and of course *alternating tempos.* (Interview B)

Participant 3 is positive about the technique. She mentions that time may be a setback for the application, as it may be time consuming, but it can also save time once its applied by deepening the practice experience.

> Participant 3: …the problem is [sic] in my life at the moment is to have time. You need time. But you need time to practise and if you practise well like that, you save time in the end. (Interview B)

All three participants seemed very positive about the application of *Mental leadership*, although it was mentioned that it is a time-consuming technique and requires practice to apply correctly.

Enhancing inner hearing

The aim of *enhancing inner hearing* is to teach the mind to lead the muscles instead of the muscles leading the mind to guide memorisation and interpretation. This is achieved by taking a section of music, and imagining playing it, and what it sounds like. The exercise is also repeated from memory (Van Auken & Larson 1998:17-18).

Participant 1 was able to do the exercise with music in front of her. She was worried that she would not be able to do it if she had to do the exercise from memory.

> Participant 1: Yes, if I can see it in front of me. There would be a problem if I am doing something for memory… and imagine playing it. That is where I mix up. (Interview B)

Contrary to Participant 1's approach, Participant 3 performed the exercise mostly from memory.

> Participant 3: I played a concert with solo Bach after I saw you last. Then I did it a lot, a few times a day, and over and over. I was playing my pieces in my head. Wherever I went and then I was very, very confident. When I played it I knew exactly where I was. I believe that I should always do it. This has helped me a lot.

Participant 3 had a very positive experience of the exercise and believed that it helped her a lot. She also mentioned that she could apply it anywhere. She sometimes even combined this exercise with physical exercise.

> Participant 3: …when I did the Bach I would still do my running and play the Bach in my head all the time, force myself to focus on the Bach and play the Bach in my head while I am running, every note and then… and actually I found one place in my [sic] Bach where I felt insecure, and then I could fix it… two days before the concert, I jogged and there was one spot where I could not remember the exact note – how I went down a run – and I figured it out… I couldn't use my physical memory. (Interview B)

Participant 2 did not apply *Enhancing inner hearing*. According to the data, one of the advantages of this exercise is that it can be practiced away from the instrument, and that prevents a reliance on physical (motor) memory. Another technique that helps the mind not to rely solely on motor memory is *Miming*.

Miming

Miming is a technique of teaching the mind to sense whether or not the right notes are bring played, rather than your fingertips. Although it is closely related to *enhancing inner hearing*, this technique can be practiced with the instrument, and focuses on physically miming movements; without the bow, for instance, or without the instrument or bow. The exercise can also be repeated mentally, with a focus on imagining the movements (Johnson 2003:57).

Participant 1 struggled with the application of this technique and she expressed her concern regarding the influence *miming* might have on intonation, if the bow is not used, and she cannot hear the notes being played.

> Participant 1: That, I still struggle with [sic]. I have been trying, and, you know, what I find difficult, if I have to actually imagine myself playing, imagine the fingering, it is almost like I struggle with that… I can look at the music and imagine playing it. That is okay. But where it comes to just doing the left hand, what worries me there is intonation. I cannot hear it. (Interview B)

It was the suggested that the participant applies the miming technique with bow, without the instrument, to avoid intonation problems.

> Participant 1: I find it helps in…a fast passage… separating my mind from my fingers. So only actually think of the fingering, because the bow just goes [sic]… (Interview C).

The participant finds that through this exercise, the bowing and fingering is mentally separated. Participant 2 found it difficult at first, but it became easier as she practiced it, whilst combining it with *alternating tempos* mentally.

> Participant 2: Miming was a bit new for me. As I said, it was a bit difficult in the beginning, but I got… I get to do the music a bit faster at a faster tempo, and after I did it a few times, but in my mind, of course. (Interview B)

During the last interview, Participant 2 found it became much easier and found it useful in learning new repertoire.

> Participant 2: …last time I said what was difficult for me. I think I said it was the miming, but it is better now that I do it more often... I find… now that I have done it more frequently, the miming is… I find it… easier than previously… it is getting better not to rely only on, I can say, on my fingertips; it is easier hearing the music before playing and…practise it [sic] …in your mind before playing the notes… it really helps, especially while learning the piece. (Interview C)

Participant 3 found the technique very useful.

> Participant 3: …You can fool your brain to believe that you were doing something and you can place yourself somewhere else imagine you doing something. (Interview B)

She also noted her daughter unconsciously applies *miming:*

> Participant 3:… it was a process that happened from primary school… I remember that I was always walking to school, playing my music on my… on my suitcase and… so that is a kind of miming and it happened sort of unconsciously. It just developed, but it is a skill that I am doing [sic] more and more, but not presently; not the last two months, I think. (Interview C)

According to the data, Participants 1 and 2 found *miming* difficult at first, but after practice, they enjoyed the application. Participant 1 and 2 found it separated the mind from motor actions, such that they could become aware mentally of what movements her fingers and bow arm were performing. Participant 3 is very positive about this technique, and believes it should be practiced and applied consciously.

Alternating tempos mentally

Alternating tempos mentally is closely related to *miming* and *enhancing inner hearing,* but is practiced in different tempos. A section of music is taken and imagined and mimed at a slow tempo at first, and the speed is increased gradually, until a final tempo is reached. The aims are to eliminate tension in the body assosiated with the movements of playing, and also to imagine a piece at final tempo if it cannot be physically done (Freymuth 1999:71-74).

Participant 1 is hesitant to apply *alternating tempos mentally,* because she is afraid to mentally practice the music incorrectly.

> Participant 1: I can sort of go through the music, and I know that in real time, it is going very fast, but if I really slow down in my mind, then I lose track of where my fingers are, what note am I actually playing. You know, I know if I miss a note then I could actually be rehearsing it in my mind wrong, and then am actually ruining it. You have to be so careful, and that is why I tend to rather not do it, than do it wrong, because I know if I do it wrong, it is going to cause a problem. (Interview B)

Although Participant 2 found the application of this technique difficult at first, she felt that eventually the technique helped to secure her pieces in a way she had never experienced before.

> Participant 2: …it was a bit difficult in the beginning, but I got… I get to do the music a bit faster at a faster tempo, and after I did it a few times, but in my mind of course… when I got to the performance … I was really confident and really rooted into the music and the passages, especially the difficult passages. I really had it in my fingers, and I found previously and in other pieces I did in previous years it was not… I could almost see the whole passage, feel it in my fingers, if I can explain it that way. (Interview B)

Participant 3 says that she usually applies the technique slowly.

> Participant 3: I played about [sic] slowly and fast in my head. I play it mostly slowly in my head… there is too much information. I cannot think of if so fast. (Interview B)

She reported that even though she is comfortable applying the technique slowly, it is beneficial for her to do so, because it forces her to apply it faster, until an optimal tempo is reached.

> Participant 3: …alternating tempos is also something very good, because sometimes I fell into the trap of letting people maybe play slow all the time [sic] and that is also not good. You have to alter your tempos to learn different… especially because [the] violin has the bow and you cannot just play slow. You have to see what the effect of moving faster is. (Interview C)

According to the data, Participant 1 did not apply the technique, because she was afraid it might influence her playing negatively. Participant 2 found it difficult at first, but after practice, she found it secured her repetoire, and Participant 3 enjoyed the application of this technique.

Imagining an ideal performance

The last technique the participants were given is *imagining an ideal performance.* This is an exercise that combines aspects of both mental imagery and mental rehearsal, through imagining all the aspects of a performance (the environmental aspects, the

audience, the performance itself and the emotional aspects), while the focus remains on a positive performing experience.

Participant 1 found that this exercise helps to eliminate negative thoughts, which she believes can ruin a performance.

> Participant 1: I found it actually quite scary [sic] how much that plays a part, yesterday I just thought 'oh my goodness, I can't play. I can't play the Beethoven. I can't believe I have got to.' You know, when you just think: 'I cannot do these concerts.' There is actually no room for even thinking that thought once. You cannot allow that negative thought to come into your thinking, because it is scary how bad the sabotage is [sic]. (Interview B)

Participant 2 applied *imagining an ideal performance* in combination with *relaxing the body.*

> Participant 2: …really tried to relax myself physically and emotionally; and envisioning the performance… (Interview B).

She believes that applying this technique enhanced her exam performance.

> Participant 2: I would say so, because during my performance, I found that overall, I had a very solid performance… Usually if I think of previous performances, especially for competitions, and I remember that anxiety feeling [sic] I felt it throughout the performance. Well, some part of the performance, and this time I was only a bit shaking in the beginning, like the first few lines of the first piece. The rest of the performance I was… I did not have that feeling, because I actually went through everything beforehand mentally and ja [sic], that was the one thing that was missing which I was very glad [about]! (Interview B)

Participant 3 applies the technique very often. She is very positive when imagining a performance.

> Participant 3: Yes, a lot. I do it nearly subconsciously. Every time I played the Bach it… [sic]. Even when I rehearse a Beethoven quartet, I see myself as being successful. I am not thinking negative things, that: 'I cannot do this', or 'I cannot play this fast

> enough' or '… '… I know I will do it perfectly. So I am lying to myself maybe, but that is what I imagine. (Interview B)

She focuses on the people that she imagines will attend the performance, and tries to imagine the venue. Not knowing the venue causes anxiety.

> Participant 3: …the people in the hall and the… venue… it is always more stressful to go to a place where I have not been. I imagine myself in the room where I am, and where I will be sitting, and… So, it is may be more detailed than I try to [sic]. I just imagine myself in that venue, but I know most venues that I play. I do not perform worldwide. So I know the venues where I play (Interview C).

All three participants had a positive experience of the application of *imagining an ideal performance* and they each drew different benefits from applying this technique. Participant 1 believed it helped to eliminate negative thoughts. Participant 2 found that it helped her by calming her and relaxing her, both physically and emotionally. Participant 3 prepared herself mentally through this exercise by imagining herself performing for a specific audience.

It can be concluded that Intervention Theme A showed a detailed account of each participant's experiences of the application of the mental imagery and mental rehearsal techniques given for the intervention. The next section reflects the participants' experiences of the techniques, as an aid in overcoming setbacks identified prior to the intervention.

4.8 Intervention theme II: Reflection: The role of mental imagery and rehearsal in overcoming subjective setbacks

The main focus of this study is to determine whether the application of mental imagery and mental rehearsal techniques can be helpful in overcoming setbacks that prevent optimal performance. Through the analysis of the data possible perceived subjective setback were identified (mainly insufficient practice time; difficulty performing from memory; poor concentration ability; and wandering thoughts), and the participants were asked if they thought that the techniques were helpful in overcoming any of the setbacks identified prior to the intervention.

Subtheme a: Insufficient practice time

The first setback preventing optimal performance identified by all three participants was insufficient practice time. The participants were asked if they thought that the techniques were useful in overcoming this aspect.

> Participant 1: Yes, absolutely. I think if you practise with awareness and you can only really keep that up for so long [sic] before you get a bit tired. So, in other words I think that the most important practicing is done the first hour… but I think it does help, because it also gets you to know the music… for me, where that would be a little bit difficult is that I found that just the physical part of playing is so much is [sic] dependent on physical strength. I found where I have really, you know [sic], 'gone to the gym a lot' and I am feeling really strong, suddenly all sorts of things are possible, and I think, well, it is only possible because I am strong. Just take away that much of that physical strength and it is physically not possible to do it properly… (Interview B).

Participant 1 believes that the techniques optimise practice time, but she is concerned about the fact that the techniques does not build the physical strength required to perform.

> Participant 2: I guess so. I never feel when I do these techniques I am wasting my time. It is really help [sic]… really helping me [sic] when I practise... (Interview C).

Participant 3 also found that it is beneficial, especially in saving time with memorisation.

> Participant 3: It is so relative… it does save time… I think, since I really mentally know what I do, it is easier to memorise if you really think about what you are doing and not play [sic] it by… like a kind of habit; habitual kind of playing.

A significant outcome of this study is that all the participants agreed that the mental imagery and rehearsal techniques helped in optimising practice time. It was also found to save practice time, because it can be practiced away from the instrument, for example, when one is driving or jogging.

Subtheme b: Performance from memory

The second setback identified by the participants is problems with memorisation. Participant 1 have problems memorising, and prefer not to play from memory.

> Participant 1: You know, that is one thing that scares me, is I can play something from memory fine in my room, but if I play it to somebody then I will mess up [sic]. It is like the mind suddenly starts… it like [sic] sabotages.

In order to aid her memorisation setback, I recommended that she apply an image that evokes an emotion, in order to help with memorisation.

> Participant 1: …that is an interesting thing. So you actually use emotion to memorise a passage. I have not tried that, but it would be very well worth trying, because you know normally I think… well, no, because you have got to memorise the notes. But maybe something clicks in the brain that makes that work. I feel like I have a block when it comes to memorising. The shutters just go down. Maybe just that very process would open the shutters. Thinking about it now, and just thinking automatically, the passage that I had applied it to, it does make sense. Suddenly it is clear. (Interview C)

Participant 2 also found that imagery evoked emotions in passages that aided her with memorisation.

> Participant 2: It does create a certain emotion with each passage... If I think back now to the Mendelssohn I did, especially… ja [sic], the more difficult fast passages are a bit tricky, but the other passages I memorised I would say it does… I think it does help. (Interview C)

Another technique Participant 1 claims to aid her memorisation process is *imagery development,* because it can be used in order to recognise musical patterns more easily, aiding memorisation.

> Participant 1: especially with Bach, where you get sort of repetitive patterns, there it will be more recognition of the pattern rather than the actual notes… the music on the page is so black and white [sic], and so linear and two-dimensional, that this other approach is the dead opposite, and can in fact help you recall something

> that is two-dimension on paper. (Interview C)

Participant 3 used physical exercise in combination with *inner hearing* to improve memorisation.

> Participant 3: …when I did the Bach I would still do my running and play the Bach in my head all the time, force myself to focus on the Bach and play the Bach in my head while I am running; every note I really had to use my brain [sic]. I couldn't use my physical memory… Two days before the concert I jogged and there was one spot where I could not remember the exact note – how I went down a run – and I figured it out. (Interview B)

According to the data, the mental imagery and rehearsal techniques that were most helpful in enhancing memorisation skills were *creative images* (through evoking emotions); *imagery development* (to help recognize musical patterns); and *inner hearing* (to recall passages from memory without relying on motor memory).

Subtheme c: Poor concentration ability and wandering thoughts

The last setback experienced was poor concentration ability. Participant 1 found *mental leadership* beneficial in learning to control thoughts and improve absolute focus by teaching the mind to focus on the next note. She also deals with unwanted thoughts by evoking the *creative image*s of soap bubbles in her mind's eye. She reportedly imagines the thoughts as a soap bubble, that she flicks away.

Participant 2 believes that her concentration will improve with experience, and she also found *creative images* helpful in improving concentration.

> Participant 2: …I envision everything around me, but at the same time, I am trying to create also a space around me, not necessarily a circle, but a space, and then the thoughts feelings in it… (Interview C).

It can therefore be concluded that according to the data, the techniques that were most helpful in improving concentration were *creative images* and *mental leadership*.

4.9 Summary

This chapter presented a detailed analysis of the research data. Three sets of interviews were conducted, during two stages. From Stage 1, three themes (musical background and experience, conceptions of self in performance situations, prior conception of mental imagery and mental rehearsal techniques) emerged, underpinned by fifteen subthemes. From Stage 2, two themes (intervention results of applied mental imagery and mental rehearsal techniques; intervention reflection: the role of mental imagery and rehearsal in overcoming subjective setbacks) emerged, and was underpinned by four subthemes and extracts from the verbatim texts. The findings will be discussed in relation to the existing literature in Chapter 5.

CHAPTER 5

DISCUSSION

5.1 Introduction

The main aim of this study is to explore the influence that mental imagery and mental rehearsal techniques play in addressing setbacks experienced by string players that prevents their optimal performance. Research done on mental imagery and mental rehearsal techniques seems to advocate for the benefits of mental imagery and mental rehearsal techniques, however, according to Clark et al. (2012:356), many of the empirical investigations they studied had the following limitation in common: mental imagery training or the time to apply mental rehearsal was rarely provided. They also suggest that future research should be done where participants are provided with sufficient time to incorporate mental imagery and mental rehearsal into their daily practice routine. This study gave each of the three participants a period of two months to incorporate the list of eight mental imagery and mental rehearsal techniques into their daily practice routine. These techniques are based mainly on mental imagery and mental rehearsal techniques suggested by Freymuth (1999:40-80), and Johnson (2004), but also on Ginsborg's (2004) suggestions for the development of imagery abilities, Holmes and Collins' (2001) recommendations for effective imagery, and Greene's (2001 and 2007) techniques for an optimal performance.

This chapter includes a discussion of the interview data according to Stage 1 (pre-intervention) and Stage 2 (post intervention). The themes of Stage 1 (musical background and experience, conceptions of self in performance situations and prior conception of mental imagery and mental rehearsal techniques) and the main themes of Stage 2 (intervention results of applied mental imagery and mental rehearsal techniques; and intervention reflection: the role of mental imagery and rehearsal in overcoming subjective setbacks), will be discussed in relation to current literature on mental imagery and mental rehearsal techniques.

5.2 Pre-intervention theme i: Musical background and experience

The analysis of pre-intervention theme i revealed information regarding the participants' musical background, with focus on performance experiences and frequency, negative experiences that might influence their concept of performance, learning strategies, and their thoughts on performance from memory. This general information was taken into account when the effects that the mental imagery and mental rehearsal techniques had on the participants received analysis.

The analysis of the the data shows that all three participants are professional string players, with between 20 and 45 years playing experience, all of whom perform on a regular basis. Although they are all experienced players, they represent a span of professional playing experience, ranging from a participant at the commencement of her professional career, to a highly experienced participant. All three participants are generally positive about performing, but had negative experiences which, in the past, influenced the way they felt about performing. These negative experiences were both external (over which they had no control) or internal/emotional (limited control). For example, a negative experience which had a lasting effect, was with a teacher who passed away. This resulted in the participant having her support system removed. This negative external experience influenced her perception of performing and resulted in anxiety while performing.

> …[the] first time I ever felt nervous in my life was when my teacher died, I suddenly had to do a concert and she wasn't there. I had very strong support from her…

Inette Swart (2009:82) discusses the influence of traumatic (negative) events on performance in her doctoral thesis. She argues that if a traumatic event is not integrated and worked through, it may remain difficult for the performer to achieve integration with his or her instrument. She gives an equation, originally described by Gorrie's (2009) 'Alterative Performance Equation' to define performance results: RLP = (c + p - e) + a

The '**r**esulting **l**evel of **p**erformance' is a result of the sum of the performer's cognitive abilities '**c**', such as performance intelligence; plus physical attributes '**p**', such as capacity at the given point in time to realise performance intelligence; minus

external interference, '**e**'. External interference refers to events that the performer has no control over (including traumatic experiences). External interference always lowers the value of the RLP. To this is added the appropriateness of the level of performance arousal, '**a**', as before and during the performance. As has been seen, it can be argued that trauma can also affect levels of performance arousal, particularly shifting it to the negative or 'anxiety' end of the spectrum person (Swart 2009:84).

This equation was useful in interpreting the influence that negative experiences had on the participants' performance. For example, participant 2 had a negative experience when something happened to her instrument during a performance, which caused her to lose focus and get upset, where she reported to have: "…chipped a corner out of my violin during the performance and I got so angry with myself…". As an example, the equation RLP = (c + p - e) + a can be used to interpret participant 2's negative experience as follow: **c** (experienced player) + **p** (well prepared for the concert) – **e** (chipped a corner from her violin) + **a** (tried to remain focused because of the performance situation = RLP (managing to continue with the performance despite her frustration, possibly affecting the performance negatively).

Through the analysis of the data, it seems that both participants' external negative experiences not only affected their physical performance in a negative way, but also resulted in emotional experiences. The ensuing reactions experienced was Participant 1's negative experience, resulting in anxiety, and Participant 2's negative experience, resulting in anger.

According to the data, Participant 1 believes that because performance is a creative process, any emotions or personal issues will reflect in your playing. Research by Cockey (2008:42) reinforces this view, by describing the connection with the instrument as "that extraordinary interconnection of the body, mind and spirit that eventually becomes a paramount issue within musical artistry". Because of this connection, there is a great likelihood that experiences and emotions affecting individuals will also affect their performance.

The data revealed that emotional experiences immediately before and during a performance impacts the performers, but that thoughts and feelings after a

performance also play a major role in the performers' attitude towards future performances. The data shows that these experienced performers mostly felt relief after a performance, and focused on its positive aspects.

Through analysis of the data, it became evident the participant's way of learning a new repertoire may influence the performance, in terms of fluency of the performance, and secure memorisation. The data shows that two of the three participants followed a holistic approach when learning new repertoire, and tried to form a subjective concept of the work as a whole, before breaking it down into smaller sections to identify problem areas. The problem areas are then practiced slowly. Thereafter, the whole work is played through again.

Contrary to Participants 1 and 3, it seems that Participant 2 has a more systematic approach, immediately breaking the work into sections, which she works on one by one. Interestingly, Participant 2 has no problems performing from memory, and prefers it. She claims to make use of emotional aspects in the music to aid her memorisation process. Chaffin et al. (2009:356) states that memories for emotional events are more likely to be remembered than memories for non-emotional events. They also observed that musicians found it difficult to perform from memory without expression, arguing that "…playing without expression eliminates emotional cues that normally contribute to the retrieval of the music from memory". I argue that Participant 2 identifies emotional cues in the music when systematically learning the work, which could aid her memorisation process in line with the observations of these authors, where it can be concluded that emotional cues identified during the learning process aids memorisation and secures performance from memory.

Participant 1 claims that she was never taught to memorise effectively. Her system of memorisation involved mainly memorisation by repetition. This participant also struggles with visualisation. Research by Clark et al. (2012:357) states that mental imagery and mental rehearsal is beneficial the memorisation of music. Therefore, there is reason to believe that this participant may benefit from the application of mental imagery and mental rehearsal techniques, to aid the memorisation process. Interestingly, although she claims to struggle with the visualisation of abstract music notation, the data shows that this participant is drawn to visual images and often

imagines pictures with music. The researcher therefore suggested the visualisation of images that evoke emotions, which might aid the memorisation process (Chaffin et al. 2009:356; Clark et al. 2012:357). This will involve the application of the technique *imagery development* as part of the intervention. Participants 2 and 3 do not struggle with memorisation nor visualisation, suggesting a possible link between effective memorisation and visualisation.

After the participants' general musical background, performance experiences, learning strategies and memorisation ability was generally established, the interviews focused more on their perception of themselves in a performance situation, including their subjective view on motivation, self-evaluation, their conception of anxiety and setbacks that prevents optimal performance. This lead to pre-intervention theme ii.

5.3 Pre-intervention theme ii: Conceptions of self in performance situations

According to the data, the participants have a positive self concept of performing, and seem intrinsically motivated. They claim that they perform because "I enjoy performing!" and they are motivated to prepare for each performance. This concurs with Eisenberg's (2011:131) statement that persons are intrinsically motivated if they perceive themselves engaging in an activity primarily out of the person's interest in it.

Apart from intrinsic motivation, the participants also claim to use performing often as a form of motivation. Participant 2 claims that "the more you play, the more motivated you become…". Participant 3 believes that performing often creates the opportunity to improve during every concert through inner competition, suggesting that inner competition might increase motivation. A study on competition-performance relation by Muryama (2012) concluded that competition appears to be neither entirely beneficial nor entirely detrimental to performance, but the competition–performance relation varies as a function of the type of achievement goals pursued. Therefore, it can be assumed that personal goals (inner competition) increases motivation, resulting in a better performance.

The data shows that although competiveness and motivation decreased with maturity, the participants claimed that their concentration ability improved with maturity and time. To reinforce this, Participant 2, the youngest of the participants, claims to struggle most with concentration: "… I often catch my thoughts wandering…". Participant 1 believes that negative thoughts impairs her concentration ability, and she deals with negative thoughts through mental images: "… Flick it away! I see the thought like a little soap bubble. When it comes I say: 'no thanks, I'll deal with you later', and I simply flick it away!"

Participants 2 and 3 however, complained that they do not always know how to deal with unwanted thoughts. In his book *Why are you so nervous?*, Alan Solomon (1978:7) mentions three ways of controlling thoughts during a performance:

1. never react or give undue thought to a mistake you have made;
2. never anticipate future difficulties;
3. never concern yourself with the impression you are making.

Getting rid of negative thoughts and affirming positive thoughts is also a good way to reduce anxiety during a performance. Analysis of the data revealed that factors that increased anxiety for the participants were lack of preparation time, negative experiences, and not performing often. It became evident that the participants incorporate visualisation of the concert, stage and audience so as to help reduce anxiety. Another possible cause of anxiety for the participants is mistakes during a performance. The data shows that mistakes cause intense emotions for the participants: "it makes me angry…" (Participant 1); "I am at war with myself about mistakes…" (Participant 2). Their biggest challenge is to try and remain focused, and to focus on the positive for the rest of the performance.

After the particiants' conceptions of themselves in a performance situation was established, their conception of mental imagery and mental rehearsal techniques needed to be established before the intervention. This paved the way for the pre-intervention theme iii: prior conception of mental imagery and mental rehearsal techniques.

5.4 Pre-intervention theme iii: Prior conception of mental imagery and mental rehearsal techniques

Analysis of the data showed that all the participants have incorporated some form of mental imagery and mental rehearsal as part of preparation for a performance. This mainly focused on visualising a performance and projecting forward to the concert. During pre-intervention theme ii it was mentioned that Participant 1 use mental images for dealing with unwanted thoughts, and all the participants visualizes the concert hall and audience to reduce anxiety and improve focus. Although all three participants visualised their performance, they focused on three different aspects: Participant 1's main focus during visualisation was the environment (visual), Participant 2's main focus was her feelings during the performance (emotional) and Participant 3 was focused on physical movements while playing (kinesthetic).

According to Freymuth (1999:36-44) the most common forms of mental imagery are aural, visual and kinesthetic. Aural imagery is widely common amongst musicians, since they often imagine hearing music. Visual imagery involves seeing events in the minds eye (including imagining a score, imagining yourself playing or visualising the movements of your hands while playing). Kinesthetic imagery is when sensations are imagined that is used in muscular movements.

Together with Participant 1's focus on environmental aspects, the data also shows that she is drawn to creative images. She believes that these images evoke emotions, which help her to override negative thoughts: "I remember practicing a Brahms Sonata, and there was a patch where I… couldn't do it… I thought of this image of horses going to battle, and I held that image in my head, and then it was just so much easier!" Bruno Repp advocates the use of the creative images applied by Participant 1, where he has explained, "a performer may use imagery during a performance to attain the desired emotion and sound from a work. This involves… imagining creative ideas or scenes that corresponds with the music's character" (Repp 2001:185). Interestingly, Participant 2, who focuses more on emotional aspects and personal feelings during visualisation, is drawn to imagining physical movements and moving mental images, rather than to creative mental images. Participant 3 is drawn to physical movements of playing during visualisation and understands mental images as movements.

Therefore it can be concluded that Participant 1's conception of mental imagery and mental rehearsal before the intervention includes visualisation, with emphasis on the environment (visual) aspects and also as a medium to override negative thoughts through mental images. According to her feedback in the data, she almost never rehearses music mentally. Participant 2 reported having incorporated some mental imagery, especially on the day of the performance, to avoid physical exhaustion beforehand. She reportedly focuses mainly on her feelings and thoughts during mental imagery and mental rehearsal. She further reports the ability to imagine herself playing and envisage her fingerings and feels herself playing. Because she mainly applies mental imagery and mental rehearsal before a performance, the participant ought to be encouraged to apply the given techniques on a daily basis to assess whether this has an effect on her preparation. Participant 3 often rehearses music in her mind unconsciously, and believes that it can be more effective if she applies it consciously. She focuses on kinesthetic elements of playing during mental imagery and mental rehearsal. Because she usually applies mental imagery and mental rehearsal techniques unconsciously, this participant should be encouraged to apply it consciously and as part of her daily practice routine.

5.5 Pre-intervention theme iv: Biggest personal setbacks that prevent optimal performance

According to the data, the biggest personal setback that prevents optimal performance is insufficient practice time. According to Participants 2 and 3, busy schedules prevent sufficient practice time. There is therefore a need to explore ways in which to increase quality of practice time and reduce unnessecary repetition. In this study mental imagery and mental rehearsal techniques were explored during the intervention as the medium for increasing quality of practice time and making the mind more aware during rehearsal and performance. According to Johnson (2003:11), employing mental imagery and mental rehearsal techniques as part of your daily practice routine increases the speed of learning music.

Participant 1 has a physical condition that limits her hours of daily practice and results in insufficient practice time. She might benefit from a combination of physical and mental practice to extend practice periods. Freymuth (1999:17) describes her

experience of the combination of physical and mental practice while she was recovering from an injury:

> I wanted to make most of the precious few minutes I was actually able to play. By playing a few measures at a time and then practice mentally for several minutes, I was able to distribute five minutes of physical playing over an hour's worth concentrated mental work.

Freymuth found that the combination of physical and mental practice lenghtened her practice time periods, but according to Sugarman (1999: 172), mental practice can be applied alone on days when physical practice is not possible. He states that according to the psychoneuromuscular theory: "…vividly imagined events produce an enervation in your muscles that is similar to that produced by physically executing the movement". According to this theory, mental practice is believed to have almost the same effect as physical practice. Drawing on these sources, it was predicted that the intervention of the mental imagery and mental rehearsal techniques provides an alternative method of practice for those who suffer from a physical condition that prevents sufficient practice.

Other setbacks identified by Participant 2 and 3 prior to the intervention of mental imagery and mental rehearsal techniques were problems with performance from memory; and poor concentration ability and wandering thoughts. Freymuth (1999: 64) suggests *creative images* for improving concentration by imagining a bubble or barrier of light surrounding you, shielding you from distractions. Participant 1 believes she does not struggle with concentration, and deals with unwanted thoughts through the use of mental images (Chapter 4.4, subtheme b). Although she does not struggle with concentration, she struggles with performance from memory and benefits from the application of mental imagery and mental rehearsal techniques that enhance performance from memory.

It was established prior to the intervention that all the participants are experienced performers that enjoys performing, however the data shows that they have certain setbacks that prevent their optimal performance, resulting in anxiety. These setbacks include insufficient practice time, performance from memory; poor concentration ability, or wandering thoughts. It was predicted that the list of mental imagery and

mental rehearsal techniques given to the partcipants for the intervention, may have a positive effect on treating the setbacks experienced prior to the intervention.

5.6 Intervention theme I: Intervention results of applied mental imagery and mental rehearsal techniques

Within two weeks after the first interview, the participants were supplied with a list of techniques to apply to their daily practice routines for a period of two months. The intervention techniques are based on elements from the Johnson (2004) and Freymuth (1999) mental imagery and mental rehearsal techniques; Ginsborg's (2004) suggestions for the development of imagery abilities; Holmes and Collins' (2001) recommendations for effective imagery; and Greene's (2001 and 2007) techniques for an optimal performance. All the participants were given the same list of techniques to apply during the intervention. The techniques included:

- relaxing the body
- imagery development
- creative images
- mental leadership
- enhancing inner hearing
- miming
- alternating tempos mentally
- imagining an ideal performance

The participants were all given the same techniques to apply, but it became evident that, after about a month (when Interview B was complete), that each of them started focusing more on specific techniques. However, the data in Chapter 4 shows that they all agreed that the techniques teach mental awareness. According to Johnson (2003:48), mental imagery and rehearsal techniques can be optimally developed when practiced under non-stressful circumstances. Therefore, these were given to participants to apply as part of their daily practice routine.

Chapter 4 shows a detailed description of each participant's experiences of the application of the techniques, and the following discussion is based on analysis of the data written in Chapter 4. Interestingly, the participants experienced the

application of the techniques differently, according to their years of playing experience.

The first technique the participants were required to apply was *relaxing the body.* This technique includes focusing on breathing and progressive relaxation, followed by imagining performing, while focusing on keeping muscles relaxed. According to Johnson (2003:32), one needs to focus on relaxation in order to eliminate external stimuli, and to become aware of one's inner state. That is why this technique had to be applied first.

Through the analysis of the data, it became evident how the participants each interpreted the technique differently, and changed the application to suit their needs. Participant 1 applied the exercise in combination with *miming,* in order to teach her body movements in a relaxed way. Freymuth (1999:48) emphasises a focus on relaxation during *miming,* because tension will be released and the task will be learned with relaxed muscles, rather then tense muscles. Participant 2 applied the technique to reduce anxiety before performances, and combined it with *imagining an ideal performance* and accepting imaginary mistakes. Participant 3 focused mainly on breathing for relaxation, and combined the technique with physical exercise so as to relax her muscles before practicing.

After *relaxing the body,* the next technique the participants were asked to apply was *creative images.* This technique can be used to create and enhance certain moods and emotions within a piece of music (Freymuth 1999:64). Creative images had to be visualised and focused on during rehearsal so as to influence the character of the piece being played. Participant 1 suggested that images that evoke a certain emotion could aid the process of memorisation, due to the link between memory and emotion. According to Eschrich et al. (2008):

> …specific pieces of music can elicit strong emotions in listeners and, possibly in connection with these emotions, can be remembered even years later. We investigated whether emotional music is remembered better than less emotional music… It was concluded that positive emotions and high arousal levels that are associated with specific events act as a memory enhancer for these particular events. In the context of associative memory models, this memory-enhancing effect of emotions and arousal can be explained as a

> strengthening of the associations between the memories due to strong emotions…

Based on the connection between music, emotion and memory, *creative images* could be used as an aid to evoke emotions, which might in turn enhance memorisation and performance from memory. Participant 2 used *creative images* to help her interpret the music of Debussy. She does not only imagine specific images, but also an atmosphere or a scene. She claims that images create certain moods and feelings.

When Participant 3 applies *creative images* to her own practicing and playing, she thinks of kinaesthetic images, rather than of static images. She is focused on smell, taste and movement, rather than on the actual image. Because this participant is more orientated towards kinaesthetic images and movements, Freymuth (1999:79) suggests that a performer that struggles with creative images focus on tactility or sensation, for example "my arms feel like wings". *Creative images* can also be used to improve concentration. According to the data, concentration improves with experience and maturity: Participant 2 (least experienced) had the most problems with concentration, and she was therefore the only participant to apply the technique. Participant 2 imagined a space instead of a circle, and focused on her inner emotions. She also preferred to imagine specific people she trusts with her inside the space.

To help develop imagery awareness and *creative images*, the third technique, *imagery development,* involves imagining a three-dimensional object and focusing on its detail while doing so. Thereafter, it should be visualised from different perspectives (Johnson 2003:62). This seems to be the techniques the participants struggled with most. All three participants were at first hesitant to apply the technique. This might be because imagining an object is not related to music, and they might have had difficulty understanding the reason for applying the technique. Participant 3 did not apply this technique as part of her practice routine, whereas Participants 1 and 2 did. Participant 1 found it advantageous when memorising a work and could apply it through practicing visualisation of the score. Participant 2 applied it to learning new repertoire.

It ought to the participants might have found this technique difficult to apply because it focused only on the visual aspect of imagery development. Johnson (2003:49) combines the above-mentioned exercise, involving more of the senses. He

focuses on imagining the texture, smell, shading and taste of the object. He states that this technique could lead to more creative music making, through encouraging perceiving music in different ways, both musically and technically. Another exercise he gives to enhance imagery development is listening to a piece of music and considering emotional and visual images, which come to mind when listening to the music. Green (1986:153) suggests letting your mind create a 'movie' of the music in its full spectrum of affect, imagining colours, scenes and actions.

Contrary to their experience of *imagery development*, all three participants seems very positive about the application of *mental leadership*. This technique involves playing a scale or fragment, and mentally thinking each note out ahead, before playing it on the instrument. Participant 1 states that she believes most important benefits of the technique is that it enhances the ability to control your thoughts, and improves absolute focus. Freymuth (1999:38-42) states that this technique is very good for developing inner hearing, and letting the mind guide muscles, rather that motor memory. This statement is reinforced by Participant 2, who described how she believes this technique helped her in overcoming a mistake during a performance:

> I carried on, my muscles carried on with it, but I think it is because all the fast… difficult passages I went through one of these techniques…*mental leadership*… (Interview B)

Although Participant 3 were positive about the application of this technique, she pointed out that it can be very time-consuming and, therefore, she does not always have time to apply the technique.

The fifth technique the participants were asked to apply was *enhancing inner hearing*. This involved mentally imagining the sound and feeling of a fragment of music and then comparing it to physically playing the same. This technique can be done using either the score and/or from memory. Participant 1 implemented the exercise using the score, only stating her concern that she would not be able to do it if she had to do the exercise from memory. Participant 3, however, performed the exercise mostly from memory:

> I did it a lot, a few times a day and over and over. I was playing my pieces in my head. Wherever I went and then I was very, very confident. When I played it I knew exactly

> where I was. I believe that I should always do it. This has helped me a lot. (Interview C)

She mentioned the important benefit that, by 'practicing' from memory, she could apply the technique anywhere, with or without her instrument, and even in combination with physical exercise (for instance, while jogging). It is therefore clear that according to the participants, one of the advantages of this exercise is that it can be practiced away from the instrument, and that this encourages one to not rely on physical (motor) memory. Another technique that helps the mind not to rely on motor memory is *Miming*. Participant 1 struggled with the application of this technique, and she expressed her concern regarding the adverse influence *miming* might have on intonation if the bow is not used, and she cannot hear the notes being played. Although she struggled with the technique, she believes that through this exercise, the bowing and fingering are isolated from each and other and can be focused on separately. Participant 2 found miming difficult at first, but claimed that it became easier as she practiced it. She eventually managed to include miming at alternating tempos. During the last interview, Participant 2 found the technique became much easier, and found it useful in learning new repertoire.

Participant 3 found the technique very useful, and expressed the view that one can manipulate one's brain into believing that you are physically doing something when you are not. This view concurs with Sugarman's (1999:172) psychoneuromuscular theory, which states that imagined events produce an enervation in your muscles similar to that produced by physically executing the movement. Therefore, by *miming* an action, you can fool your brain into believing that the action was physically executed. This might be useful for participants who wish to practice when they do have access to their instrument for a short period of time.

The next technique the participants were encouraged to apply was *alternating tempos mentally*. To perform this exercise, a section from a piece had to be imagined without the instrument at slow speed and then gradually an increased tempo until the final tempo is reached. According to Freymuth (1999:71-74), this technique allows exploration of motions that need to be done at a particular speed without compromising technical integrity. For example, in string players, the *spiccato* bowing depends on the speed of playing and when it is physically practiced slower, the

technique requires a completely different bow control. Therefore, this mental rehearsal technique allows the player to analyse the technique at a slower tempo without unwanted physical changes.

Participant 1 was hesitant to apply *alternating tempos mentally* because she felt afraid to practice the music this way incorrectly, similar to her experience of the technique *mental leadership*:

> …if I really slow down in my mind, then I lose track of where my fingers are, what note am I actually playing. You know, I know if I miss a note then I could actually be rehearsing it in my mind wrong and then am actually ruining it [sic]. You have to be so careful and that is why I tend to rather not do it than do it wrong, because I know if I do it wrong it is going to cause a problem. (Interview B)

Participant 2 found the application of *alternating tempos mentally* was beneficial in securing her pieces from memory:

> …especially the difficult passages. I really had it in my fingers and I found previously and in other pieces I did previous years it was not… I could almost see the whole passage, feel it in my fingers... (Interview B).

Participant 3 believes that *alternating tempos mentally* is beneficial because it forces her to increase the practice tempo, until a final tempo is reached.

The last technique the participants were given, is *imagining an ideal performance.* This is an exercise that combines aspects of both mental imagery and mental rehearsal. All participants claim to have applied some form of this exercise consciously or unconsciously before. For this study they had to apply this technique by visualising the concert hall, audience, stage and specific audience members. Then they had to imagine themselves backstage, while focusing on breathing as well as on any emotions they experience. An imaginary perfect performance then follows, with focus on details.

Participant 1 found that this exercise helps to eliminate negative thoughts. She asserted that negative thoughts can ruin a performance. Participant 2 applied

imagining an ideal performance in combination with *relaxing the body*. She believes that applying this technique enhanced her exam performance:

> Participant 2: I would say so because during my performance I found that overall I had a very solid performance… Usually if I think of previous performances, especially for competitions, and I remember that anxiety [sic] feeling I felt it throughout the performance. Well, some part of the performance, and this time I was only a bit shaking [sic] in the beginning, like the first few lines of the first piece. The rest of the performance I was… I did not have that feeling because I actually went through everything beforehand mentally and ja [sic], that was the one thing that was missing, which I was very glad! [sic] (Interview B)

Participant 3 focuses on maintaining positivity when imagining a performance:

> I am not thinking negative things - that I cannot do this, or I cannot play this fast enough or… I know I will do it perfectly. So I am lying to myself maybe, but that is what I imagine. (Interview B)

To summarise, the analysis of the data of Stage 1 shows that Participant 1, with 45 years playing experience, found it difficult to adapt her practice routine according to the techniques. Although she seems very positive about the techniques stating that "It definitely helps!", she felt more comfortable with the techniques she was familiar with before the intervention, and with using them in the way to which she had become accustomed. Participant 2, with 19 years of playing experience, was very enthusiastic about the application of the techniques, and she was able to incorporate them as part of her practice routine with apparent ease, reporting that, "it is starting to become part of my daily practice routine". She admitted that some of the techniques were more challenging, but eventually, she enjoyed the challenging techniques the most: "everything was beneficial… I can learn music more thoroughly by doing these techniques…". Participant 3 has 36 years playing experience. She too struggled to incorporate the techniques as part of her practice routine. She believes that one needs to apply the techniques from an early age onwards for them to be optimally beneficial.

It can therefore be concluded that Participant 1 and 3 with an excess of 25 years, playing and practice experience, found it most difficult to adapt to these techniques.

The participant with less experience (Participant 2) found it much easier and seemed to have enjoyed the application. They were nevertheless all open to the suggestions of the techniques and tried to utilise what was most beneficial for them.

5.7 Intervention theme II: Reflection: The role of mental imagery and rehearsal in overcoming subjective setbacks

The main focus of this study was to determine whether the application of mental imagery and mental rehearsal techniques can be helpful in overcoming subjective setbacks that prevents optimal performance. The main setbacks that prevented optimal performance according to the data was lack of sufficient practice time (due to physical problems or a busy schedule), difficulty performing from memory, and poor concentration ability and wandering thoughts.

According to analysis of the data, all three participants found that the techniques helped saving practice time by optimising practice time available, and reducing repetition, by increasing mental awareness during practice. The data shows that the techniques might consume more time when applied initially, and takes practice to apply correctly, but that, in the long run, it saves time by making rehearsals more efficient and by preventing unnecessary repetition. Participant 1's insufficient practice time setback is caused by a physical injury that limits her daily practice time: "…my biggest concern is my body and whether it is going to last. " It was predicted prior to the intervention that Participant 1 might benefit from mental practice techniques so as to aid her practice sessions on days when her body don't allow much physical practice. During the intervention interviews, she agreed that the techniques did help, but she is worried about physical strenghth that might not be built through mental practice. According to Freymuth (1999:96-100), mental imagery and mental rehearsal can be used to support the rehabilitation of injuries. As a professional violinist, Freymuth applied mental imagery and mental rehearsal techniques, after a severe case of tendonitis, in combination with short periods of physical practice to build her strength.

Johnson (2003:8) mentions an account of a violinist that suffered an injury due to a stroke, and was unable to use his left hand. Through mental practice and by merely placing his left hand statically on the fingerboard, he imagined them moving in the

correct positions. He eventually regained control in his fingers, thereafter advocating that practice should involve the mind first and foremost. Participant 1's main concern was that the techniques do not focus on building physical strength required for performance. However, Johnson (2003:79) holds that mental imagery and mental rehearsal cannot be considered a substitute for physical practice.

Mental rehearsal techniques are not a substitute for physical practice, and the techniques prescribed in the intervention do not focus on building physical strength. There are other techniques available for building physical strength through mental training, for instance, the chapter on imaginary weight training exercises in Solomon (1978:76-80), and future research could consider investigating these physical and mental rehearsal techniques, with the mental imagery and mental rehearsal techniques mentioned in this study.

All three participants agree that the application of mental imagery and mental rehearsal techniques are effective in addressing problems with memorisation. According to Holmes (2003:37), mental rehearsal will aid memorisation through greater understanding of the music. Participant 2 believes that mental imagery mainly evoked emotions, which enhanced the memorisation process. In 1938, Seashore stated that: "…imagery is closely related to fantasy and fantasy is one of the best aids to memory in that it gives us striking, interesting, odd and lasting impressions which aid in recall" (In Holmes 2003:40). Holmes (2003:49-51) suggests that visual imagery has a significant contribution in the functioning of longterm memory, and her study found that imagery has a function in transferring emotions, through motor control into memory. This means that mental imagery and mental rehearsal techniques might aid memorisation, through deepening the understanding of the music and by linking imagery with emotions to the longterm memory. Participant 1 agrees that the technique *creative images* evokes emotions, and that this enhances memorisation:

> Participant 1: Thinking about it now and just thinking [sic] the… passage I've applied it to, it makes sense. Suddenly its clear. (Inteview C)

The last setback that prevented optimal preformance is poor concentration ability and wandering thoughts. Before the intervention, Participant 2 and 3 complained

that wandering thoughts sometimes affect their performance negatively. According to Participant 1, she doesn't struggle with concentration, and if an unwanted thought appears during a performance, she imagines the thought as a soap bubble that she gently flicks away. Citing this, she finds mental imagery is helpful in dealing with unwanted thoughts. According to the data, Participant 2 felt the technique that was most helpful in improving concentration was *creative images* through creating a imagined space around her to keep unwanted thoughts out. Participant 3 felt *mental leadership* improved concentration through improving mental awareness.

5.8 Conclusion

The discussion of the analysis revealed valuble information regarding the three participants' musical background and experience; their conception of themselves in performance situations; their understanding of mental imagery and mental rehearsal prior to the intervention; as well as their experiences of the application of mental imagery and mental rehearsal techniques during the intervention. However, the main focus of this study has been to explore how effective mental imagery and mental rehearsal techniques are in addressing setbacks experienced by string players during a performance. During Stage 1, certain setbacks were identified and discussed. These setbacks includes insufficient practice time, difficulty performing from memory; and poor concentration ability and wandering thoughts. During Stage 2, the efficacy of the application of mental imagery and mental rehearsal techniques in addressing these setbacks were discussed, with the support of current literature. According to the data, the techniques that enhanced performance from memory and memorisation are *creative images*, *mental leadership, miming, and imagining an ideal performance*. The techniques that enhanced concentration ability are *creative images, mental leadership, enhancing inner hearing, miming, alternating tempos mentally*. It was also concluded that the techniques save practice time, by making rehearsals more efficient and preventing unnecessary repetition.

CHAPTER 6

CONCLUSION

6.1 Introduction

This research set out to investigate whether mental imagery and mental rehearsal techniques can be effective as an aid to address possible setbacks experienced by string players, preventing optimal performance. According to Johnson (2003:79), incorporating mental methods ensures that the mind stays ahead of the body, thinking about both technical and musical issues. Chapter 1 provided an overview to the background of the study, the aim of the study, research questions, an overview of the methodological process, limitations of the study and a chapter outline. Chapter 2 presented the literature overview and discussion of literature on research mental imagery and mental rehearsal techniques. Chapter 3 showed a detailed discussion of the methodological procedures used for the Chapter 4 presented the results of the analysis during two stages. Chapter 5 discussed these results in relation to the literature. Chapter 6 summarises and presents the conclusions of the research. The main research question and the three sub-questions are addressed systematically in this chapter.

The study used a qualitative research approach and falls into the interpretive paradigm. The qualitative research paradigm was the most appropriate when addressing the phenomena of the research. A hybrid case study design was utilised with elements of action research. The action research component involved the intervention of mental imagery and mental rehearsal techniques based on existing mental imagery and mental rehearsal techniques suggested by Freymuth (1999), Johnson (2004), Ginsborg (2004), Holmes and Collins (2001), and Greene (2001 and 2007). The specific techniques were chosen because they addresses a wide variety of factors that performers encounters often in rehearsal and performance situations; and it was revealed in my literature review that these techniques are some of the few techniques available for practical application in music rehearsal and performance.

The study was conducted with three string performers, with varying degrees of performance experience, in two stages, a pre-intervention and an intervention stage. Data was collected through semi-structure interviews. Stage 1 (pre-intervention) included a semi-structured interview (Interview A) with each participant. The goal of the initial semi-structured interview was to establish the participants' point of view on a musical performance, and also to identify possible setbacks experienced by the participants during a performance.

Stage 2 (intervention) commenced within two weeks after interview A, when a list of mental imagery and rehearsal techniques was given to each participant to apply to their daily practice routine. During this part of the intervention all the participants also played at least one concert. A month after the start of the intervention, another semi-structured interview (Interview B) was held to establish how the participants are experiencing the influence of mental imagery and rehearsal on their daily practice routine, and to monitor the effects of these techniques. A month after Interview B (including another conncert), Stage 2 of the intervention was concluded with Interview C. The goal of interview C was to establish the outcome of the possible effect the mental imagery and rehearsal techniques had on the participant's performance and whether these techniques were beneficial in addressing setbacks that the participants experienced prior to the intervention.

6.2 Addressing the sub-questions

The main research question of the study was: **How would mental imagery and mental rehearsal techniques address setbacks experienced by string players during a performance?** The three sub-questions will be addressed before a discussion of the main research question.

The first sub-question was: **What are the possible setbacks experienced by string players that prevents optimal performance?** Answers to this sub-question were elicited during stage 1 of the study. According to the analysis of the data, the main setbacks that string players experience that prevents optimal performance were insufficient practice time, difficulty performing from memory, poor concentration ability and wandering thoughts. Insufficient practice time is a setback mentioned by all three participants, and it prevents them from achieving optimal performance

because they feel unprepared and insecure. Participants 2 and 3 claim that insufficient practice time is mainly caused by a busy schedule that limits physical practice time and causes them to practice with less focus. Participant 1's insufficient practice time setback is caused by a physical condition that limits physical practice to an hour or two per day.

Another setback that became evident during the analysis of the data is problems with performance from memory. Because performance from memory has many benefits and is sometimes compulsory, the participant who struggles with performance from memory finds that this setback prevents optimal performance. When she has to perform from memory, she feels insecure and it affects her level of performance negatively. She stated that she would like to improve her memorisation abilities so as to enhance performance through memorisation. Participant 3 finds that she struggles with memorisation due to limited practice time, and she therefore believes that finding ways to make practice time more efficient might create the opportunity to give more attention to memorisation.

The final setback that emerged included problems with concentration and wandering thoughts. Two of the three participants claim that they struggle with concentration during a performance, resulting in unnecessary mistakes that prevent optimal performance. They claim that problems with concentration not only affect their performance negatively, but also their practice sessions. Interestingly, the least experienced participant struggles most with concentration, and the most experienced participant claims that she has no concentration problems. Therefore, according to the research, it seems that concentration ability increases as the level of performance experience increases.

It was interesting that all three setbacks (insufficient practice time, difficulty performing from memory, poor concentration ability and wandering thoughts) experienced by the participants are linked, and addressing one might also have a positive effect on the others. For example, through enhancing concentration ability, practice time may become more efficient, which, as a result can reduce practice time through the avoidance of unnecessary repetition and the creation of more time for memorisation. Research done on the benefits of the use of mental imagery and mental rehearsal techniques in enhancing performance from memory, improving

concentration and making practice time more effective, prompted the intervention. By administering a few of the techniques, I anticipated that the setbacks experienced by the participants prior to the intervention might be addressed. This led me to the second sub-question: **In what way would a mental imagery and mental rehearsal technique intervention address the problems experienced?**

The intervention consisting of mental imagery and mental rehearsal techniques given to the participants (stage 2 of the study) provided them with the opportunity to incorporate mental imagery and mental rehearsal techniques as part of their daily practice routine, in order to establish a clearer understanding of the effect the techniques had on their practice and performance. The following techniques were given:

- relaxing the body
- imagery development
- creative images
- mental leadership
- enhancing inner hearing
- miming
- alternating tempos mentally
- imagining an ideal performance

The literature has proven that mental imagery and mental rehearsal makes practice more efficient and refocuses attention during performance (Ginsborg 2004:225). In the light of these findings, it was predicted that practice time could be made more efficient and concentration could be improved by the intervention of mental imagery and mental rehearsal techniques. Improved concentration and efficient practice could possibly result in saving practice time by avoiding unnecessary repetition. Memorisation and possibly emotional cues to aid memorisation (Chaffin et al. 2009) could also be enhanced through the intervention.

All the participants reported a positive effect after the intervention, albeit to varying degrees. The participants agreed that the techniques improved their quality of practice and gained in time and efficiency of practice. Furthermore, there was a marked increase in concentration during practice and performance, as well as an

improvement in the ability to memorise. Analysis of the data shows that although the participants agreed that all the techniques given were beneficial to their playing, certain techniques were more useful in overcoming setbacks experienced. This lead me to the third sub-question: **Which mental imagery and mental rehearsal techniqus were helpful in overcoming setbacks experienced by string players?**

All the participants stated that the techniques improved insufficient practice time by making rehearsals more efficient, and preventing unnecessary repetition. Although they found that the techniques might consume more time when applied initially, and that they require practice to apply correctly, they also save practice time in the long run. Also, in the case of an injury, it expands periods of practice time by adding mental practice to short period of physical practice. The participants stated that a combination of all the techniques proved beneficial for overcoming practice time setbacks. The techniques that enhanced performance from memory and memorisation were *creative images*, *mental leadership, miming, and imagining an ideal performance.* Those techniques that enhanced concentration ability were *creative images, mental leadership, enhancing inner hearing, miming,* and *alternating tempos mentally.* A detailed discussion of why these techniques enhance each setback, with evidence based on current literature, can be found in Chapter 5.

6.3 Addressing the main research question

The main research question of the study was: **How would mental imagery and mental rehearsal techniques address setbacks experienced by string players during a performance?** The study found that the intervention of mental imagery and mental rehearsal techniques can most definitely benefit string players in addressing setbacks (insufficient practice time, difficulty performing from memory and poor concentration ability). However, it must be emphasised that according to the research findings, the techniques are not a substitute for physical practice. The study found that the application of the techniques is most beneficial when it is applied in combination with physical practice in order to reach optimal performance. No doubt the temporal efficacy of the practices would be need to verified in subsequent studies, however, overall the outcome of the intervention of mental imagery and rehearsal techniques was largely postive for all the participants.

6.4 Limitations of the study and recommendations for further research

A few limitations became evident durng the course of the research. All the participants in this study are female string players. The study can be extended by including male participants. Furthemore, the views of other instrumentalists would be insightful. Since this study found that mental imagery and mental rehearsal techniques applied in combination with physical practice requires less physical practice time, it may be interesting to examine how other instrumentalists experience these techniques.

Another limitation of this study was that the mental imagery and mental rehearsal techniques were applied for a period of two months only. According to the data, the participants felt that the mental imagery and mental rehearsal techniques take time to practice and apply correctly before becoming truly efficient. Therefore, it might be beneficial to conduct this study over a longer period of time in order to test the long-term impact of these techniques.

During the course of this research, it became very apparent to me that this topic can be explored in much more depth. For example, the analysis could be intepreted through many existing theories such as motivation, and self-determination theories.

6.5 Concluding comment

This study provides a preliminary contribution to our understanding of the use of selected mental imagery and mental rehearsal techniques in string players. As a string player, I have found these techniques most beneficial to my own performance practice. This study showed that mental imagery and mental rehearsal techniques, when applied in combination with physical practice, may be effective in addressing setbacks experienced by string players and may increase the chances for optimal performance.

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APPENDIX A

LETTER OF INFORMATION AND INFORMED CONSENT FROM

FACULTY OF HUMANITIES
DEPARTMENT of MUSIC
TEL: 012) 420-3747 (*Secretary*)
FAX: (012) 420-2248

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

February 2014

PARTICIPANT LETTER OF INFORMATION

Research Title: The use of mental imagery and mental rehearsal techniques for optimal performance in string players

Aim of the study

The main aim of this study will be to investigate whether mental imagery and mental rehearsal techniques can be helpful as an aid to overcome possible psychological setbacks experienced by string players during a performance. This study will use a hybrid case study design with a quasi-exploratory approach.

Procedures of the study

Data for this study will be collected through three semi-structured interviews between the participant and researcher over a period of three months. The first interview will be to find out whether mental imagery and rehearsal techniques are currently used and if not, how it could be implemented. You will then be invited to take part in an intervention of custom designed mental imagery and mental rehearsal techniques, devised specifically to address your particular needs. The intervention will take place over a period of two months. The second interview will

be arranged in the middle of the intervention session and the final interview will take place at the end. All the interviews will be audio recorded and transcribed.

Participants' rights during the study

You have the right to withdraw from the study at any point, or refuse to answer an interview question or stop the intervention at any time, without any negative consequences to you. You also have the right to view your own personal data in the form of the transcribed interviews gathered before final preparation of the data.

Benefits of the study

This study may benefit you in that the intervention may offer solutions or help you solve difficulties you currently experience during your performance.

Confidentiality

All information will be treated as confidential and your anonymity will be assured. All relevant data will be destroyed should you decide to withdraw. The data gathered will be used for the purposes of the study only and will be in line with the research goals of the study. All data will be stored at the premises of the University of Pretoria, Department of Music, Lynnwood Road, Pretoria for a period of 15 years.

Possible disadvantages

The intervention will not be harmful in any way and I foresee no disadvantages for being involved in this study. Your anonymity is ensured.

Ané du Toit
Researcher/ Student
Cell: 072 601 5467
Email: anedutoit@icon.co.za

Dr. C.R Panebianco-Warrens
Supervisor
Work: 012 420 5382
Email: Clorinda.Panebianco-Warrens@up.ac.za

FACULTY OF HUMANITIES
DEPARTMENT of MUSIC
TEL: 012) 420-3747 (*Secretary*)
FAX: (012) 420-2248

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

February 2014

PARTICIPANT INFORMED CONSENT FORM

Researcher: Ané du Toit

Supervisor: Dr. Clorinda Panebianco-Warrens

Research Title: The use of mental imagery and mental rehearsal techniques for optimal performance in string players

I have understood the content and nature of this study, and I am partaking in this study of my own accord

With full knowledge, I agree to participate in this study on this _____(day) of this _____(month) and this_____(year).

Participant Details:

Name: _____ Signature:_____

Contact number: _____ Date: _____

Researcher and Supervisor Signature:

Researcher: _____ Date: _____

Supervisor: _____ Date: _____

APPENDIX B

INTERVIEW QUESTIONS TO INTERVIEWS A,B AND C

Interview questions for Interview A: (Participant 1, 2 and 3)

1. How long have you been playing your instrument?
2. How often do you perform on stage?
3. Tell me about your performance experiences, do you enjoy performing?
4. Please explain your feeling and thoughts after a performance.
5. Are you good with motivating yourself? If so, please describe how you motivate yourself. If not, why would you say you are not?
6. Are you aware of any specific strategies you use in the preparation for a performance? If so, describe them.
7. How often do you find that you rehearse music in your mind?
8. Please explain what you understand within the concept of mental images and whether or not you find it difficult to form mental images.
9. Do you have the ability to imagine what it feels like to play your instrument? If so, how often does this occur?
10. Do you ever think through physical movements without playing? If so, when does this happen?
11. How often do you mentally visualize the score?
12. What are your thoughts on mental rehearsal and imagery techniques?
13. Have you ever applied these techniques in the preparation for a performance? If, so describe the techniques.
14. How easily do you control your thoughts during a rehearsal or a performance?
15. How much does the complexity of a piece affect your learning strategies?
16. What is your general structural overview of the music you perform? Does this influence your preparation?
17. How important is the context of the music to you (what comes before and after) and how does this influence your performance?
18. Which goals do you try to achieve during your rehearsals?
19. What are your thoughts on analyzing performance after you completed it?
20. Explain whether or not you prefer to perform from memory?

21. At what stage of learning new repertoire do you consciously begin the process of memorisation?
22. At what point do you begin to think about interpretation?
23. What role does bowings and fingerings play as part of you memorisation process?
24. What role does shapes, movements and gestures play as part of your memorisation process?
25. How important do you think is the emotional content of a piece as an aid to performance and memorisation? Please motivate
26. Do you find it that your thoughts wander often during a performance? Why would you say this happens?
27. Are you easily distracted and put off by noises during a performance?
28. According to your own experience, how do you feel about your concentration ability a performance?
29. What are your thoughts on relaxation before a performance, do you personally find it easy to relax before a performance?
30. Do you know of any relaxation exercises and techniques? If so, describe them.
31. How much does mistakes worry you during a performance? Do you have the ability to carry on as if nothing happened?
32. Would you describe yourself as a competitive person? Please explain.
33. What are your thoughts on confidence when performing?
34. Do you suffer from lack of confidence when performing or do you approach performances with confidence?
35. Would you describe yourself as an introvert or extrovert person? Please motivate why.
36. According to your own experiences, what is your biggest possible setback during performance that may lead to unnecessary mistakes?

Interview B: Interview Questions (Participant 1)

1. How did you experience the application of the mental imagery and mental rehearsal techniques to you daily practice routine?
2. From the previous interview I gathered that you already apply some form of *imagining an ideal performance*. Did you consciously apply this technique now and did find any difference in the outcome?
3. You've mentioned that you would like to be able to rehearse music in your mind. How did you experience *alternating tempos mentally*?
4. Did any of the techniques enhance your ability to form mental images? If yes, which techniques?
5. How did *mental leadership* impact your level of confidence during performance?
6. Do you find that *imagery development* enhanced your ability to visualize the score?
7. You've mentioned during the interview that absolute focus and the ability to control your thoughts enhances your performance. Which techniques aided these abilities?
8. Which techniques did you helpful in improving your quality of practice time?
9. According to you, which technique(s) did you find most useful and which technique(s) did you not find helpful?

Interview B: Interview Questions (Participant 2)

1. How did you experience the application of the mental imagery and rehearsal techniques I gave you?
2. How did you experience the application of technique 1 as part of your pre-performance preparation?
3. It became evident during the previous interview that you already incorporate some form of *imagining an ideal performance* unconsciously, but how did you experience the conscious application of this technique?
4. What was your experience of the application of i*magery development*?
5. It became evident during the previous interview that you applied *miming* when you saw a recording of a famous violinist playing the Mendelssohn violin concerto, which is very familiar to you. You've mentioned that you apply this only before performances. Did you manage to apply this technique to your

daily practice routine and did you find a difference in its efficacy when applying it consciously?

6. In what way did *creative images* address concentration problems?
7. What was your experience with the application of *mental leadership* for mental preparation of a difficult passage?
8. During the previous interview you said that emotional content is an aid in memorisation because you are an emotionally orientated person. Did *creative images* assist you in memorizing the music through connecting emotions to images?
9. According to you, which technique(s) did you find most useful and which technique(s) did you not find helpful?

Interview B: Interview Questions (Participant 3)

1. How did you experience the application of the mental imagery and rehearsal techniques I gave you?
2. During the previous interview it became evident that you already incorporate some form of mental imagery and mental rehearsal, for instance *imagining an ideal performance*, unconsciously. What was your experience when applying it consciously to your practice routine?
3. You've mentioned that you do physical exercise for relaxation and I try to be at a venue early before a concert, which makes you feel calmer because you do not often have the time to relax before a concert. Do you find that *relaxing the body* aided you pre-performance routine?
4. Do you feel that *mental leadership* aided your mental rehearsal/ mental rehearsal awareness?
5. You've explained that mental images for you are movements and gestures rather than images. What was your experience when applying *imagery development* and *creative images*?
6. Did you find *creative images* helpful to enhancing your concentration ability?
7. You've mentioned that you find it helpful to practice difficult passages slowly. *Alternating tempos mentally* aims to enrich the slow practice by practicing slowly mentally as well without your instrument. Do you find that it aided the rehearsal of a difficult passage?

8. You said during the interview that you believe mental images might help to control your thoughts during a performance. How did you experience the application of *creative images* to help control your thoughts?
9. Did you find the techniques I gave you useful in firstly, improving the quality of your practice time, and secondly to be able to practice even when you are away from your instrument for example when you are driving?
10. According to you, which technique(s) did you find most useful and which technique(s) did you not find helpful?

Interview C: Interview Questions (Participant 1)

1. How you have made the mental imagery and mental rehearsal techniques part of your general practise routine?
2. Which technique would you describe as most helpful in enhancing your performance?
3. In what way did you find the techniques influenced your ability to rehearse music in your mind?
4. I am curious to know if you have tried *miming* with your bow, without your instrument?
5. Have you ever tried connecting certain images and words to certain passages and did you think it perhaps evoke certain emotions?
6. Do you find that these techniques can be helpful in reducing practise time?
7. Did any of the techniques enhance your memorising ability? Which techniques?
8. Did any of the techniques enhance your concentration ability? Which techniques?
9. Do you think that you can fool your brain to some extent by building stamina and strength mentally?
10. Would recommend the mental imagery and mental rehearsal techniques to other string players?

Interview C: Interview Questions (Participant 2)

1. Have you incorporated the mental imagery and mental rehearsal techniques as part of your general practise routine?
2. You mentioned that you found the application of the techniques hard at first. Do you experience that the application of the techniques becomes easier with time? In what way?
3. During the previous interview you said that you struggled with *miming* and *mental leadership*, you said. So, how do you find it now?
4. Have you tried connecting certain images and words to certain passages in the music?
5. How do you experience memorising something when you have an image and emotion connected to it?

6. How do you find the application of the relaxation techniques influence your breathing on stage?
7. Do you find these techniques helpful in reducing practise time and saving time in a sense that you can practise mentally while doing something else?
8. Did any of the techniques enhance your memorising ability? Which techniques?
9. Did any of the techniques enhance your concentration ability? Which techniques?
10. Does it help to learn the repertoire quicker or just more thorough?
11. Which of these techniques would you recommend these techniques to other string players?

Interview C: Interview Questions (Participant 3)

1. Did you recently practise or memorise anything other than chamber music repertoire?
2. How did you try to make the mental imagery and mental rehearsal techniques part of your daily practice routine?
3. Have you tried connecting images to certain sections when you practise?
4. You said you apply the techniques subconsciously most of the time. Have you tried applying the technique *enhancing inner-hearing* consciously, deliberately?
5. How did you experience *imagery development*?
6. Which of these techniques do you think is the most beneficial and would you recommend to other string players?
7. In what ways do you find these techniques address a lack of practice time?
8. Did any of the techniques enhance your memorising ability? Which techniques?
9. Did any of the techniques enhance your concentration ability? Which techniques?

APPENDIX C

SUGGESTED MENTAL IMAGERY AND MENTAL REHEARSAL TECHNIQUES FOR INTERVENTION

Relaxing the body

Sit down or lie on your back, close your eyes and focus on becoming calm and relaxed. Imagine that you are in a relaxing natural environment such as the beach, mountains or anywhere where you feel at peace. Be aware of how your body reacts as you inhale and exhale. Inhale through your nose and exhale through your mouth. Feel your body becoming heavier, warmer and looser with each breath. Consciously be aware of any thought that comes to your mind and let it go. Bring your mind back to your breathing. Then apply Dr. E Jacobson's progressive relaxation: beginning with your feet, tighten and release each muscle group. You will for example tighten your toes, keep it for five seconds and then release it. Then move to your feet, repeat the process and move progressively up the body. Through this you will learn to tell the difference between tension and relaxation in different muscle groups and you will be able to identify unnecessary tension during rehearsal and concerts.

Be aware of your breathing throughout. When the body is relaxed, you can imagine yourself practising a very familiar piece in a familiar environment. At first, you can imagine seeing yourself from the audience's perspective as if you are watching a movie. Be aware as to whether you see any signs of tension that can later be worked on during physical practice. Then, imagine yourself practicing from an internal perspective. Feel yourself playing the piece and take note of how all your muscles feel, what your instrument feels like, what the room looks like and what you smell (the wood, the room, etc.). Make sure you hear everything that you play in your inner ear. When tension occurs during this process, you should inhale deeply and imagine relaxing your muscles when you exhale.

Imagery development

Now that your body is relaxed, an exercise that increases imagery vividness will follow. Take a 3D object like an apple and study all of its details. Close your eyes and imagine the apple. Notice its colours and shading and imagine painting the apple. Thereafter, imagine taking the apple and eating it. Imagine the smell, taste and texture. This will enhance imagery abilities and it could encourage perceiving music in different ways. For example you can look at a piece from different viewpoints, as performer, composer and audience.

Next, close your eyes and imagine block of colour. Zoom in until you visual field is covered with the colour and zoom out until the patch of colour disappears into darkness. Change the colour and repeat the exercise. Another exercise is to take a recording of the piece to be performed (recording of yourself playing or another artist) and listen to it without worrying what it feels like to perform the work. Let your mind create a movie out of the music and imagine colours, images, actions and scenes that comes to mind when hearing the music.

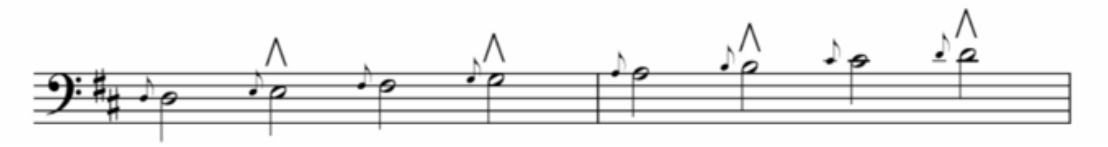
Creative images

Now that your body is relaxed, an exercise to use creative mental images will follow. You can use creative images to create and enhance certain moods and emotions within a piece of music, for example painting with a paint brush to suggest legato passages for string players or an image of lighting to suggest *sforzandi*. The visualisation of creative images can also be used during a performance. The image of light, for example, can be used in the form of a sun, providing energy and warmth to the body of the musician or in the form of a fire, surrounding the you to keep out negative thoughts and noises that might distract you. Fantasy pieces or *scherzos* often evoke visual images, like elves, fairies or landscapes. You can focus on these images that was inspired by the music while rehearsing and performing as this will influence the character of the piece, and might result in a better performance.

Mental leadership

Mental leadership is a technique that encourages you to anticipate technical as well as musical difficulties in a piece. Take your instrument and choose a simple scale. Play the scale and focus on staying mentally ahead while playing by thinking the sound and fingering of the next note directly before it takes place.

Example 1.1 (Johnson 2003:53)



As you play the scale, the little notes should be used to think ahead, mentally hearing the sound and feeling the fingering of the following note. This technique is very effective in helping the mind guide the muscles rather than using only motor memory. I suggest that you also sing the little note before playing it as well because this will involve aural awareness, incorporating even more senses and improving intonation for string players, specifically. Next you can take an excerpt from one of your pieces and rehearse it in the same way. Once this exercise is completed, you can use the same technique, thinking ahead by measure and finally by phrase.

Enhancing inner hearing

Inner hearing is the ability to imagine music in one's head. Rehearsing inner hearing is a critical part of music education, because this teaches the mind to lead the muscles instead, of the muscles leading the mind, and it guides memorisation and interpretation.

Take a section from a piece. 'Hear' the music mentally and listen carefully to the imagined sound. Physically play what is imagined and listen critically to what is being played. Ask yourself whether the physical performance matched the mental performance. After this exercise is completed, take the score and study it without your instrument. Try to mentally hear all the different instruments/voices and also try to sing the melodic lines.

According to Van Auken & Larson (1998:17-18), there are five steps a musician can take to develop inner hearing:

Step 1: "Hear" the music mentally.
Step 2: Listen carefully to the imagined sound.
Step 3: Physically play what is imagined.
Step 4: Listen critically to what is being played.
Step 5: Ask yourself whether the physical performance matched the mental performance.

Another way by which inner hearing can be enhanced is by singing the melodic lines of the piece and studying the score without the instrument. This can also improve intonation in general.

Miming

Miming is a technique that teaches your mind to sense whether you are playing the right notes, rather than your fingertips. Take your instrument and practice a section without your bow. It is very important to make sure that you are mentally hear the music while miming and to concentrate on having no tension in your body while playing. After rehearsing the piece by miming, you can practice the piece without any physical action involved. In other words, the piece should be rehearsed mentally, thinking about every muscle movement in the hands, position changes, etcetera, while mentally hearing the passages that are being rehearsed. If you concentrates on relaxing muscles while miming a piece, the actions will be learned with relaxed muscles, possibly preventing injuries while playing.

Alternating tempos mentally

Alternating tempos during mental rehearsal has many benefits. In the initial state of learning a piece, it might be very effective to mentally rehearse the piece very slowly. Take a section from a piece and imagine hearing it at a slow speed. Repeat the section by miming the section at a slow speed. This will give you time to have an awareness of any extra tension caused by physical movement when learning the piece. Then, try and imagine performing the section again but this time from

memory. The practice tempos should then gradually increase until the final tempo is reached. This exercise can be done with or without a metronome. If you are not able to physically play a piece at the final tempo yet, you can also do this exercise by imagining the sound at the final tempo, adding new ideas for interpretations, dynamics and articulation.

Imagining an ideal performance

Visualise the concert hall, the audience, specific audience members, the stage, etc. Imagine yourself standing backstage and focus on breathing. Be aware of all your pre-performance emotions (excitement, fear, etc). Imagine walking on stage, hear the audience's applause and imagine feeling very confident. Bow and focus on breathing. Take your instrument and mentally hear yourself tune. Imagine your instrument's sound filling the room and feel the vibrations of the sound through your body. Smell the wood and rosin. Focus on having a relaxed, solid posture and feel your weight evenly balanced. Focus on breathing. Feel your body relax as you prepare for the first notes. Then imagine playing the piece perfectly. Here you can choose whether you perform a detailed version of the piece (every bowing, note, etc.) or more of an overview performance. See yourself performing from the performers viewpoint as well as the audiences'.

Concluding

The mental imagery and mental rehearsal exercises above can be used in sequence to rehearse a specific difficult passage, or you can apply certain techniques on certain days. It is however recommended that you use some form of these techniques almost every time you practice in order to establish whether the techniques are beneficial for your rehearsals and performances.