

**Exploring memorisation and sight-reading and their inter-
relationship in undergraduate piano students**

by

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Abstract

For musicians, the ability to sight-read and memorise are skills required for ease of learning and performing. The competitive nature of the classical performing world requires of solo performers, especially pianists, to play flawlessly from memory and to be able to sight-read any genre of sheet music. By their own admission, many pianists claim that they are able to memorise well but are unable to sight-read, while others sight-read very well but are unable to memorise.

The aim of the study is to explore these phenomena in pianists. Numerous studies have been conducted on the sight-reading and memorisation abilities of pianists respectively, while only two investigated the relationship between these skills. In this dissertation, I address the gap in the literature by qualitatively exploring the possibility of a relationship between the two.

This study utilised a constructive grounded theory approach through semi-structured interviews with undergraduate music students, focusing on their self-reported abilities and beliefs regarding the two skills. The main categories that were identified in the data were: participants' self-appraisal of their abilities, reflexive engagement with memorisation and sight-reading, and formative influences. The results of my study suggest that music students are better able to memorise music than they are to sight-read music. Prominent factors mentioned by the participants that influence their sight-reading and memorisation abilities included stress, formative experiences, genre of music and the influence of teachers and lecturers. An interesting and unexpected finding of this study was the lack of suitable tuition in sight-reading and memorisation skills.

In conclusion, this dissertation provides a platform for further research into the relationship between memorisation and sight-reading skills in pianists, but also provides insight into the respective phenomena in the context of undergraduate music students. The resulting theory from the data is that individuals who have well-developed skills in sight-reading are less likely to struggle with memorisation tasks, while those who have well-developed memorisation abilities struggle with sight-reading tasks.

Keywords: Memorisation, sight-reading, relationship between memorisation and sight-reading, grounded theory, exploration, undergraduate music students

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Chapter 1

Introduction

1.1. Background to the study

During solo piano performances, audiences often take for granted that which seems effortless to the performer. With their fingers gliding expertly across the keys in a faultless performance from memory, audiences are entertained by feats of musicianship that appear to be second nature to the performer. However, this is not the case. World-renowned pianist, Glen Gould, says: “We do not play piano with our fingers, but with our minds”. This statement rings true with most solo performers who not only spend hours practicing for a performance, both mentally and physically, but also devoting much of their time honing several specialist skills such as sight-reading and memorising.

Given the fact that a fluent performance is the culmination of several skills, I became curious about the role of sight-reading in memorisation. My own experience is that I easily memorise music, but sight-reading is not my forte. This led me to question the correlation between these skills. My curiosity was further piqued by informal discussions with fellow musicians who are divided in their opinions about sight-reading and memorisation skills. It seems that there is a lay perception that those who can sight-read well are not able to memorise, and vice versa. This dichotomy led me to question the importance and impact of these skills required of performing musicians.

A preliminary search revealed that these constructs were not investigated together, but as separate entities. There is a vast amount of research on sight-reading and on memorising music, while there is a distinct paucity of information regarding the relationship between the two. The research available on sight-reading and memorising has generated theories regarding the nature and development of these abilities.

One theory claims that the ability to sight-read efficiently is predetermined and that a musician is either a good sight-reader or not (Zhukov, Viney, Riddle, Teniswood-Harvey & Fujimura 2016:155). Other scholars, like Klingenstein (2009:217), posit that sight-reading and memorisation can be taught. Brandfonbrener (2001:83) is of the belief that ease of memorisation is an inborn skill but that it, like other skills such as sight-reading, can be taught.

Despite theories claiming that memorisation and sight-reading are inborn, yet highly trainable skills, there is little to no research available on the relationship between the two skills. This could be due to the plethora of research available on memorisation and sight-reading as independent facets of musicianship.

There are numerous advantages associated with the ability to sight-read. Proficient sight-reading allows musicians to comprehend intricate solo repertoire quicker, encourages participation in chamber music performances and reduces the amount of time spent on score analysis (Zhukov *et al.* 2016:155). Similarly, the ability to memorise music efficiently results in a better understanding of the entire composition, enhances musicality and develops a higher level of discipline during practice (Klingenstein 2009:166).

Despite the benefits of good sight-reading and memorisation skills, it is very often the case that music teachers and institutions favour one above the other. Zhukov (2014:288) investigated 27 institutions in Australia offering undergraduate music programmes. None of these institutions offered training in and testing of sight-reading abilities, while memorisation abilities were both trained and tested. This could be in part due to the current performance practice in which professional musicians are expected to perform purely from memory, whereas previously – nineteenth century – musicians were expected to sight-read during a performance (Aiello & Williamon 2002:168). An interesting contradiction arises here as performance requirements of the Associated Board of the Royal Schools of Music (a music authority often used in South Africa for instrumental exams as an alternative to the University of South Africa music exams) focus on the musicians' sight-reading skills, despite memorisation being favoured during performance (Holmes n.d.).

A dichotomy exists in the research as it suggests that memorisation and sight-reading are both considered to be inborn skills, and skills that can be taught. Street (1987:32) claims that very few musicians are able to balance their memorisation abilities with their sight-reading skills, hence musicians are often either able to memorise efficiently or sight-read efficiently. He further states that musicians often depend on their musical strength e.g. memorising, to the detriment of their other skills e.g. sight-reading, and thus, due to continual use, it is further strengthened where the other is neglected and worsens (Street 1987:32). This brings about the question of what the correlation between the two skills is and whether propensity for one inhibits the development of the other.

1.1.2 Problem and rationale

Numerous studies have been undertaken to understand the brain processes (Williamon & Egner 2004), advantages (Klingenstein 2009) and methods of teaching effective sight-reading and memorisation skills. However, my preliminary investigation revealed that not many studies have explored the correlation between memorising and sight-reading abilities.

This topic is of particular interest to me as I am able to memorise music with ease, but struggle severely with sight-reading. During my early music lessons, I was not taught how to sight-read as my teacher deemed it to be of lesser importance, and so I memorised. Informal conversations with my peers revealed that this lack of tuition in sight-reading techniques seems to be a common occurrence among musicians. Through these informal conversations, it appears as though those who are able to sight-read efficiently have difficulty in memorising music, and those who memorise with ease struggle with sight-reading, however, this cannot be stated conclusively.

1.1.3 Aims of the study

The aim of the study is to conduct a preliminary investigation into the relationship between memorisation and sight-reading through conversations with fellow music students about their self-perceived abilities and acquisition of the two skills. The aim is to explore undergraduate music students' self-reported perceptions of their level and ability to sight-read and memorise music, and subsequently to explore the relationship between the two skills. The study aims to determine to what extent the skills are related or mutually exclusive. Furthermore, through a constructivist grounded theory approach, the research aims to understand how sight-reading and memorisation skills are taught and developed over time and whether advanced ability in one affects the propensity for the other. Lastly, the study seeks to determine whether and in what way the ability to sight-read affects memorisation ability and vice versa.

1.1.4 Research questions

The primary research question is:

How do undergraduate piano students perceive the relationship between memorisation and sight-reading in light of their own experiences?

Secondary research questions:

How are memorisation skills and sight-reading skills acquired?

In what way are memorisation skills and sight-reading skills related?

How do music students develop memorisation and sight-reading skills?

In what way does sight-reading ability affect memorisation ability and vice versa?

1.2. Review of related literature

There is no shortage of literature on memorising and sight-reading music. This is because these skills need to be mastered by aspiring musicians to achieve an accepted level of professional musicianship. In the following sections, I briefly discuss some of the literature pertaining to memorising and sight-reading music, and I discuss the conceptual framework used in this study.

1.2.1 Conceptual framework

The conceptual framework on which my research depends includes the psychological concepts of schema and constructivism. These two concepts explain the individual differences between pianists' sight-reading and memorisation abilities as identified by researchers.

Schemata are defined as overarching bodies of knowledge that are central to our thinking and reasoning (Gilbert 2011:247). This means that our everyday actions are based on our existing schemata that consist of scripts, which provide a specific set of information to serve as guiding principles in certain situations. In sight-reading music, we rely on scripts relating to music such as arpeggios, scales and tonality, amongst other musical principles, to guide us in the execution of the music, a concept also highlighted by Williamson (2014:174).

In terms of memorisation, schemata provide frameworks of meaning into which the contents of the long-term memory are organised (Van Ommen 2011:277). This explains the process of memorisation in which individuals chunk information into meaningful sections – the meanings of which are provided by the pre-existing schemata.

Meaning, according to Jean Piaget, is constructed by an individual's previous experiences through their interactions with the world (Gilbert 2011:249). This theory of constructivism explains that our past experiences shape our frameworks and schemata that organise the new information learnt. This again reiterates that, during sight-reading, individuals rely on previously learnt information about music such as scales, arpeggios and the like, while

constructivism accounts for the meaning given to information organised by schemata and stored in the long-term memory.

According to McVee, Dunsmore and Gavelek (2005) schema theory has existed for almost a hundred years with its first mention traced to Immanuel Kant who in 1784 referred to schemata as structures that organise the world and how we see and interpret it. However, it is Frederic Bartlett's experiments and writings on schemata (1932 and 1995) that are most cited in today's psychology literature. Bartlett's research provides an explanation of schemata as being patterns that extend beyond the "knower" into the social and cultural world, in other words, they are not stationary features of the mind, but functional assets for adaptations between individuals and their interactions with their physical and social surroundings (McVee *et al.* 2005:535). The early conceptions of schemata point to the reciprocal relationship between individuals' knowledge and their cultural practices.

Schema theory paved the way for Piaget's social constructivist theory according to which individuals construct their own knowledge through their social interactions in which they either assimilate information consistent with existing schemata or accommodate schemata to fit the experience (McVee *et al.* 2005:536). Furthermore, Piaget emphasised the importance of sensory-motor schema acquired at a young age – a perspective not investigated or mentioned by Bartlett.

It is interesting to note how the use of schema theories changed over the years to focus solely on its function as organisational unit in the mind, disregarding the cultural aspects thereof (McVee *et al.* 2005:536). In recent literature, researchers often fail to mention that original schema theories were based on the individuals' cultural experiences as well as their existing knowledge. (Beals 1998:18; McVee *et al.* 2005:536).

During the 1970s and 80s schemata were considered to be data frameworks for generic concepts stored in memory to, among others, understand objects, situations and events (McVee *et al.* 2005:536). Schemata were further defined as higher order cognitive functions that give perspective on how an individual's existing knowledge interacts with new knowledge regarding perception, memory, language and thought (McVee *et al.* 2005:537).

Despite the variations of schema theory, none address schema's propensity for accuracy. a study by Yamada and Itsukushima (2013) aimed to prove the opposite: that schema can cause false recollection in individuals. Their study included 32 undergraduate students from the

Nihon University. Prior to the commencement of the study the researchers asked ten participants, who were not part of the experiment, to rate objects and actions on a scale of 1 to 7 – 1 being extremely schema-inconsistent for a kitchen environment and 7 being extremely schema-consistent for a kitchen environment (Yamada & Itsukushima 2013:278). This resulted in 20 schema-consistent objects and actions and ten schema-inconsistent objects and actions being used in the study.

The participants were divided into groups consisting of between one and six people per room who were shown a series of 50 flip slides for one second each, creating the illusion of animation, depicting a man in a kitchen performing ten schema-consistent (expected) actions while ten schema-consistent (expected) objects remained in place in all the slides (Yamada & Itsukushima 2013:278). The participants were instructed to memorise the kitchen scenes carefully in order to complete a memory test afterwards.

Following the flip-slide show, the participants were given two lists, one containing ten expected target actions one would find in a kitchen, ten expected distractor actions and ten inconsistent actions. The second list contained ten expected target objects one would find in a kitchen, ten expected distractor objects and ten inconsistent objects. The participants were told to circle items that appeared in the kitchen scene (target actions and objects) and cross out items that did not appear in the kitchen scene. They were also asked to write an “R” next to items of which they remember specific details (remember judgment), thus one of the expected target actions or objects. They were asked to write a “K” next to objects they were sure were presented in the scene but of which they cannot remember specific details (know judgment) –one of the inconsistent or distractor objects or actions (Yamada & Itsukushima 2013:278).

The results of this study indicate that participants recognised objects and actions that were typical of a kitchen scene but that were not shown. They did not recognise or acknowledge inconsistent distractor actions and objects that were atypical of a kitchen environment. This means that participants recognised actions and objects that are typically found in kitchen settings, whether they were actually seen in the flip slides or not (Yamada & Itsukushima 2013:280). In terms of remember and know judgments, the participants chose schema-consistent distracters more than schema-inconsistent distracters for both object and action. This shows that the participants feel familiarity for schema-consistent distracters due to schematic memory reconstruction (Yamada & Itsukushima 2013:280).

Furthermore, participants recollected objects falsely more often than they did actions. The authors speculate that the reason for this is because participants recall perceptual thoughts and context details for objects more easily than for actions (Yamada & Itsukushima 2013:281). The authors conclude that memory for both actions and objects is reliant on existing schemata, hence participants easily recognised false objects, however, the memories of action targets were accurate enough to prevent false recognition of schema-consistent action distracters. This means that, with the aid of schema, participants are better able to correctly recollect actions than objects (Yamada & Itsukushima 2013:281).

Music depends on the individual performing it, especially in terms of sight-reading and memorisation. By performing music individuals are engaging in actions to make music, thus schemata will allow them to recollect the actions needed correctly according to the findings by Yamada and Itsukushima (2013).

When related to music, schemata for harmony, rhythmic and melodic patterns, tonality, chords and the like make up musicians' general music knowledge. Chaffin, Logan and Begosh (2009) explain that the accuracy found in performances of music can be traced to the fact that music is dependent on multiple constraints, each of which requires its own schema that, when combined, produces a mostly accurate musical performance (Chaffin, Logan & Begosh 2009:354). Here again scripts come into play as each of the schema for music is further organised into scripts of melody, harmony, meter and rhythm, which, combined with continuous performances, ensures an accurate performance. Hodges and Sebald (2011) are of a similar opinion and state that schemata are responsible for enabling an individual to understand the inherent complexity of music (Hodges & Sebald 2011:133).

When memorising a piece of music our schemata influence our interpretation of the piece. If the piece is too easy it might be regarded as frivolous or childish. However, if it is too complex, individuals might be inclined not to like the piece finding it too unpredictable (Levitin 2007:235). However, this is reversed during sight-reading as individuals prefer simpler pieces that can easily be played above overly complex pieces that are exceedingly difficult to sight-read.

Levitin (2007) also touches on the subject of culture in forming schemata. He mentions that Western music is the music in which our schemata have been formed as it includes our implicit knowledge of the scales and tonality normally used (Levitin 2007:116). However, if we were to listen to Pakistani or Hindu music it might sound unnatural to those with

schemata based in Western music and its characteristics. Hence, according to Levitin (2007), Chaffin *et al.* (2009) and Hodges and Sebald (2011), when hearing or seeing music, we must first organise it and interpret it with existing schemata, whether it be culturally influenced or based on general music knowledge. If the schemata are insufficient for comprehension we must accommodate the information by changing our schemata.

According to Green (2010:137) schemata also allow us to use our time efficiently by directing our attention to where it is most needed. In sight-reading, this would entail musicians focusing on big jumps in the music which do not form part of their schemata, while devoting less time to sections in the music that do form part of their schemata. (Levitin 2007:118). Schemata allow us to predict certain outcomes and, as a result, we focus on these instead of wasting time and attention on those we are unable to predict. Thus, schemata enhance the process of understanding information well enough to determine our course of action instead of mulling over information that will not aid us in achieving our goals. In short, schemata aid us in managing our limited mental resources such as attention (Green 2010:137).

Furthermore, Green (2010:142) emphasises the importance of culture and social conditioning used for creating schemata and their application in the social world. This ties in with the constructivist theories of not only Piaget but also Bruner, Dewey and Vygotsky, which include the notion that learning is experiential, interactive, cumulative, contextual and holistic (Wiggins & Espeland 2010:342).

In terms of music memory, constructivism provides reasons why individuals are able to recognise a scale or a chord progression, even though it might be transposed to various different keys (Levitin 2007:138). The constructivist approach explains that memory extracts generalised, invariant information about music, which it stores. This means that, when an individual commits a musical aspect to memory, they memorise the most important aspects (rhythm and structure of a scale) while omitting irrelevant details (such as certain pitches because a scale can occur in any key) (Levitin 2007:136). Similar findings are presented in research by Snyder (2009). This research shows that memory for music is not episodic, as memorised music is recognisable even if pitches are changed, thus it is schematic as certain features of the music are remembered (Snyder 2009:111). The research further mentions that the contour of a melody is far more important to recall than the pitches of the melody (Snyder

2009:112). This is in agreement with Williamson (2014:174) who states that musicians do not memorise music note by note.

Another principle idea of constructivism is the zone of proximal development, a notion coined by Vygotsky. This is the gap between an individual's existing knowledge and a higher level of knowledge that they are aiming to achieve. This can be related to sight-reading, as, the more a musician develops the more difficult the pieces they are able to sight-read (Flohr & Trollinger, 2010).

The participants in this study were requested to describe their experiences, understanding and practices related to memorisation and sight-reading, thus giving insight into their schemata for the skills through the constructivist approach that focuses on each individual's subjective accounts.

1.2.2 Memorising music

The literature on memorisation is varied, discussing aspects such as chunking and incidental memory (Lehmann, Sloboda & Woody 2007), types of memory (Klingenstein (2009)) and retrieval structures (Williamson (2014). Alongside this, authors also discussed memorising using tactile cues and structural bars (Williamson & Egner 2004) and using procedural long-term memory when recalling music (Tan, Pfordresher & Harre 2010). Imreh *et al.* (2002:233) recommend memorising music using the three principles of expert memory, namely encoding new information according to previously established chunks, maintaining a retrieval scheme and practicing the retrieval scheme extensively.

The literature regarding memorisation will be explored and elaborated on in the literature review section of this essay in order to allow readers to understand the vast array of literature on the subject but also to give the reader an idea of memorisation with regards to music and piano.

Memory and memorisation remain a challenging aspect for musicians, as it would appear that relatively few musicians are aware of the concepts and benefits of chunking music when memorising a score. I seldom engage in deliberate, as opposed to incidental, memorisation as I was previously convinced that it was an inborn talent that could not be taught. As the brief discussion of the literature has shown, memorisation is a skill that can be taught and learned with the right combination of tools, tailored to each individual's needs.

1.2.3 Sight-reading music

The ability to sight-read written notation is considered by many to be a basic skill needed in order to become an accomplished musician (Lehmann & McArthur 2002:137). Sight-reading is defined as “The ability to accurately perform or interpret music notation that has not been seen before” (Ely & Rashkin 2005:409). As mentioned previously, there are authors who believe that sight-reading is an inherent ability (Zhukov *et al.* 2016) where others believe that individuals can be trained to sight-read (Klingenstein 2009). Lehmann and McArthur (2002:135) discuss the psychological aspects of sight-reading include perception, kinaesthetics, memory and problem-solving skills. While Zhukov *et al.* (2016:156) believe that there are three main areas one needs to focus on when teaching sight-reading, namely the role of accompaniment or ensemble playing, rhythm training and understanding different musical styles

Brochard, Dufour and Despres (2003) assessed visual perception and imagery abilities in musical and non-musical adults, and Pike and Carter (2010:231) investigated the efficacy of chunking techniques to improve sight-reading skills, similar to the researchers of music memorisation. Many strategies to improve sight-reading, including the use of online media, are available. Shoemaker and Pike (2013) discovered that students who received online video training in addition to their weekly piano lessons had significant improvement in their sight-reading abilities.

Judging by the numerous perspectives on sight-reading and the various approaches to teaching sight-reading, it, like memorisation, is an amalgamation of mental and physical processes, which appear to come naturally to some, while it can be taught to others with the aid of a variety of techniques.

In terms of memorisation, musicians should be taught how to apply chunking techniques, engage in deliberate memorisation as well as regularly practicing the mental imagery of their pieces. Memorisation can also be improved by employing the three aspects of expert memory namely encoding new information according to previously established chunks, maintaining a retrieval scheme and practicing the retrieval scheme extensively. It becomes apparent that memorisation and sight-reading can be taught and trained, and a high level of expertise in both areas can be obtained provided that musicians give an equal amount of dedicated attention to developing each of these skills.

1.3. Research design

This study is qualitative, which is concerned with understanding the social and cultural contexts underlying numerous behavioural patterns, by studying people and interacting with them in their natural environments (Nieuwenhuis 2007(a):51). According to Creswell (2013:48), qualitative research allows the researchers to gain a complex and detailed understanding of a problem that can be written in a literary and flexible style to portray the contexts in which participants are studied.

The research design of this study is the constructivist grounded theory (Creswell 2013:83, 99). Given that there is a paucity of literature about the correlation between the two constructs (memorisation and sight-reading), a grounded theory approach allows me to engage in the data and propose a theory that is generalisable (Creswell 2013:83). The constructivist grounded research approach to the study also allows me to compare the data gathered from participants, not only with each other, but also with the identified categories (Nieuwenhuis 2007(b):78). This approach also allows me to generate a theory based on data from participants who personally experienced the phenomena (Creswell 2013:83). Furthermore, employing the constructivist grounded theory allows me to interview a minimum of 10 participants for my study, in order to explore the phenomenon under question (Creswell 2013:105).

My role as researcher in this study is not objective due to the memorising process associated with grounded theory research. This entails the compiling of memos and noting ideas during data collection and analysis in an attempt to formulate the process as seen by the researcher (Creswell 2013:85).

Through this study I am merely investigating the possibility of a connection between the two by attempting to understand the current status of students' self-reported abilities.

1.3.1 Research methodology

The methodology includes sections explaining the participant criteria, data collection methods and materials as well as explaining how the interviews were conducted and the quality criteria employed.

1.3.1.1 Sampling and participants

The purposeful sampling method was used in this study. A sample of ten undergraduate music students majoring in piano as first instrument at the Department of Music at the

University of Pretoria were invited to take part in the study. Ideally, five participants from each year group would have been included (first to fourth year), however, due to the availability of the students, 3 first year, 4 second year, 1 third year and 2 fourth year students were interviewed. My reason for including solely piano students was to minimise the variable regarding memorisation and sight-reading and non-keyboard instruments.

1.3.1.2 Data collection

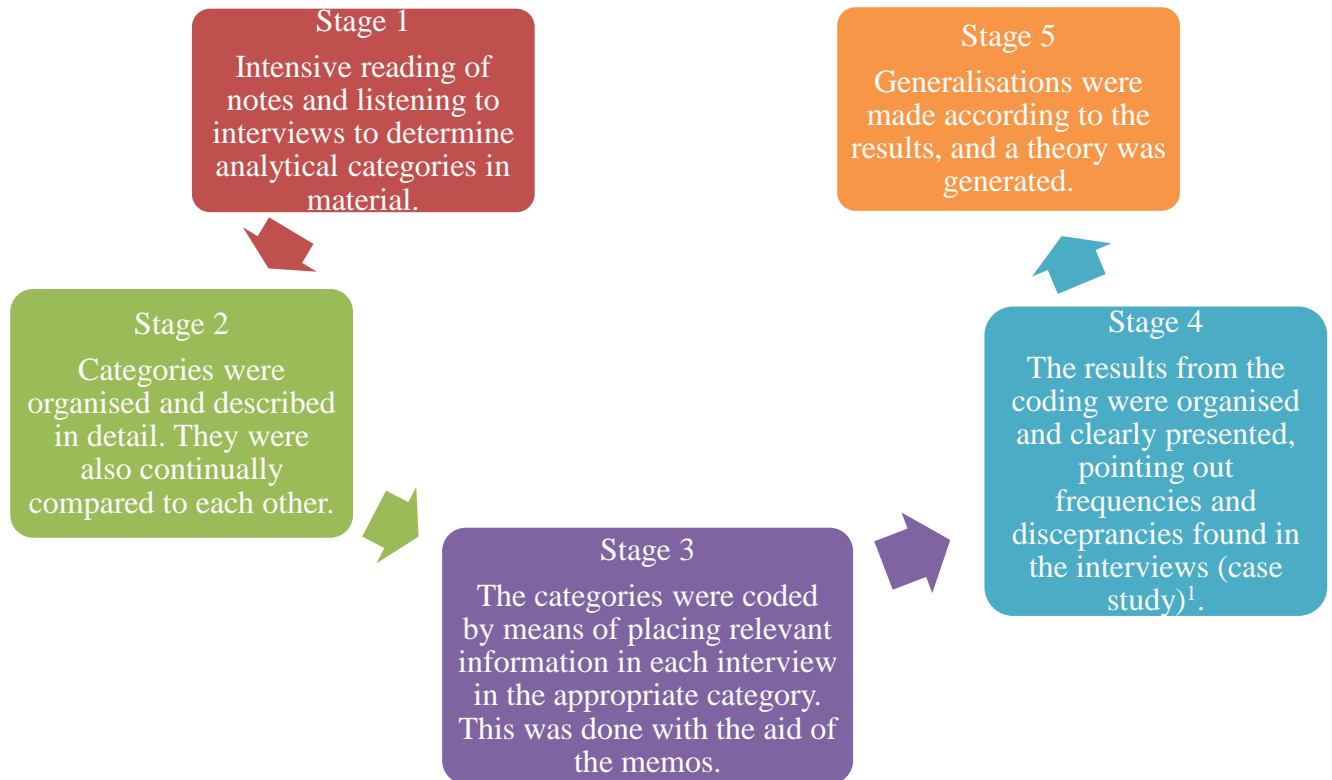
Data were collected through semi-structured interviews. The interviews with participants were conducted face-to-face over a period of a month at an appropriate convenient venue at the Department of Music at the University of Pretoria. The interviews lasted between 30 and 45 minutes and were audio-recorded to ensure accuracy (Nieuwenhuis 2007(b):89). Before the commencement of the interviews the participants were asked for their consent to participate in the study and also for their consent for the interviews to be recorded.

The aim of the interviews was to explore the self-reported abilities of sight-reading and memorisation in music students with piano as first instrument. The interviews focused on the students' own perceptions and experiences, and included a discussion of how these skills were taught and developed over time.

1.3.1.3 Data analysis

Data analysis took place in five stages (Schmidt 2004:254–257; Eaves 2001:658–659).

Diagram 1: Stages of data analysis



During each stage of the process memos were compiled in which the interviews were continually compared to each other across the four year groups in order to note any similarities and/or differences, and to gain an idea of how opinions change during the process of studying music (Eaves 2001:658).

1.3.1.4 Quality criteria: Trustworthiness and validity

Qualitative research, with its predominantly social by nature, is often criticised in terms of the validity and trustworthiness of the data gathered. In order to address trustworthiness, I involved other investigators and peer researchers to assist me with interpreting the data gained from the participants (Roberts 2010:161).

Creswell (2013:251) suggests negative case analysis to report any results that do not fit a category of data, providing a realistic assessment of the studied phenomenon. This was done in an attempt to validate the qualitative research results in order to assess the accuracy of the data collected as described by myself and participants (Creswell 2013:249–250).

1.4. Ethical considerations

The participants were informed of the study, and they understood that their participation was voluntary. They understood that they had the right to withdraw from the study at any stage, without negative consequences. They were also informed that their participation was anonymous and that the results would be safeguarded by the Department of Music at the University of Pretoria for 15 years. Each participant was required to sign an informed consent form, confirming their knowledge of the study and its parameters as mentioned above (Spangenberg, Grohmann, & Sprott 2005).

1.6. Chapter layout

Chapter one serves as an introduction to the study which includes the aims, research questions, research design and a brief literature review. Chapter two is a detailed literature review that explores academic writings on the subjects of memorisation and sight-reading. Chapter three provides a detailed explanation of the methods used for data collection and analysis, as well as the research design used for this study. Chapter four reports the results of the study by reviewing participants' views and by discussing the main categories identified. Chapter five is a discussion of the results and how they relate to existing literature, thus placing the study in context. Chapter six concludes the study and provides a preliminary theory grounded in data as well as outlining the limitations of the study, answering the research questions and providing recommendations for future research.

Chapter 2

Review of related literature

2.1 Introduction

In modern times the ability to memorise and sight-read on an advanced level is almost synonymous with being a good pianist. In most piano syllabi such as the Trinity syllabus (Kemp 2015–2017) and the ABRSM syllabus (n.d.) performers are assessed on their sight-reading abilities as well as their abilities to perform from memory. In contrast to practices of today, most performers before the nineteenth-century were able to sight-read out of necessity and those who memorised music and performed entirely from memory were the pioneers of their time. Many attribute the custom of performing from memory to Franz Liszt, who initially did so to impress his audiences (McBride & Arkatov 2016). However, at the time, such feats of memory were often seen as arrogant and unnecessary (Mishra 2010:2).

This literature review briefly delves into the literature pertaining to sight-reading and memorisation abilities in pianists, how they go about it and what brain mechanism are at play. As separate constructs, memorisation and sight-reading have been thoroughly researched, particularly in the past decade, and some of the most prominent research findings in memorisation and sight-reading are presented in this chapter.

2.2 Memorising music

Williamson (2014) defines memory as the key to understanding our experience of consciousness, learning and sense of identity. She describes memory as the glue that holds us in the present moment, allowing us to reflect on the past and plan for the future (Williamson 2014:173). This is especially true for music where a performer has to hold the present moment together by reflecting on the music that is past and focusing on the music to come.

A dichotomy exists among researchers of musical memory – some believe that it is an inborn talent while others believe that it is a learnt skill. Williamson (2014) believes that memorisation can be taught using the right tools and techniques, whereas Brandfonbrenner (2001:83) believes that it is an innate skill that could be enhanced with training, but that its effectiveness lies with the individual's natural propensity for it. Despite various research attempts, this dichotomy still exists with some researchers exploring musicians' natural ability, while others explore the trainability of memorisation.

2.2.1 Chunking techniques

According to Williamson (2014:174) musicians do not memorise every single note of a composition. Rather, they look at the entire piece and chunk it into meaningful sections by using their previous knowledge of scales, arpeggios, cadences and so on. Following this the musicians can focus on remembering the chunks as one. This notion is substantiated by evidence from a study by Gerling and Dos Santos (2015), which found that students focus more on the relationship between the notes, hoping to establish a pattern rather than memorising every single note.

Noice, Jeffrey, Noice and Chaffin (2008) demonstrate evidence of chunking techniques in their study, which explores the memorisation structures of a jazz pianist and compares them to structures of classical musicians. This study used videotaped and recorded discussions and numerous copies of the annotated music to ascertain how the jazz pianist memorised the given music. During the experiment, the musician was given the music for *Funk in Deep Freeze* by Hank Mobley to memorise for solo performance. This was done over two video recorded sessions ten days apart, the first session having lasted for fifteen minutes and the second session having lasted for 30 minutes (Noice *et al.* 2008:67–68). During these sessions, the musician was encouraged to verbalise his thoughts in order to guide researchers through his process of memorisation (Noice *et al.* 2008:68). The results of this study indicate that the jazz musician's methods for memorising were similar to those employed by classical musicians (Noice *et al.* 2008:68). The jazz musician chunked sections together and did not focus on individual notes; however, like classical musicians, the jazz musician was concerned with understanding the formal and harmonic structure for memorisation purposes (Noice *et al.* 2008:70). Alongside his focus on structure, the jazz musician also focused on performance cues and practising the retrieval of stored information (similar to classical musicians) to ensure that he was prepared for a performance (Noice *et al.* 2008:74). The performance cues and retrieval structures that were memorised allowed the jazz musician to improvise with ease. It is interesting to note that the jazz pianist focused on practicing the retrieval of stored information as it is one of the core aspects musical memory.

Memory retrieval is aided by a good retrieval structure and is usually achieved through practicing structural bars (bars where musicians prefer to start and stop) (Williamson 2014:175). This is also seen when referring to the jazz pianist mentioned above, as, once the music was chunked and the retrieval structures were in place, the musician practiced diligently to enhance the speed of the recall. By doing this he activated the implicit memory

system, moving the memorised piece from high-attention to low-attention memory processing, allowing him to focus on the finer musical aspects rather than on note accuracy (Williamson 2014:176).

The activity of chunking music into meaningful sections is also discussed by Lehmann, Sloboda and Woody (2007:112) who mention that the ability to make sense of information depends on previous knowledge. This previous knowledge is dependent on procedural (how) or declarative (what) information. Chunking is further aided by the regular and often predictive structure of music and is defined by Lehmann *et al.* (2007:112) as “a mechanism that links current perception to previously stored knowledge”. Snyder (2009) also discusses this link between memorising and previously stored knowledge, stating the importance of scales, arpeggios and tonality on which musicians rely during memorisation activities.

2.2.2 Types of memory

Alongside the theories of chunking music are the theories that propose that memory can be divided into different sections depending on the specific functions of these sections. Some of these memory sections include incidental and deliberate memory, and aural, visual, kinaesthetic and tactile memories. These memory sections are often used by musicians who are taught to rely on hand positions, visual and tactile patterns, musical analysis and metaphorical associations when memorising (Lehmann *et al.* 2007:119).

Lehmann *et al.* (2007:118) make an important distinction between two variations of musical memory i.e. incidental memory that occurs as a by-product of practising and deliberate memory that takes great effort to establish. The first type of memory is called “forward changing” and is a result of a musician continually practicing music, creating interconnected, consecutive chunks. This type of memorisation could be detrimental in performance situations as the musician’s anxiety could possibly break down the connection between the chunks. This results in a memory lapse as the next chunks, which are dependent on the previous chunks, are then not be retrieved (this is especially common in young performers).

In contrast, deliberate memorisation requires a complete, holistic engagement with the music by writing down parts, analysing them away from the instrument, starting in different places or singing one voice while playing another (pianists) Lehmann *et al.* (2007:117). By doing this, the information is chunked and can be seen in as a structure in the mind’s eye. The advantages of this type of memorisation is that performers can jump from one meaningful place (structured bar) to another, should they encounter a problem like a memory lapse. Yet,

despite the proven efficacy of deliberate memorisation, it is surprising to encounter individuals who rely solely on incidental memory achieved through constant repetition.

Lastly, Lehmann *et al.* (2007:118) state that experienced performers learn to create a clear mental image of the piece that depends on tactile cues. This brings to light the various sensory aspects of the brain, in particular, kinaesthetic memory. This is also highlighted by Klingenstein (2009:167) who believes that reliable memorisation is a combination of analytic, tactile, aural and visual memories working together. This can be done by studying the piece thoroughly before playing (analytic), remembering the fingering of the piece as you play it (tactile), hearing the music before you play (experiencing strong aural cues) and lastly seeing the score in your mind while you play (Klingenstein 2009:168–169).

Klingenstein (2009:167) also differentiates between two types of mechanisms employed by musicians. These mechanisms are memorisation and remembering. Klingenstein (2009:167) explains that students who constantly repeat music are able to remember the music superficially and thus often suffer from memory losses. She further goes on to explain that students can eliminate the problem of “forgetting music” if they actively engage with the music when memorising (Klingenstein (2009:167)).

In her historical study of literature about memorisation pedagogy, Mishra (2010) discusses the types of memory identified by Klingenstein namely aural, visual, analytic and kinaesthetic memories. In her study, Mishra (2010) analysed 185 articles published between 1872 and 2006. Her analysis shows that most authors did not discuss methods of improving visual or aural memory; however, some authors did mention activities generally considered as aural memory—such as hearing the music in your head before you play it—that they did not necessarily classify as aural memory (Mishra 2010:10). The majority of authors focused on developing kinaesthetic memory in pianists, especially since they believe that memory instability often arises from an overreliance on kinaesthetic memory through repetition of movements.

According to Mishra (2010:11), most author focus on analytical memory. Analytic memory pertains to the cognitive interpretation and understanding of a musical piece through focusing on its structure and patterns. This is often done by studying the score, without playing the music, and identifying patterns and structural bars. Using analytic memory to commit a piece of music to memory is considered by most to be an effective way to ensure a deeper understanding of the music.

Overall, Mishra (2010) shows that very few authors encouraged a holistic approach to memorising in which all of the above-mentioned types of memory are employed. Alongside the focus on kinaesthetic and analytic memories the articles analysed by Mishra suggest various techniques for memorising music such as practicing a piece very slowly, separating elements to practice individually, focusing on expressive cues and even playing the piece backwards.

Tan, Pfordresher and Harre (2010:200) propose a different memory aspect employed by performing musicians (pianists in particular) namely procedural long-term memory. This means that the information they need for the performance is stored for a lengthy amount of time before being recalled. The procedural aspect of the memory refers to the motor actions involved in playing an instrument. Most individuals are not aware of the information stored concerning procedural memory. An example of this might be typing on a computer; it might be more difficult to remember which finger is used for the “s” key than it is typing the word “slip.” However, when playing the piano, it is more important that one remembers your fingers on the keys than to remember the individual notes they play. This is the same for musicians who do not focus on every individual note but rather on their fingering of the notes, an issue identified by Gerling and Dos Santos (2015:17) as the topography of a piano

Tan *et al.* (2010:201) further explain that procedural long-term memory does not imply conscious awareness, that is to say, when pianists play notes on the piano, they might not necessarily be identifying them whilst playing. On the contrary, procedural memories are not consciously accessible; however, this does not mean that they are in any way easier or less complex memories than explicit memories. Tan *et al.* (2010) further state that, in music, it is exceedingly important for pianists to commit music to memory and for the unconscious to let them to focus on other factors such as expressivity (Tan *et al.* 2010:202).

2.2.3 Mental practice

Among factors, such as previous experience and chunking ability that influence the memorisation of music, are the two types of mental practice involved in learning an unfamiliar piece, namely auditory and motor practice. Highben and Palmer (2004) explored this avenue of memorisation by monitoring sixteen adult pianists who performed unknown music during ten practice trials – either with or without auditory feedback. This experiment consisted of three test conditions, the first being the “normal” condition in which pianists performed the piece they had previously practiced from memory with auditory feedback from

headphones they were wearing, thus they were able to hear themselves (Highben & Palmer 2004:4). In the “motor only” condition, the participants were able to see their fingers as they played, however, they were not able to hear what they were playing. In the “auditory only” condition the pianists were required to hold their hands in loose fists while a recording of the piece was played back to them. During the “covert” condition the pianists sat with their hands in loose fists and heard silence for the duration of one piece.

At the start of each condition, the pianists had to practice a one-measure piece of music ten times and then had to perform it without the notation three times. During the conditions, the notation was removed and they were told to imagine the notation during the normal condition. During the “motor only” condition, they were told to imagine what it would sound like. The instructions for the “auditory only” condition were that the pianists had to imagine what the piece would feel like and during the “covert” condition they were told to imagine what it would sound like and how it would feel (Highben & Palmer 2004:4).

Following the memory conditions, the imagery post-tests were administered to the pianists. The motor imagery test required that the pianists memorise pictorial sequences of finger movements and later perform these on a keyboard without auditory feedback. The auditory imagery test necessitated that the pianists listen to short auditory sequences while perusing the notated music. After each of these post-tests, their answers were recorded on an answer sheet. Furthermore, the pianists were asked to rate their memorisation, sight-reading and playing-by-ear skills on a ten-point Likert scale (1 – poor, 10 – excellent) (Highben & Palmer 2004:4).

The results of this study indicate that motor and auditory practice aided musicians’ memorised performance of unfamiliar music; however, removal of either motor or auditory feedback caused notable shortcomings in memory during later performances (Highben & Palmer 2004:6). The condition that yielded the highest recall accuracy was the physical condition with both auditory and motor feedback present, whereas the covert condition yielded the worst results in terms of recall accuracy (Highben & Palmer 2004:7). Further results indicate that pianists with apt aural abilities were least affected by the absence of auditory feedback. The authors interpreted these findings to imply that existing aural abilities significantly affect and aid memorisation of unfamiliar music. These findings indicate that more emphasis should be placed on individuals’ aural training abilities to aid their memorisation process.

Klingenstein (2009:167) agrees by stating that mental practice, alongside physical practice, is often prescribed to students hoping to perform without notated music, as mental practice is reliant on existing aural abilities. However, the study by Bernardi, Schories, Jabusch, Colombo, and Alternmüller (2009) contradicts this theory despite its favourable recommendation by music teachers. Bernardi *et al.* (2009) embarked on a research endeavour in which they explored mental practice – a complex network of strategies for improving musical performance without physically performing at the instrument (Bernardi *et al.* 2009:20). In their study sixteen pianists were asked to memorise two pieces of approximately equal length and difficulty. One was to be memorised through physical practice, while the other was to be memorised through purely mental practice. During the mental practice portion of the experiment, the participants were permitted to listen to a MIDI (Musical Instrument Digital Interface) version of the piece repeatedly for as long as they wished. In addition to this, they were also allowed to write on the score and move their fingers, whereas the physical practice sessions required of the pianists to ignore any mental images they might have and not to engage in any formal analysis of the piece (Bernardi *et al.* 2009:21).

The chosen pieces were the first halves of Domenico Scarlatti's *Sonata in A* and *Sonata in C*, which was divided among the participants so that some would memorise the A major sonata through mental practice while the other half memorised the C major sonata through mental practice (Bernardi *et al.* 2009:21). The sessions for both mental and physical practice lasted 30 minutes. the participants were not asked to memorise the piece, they were simply informed that they would have to perform the piece without sheet music after the 30-minute practice sessions (Bernardi *et al.* 2009:22).

Following the practice sessions, the pianists were asked to perform the pieces twice from memory. These performance sessions were recorded and the best performance of the two was used for research purposes. During both practice conditions, participants were asked to complete a short questionnaire regarding the mental strategies they were using. This questionnaire included questions assessing the pianists' use of strategies such as “mentally hearing the sound of notes”, “mentally feeling the movement of fingers/hands”, “mentally visualizing the movements of fingers/hands”, “mentally visualizing the score”, “harmonic, rhythmic and melodic analysis of the piece” (Bernardi *et al.* 2009:22).

After the performance the pianists were given another, questionnaire similar to the one they encountered during the practice session to determine the mental strategies used during the

performance. Furthermore, short interviews were conducted with the participants after the performances to determine which strategies they used during the practice sessions and how extensively the piece had been formally analysed. Lastly, the participants were given an auditory imagery test in which they were shown a melody after which a melody was played. The participants had to identify discrepancies, if any, between the written and played music. The participants were also given standardised questionnaires to account for individual differences in mental imagery (Bernardi *et al.* 2009:22).

Results indicate that mental practice was not as effective as physical practice, despite the ample amount of time given to the pianists to memorise the music. As suspected by the authors, the efficacy of mental practice is directly proportional to the pianist's familiarity with the basic mental operations and to their aural skills; the more advanced a pianist's aural training the better they performed in the mental practice sessions (Bernardi *et al.* 2009:24; Higben & Palmer 2004:7). Furthermore, mental practice combined with physical practice produced poorer results than pure physical practice. However, overall the authors, Bernardi *et al.* (2009), conclude that mental practice, though not as effective as physical practice, is still a valuable tool for pianists with time limitations as it allows for practice anywhere, anytime without a piano. The authors advise that mental practice should be used in conjunction with physical practice to achieve optimal results (Bernardi *et al.* 2009: 25).

2.2.4 Memorising using performance cues

Gerling and Dos Santos (2015) are of the opinion that a pianist's method of memorisation is strongly dependent on the structure and interpretive performance cues of a piece of music. Their study consisted of two phases and included nine undergraduate music students from the Brazilian Federal University. The first phase of the experiment required of the participants to choose and review a piece they had previously performed and memorised. The students were given a period of two weeks to review their piece, during which time semi-structured interviews were conducted with them. The aim of the interviews was to determine their memorisation strategies by focusing on their thoughts about the piece, their ability to start at any point in a piece, the style, tempo and their memorisation failures (Gerling & Dos Santos 2015:5).

The second phase of the experiment entailed the training of the pianists in the performance cue protocol by Roger Chaffin, using text and materials translated into Portuguese. The protocol allows performers to monitor their performance and make appropriate adjustments

by using performance cues that represent important categories in the music (Gerling & Dos Santos 2015:3). These categories include technical aspects, such as fingering and posture; structural cues, such as cadence points and formal structure; interpretive cues, such as dynamics; and lastly, expressive cues, such as atmosphere and images experienced by the performer. The participants were then asked to apply the performance cue protocol while memorising a new piece that formed part of their university curriculum. They were allowed ten weeks in which to memorise the new piece and were encouraged to use as many copies of the music as they wished (Gerling & Dos Santos 2015:5). Following the ten weeks, the participants were asked to record their memorised performances and to submit the scores that they used during the memorisation. After their performances, the participants were asked to mark their performance cues on a clean score. Lastly, the participants were subjected to semi-structured interviews focusing on how they perceived the role of performance cue identification, the types of performance cues employed, the use of other cues and the placement of the performance cues during memorisation (Gerling & Dos Santos 2015:6).

The results of the first phase of the experiment show that the participants focused on the harmonic context as well as structural elements, such as the beginnings and endings of sections. Despite the lack of verbal descriptions of note-by-note memorisation, the authors do not conclude that the participants engaged in this type of memorisation. Relevantly, the participants made no mention of using interpretive resources, such as dynamics, articulation or phrase structure during their memorisation process (Gerling & Dos Santos 2015:14).

The results of phase two of the experiment indicate that the most utilised performance cue protocol used by the participants was interpretive resources. According to statements by the participants, they were eager to explore this previously unexplored performance cue method (Gerling & Dos Santos 2015:15). The performance cues utilised were strongly influenced by the nature and style of the piece, implicating explicit memory, which is linked to the intentional expression of a piece's stylistic structure (Gerling & Dos Santos 2015:16).

The use of performance cues when memorising is also mentioned by Mishra (2010:12) who analysed. Mishra (2010) concluded that pianists should identify landmarks in the music and start from various points in the music. This is done by paying attention to phrase structure and musically important or difficult sections (structural bars) (Williamson 2014:174). These landmarks would then serve as reference points should the performer's memory fail during performances. This is also an example of the deliberate memory (Lehman *et al.* 2007:117).

Mishra (2010:13) concludes that, despite the focus on landmarks and structural bars, performers should always keep the continuity of the piece in mind in order to deliver a satisfactory performance.

2.2.5 Context dependent memory

Memory can be influenced by many variables, one of which is context. Backlin and Mishra (2007) explored the effect of the environmental and instrumental contexts on the performance of memorised music. This research included three experiments, all with different variables. In the first experiment, the participants were ten undergraduate music students of which four were vocalists, three were pianists and three instrumentalists. The participants were required to memorise a sixteen-bar exercise from the *Watkins-Farnum Performance Scale*; the exercise was adapted to suit both instrumentalists and vocalists who had to sing on *solfege* syllables (Backlin & Mishra 2007:457). Each of the participants was randomly assigned to one of two learning contexts and one of two recall contexts. The contexts used in this experiment were an auditorium lobby (A) and a conference room (B); these contexts were deliberately chosen as they were highly atypical of standard performance contexts. Participants either learned and recalled in the same context (AA and BB) or learned in one and performed in another (AB and BA) using any memorisation techniques they wished with no time limit to their memorisation (Backlin & Mishra 2007:458).

The judges focused on melodic and rhythmic accuracy during the performances (Backlin & Mishra 2007:459) and the results for the first experiment show that memory was drastically affected when the performance environment and learning environment were changed, altering between a lobby and conference room. Furthermore, musicians recalled the same amount of music in the conference room regardless of the learning context and the worst performances were from musicians who learned and recalled in the auditorium lobby.

The second experiment included 20 woodwind players, 26 brass players and 14 string players (Backlin & Mishra 2007:406). The participants were required to memorise a 36-bar exercise from the *Farnum String Scale*. The exercise was more difficult than that in the first experiment, however, due to their similarity it was easily adapted to woodwind and brass instruments (Backlin & Mishra 2007:461).

The procedure for the second experiment involved three contexts typically encountered by music students during their studies and performances. The contexts were a practice room in a university music department (A), a professor's studio/office (B) and an auditorium stage (C).

For this experiment, participants learned in the practice room and recalled either in the same practice room (AA), in the professor's studio/office (AB) or on the auditorium stage (AC). The performances were judged according to bars with a point awarded for rhythmic accuracy and one for pitch accuracy (Backlin & Mishra 2007:462).

The authors found that memory was not significantly altered in experiment 2 where the contexts were those generally encountered by undergraduate music students (Backlin & Mishra 2007:463). An insignificant decrease in recall by those who performed on the auditorium stage was noted. This means that contexts with which musicians are familiar have no adverse effects on their ability to recall memorised music.

The final experiment was based on a definition of context that included an instrument. This experiment included 32 first and second year piano students (Backlin & Mishra 2007:463). The participants were required to memorise a sixteen-bar piano piece which was specifically composed for this experiment by one of the researchers. The context used for this experiment was a Steinway and Sons grand piano (A) and a Kawai upright studio piano (B). Both pianos were located in a professor's studio/office. The participants had to learn the piece either on the Steinway or the Kawai and were required to recall on either the same piano (AA and BB) or a different piano (AB and BA) (Backlin & Mishra 2007:463).

The performances were judged based on rhythmic and pitch accuracy in each bar. The results of this experiment show that the pianists who memorised and performed music on the same piano had much better recall abilities than those for whom the pianos were not consistent (Backlin & Mishra 2007:464). In summary, the results of this study show that memory is context dependent. Recall for music is most adversely affected when the context changes, especially when the contexts are highly atypical of music performances, such as a lobby or conference room. However, recall is not as severely affected when the contexts are typical of those encountered by music students. Backlin and Mishra (2007:464) also found that the piano on which the students learn and recall significantly affects their recall abilities. When students are learning a piece they usually do so on an upright piano, however, when they perform it is done on a baby grand or grand piano. This change in piano often disorients the students as the sound, look and feel of the two pianos are different. Thus, it could be suggested to universities that pianos in the practice rooms should be the same as the pianos on which the students should perform for exams and recitals.

2.2.6 Memory, psychological and physical tension

Moving away from context dependent memory, Wan (2008:32) discusses memory for music and its strong relationship with learning, stating that learning is the acquisition of knowledge whereas memory is the expression of what has been acquired. She emphasises the interconnectedness of technical movement, understanding and memorisation of music by explaining that music memorisation becomes easier once a performer has secured the technical movements of the piece and developed an in-depth understanding of the music. Wan (2008:33), like Klingenstein (2009:167), also mentions the various types of sensory memory connected to music memorisation: aural, visual and kinaesthetic, specifically mentioning analytic memory.

Furthermore, Wan (2008:42) points to evidence suggesting that memory for music is adversely affected by physiological and psychological stress. In order for encoding and retrieval to be effective, an individual's emotional and physical state should not be under any severe stress as this inhibits memory functions. The author suggests that the amygdala could play an important part as it is only responsible for emotional reactions but also for learning and memory, similar to the hippocampus. This implies that a negative psychological state can deter memory functions as seen by sufferers of anxiety or depression who struggle with attention and concentration tasks (Wan 2008:43).

During periods of intense stress the body releases hormones to allow the individual to cope with the stress by increasing their alertness, however, prolonged exposure to high intensity stress situations negatively affects memorisation abilities (Wan 2008:43). Wan suggests numerous methods for decreasing psychological and physical tension and for optimising memorisation for music. Her techniques for musical memory improvement include memorising the music in various ways, such as visually and aurally, as well as employing "depth processing" during memorisation. That is focusing on the aesthetic and expressive aspect of a piece in addition to the theoretical information (Wan 2008:69). The author also suggests alternative techniques to aid a musician with committing a musical piece to mind. These include playing with one's eyes closed, to properly feel the piano keys under one's fingers, altering the tempo of the piece and playing the piece very softly before going to bed as this will encourage subconscious rehearsal while asleep (Wan 2008:76–77).

Wan (2008) concludes that pianists should focus on managing their stress as effectively as possible to avoid negative outcomes during performances. Some of the techniques mentioned

for handling stress are various therapies and memorisation strategies. The author also emphasises the importance of not eliminating all stress as it might be equally detrimental to a pianist who suffers from high levels of tension and stress (Wan 2008:81). A balance of tension and stress should be achieved through careful monitoring to achieve optimal results. McBride and Arkatov (2016) agree by saying that individuals normally produce good performances when they are nervous, yet in control. It is when nervous energy becomes too much to manage that memory lapses generally occur. McBride and Arkatov (2016) further state that there are two types of nervousness, the first which stems from not knowing the piece entirely from memory, and the second which stems from a passage that the performer is insecure about.

Mishra (2010) briefly mentions anxiety or stress as a reason for memory lapses; however, the authors she investigated attributed this stress/anxiety to the unfamiliar spaces in which they perform and not to psychological problems or problems with physical tension as mentioned by Wan (2008).

2.2.7 Summary

In summary, there are numerous theories regarding the memorisation of music by pianists. Authors such as Williamson (2014), Lehman *et al.* (2007) and Chaffin *et al.* (2009) describe chunking techniques employed by pianists who group important sections together instead of memorising music by rote. Klingenstein (2009) describes the different types of memory often employed by pianists such as visual (seeing the music), aural (hearing the music), kinaesthetic (physically playing the music) and analytic (identifying significant patterns and structure of the music). Tan *et al.* (2010) focus on procedural long-term memory in which important musical aspects are stored but are not available to access consciously.

The literature also shows effective techniques employed when memorising music, such as those described by Gerling and Dos Santos (2015) in which they taught students about performance cues and how to use them in order to memorise music more effectively. Especially focusing on directing pianists' attention to expressive cues proved to be an aid to their memorisation, which, despite being an unexplored avenue of memorisation, provides a welcome alternative to memorisation that is solely dependent on harmonic and formal structures.

Backlin and Mishra (2007) have a different approach to memorisation, focusing on the effect of context on memorisation. Their results show that context, especially highly unfamiliar

contexts, adversely affect a performance from memory, while a change of instrument also adversely affects memory of music.

Lastly, psychological and physical tensions also have adverse effects on memorisation of music. Wan (2008), one of the few authors to recognise the effects of psychological and physical tension on memorisation, concludes that too much tension negatively affects memorisation. However, she also states the importance of not eliminating all tension, but rather of balancing out the tension as not all tension is necessarily bad for one's performance.

Music memory is a complex phenomenon that, despite its thorough research, does not provide uniform results. There are numerous types of memory that can be employed by musicians, with equally as many external factors influencing memory and its success during performances. An aspect of music memory not explored in detail in this literature review is that of the teachers and how they influence the memorisation in their students, if they do so at all. The question remains, do teachers train their students how to memorise music or not? If they do, how effective is their training?

2.3. Sight-reading music

In the eighteenth and nineteenth centuries, it was the norm for performers to perform at first sight instead of performing after copious amounts of time spent rehearsing. The reason for this being that the performers were familiar with most musical ideas at the time; the music was only performed a couple of times and composers were fearful of plagiarism by orchestras (Lehmann & McArthur 2002:136). Although the norm is that recitals are played from memory, professional musicianship still entails above average sight-reading skills. This is confirmed by the requirements stipulated by the Associated Board of the Royal Schools of Music. Despite the focus on memorised performances, emphasis is still placed on the sight-reading skills of musicians (Holmes n.d.)

Lehmann and McArthur (2002:136) claim that most Western musicians underestimate the gap between each person's level of rehearsed performance and their ability to perform completely from sight. This means that most musicians assume that an individual who is a good performer is automatically a good sight-reader. Contrary to this, Kenneth Saxon (2009:23) believes that the ability to sight-read is dependent on the performer being trained to read notes far ahead of those being played, while Zhukov, Viney, Tenniswood-Harvey, Riddle and Fujimura (2016:155) believe that sight-reading it is an inborn talent.

2.3.1 Sub skills of sight-reading

Despite varying opinions, most authors agree that numerous factors influence an individual's propensity for sight-reading. Lehmann and McArthur (2002:138) as well as Pike (2012:24) refer to these factors as "subskills of sight-reading" which include perceptual skills, kinaesthetic skills, recall, memory and problem solving.

Perceptual skills refer to visual tasks and eye-movement when sight-reading. In general, expert sight-readers scan the page more efficiently than novice sight-readers. They require fewer fixations, as they grasp more information in one fixation. They read further ahead in the music and focus less on individual notes (Lehmann & McArthur 2002:139). Saxon (2009:23) adds that good-sight readers do not look at the keyboard very often, keeping their eyes on the page. He goes on to say that expert sight-readers read intervals instead of individual notes and mentions their chunking behaviour when looking at music.

Kinaesthetic skills involve the physical act of playing piano while sight-reading. Expert pianists do not look at their hands when sight-reading or keep the glances at their hands to a minimum (Lehmann & McArthur 2002:140), as they have good spatial orientation and/or good fingering techniques (Saxon 2009:24). Recall and memory during sight-reading might seem contradictory; however, repeatedly reading a piece will improve its overall performance. The music score is still necessary for the performance as the entire piece is not memorised, but important aspects such as fingering and repeated material is remembered and consequently the piece is learnt with ease (Lehmann & McArthur 2002:141).

Zhukov *et al.* (2016:156) believe that teachers need to focus on three main areas when teaching sight-reading, namely the role of accompaniment or ensemble playing, rhythm training and understanding different musical styles. Their study included 40 advanced piano students, ten each per university lecturer from four universities in Australia. The material was mailed to the university lecturers involved in the study. Two lecturers chose to work through the materials during individual lessons with the students while the other two chose to present the material in small group classes (Zhukov *et al.* 2016:155). The sight-reading material was combined into one resource to be used over a period of ten weeks. Each week included rhythm training, solo repertoire and duet playing. The chosen pieces were from a wide variety of styles and keys. The reason for this was to address various issues faced by sight-readers and to allow the students to fully engage with as much music as possible (Zhukov *et al.* 2016:158). The content was easy enough to be learned after only a few practice sessions

instead of weeks spent practicing the pieces. The rhythm section consisted of scales and arpeggios in varied rhythmic patterns to allow the participants to focus on the rhythm and not the accuracy of notes. As the weeks progressed, the rhythmic patterns became increasingly more complex. The solo and duet repertoire were chosen based on the rhythmic exercises of the week. The aim of the duet repertoire was to allow the participants to play alongside another pianist and to improve their own flow during performances as duet playing forced them not to stop during their performance. The solo section consisted of short pieces from the Baroque, Classical, Romantic and twentieth-century periods to encourage analytical understanding of the periods as well as practical experience of the characteristics of each style (Zhukov *et al.* 2016:159). Furthermore, the solo repertoire included explanatory notes on the style and characteristics of the piece, focusing on its structure and harmonies. Overall, the materials included 40 solo repertoire pieces and fourteen duets (Zhukov *et al.* 2016:159). The participants were tested before the start of the experiment and were again tested after their ten weeks of training. Each participant was given a minute to peruse the chosen pieces after which they had to perform it on a keyboard with weighted piano keys, playing with a metronome beating out loud to a moderate tempo (Zhukov *et al.* 2016:160). The performances were analysed using custom-made software, which provided two scores for pitch accuracy and two scores for rhythmic accuracy. The results of this study indicated that participants' sight-reading abilities improved significantly after being trained in the curriculum that combined rhythmic, ensemble training and style analysis (Zhukov *et al.* 2016:165).

Results of a previous study undertaken by Zhukov (2014) alone show that participants who received training on only one of these parameters (rhythm) did not improve by the same margin as those who received the combined training curriculum. Conclusively, a holistic training approach is the most effective technique to employ when learning how to sight-read or improving one's sight-reading.

2.3.2 Factors influencing sight-reading abilities

Mishra (2013:462) investigated changing factors that influence sight-reading in musicians as they age. Her study was conducted to determine whether related constructs were in any way associated to sight-reading skills. During her research, she investigated 92 studies with topics pertaining to sight-reading and its correlations to numerous other variables, namely technical ability and music aptitude. Mishra (2013:455) included articles from published and unpublished research, dissertations and theses in her research. She used the search terms

“sight-reading, sight singing, sight playing” and variables of thereof to locate the articles. The articles were restricted to those containing content pertaining to sight-reading and its correlation to another consistently measured variable. A further requirement for inclusion was that the studies used sight-reading as a performance measurement. The 92 studies analysed for this research were concluded of a period of 85 years – from 1925 to 2010. The majority of the articles were unpublished. The items were encoded according to the type of publication, the participant’s level of experience, the type of sight-reading test and the mode of sight-reading. The variables or constructs that Mishra (2013) identified that were correlated to sight-reading are: music aptitude, music study, music knowledge, academic achievement, ear-training ability, perception, psychomotor skills, sight-reading ability, personality, practice, technical ability, age, attitude, early exposure, memorisation and improvisation (Mishra 2013:457). The results revealed that constructs that are closely related to sight-reading ability include improvisation skills, music knowledge, ear-training and technical ability, whereas stable characteristics such as IQ, personality and music aptitude were not strongly correlated with sight-reading ability (Mishra 2013:460). This implies that sight-reading abilities can be trained and improved by practicing improvisation skills, participating in ear-training tests and expanding one’s musical knowledge. Thus, the development of a performer’s musicality and their sight-reading abilities are directly proportional to each other. Mishra (2013:463) further states that sight-reading is an important factor to consider when judging a younger musician’s musical aptitude, but it becomes a moot point after the musician ages or reaches a certain level of playing.

Continuing with factors that influence sight-reading ability, Brochard, Dufour and Despres (2003) investigated visual perception and imagery abilities in musical and non-musical adults. Their study consisted of two experiments, the first experiment included 20 participants of which ten were music students with at least eight years of musical training and experience in sight-reading, performing and practicing. The other ten participants were psychology students with no previous experience in music (Brochard *et al.* 2003:104). The method for the first experiment tested the visuospatial abilities of non-musicians versus musicians using a perceptual and mental imagery test by testing the reaction time of the participants who had to report on which side of a line a dot was flashed. In the vertical test, the dot was placed either above or below a horizontal line; in the horizontal test, the dot was placed either on the left or on the right of a vertical line. This was done through two experimental conditions namely “line on” and “line off”. In the “line on” condition, the line was shown on a screen and

remained there while the dot flashed. In the “line off” condition the line did not remain on the screen when the dot flashed, however, participants were asked to keep a mental image of the line in their head to determine where, in relation to the line, the dot flashed (Brochard *et al.* 2003:104). The experiment lasted about half an hour with approximately 240 trials per participant. Their reaction times were measured from the onset of the dot on the screen. The results indicated that detection on a vertical axis was more difficult than detection on a horizontal axis. The results further study showed that musicians outperformed non-musicians in all conditions, having faster reaction times than the non-musicians (Brochard *et al.* 2013:105).

The second experiment by Brochard *et al.*'s (2013:106) included 24 participants, none of whom were part of the first experiment. The participants included twelve musicians and twelve non-musicians. This experiment was based on the findings of the first experiment. Musicians have shorter reaction times to visual stimuli as compared to non-musicians. This is due to the musicians' continuous practice on a musical instrument, converting visual information into motor movements as done in sight-reading. During the second experiment, the participants were tested on their simple reaction times by pressing a key as soon as they detected a dot on the screen in front of them. Their choice reaction times were tested in a colour discrimination task where they had to press one of two keys depending on the corresponding red or green dot on the screen (Brochard *et al.* 2013:106). The results of the second experiment showed that, as in the first experiment, musicians outperformed non-musicians by having faster reaction times (Brochard *et al.* 2013:107). Furthermore, the difference in reaction times between musicians and non-musicians was much more pronounced in the choice decision condition than in the simple detection condition.

Overall, the results show that musicians have better visuospatial perception and imagery than non-musicians. Judging by shortened reaction times for musicians, the authors conclude that musicians are quicker at associating visual stimuli with a specific motor response than non-musicians (Brochard *et al.* 2003:107). This could possibly be due to the sight-reading aspect of musicians' careers in which they read the music on the score and play it on the piano. Brochard *et al.* (2003) state that their study did not include musicians who were not able to sight-read well; however, this study shows that musicians' sight-reading abilities could be enhanced by improving their visuospatial perception.

Other factors that influence sight-reading ability were studied by Kopiez and In Lee (2006) who investigated different variables related to sight-reading and how these either gain or lose significance depending on the complexity of sight-reading stimuli. Their study included 52 graduates and postgraduates majoring in piano from the Hanover University of Drama and Music. The sight-reading stimuli used for the experiment were gained from the University of South Africa exam syllabus which had the advantage of being pre-examined and arranged into levels of increasing complexity (Kopiez & In Lee 2006:100). For the purpose of acclimatising participants to laboratory environments and the experiments, two warm-up exercises were chosen alongside which five pieces of increasing complexity were also chosen. The “pre-recorded pacing melody paradigm” was used in this study. This means that the melody line of a solo instrument was pre-recorded and played to the pianists participating in the study. The pianists then played the accompaniment of the piece to the pre-recorded melody line (Ericsson & Lehmann 1993:182). In the study by Kopiez and In Lee (2006:101) the melody was pre-recorded by a violinist who was synchronised to a metronome through headphones. The piano participants were allotted 60 seconds to peruse the music without playing before they were given two full bars of clicks, after which they started playing. The pianists heard the solo instrument through loudspeakers while their sight-read performance was captured with a MIDI keyboard (Kopiez & In Lee 2006:102).

In addition to this, the pianists’ cognitive abilities were tested. All in all, 23 identified skills were divided into three categories, namely: general cognitive skills, elementary cognitive skills and practice related skills. These skills were analysed to determine their relationship to the pianists’ sight-reading abilities. The results show that advanced sight-reading abilities can be attributed to a pianist’s speed of processing information, psychomotor speed and sight-reading expertise (Kopiez & In Lee 2006:117). The results also indicated a close relationship between sight-reading ability, inner-hearing, pianistic expertise and short-term memory. Furthermore, the authors conclude that a good sight-reader will automatically be able to play from memory, play by ear, improvise and be a good performer (Kopiez & In Lee 2006:117).

2.3.3 Sight-reading ability and chunking techniques

Zhukov (2014:487) embarked on a study to investigate advanced students’ sight-reading abilities and how important the students regarding sight-reading to be. Her study included 74 participants between the ages of 15 and 25. 46 of the participants were from three Australian universities, 20 were from three Australian high schools and eight were from private studios

(Zhukov 2014:490). In order to ensure a homogenous sample, all 74 participants had achieved a grade eight level of playing.

The participants were randomly placed in either one of the three experimental groups or the control group. The experimental groups each focused on a specific area of sight-reading such as accompanying, rhythm training and style training while the control group received no added input (Zhukov 2014:490). Before the study the participants were asked to complete a background questionnaire in which they were to rate their sight-reading abilities on a scale of 1 to 5 (5 being excellent) and to rate the importance of sight-reading, also on a 1 to 5 scale. Furthermore, participants' sight-reading was tested before and after the ten-week experiment. On completion of the ten-week training, the participants were interviewed to determine their prior sight-reading experience and the experience they had of sight-reading during the experiment. The interviews were coded according to the number and type of sight-reading strategies mentioned by the participants. The results were categorised according to pitch (key signature, clef, tonality/modality and accidentals), rhythm (time signature, rhythm, counting), structure (melody, scanning for difficulties, structure/patterns, harmony/chords), motor skills (visualising playing/fingering, shadow playing, separate hands, speed/tempo) and expression (mood/dynamics, style/title, listening to recordings) (Zhukov 2014:491). The results of this study show that many of the advanced piano students had poor sight-reading abilities, while all of the students deemed sight-reading to be one of the most important aspects of instrumental playing (Zhukov 2014:495). Additionally, a large number of participants did not regularly engage in sight-reading or accompanying activities despite being advanced pianists. The authors also found that there was no standard approach to teaching sight-reading. The approaches to sight-reading as described by the participants painted an ad hoc picture about the acquisition of sight-reading skills in students. Despite the literature available on sight-reading highlighting the importance of structure and stylistic elements, the majority of the students and their teachers focus on rhythmic and pitch elements (Zhukov 2014:495). Zhukov (2014:496) conclusively focuses on the importance of a holistic approach to sight-reading by students and teachers alike.

Pike and Carter (2010:231) also encourage a holistic approach to sight-reading in their study, which investigated the efficacy of chunking techniques to improve sight-reading skills, similar to the researchers of music memorisation. In their experiment, undergraduate piano students were trained to use chunking techniques when sight-reading music. This study included 43 beginner piano students enrolled at a university in the southern United States of

America. The participants were divided into three groups – one control group (A) consisting of 15 participants, and two experimental groups (B with 13 participants and C with 15 participants) (Pike & Carter 2010:232).

Before the start of the experiment participants were tested on their sight-reading abilities to ensure that they were all at the same level of sight-reading. The material they were given for the pre-test consisted of three, eight-measure pieces from *Alfred's group piano for adults, Book 1, Teacher's edition* (Pike & Carter 2010:233). The participants received sight-reading training in groups during the last ten-minutes of their class – the typical amount of time spent on sight-reading. The experiment lasted over a period of three weeks with the participants receiving a total of 60 minutes of sight-reading training and working through twelve sight-reading examples (Pike & Carter 2010:233). For each participant group the music was displayed on a screen in the front of the classroom, alongside which all of the participants were given a copy of the music that was created on the program, *Finale*. The control group was presented with the music and instructed to play through the music several times hand separately, after which they were instructed to play hands together (Pike & Carter 2010:236). Rhythmic, harmonic or pitch patterns were not pointed out to the participants and the observer did not note any of the participants tapping the beat or practicing block chords. During the final group performance, a MIDI track was played in the background to encourage rhythmic continuity. The first experimental group (B) were led through a series of one to four rhythmic drills that they had to tap before the sight-reading exercise (Pike & Carter 2010:236). Following the tapping of the rhythm with both hands, the music was presented and the rhythmic patterns (chunks) were highlighted. Students were then given a personal copy of the music and instructed to play through it hands together. During this initial play-through many made mistakes, struggling with the pitch added to the rhythm. At the end of the session, the students had to play through the music with a MIDI track playing in the background.

The second experimental group (C) followed the same procedure as group B, however, their focus was on pitch patterns found in the sight-reading examples (Pike & Carter 2010:236). The participants were encouraged to see waltz-style or Alberti bass accompaniment as chords, alongside which the melodic lines were practised without embellishments. All of these were practiced in numerous keys as would be experienced in the sight-reading examples. When the music was presented on the screen, the chunks and patterns they had just

practiced were highlighted. During their allotted practice time, some participants practiced using block chords, while other practiced hands separately, none tapped the rhythm.

After the training period, the participants were administered a post-test which also consisted of three, eight measure sight-reading examples. However, the level was more difficult as compared to the pre-test examples (Pike & Carter 2010:236). Data were collected through video recordings and in-person field observations as well as through surveys completed by the participants concerning their attitudes to and experiences of the training (Pike & Carter 2010:237).

The results of this study indicate that students who received training in chunking techniques (Group B and C) performed better on sight-reading tasks than those who did not receive the training (A) (Pike & Carter 2010:240). The group that showed the most improvement was group C who practiced the block chords and pitch patterns in numerous keys (Pike & Carter 2010:241). Both groups B and C improved significantly in terms of their rhythm accuracy and continuity, despite the fact that only group B received rhythm training (Pike & Carter 2010:243).

2.3.4 Alternative methods to improve sight-reading

There are many strategies available to improve sight-reading, including the use of online media. Shoemaker and Pike (2013) discovered that students who received online video training in addition to their weekly piano lessons displayed significant improvement in their sight-reading abilities. The aim of this study was to investigate and compare the acquisition of sight-reading skills. This was done through two experimental groups consisting of beginner piano students, all under the age of eighteen (Shoemaker & Pike 2013:149). The students were divided into an experimental group that received training in sight-reading through live online video instruction and a control group that received sight-reading training through traditional face-to-face instruction (Shoemaker & Pike 2013:147). The control group consisted of nine students, while the experimental group consisted of ten students.

Both groups attended a weekly sight-reading session of fifteen minutes. The control group met individually with instructors for their sight-reading training, as is common in traditional circumstances when students begin their training on an instrument (Shoemaker & Pike 2013:150). The experimental group received training through live video interactions with an instructor. All of the students in the experimental group met in the same location using the same equipment for their individual online training sessions. The students received

instruction for an eight-week period and all of the students received the same course material, regardless of instruction medium (Shoemaker & Pike 2013:151). Alongside the instruction, all of the students were given explicit instructions by the researchers on how to sight-read; the instructions included scanning, clapping and shadowing an excerpt before sight-reading it.

The process of scanning allowed the students to attain a visual image of the sight-reading excerpt in front of them in order for them to see what lies ahead in terms of key, time signature and range. The clapping segment of the approach gave them the opportunity to establish the rhythm as situated in a steady pulse, as they had to count out loud either metrically or syllabically (ta-ta-ti-ti-ta) while clapping. The last instruction required of the students to imagine their fingers on the piano or keyboard as they played the sight-reading piece (Shoemaker & Pike 2013:152).

The results indicate that the students who received the online sight-reading lessons engaged more with their teacher and the material than those who received traditional face-to-face instruction. In addition to this, the students who received online sight-reading instruction also showed signs of increased independence, self-directed learning and increased integration and scaffolding of musical concepts (Shoemaker & Pike 2013:159). This appears to be a viable option to consider when teaching sight-reading as it only requires of the students to spend fifteen minutes online with the program. Shoemaker and Pike (2013) did not identify a reason to explain why online instruction provided better results. However, it might be because children in today's world are much more accustomed to computers and online activities than they are to face-to-face instruction. Online instruction also gives children a certain independence that face-to-face instruction does not.

The Suzuki method presents an alternative method to learning an instrument and also to sight-reading music (Lo 1993:27). According to Lo (1993) sight-reading in the Suzuki method is deferred until the student has mastered the technical aspect of playing an instrument and is able to focus on the printed page while playing. The method used before the child is taught to read relies heavily on parental involvement. The parents are given recordings of the piece in Volume 1 which they are to play to their child on a regular basis. Following this the children are to observe lessons where other children play the piece in order to motivate them to play the pieces and mimic what they see (Lo 1993:33). Students only

learn to read upon completion of Volume 1 of the Suzuki method when they are able to play the pieces flawlessly (Lo 1993:28).

Prior to reading, the students are taught note names, clefs, time signatures and note values through games played with the teacher. These games include using large flash cards on which the musical alphabet is printed. The teachers require of the students to arrange the cards in various ways to show certain chord patterns or scales (Lo 1993:52). Following this staves and clefs are introduced and the children are required to place large buttons with the note names on the various lines and spaces of the staves (Lo 1993:53). As the lessons progress the note names are replaced with notes.

Mills and Mills (1973:158) elaborate on the reading methods taught in the Suzuki method. According to them, reading is taught in three different stages. The first stage involves developing a vocabulary to use when speaking to the student. This means that the teacher starts using simple terms to explain the music. These terms could include up, down, step or skip. Foreign language can also be introduced and used in a way that the learner will understand such as using the term *Dolce* after saying how sweet the passage was (Mills & Mills 1973:164). Stage 1 also includes rhythm and movement. Students play a rhythm on one or two notes while counting the notes they play. After this they are taught to say and play the note values i.e. saying quarter while playing quarter notes. Following this, the students are taught that each finger has a number. This is done by numerous games played on and off the instrument to ensure that the student is completely sure of which finger is which (Mills & Mills 1973:178). When the students have mastered this, they are able to associate notes with the numbers and learn specific patterns. With the teacher's help, they learn and discover that they can make words associated with chords from the note names they have learnt. An example of this would be an F major seven chord, which has the notes F-A-C-E.

The second stage of reading also involves games with flash cards in which the students need to react as quickly and accurately as possible to a note shown on a flash card. The students are also taught about the staff and the relationship between the notes on the staff (intervals) and the importance of the clefs (Mills & Mills 1973:184). These methods are taught through numerous games in which the students look at the music from Volume 1 and identify passages that look the same. They also write in the numbers of the fingers they use and then read the numbers, following the music while listening to a recording and identifying certain aspects in the music. They also learn to play musical volleyball in which one team starts a

piece and the other team continues it (Mills & Mills 1973:186–187). Other games involve the teacher playing notes and the children moving accordingly on a music stave placed on the floor.

The last stage of the Suzuki reading methods involves teaching the student to read fluently and accurately. As with previous stages this is achieved through games that encourage self-discovery. By discussing the piece to be sight-read with the student, pointing out the distances between the notes, the density of the notes and the fact that the student should constantly adjust his/her eye speed, children are encouraged to play the music as fluently as possible (Mills & Mills 1973:194). Further methods to increase fluency include allowing the student to play with others when sight-reading (as this will force them to continue despite mistakes), copying excerpts of their favourite songs in a note book and using rhymes for key signatures, sharps and flats (Mills & Mills 1973:196). Overall, the Suzuki method, as applied to sight-reading, is very focused on the student's self-discovery. This is done by providing many different games and techniques for teaching to ensure that the student fully understands a concept and enjoys learning.

2.3.5 Sight-reading and working memory capacity

Working memory is defined as “a limited capacity system that temporarily holds and processes information” (Passer *et al.* 2009:336) and has been found to be correlated with good sight-reading ability. Meinz and Hambrick (2010) are of the opinion that working memory capacity, rather than deliberate practice, is accountable for individual differences in piano sight-reading skills. Their study included 57 participants under the age of 50 (Meinz & Hambrick 2010:915). The procedure of this experiment involved three hours of testing per participant starting with questionnaires and interviews regarding the participant's previous piano experience, such as number of hours spent practicing, number of years receiving instruction, when their teachers changed and so forth (Meinz & Hambrick 2010:915).

Following this, the participants took part in a sight-reading test consisting of three pieces of low, medium and high difficulty. They were allowed to view each piece for 60 seconds after which they had to perform it without stopping or correcting mistakes. Following this, they were given another 60 seconds to review the piece and subsequently perform it again. The pieces were performed in the order from low to high difficulty. The pieces were recorded and evaluated in terms of overall performance, technical proficiency and musicality, by judges who did not see the participants (Meinz & Hambrick 2010:916). After the sight-reading task, the participants were given four tasks consisting of a decision and a memory component in

order to test working memory. The participants were required to give yes or no answers in a variety of tasks. They were also required to remember these answers and write them down after three of six pairs of components were completed (Meinz & Hambrick 2010:916). The answers were moderated and each correct answer (decision and memory) were awarded 1 point. The results of this study show that deliberate practice and working memory are positively correlated to sight-reading abilities. This means that pianists who have a better or more developed working memory capacity will be more adept at sight-reading (Meinz & Hambrick 2010:917). Meinz and Hambrick (2010) also speculate that the role of the working memory capacity during sight-reading activities could determine the extent to which pianists look ahead in a score and prepare for upcoming keystrokes. They go as far as to claim that working memory capacity could inhibit a pianist's professional career if it is underdeveloped, despite the fact that it accounted for only 7,4% of variance where deliberate practice accounted for 45,1% of the variance (Meinz & Hambrick 2010:917).

Altenmüller, Fahle and Rosemann (2016) conducted a study exploring the influence of practice, playing tempo, complexity and cognitive skills on the eye-hand span in pianists during sight-reading. Eye-hand span is the "separation between eye position and hand position when sight-reading music" (Altenmüller *et al.* 2016: 658) Their study included nine participants. Having light eyes was a prerequisite in order for the eye-tracking apparatus to work efficiently (Altenmüller *et al.* 2016:661).

The participants performed the accompaniment score of J.S. Bach's Flute Sonata in E minor, *Adagio ma non troppo*, a piece which was unknown to all of the participants. The sheet music consisted of two pages with 30 measures showing the flute melody and the piano accompaniment. The flute part was recorded by Fahle. During the experiment, the pianists had to accompany the flute, which served as a timer to avoid a timing difference. Before the first flute note, a metronome provided the time for one bar, after which the pianists had to start. The eye movements of the pianists were tracked with an eye movement tracking system and the music performance was recorded by a MIDI keyboard which relayed the input to a connected computer (Altenmüller *et al.* 2016:661). The experiment consisted of four trials. In the first trial the pianists were required to start playing after the first bar of metronome beats without having seen or studied the music previously (Altenmüller *et al.* 2016:661). The second trial allowed the participants to practice the piece for 30 minutes and perform it at three different tempi starting with the original tempo. The third and fourth trials required of the participants to play the piece 20% faster or 20% slower than the original tempo. Half of

the participants started with the fast tempo while the other half started with the slow tempo. The performances and the eye movements were recorded for all four trials and participants were always able to hear what they were playing (Altermüller *et al.* 2016:662).

The aim of the trials was to assess the influence of practice, temporal changes and different levels of structural difficulties on the length of eye-hand span of pianists who had to perform a piece at sight (Altermüller *et al.* 2016:665). The results indicate that there was no significant difference in eye-hand span of pianists after a 30-minute rehearsal. With regard to tempo, the results show that eye-hand span delay was reduced with a faster playing tempo and increased with a slower playing tempo (Altermüller *et al.* 2016:669). This means that, the faster the tempo of the sight-read music the quicker the pianists' reactions to the sheet music. With regard to working memory capacity, Altermüller *et al.* (2016:671) found similar results as Mainz and Hambrick (2010:917) that a more developed working memory capacity positively affects eye-hand span reactions and sight-reading specifically.

2.3.6 Summary

In summary, Pike (2012), Lehmann and McArthur (2002) identified numerous “subskills of sight-reading” such as perceptual skills, kinaesthetic skills, recall, memory and problem-solving that influence the overall standard of an individual's sight-reading ability. Efficacy in all of the above skills is generally indicative of an individual with good sight-reading abilities. Contrary to this, Zhukov (2014) believes that there are three main areas in which a performer needs to be proficient in order to be adept at sight-reading. These areas are accompaniment and/or ensemble playing, rhythm training and understanding of different musical styles. From this it becomes evident that each musician needs his or her own hierarchy of skills in order to sight-read music efficiently.

Mishra (2013) systematically explored factors that influence sight-reading ability and found that they include improvisation skills, music knowledge, ear-training and technical ability. Brochard, Dufour and Depres (2003), on the other hand, are of the opinion that visuospatial perception and imagery abilities are the key factors in determining a musician's aptitude for sight-reading. These somewhat contradictory findings make it difficult to pinpoint specific skills needed for an advanced level of sight-reading ability. However, it should be noted that these studies did not strongly account for individual differences in terms of gender and age.

Zhukov (2014) focused her attention on sight-reading abilities in advanced piano students and found that many of them were poor sight-readers who were not taught sight-reading and

consistently abstained from practicing sight-reading. Her study showed that the majority of the participants indicated that they deemed sight-reading to be one of the important aspects of professional musicianship, despite the majority of them being inept at sight-reading. Related to this is chunking techniques and their effect on sight-reading, which was explored by Pike and Carter (2010). They found that students who were taught how to chunk music into manageable bits performed better on sight-reading tasks than those who were not.

In contrast to most authors mentioned in this study, Shoemaker and Pike (2013) explored a new method of teaching sight-reading to young musicians, namely online sight-reading training. Their methods were compared to “traditional” methods of sight-reading pedagogy and it was found that online sight-reading training proved more effective than traditional training. Students who received training online showed more independence and self-directed learning than those who received training through traditional teaching methods. Another alternative method for teaching sight-reading is outlined in the Suzuki method, as explained by Mills and Mills (1973), which focuses on self-directed discoveries made by the students through games and ensemble playing.

Alongside alternative teaching methods, Mainz and Hambrick (2010) explored the effect of working memory capacity and its role in sight-reading. Their study concluded that pianists with a well-developed working memory capacity are better able to sight-read than those whose working memory capacity is underdeveloped. This finding is supported by results of Alternmüller *et al.* (2016) who explored the length of eye-hand span movement in pianists while sight-reading.

The studies mentioned here bring about questions of individual differences and sight-reading as well as methods utilised by teachers to teach sight-reading. The question: “Do educators teach sight-reading” also arises from the research as it is not always taught in practical lessons, yet proficiency in sight-reading is often expected from pianists and piano students

2.4 Conclusion

The literature review has shown that various factors underlie an individual’s propensity for respectively memorising and sight-reading music. However, they do overlap in terms of chunking, which is mentioned by authors regarding both memorisation (Williamson 2014) and sight-reading (Zhukov 2014). Another overlap is in terms of kinaesthetic experience, problem-solving abilities and aural training. Authors claim that pianists who have well

developed aural skills are better able to memorise (Klingenstein 2009) and sight-read (Mishra 2013).

Sight-reading and memorisation also overlap in terms of teaching methods, or rather lack thereof. There are no standardised methods for teaching memorisation or sight-reading as can be seen from the various techniques suggested by different authors. This is also true in my personal experience, as some of my piano teachers emphasised sight-reading skills while others emphasised memorisation skills, none of whom taught me skills to achieve either with unfailing success. Some teachers emphasise the importance of memorisation and sight-reading, while others believe that it is the student's own responsibility to develop the skills in these areas.

The literature has also shown that most musicians deem memorisation and sight-reading as core skills needed by professional musicians in order to achieve some measure of success. This is also seen in numerous syllabi for performing pianists that consider both memorised performances and fluent sight-reading to be of equal importance (Holmes n.d.; Kemp 2015-2017).

Based on the extensive literature review it can be deduced that there is a link between memorisation and sight-reading; however, it appears there is a gap in the literature regarding qualitative studies explicitly exploring the relationship between memorisation and sight-reading abilities in pianists.

Chapter 3

Methodology

3.1 Introduction

In Chapter 2, I discuss literature relevant to memorisation and sight-reading in pianists. Chapter 3 provides an outline of the research approach, research design and research method, which includes sampling and participants, the construction of the interview schedule and the procedures followed. The chapter also includes a detailed explanation of the data analysis method, the quality criteria and the ethical considerations employed in this study. Chapter 3 serves to explain grounded theory methodology and its suitability for the current study.

3.2 Research approach

This research employs a qualitative approach that explores students' self-reported perceptions on their ability to memorise and sight-read music. Qualitative research is concerned with understanding the social and cultural contexts underlying numerous behavioural patterns by studying people and interacting with them in their natural environments (Niewenhuis 2007(a):51). This is done in order to gain a complex and detailed understanding of the research problem, namely memorisation and sight-reading by undergraduate students, presented in a literary and flexible style to portray the context in which the participants are studied (Cresswell 2013:48).

My decision to pursue a qualitative research design is supported by Hartley (1994) who states that qualitative research is not concerned with the distributions of features in totalities, but rather with determining what is typical of the object under investigation, thereby increasing its likelihood of transferability to other, similar objects. Similarly, this study serves to determine what is typical of undergraduate music students when dealing with memorisation and sight-reading, with the aim of procuring data that can be transferred to other, similar situations and participants.

3.3 Research design

The research design of this study is constructivist grounded theory. Grounded theory is defined by Nieuwenhuis (2007(b):77) as "a method that aims to produce a theory that is grounded in data that is methodically collected and analysed". Charmaz (2012:6) differentiates between two types of grounded theory, namely objectivist and constructivist grounded theory. Objectivist grounded theory, which uses comparative methods, embarks on

the research without consulting prior theory and disciplinary knowledge, while constructivist grounded theory uses a comparative method to enhance awareness of issues that might arise from the research, but still aim to find new interpretations through their data and analysis.

Constructivist grounded theory allowed me to engage in conversations with potential participants or other individuals with knowledge about music regarding the relationship between sight-reading and memorisation of music, before the formal data gathering commenced. Furthermore, a constructivist grounded theory approach provided the opportunity to investigate the data and propose a theory that is generalisable to other, similar situations (Creswell 2013:83). In terms of data collection techniques, constructivist grounded theory employs data collection methods such as social interaction with participants as well as semi-structured interviews and participant observations (Nieuwenhuis 2007(b):78) . DeVos (2011:319) extends this definition to include that data is collected through interviews with participants who are familiar with the processes related to the phenomena in question, which, in this study, are memorisation and sight-reading. The above-mentioned methods of social interaction with participants, semi-structured interviews, participant observations and using participants who are familiar phenomenon are used in the current study to explore the participants' self reported abilities and beliefs regarding this phenomenon.

Constructivist grounded theory is described by Charmaz (2008:402) as, firstly, constructionist grounded theory which assumes multiple realities that are constructed in reaction to specific environments. It involves research that stems from interaction between the researcher and the participants and it takes into account the “positionality” of both researcher and participants (Charmaz 2008:402). Lastly, constructionist grounded theory states that the researcher and participants are all constructors of the reality and thus the data is borne from the research instead of being an object of it. Hallberg (2009:146) further extends this description of grounded theory by stating that constructivist grounded theory is a rational approach to research I that it assumes that meaning affects action and vice versa. She further states that the data analysis is a reflection of the researcher's interpretative understanding of the participants' responses rather than the researcher's explanation of the participants' responses. Hallberg (2009:146) ends by saying that constructivist grounded theory seldom reaches a theory as it is closer to being a narrative divided into categories that is told by the researcher conveying his/her understanding of the social processes.

My decision to employ a constructivist grounded theory approach was further supported by authors Lawrence and Tar (2013:31) who advocate the use of grounded theory for studies in which a researcher is confronted with copious amounts of unstructured or semi-structured qualitative data. Furthermore, this method allows me to analyse the data according to the three steps identified by Strauss and Corbin (1990), namely: presenting the raw data as the participants told it, creating a descriptive interpretation of the data through the use of field notes and memos and lastly to generate and create a theory based on in-depth interpretations and abstractions (Strauss & Corbin 1990:419–420).

Lastly, constructivist grounded theory assumes multiple realities, mutual construction of data and that the researcher constructs categorisations (Charmaz 2012:464). This allows me to compare the data gathered from participants not only with each other, but also with the categories in accordance with the ‘fundamentally comparative method’ of grounded theory (Strauss & Glaser 1967). This also allows me to identify the categories based on my interpretation and understanding of the data. This method is explained by Strauss and Corbin (1990:419) who state that concepts relating to a similar phenomenon must be grouped together in categories, as is characteristic of grounded theory research.

Through this study, I attempt to explore the undergraduate piano students’ self-reported ability and connection between sight-reading and memorisation by. It is an interpretative approach in an attempt to gain insight into these constructs, with the aim of providing a new perspective on the phenomena. In this study, I focus on the *what is* aspect of the research rather than on the *how* aspect; hence, a qualitative study is important at this stage to provide a platform for further research that would explore the phenomena quantitatively. Qualitative research can be used to explain the mechanisms of quantitative research or to develop theories where incomplete theories exist (Creswell 2013:48), as done in this research endeavour.

3.4 Research methodology

The methodology includes sections explaining the participant criteria, data collection methods and materials as well as explaining how the interviews were conducted and the quality criteria employed.

3.4.1 Sampling and participants

Kumar (2014:244) describes judgemental or purposive sampling in which the participants are chosen based on the opinion of the researcher of who might offer the best possible

information for the study in order to develop something about which there is a paucity of information, such as the correlation between sight-reading and memorisation abilities. Nieuwenhuis (2007(b):79) describes this as “criterion sampling” whereby the researcher identifies certain criteria that the participants should meet in order to be included in the study.

A purposeful sampling method is used in this study. Strauss and Corbin (1990:420) state that a grounded theory researcher selects participants based on a phenomenon he or she is studying. Based on this, a sample of 10 undergraduate music students, majoring in piano as first instrument at the Department of Music at the University of Pretoria were invited to take part in the study. The participants were chosen based on their availability and willingness to be interviewed. Overall, the study included 3 first year, 4 second year, 1 third year and 2 fourth year students. Of these participants, four were females. My reason for including piano students only was to minimise the variables regarding memorisation and sight-reading and non-keyboard instruments. Furthermore, piano students do not have a verbal aspect to memorise alongside the music, as in the case with vocalists.

3.4.2 Construction of the interview schedule

Semi-structured interviews were chosen for this research endeavour as they allow for probing and clarification questions, while also allowing the researcher to identify new categories that emerge from participant answers (Nieuwenhuis 2007(b):87). The interview schedule (see Appendix A) consists of numerous types of questions. The first type included experience/behaviour questions, such as ‘Tell me about your ability to memorise music’. This question served to obtain an account of the participants’ self-perceived assessment of their abilities for memorisation and sight-reading. The second type was opinion/value questions, such as ‘What do you think is the most important aspect for a performing musician?’ This question was asked to gain an understanding of the participants’ opinion of memorisation and sight-reading in the context of performing musicianship. Lastly, sensory questions such as ‘Why do you think your ability to sight-read or memorise well affects your ability to memorise or sight-read?’ This was asked to gauge the participants’ experiences of their abilities and whether they thought that a possible connection existed between the two skills.

The schedule was necessary to give the interviews direction in order to avoid them becoming general discussions. However, the interviews were flexible enough to allow for some discussion of relevant topics that eventually led to important aspects regarding memorisation and sight-reading, mentioned by the participants.

3.4.3 Research design and procedure

Data were collected through semi-structured interviews. The semi-structured interviews were conducted face-to-face with participants during the period 5 September to 18 October 2016. During the interviews, the participants were asked the open-ended interview questions mentioned previously. The first six participants were interviewed in a discussion room in the library at the Department of Music at the University of Pretoria. The last four participants were interviewed at various locations around Pretoria. During all of the interviews, the participants and I faced each other, sitting across a table on which the recording device was placed. The interviews lasted between 15 and 30 minutes and were audio-recorded to ensure accuracy. During the interviews, I made supplementary notes and asked additional questions to obtain more focused answers from the participants.

The recordings were done on a Samsung Galaxy S5 cell phone, capable of operating in conversation mode thus activating both of its speakers to eliminate unnecessary, interfering noises. The recordings from the cell phone were transferred to a laptop. During the transcription process, I used headphones to listen to the recordings in order to ensure accuracy and clarity.

The aim of the interviews was to explore the self-reported abilities of sight-reading and memorisation by undergraduate music students with piano as first instrument. The interviews focused on the students' own perceptions and experiences, and also included a discussion of how these skills were taught and developed over time. Furthermore, the interviews explored participants' personal strengths as pianists and how they and their teachers viewed memorisation and sight-reading in terms of a hierarchy of skills needed by performers. Participants were also asked whether they found certain music genres easier to memorise and/or sight-read and how they perceived their performances. Lastly, participants were asked whether they played any other instruments and how they assessed their abilities to sight-read and memorise music for that instrument.

According to Kumar (2014:176–177) the advantages of interviews are that they allow the researcher the freedom to decide the format, content and order of the questions. Interviews also give the researcher the option of being flexible or inflexible (unstructured or structured). I took note of the disadvantages of one-on-one interviews as identified by Creswell (2013) and Nieuwenhuis (2007), which include encountering shy participants who are uncomfortable speaking freely or participants that are easily side-tracked. Creswell (2013:164) emphasises

the importance of the ability of the researcher to be a good listener rather than an overpowering conversationalist, as the purpose of an interview is to remain focused on the participants and their ideas, not on the researcher.

During the interviews, numerous other topics related to piano playing were discussed in order to gain background or identifying information about memorisation and sight-reading. This was done in an effort to obtain as much information as possible about memorisation and sight-reading by engaging with the participants in a discussion. Many of the participants mentioned important aspects regarding memorisation and sight-reading during these discussions. Schmidt (2004:255) comments that aspects introduced by the researcher are frequently only taken up later in explicit form or else they turn up again in response to a different question in an entirely different context.

3.4.4 Data analysis

Data analysis took place in the five stages proposed by Schmidt (2004:254–257) and Eaves (2001:658–659). The first stage was the transcription of interviews, the second was the coding of the data, the third was categorisation of the data, the fourth was organisation and presentation of data and the fifth was drawing conclusions and generating a theory based on the data. During each stage of the process the researcher wrote copious memos. The notes were used to continually compare the interviews across the four year groups to note any similarities and/or differences that arose as well as to gain an idea of how opinions changed during the participants' years of studying music (Eaves 2001:658). This method is also described by Cresswell (2013:85) as a “process that has movement over time”. That is to say it is a linear process in which memos and ideas are continually recorded as the data from the interviews are analysed.

Stage 1: Transcription of interviews

The interviews were transcribed verbatim by the researcher to eliminate researcher's bias (Nieuwenhuis 2007(b):104) into a table consisting of three columns, one for reflective notes, one for the raw data and one for codes. During this stage of the research, the interviews were each played back repeatedly, section by section, to ensure the accuracy of the transcriptions. Following this, the interviews were played back again to add reflective notes to the transcription. The interviews were each transcribed within a week of their occurrence.

Stage 2: Coding of raw data

In the first cycle of coding *in vivo* coding was used (Saldana 2013:83). This means that the data was coded according to short phrases and terms used by the participants themselves (Saldana 2013:91). According to Charmaz (2006) *in vivo* codes can provide an accurate estimation of whether the researcher has grasped what is significant to the participant and to help crystallise and condense meanings. *In vivo* codes also allow the researcher to understand the theories personally formulated by the participants being interviewed (Bohm 2004:271). After numerous readings of the interview data the *in vivo* codes were identified and recorded in the right-hand column of the table. The interviews were re-read at least three times each to ensure that the codes were not created by the researcher in her own search for theoretical assumptions by reducing the analysis to find sections in the data that can be used as proof. Lastly, to ensure further accuracy, the data were set aside for a month, after which it was re-analysed and coded to ensure the same codes were identified.

Advantages of *in vivo* coding include its versatility in terms of being able to function well in conjunction with other methods of coding. Furthermore, it is a good coding method for beginner researchers, it uses the terms created by the participants (and not by academics) and which are flexible in terms of how often they are applied in the data, that is, in every line or in every fifth line of data (Saldana 2013:93).

Stage 3: Categorisation of data

After initial coding, categories were identified in the data. The categories were identified by noting issues within each case and then finding reoccurring themes that transcend the cases (Creswell 2013:101). In this study, the multiple cases chosen were first transcribed using verbatim transcriptions alongside reflective notes to identify themes in each case (within-case analysis) after which the themes across cases were analysed (cross-case analysis) (Creswell 2013:101). The initial codes were sorted and relabelled into specific categories in accordance with the methods specified by Saldana (2013:218) for axial coding. Axial coding allows for more than one category to be developed and it allows categories to be related to subcategories as well as delineating the aspects and dimensions of each category (Charmaz 2006). The properties and dimensions identified refer to aspects such as context, conditions, interactions, and consequences. Furthermore, axial coding is a method suited to studies with a variety of data forms but also to studies with a grounded theory or elements of a grounded theory approach.

During the coding process, diagrams and tables were used to sort and organise the codes as well as relate ideas and concepts to categories, which is typical of axial coding. Furthermore, as researcher I was continuously busy with memo writing which, according to Charmaz (2012: 465), is the “crucial stage of analysis between coding and writing sections of the first draft of the study”. Through memo writing I was able to identify gaps and unanswered questions in the data, highlight and clarify comparisons, raise and discuss assumptions, and give form and structure to ideas as well as create clear links to categories.

Stage 4: Organisation and presentation of data

Mays and Pope (1995:112) state that “the problem with presenting qualitative analyses objectively is the sheer volume of data customarily available and the relatively greater difficulty faced by the researcher in summarising qualitative data”. In order to address this problem, I used the memos written during the previous stage to organise the data in categories and subcategories using a table with quotes from the raw data to substantiate these categories. The data were discussed at length, highlighting the frequencies and discrepancies. During this stage, data from participants were compared but also with the categories (in accordance with accepted procedures for constructivist grounded theory). The organisation of the data served to summarise the amount of data as accurately as possible without using quantitative methods. Furthermore, the data were organised and used depending on the correlation to the research questions and how well the data served to answer these questions.

Discrepancies in the data were highlighted and data deemed unnecessary by the researcher were excluded. Data excluded mostly contained information that was irrelevant to the research questions and the study. Some data, though unnecessary, helped the participants to reach certain conclusions regarding memorisation and sight-reading.

Two interviews were conducted in Afrikaans on the participants’ requests, and one interview was conducted in English and Afrikaans. Important quotes used from these interviews were translated into English and sent back to the participants for checking in order to ensure that the meaning of the interview section or quote was correctly portrayed and understood by the researcher. This also served to eliminate researcher bias and ensure credibility.

Stage 5: Conclusion and theory

The data were recorded and analysed to determine whether the research questions were answered. Conclusions drawn from the data are presented in Chapter 4. Following this analysis, the data were used to generate a theory that could be applied to undergraduate music

students in other countries. This was done by placing the data in the theoretical framework to tie this research to an existing theory that can be applied where the same theory is used in a different context (Robson 1999:405). The definition of the theory is a detailed explanation of the processes and concepts (Nieuwenhuis 2007(b):78) related to the phenomena of sight-reading and memorisation abilities by undergraduate music students.

3.4.5 Quality criteria: Trustworthiness and validity

Maree and Van der Westhuizen (2007:41) state that “your role as researcher should empower you to enter into a collaborative partnership with the respondents in order to collect and analyse data, with the main aim of creating understanding”. As a researcher, I endeavoured to achieve this in my research by compiling and conducting the semi-structured interviews, analysing them and ensuring their validity. Qualitative research, with its predominantly social nature, is often criticised in terms of the validity and trustworthiness of the data gathered. In order to address trustworthiness, I involved other investigators and/or peer researchers to assist me with interpreting the data gained from the participants. Furthermore, I used member checks (showing the data to the participants) to ensure that the data were recorded accurately and interpreted correctly. This also ensured credibility as it confirmed that the results obtained were believable and correct from the perspective of the participants (Kumar 2014:219). I strived, as much as possible, not to use the data to fit my own theories but to present the data accurately by describing it in detail, but also by stating all of the relevant data, regardless of its relevance to my preconceived theories.

Creswell (2013:251) suggests negative case analysis to report any results that do not fit into a category of data, providing a realistic assessment of the studied phenomenon. This was done in an attempt to validate the qualitative research results in order to assess the accuracy of the data collected as described by the researcher and participants (Creswell 2013:249–250). In order to address validity and trustworthiness I consulted experts in the field. Kumar (2014:219) mentions confirmability as one of the main factors that adds to the trustworthiness of qualitative research. It is concerned with the extent to which the results can be confirmed by others who choose to view the data. In light of this I kept detailed and accurate records of the raw data, processed data, data analysis procedures, codes, interview schedules and recorded interviews to provide an outsider with the perspectives and information needed to follow and justify my findings and conclusions. Creswell (2013:251) states that researchers should comment on their past experiences, biases, prejudices and orientations that could likely have influenced the interpretation of the data as this ensures validity. I acknowledge

possible researcher bias in that I thought there was a direct relationship between memorisation and sight-reading. I was of the opinion that musicians who can memorise effectively cannot sight-read well, and those who can sight-read struggle to memorise. Throughout my interviews, I tried to remain objective. I was aware that my bias may result in leading questions. In the event that leading questions were posed, the data that resulted from these were excluded. Lastly, to further ensure trustworthiness the interviews were transcribed verbatim and direct quotes were used throughout the analysis of the data to ensure accuracy of information.

3.5. Ethical considerations

Robson (1999:31) states that “ethics are usually taken as referring to general principles of what one ought to do”. In this research project the anonymity of the participants was ensured at all times. Phelps, Sadoff, Warburton and Ferrara (2005:87) emphasise anonymity: “also important is that in qualitative research, the promise of anonymity is assumed”. In this study, aliases such as Participant 1, Participant 2 and so on, were used for the participants. The personal contact details used to arrange times with the participants were permanently deleted from my cell phone and the participants’ personal details were not recorded anywhere in the interviews. The participants were informed of the study and assured that their participation was entirely voluntary. They understood that they were free to withdraw from the study at any stage, without any negative consequences.

Furthermore, participants were informed and assured of their anonymity and that all of the data would be safeguarded at the Department of Music at the University of Pretoria for 15 years. A letter of information (see Appendix B) was given to each participant to peruse before the commencement of the interview. A letter of informed consent (see Appendix C) was included, which each participant was required to sign before the interview could commence. By signing this document, the participants confirmed their knowledge of the study and its parameters as mentioned in the letter of information. I undertook to write about participants in a way that was respectful and did not disadvantage them in any way.

3.6 Conclusion

This chapter explains the research design, research approach, data analysis, quality criteria, and ethical considerations used in this study. This study employs grounded theory which entails memo writing, axial coding and the categorisation of data based on the researcher’s summations in order to formulate a theory applicable to other similar circumstances. The

quality criteria employed in this study are trustworthiness and credibility. Trustworthiness was achieved through consultation with peer researchers and member checks, while credibility was ensured through a negative case analysis and stating possible researcher bias.

Chapter 4

Results

4.1 Introduction

In Chapter 3 the research methodology is discussed. In this study, a constructivist grounded theory approach is used to analyse and understand the data. The data were arranged into categories in order to generate a theory, which is discussed in the last chapter. The theory is based on Strauss and Glaser's (1967) the 'fundamentally comparative method of grounded theory'.

4.2 Identifying main categories and subcategories.

Based on identified constructs and themes, the data collected from the ten interviews were divided in three main categories, and fifteen subcategories. The main broad categories are: participants' self-appraisal of their abilities, reflexive engagement with memorisation and sight-reading, and formative influences.

Table 4.1 Main categories and subcategories identified from the raw data

Main category 1: Participants' self-appraisal of their abilities	
Subcategory	Raw data from the participants
1. Participants' self-perceived strengths	<i>I think my sight-reading is a bit better than memorisation.</i> (Participant 1) <i>Definitely memorisation I learn very quickly, naturally...</i> (Participant 4) <i>It's definitely memorising</i> (Participant 10)
2. Self-perceived ability for second instrument	<i>I play cello. Uh, I've never memorised much for cello.</i> (Participant 2) <i>With violin it was, some things were easier for me than for piano. But I think it was just because there was only a single line to memorise.</i> (Participant 5) <i>With saxophone, my strongpoint there was the sight-reading.</i> (Participant 6) <i>When it's just your normal preludes and so on, I find them easier to memorise than, uh, fugues.</i> (Participant 7)

<p>3. Self-reported aural abilities</p>	<p><i>The sight-reading but it's also combined with aural training. Uh, I think cos when we do, when I do light music, jazzy kind of stuff I usually listen to it, like, five hundred times to get the exact feel of the thing and then I start to like listen to and practice it. (Participant 8)</i></p> <p><i>I'll identify some parts that are challenging and, ja, just sort of hear the music before I play it as well. (Participant 9)</i></p> <p><i>The better your aural abilities the better or the easier it is to memorise. (Participant 2)</i></p>
<p>4. The influence of genre on memorisation and sight-reading</p>	<p><i>I've never had a problem to memorise music. It also depends for me on the era. (Participant 10)</i></p> <p><i>I think twentieth century music is much easier. (Participant 6)</i></p> <p><i>I'm a very structured person so I think I memorise classical music more. (Participant 1)</i></p>
<p>5. Self-reported memorisation and sight-reading ability</p>	<p><i>I don't have much of an ability there. (talking about sight-reading) (Participant 3)</i></p> <p><i>My performance from memory. I would think it's much better than from sight-reading. (Participant 9)</i></p> <p><i>(Participant 4) about sight-reading: I don't think I have an overall big problem really but I think probably the main problem is rhythm.</i></p> <p><i>Well the memorising I was never taught how to memorise. It just always came naturally. I only recently started struggling with it because the pieces are becoming too long to just memorise without thinking about it. (Participant 5)</i></p> <p><i>(Participant 7) about sight-reading: It's poor. It's very poor. If I'm not under pressure I read well enough to learn a piece.</i></p>
<p>6. Participants' descriptions of their memorisation processes</p>	<p><i>Taking it line by line, repeating it five times and then doing that at the correct speed of the actual piece and then taking it as slow as you can. (Participant 1)</i></p> <p><i>I start with the right hand and then the left hand and then put it together. (Participant 6)</i></p> <p><i>Ok, so it really depends on the music itself. Usually I'll maybe do it phrase for phrase, as a whole idea ... (Participant 7)</i></p>
<p>7. Participants' descriptions of their sight-reading processes</p>	<p><i>So, immediately I will, whether there is pedal or not, I will put in pedal if I feel it should be there. (Participant 4)</i></p> <p><i>I mean the first thing I drilled into my head, cos I'm very bad at it, is the key. (Participant 10)</i></p>

	<i>Uh, well just a quick analysis of so what's going on in the music. And then I would just sort of, sight-read the first time, just get a feel for it. And then after that I'll start going section by section repeating everything. (Participant 9)</i>
8. The relationship between memorisation and sight-reading	<p><i>I think if you memorise a lot quickly, you don't rely on sight-reading so the sight-reading kinda stays behind. Whereas if you struggle to memorise then sight-reading will definitely take the lead in, uh, learning and even performing. (Participant 7)</i></p> <p><i>Uh, I think there's a relationship with them because if I'm not able to sight-read then I'm not able to memorise. (Participant 8)</i></p> <p><i>I don't know. I actually struggle to see a relationship between the two. Oh no, but wait, I mean obviously if you are able to sight-read better you'd be able to memorise faster. (Participant 3)</i></p> <p><i>The easier or the better your sight-reading, the quicker you will learn the piece and the quicker you can start to memorise. (Participant 5)</i></p>
Main category 2: Reflexive engagement with memorisation and sight-reading	
Subcategory	Raw data
1. Participants' past experiences with memorisation and sight-reading	<p><i>Memorisation I think played a bigger role in my childhood or in my high school years than sight-reading. (Participant 10)</i></p> <p><i>When I was younger, about seven or eight, I played at a music competition and it was the first time I played without a book and I had a big slip up with one of my pieces and I think that made me scared to play without a book. (Participant 5)</i></p> <p><i>Uh, high school memorisation, I didn't feel comfortable at all playing without a book because of just slips and I want to be sure if what I'm doing is correct. (Participant 1)</i></p> <p><i>The first time, I was small. My mom started me and I got this piece from those Jack's and Jill's beginners books and then she said: OK now you gonna play from memory and then she took the music away. (Participant 7)</i></p>
2. Participant's tuition in memorisation and sight-reading	<p><i>But we were never taught a set method like this is how you sight-read. I think it was sort of something you did yourself. (Participant 10)</i></p> <p><i>I wasn't really taught how to memorise because I thought, you know, when I was in high school, that memory was finger memory. (Participant 3)</i></p>

	<i>Uh, well, the memorisation I never really learnt how to memorise, it always came naturally. (Participant 5)</i>
3. Perception of memorisation and sight-reading as natural ability or taught skills	<p><i>(Participant 8) about memorisation: Uuuuhh, sjo, I think, I think a bit of both. No. It's a taught skill, I don't think it's an inborn thing.</i></p> <p><i>I think you have to have a talent for it. But I also believe if you do the work that's required of you that it will happen. But I mean, I mean, let's not lie here, music is an inborn thing it's not something you can learn. (Participant 10)</i></p> <p><i>I think sight-reading is practiced in. (Participant 4)</i></p>
4. Participants' perceived belief about the worth of sight-reading or memorisation skills for performance	<p><i>I think sight-reading is, uh, a very important because if you can't sight-read, well, it takes longer for you to learn the pieces. (Participant 2)</i></p> <p><i>I think sight-reading ... what, uh, well just because with sight-reading there's much more flexibility in your performance as well. (Participant 9)</i></p> <p><i>I think sight-reading definitely plays a part but at the end of the day I think it's memorisation. (Participant 7)</i></p>
5. The impact of stress or nerves on memorisation and sight-reading	<p><i>Yes, especially with sight-reading. If I'm under pressure then everything goes then I really struggle with it. (Participant 7)</i></p> <p><i>But you do get those twenty percent where everything you can imagine goes wrong. Uh, but I can't say that's memorisation as much as nerves though. (Participant 10)</i></p> <p><i>Yes, I think it adds more stress because apart from the stress of performing you have the stress of trying to remember your music. (Participant 2)</i></p> <p><i>In a stressed situation, I usually make stupid mistakes when I'm sight-reading. (Participant 8)</i></p>
6. Musical interpretation of a memorised performance	<p><i>If I walk onto stage and I play from memory and it's all up to me, there's nothing telling me what I should do it's all up to me so I definitely think musicality is way more. (Participant 10)</i></p> <p><i>When you don't have the book as well you sort of have, uh, freedom in musicality. (Participant 9)</i></p> <p><i>I also felt it gives you a lot more freedom, uh, I think memorisation is important for interpreting the music or else you would be bound to the sheet music. (Participant 2)</i></p>

Main category 3: Formative influences	
Subcategories	Raw data
1. The influence of teachers and lecturers	<p><i>My lecturer always says if you can play a piece at the slowest of slowest tempo then you really do know what's going on. (Participant 1)</i></p> <p><i>I mean we don't ever speak about sight-reading because it's a thing of: come to you with my piece already learnt. So, sight-reading is, sight-reading obviously happens in the beginning. (Participant 3)</i></p> <p><i>Well, no, Sam is really strict about memorisation. My old teacher you know apart from those little tunes we had to sight-read for UNISA ... uh no. (Participant 10)</i></p>

4.2.1 Main category 1: Participants' self-appraisal of their abilities

This category was identified based on the questions posed to participants regarding their abilities related to piano playing. These included memorising and sight-reading abilities, aural abilities, self-perceived strengths, second instruments and the relationship of the genre of music to the participants' memorisation and sight-reading abilities. The participants described their own experiences and capabilities in response to questions and the response were categorised as the participants' self-appraisal of their abilities.

Subcategory 1: Participants' self-perceived strengths

The participants were asked to indicate whether memorisation or sight-reading was their strong suit in order to determine their experience of the phenomena in their lives as pianists. This was also done in an attempt to determine whether they have a propensity for one or the other. Many of the participants indicated early on in their interviews that either sight-reading or memorisation came "naturally" to them, giving an indication that they might view one of these aspects as being a strength, while the other might be considered a shortcoming.

The participants' self-perceived strengths and weaknesses were seen from their responses to questions about their strengths. The majority of participants (seven) indicated that they felt their ability to memorise music was their strength.

Participant 4 and 5 specifically stated that memorisation came "naturally" to them:

Definitely memorisation I learn very quickly, naturally. When I play it a few times I just remember it for some reason. (Participant 4)

Additionally, none of the participants indicated that they felt that they had an equal propensity for sight-reading and memorisation, although some believed that their peers had equal capabilities for both:

Well look ... if I just think of my peers or or the people I study with, you take someone like Michelle , I mean I've never seen a better sight-reader in a long time ... and yet when she memorises everything is faultless as well B is an amazing sight-reader and amazing performer, no mistakes, so if you think about them ... yes I think there might be a correlation but I think it's also ... you can't, you can't say that yes it is this way or no it is that way I think ... I think it's a difficult thing ... cos I mean, like, if you look at these people they perform and sight-read well. (Participant 10)

Another interesting finding was that Participant 4 and 5, despite naming memorisation and sight-reading their respective strengths, also noted that the other was not difficult for them. For instance, Participant 5 identified sight-reading as her strength, said: "Sight-reading I always found to be very easy" but also said: "Memorisation always came naturally for me". Whereas the other, Participant 4, who regarded memorisation as her strength, said: "Memorisation actually comes naturally for me" and then continued to say: "My sight-reading is reasonably ok. I would say it's (sight-reading) good". It could be argued that these two participants have equal propensities for both sight-reading and memorisation despite not stating this outright.

Subcategory 2: Self-perceived ability for second instrument

I was curious to determine whether participants' self-perceived abilities differed for first and second instruments. Table 4.2 summaries the self-perceived strengths of participants for both first and second instrument. Where students only mentioned their strength for their first instrument I conclude that the same was true for their second instrument. This is indicated with an asterisk.

The participants were asked to gauge their abilities regarding their second instrument in order to provide a context for their abilities, and whether or not these abilities were limited to piano playing.

Table 4.2: Self-perceived strengths of participants for first and second instruments

Participants	No. of years playing 1 st instrument	Second instrument	Strength for 1 st instrument	Strength for 2 nd instrument
1	9	Clarinet	Sight-reading	Memorisation**
2	13/14	Cello	Sight-reading	“Have never memorised for cello”
3	10	French horn	Memorisation	Memorisation**
4	15/16	Singing	Memorisation	“Both good because it is easy”
5	12	Violin	Sight-reading	“Both easy”
6	4/5 years	Saxophone	Memorisation	Sight-reading
7	11/12	Organ	Memorisation	“SR pipe organ easier than for piano”
8	5	Keyboard	Memorisation	Sight-reading
9	7	Organ	Memorisation	Memorisation
10	15	Violin beginner	Memorisation	-

** Participants indicated that memorisation for their second instruments was good but they did not state outright that it was a strength for their second instrument.

It is interesting to note that nine out of the ten participants indicated that they played a second instrument (see list of participants). The participant (10) who mentioned that she did not play a second instrument did mention that she tried violin and recorder when she was younger, but never developed either:

Uuuh no ... I tried to play violin but Mary had a little lamb and, ja, you know, I obviously did the baby thing of recorder and pan flute and those things but no. (Participant 10)

Three of the participants (1,6 and 8) indicated that their strengths for their second instrument was the opposite than their first instrument. This is an interesting result because it shows that memorisation and sight-reading abilities might not only be individual-specific but also instrument-specific:

With saxophone, my strongpoint there was sight-reading (Participant 6)

Participants 8,4,3,1 and 5 mentioned that their second instrument was much easier because only one line of music is played in contrast to the many lines and voices a pianist must see and play:

With violin it was, some things were easier for me than for piano. But I think it was just because there was only a single line to memorise (Participant 5)

Of these participants (8,4,3,1,5) only Participant 8 played a keyboard instrument as second instrument and he also stated that his right hand only has one melody while his left-hand plays chords, despite which, he claims, it is still easier to sight-read than piano:

So, if I have a lead sheet let's say, and it gives me like a one line melody for the right-hand and chords ... for the left hand ... as a lead sheet would do and ... I would be able to sight-read that because that's quite easy for me (Participant 8)

Three participants (8, 9 and 4), mentioned that they relied more on their aural ability for their second instrument than they did for their first instrument:

Singing is easier for me than piano ... Because it's aural, it's like a song you remember (Participant 4)

Uh, the sight-reading but it's also combined with, uh, aural training ... Uh, I think, cos when, uh, when we do, when I do light music, jazzy kind of stuff I usually listen to it like, five hundred times to get the exact feel of the thing and then I start to, like, listen to and practice it. (Participant 8)

Furthermore, two participants (7 and 9) indicated that the exams for their second instrument (which both happened to be the organ) were much better and more enjoyable than examinations for their first instruments:

I find the exams a lot more laid-back than with first instrument with piano. Actually, the exam for organ is a lot more enjoyable than for piano. (Participant 7)

Overall it would appear that most of the participants had the same strengths for their second instruments as they did for their first, however, two participants (4 and 5) mentioned that they found both memorisation and sight-reading easy for their second instruments, while they also indicated that they had no particular difficulty with either for their first instrument. The participant (8) who indicated that his first instrument was piano and his second instrument was keyboard, also indicated opposite strengths for the two. However, the data indicate that ability might not be influenced by the instrument as much as by the type or genre of music.

Subcategory 3: Self-reported aural abilities

In this section, aural ability refers not only to aural training, which involves sight-singing, interval identification, rhythmic and melodic dictation, but also refers to hearing the piece before playing it and listening to recordings of the piece. The majority of participants mentioned aural ability in their interviews, most mentioning listening to the pieces and tertiary aural training, while only two mentioned hearing the piece before playing it. When speaking about aural abilities, some participants interpreted it in the context of the aural training course received at tertiary level, which included rhythmic and melodic dictation, interval identification, identifying chord progressions and rhythmic training drills.

In terms of aural ability relating to aural training received at university, Participants 2, 6,8 and 10 indicated that they had good aural skills. In this study, it became clear that aural ability is loosely correlated to the participants' strengths as three (Participants 6, 8 and 10) of these participants had previously identified memorisation as their strength. However, this is the only category related to the participants' self-reported aural abilities, albeit weakly. Participants 6, 8 and 10 who mentioned their tertiary aural training, and memorisation as their strengths, also indicated that they listened to recordings of their pieces while learning them in order to help with memorisation:

When I'm learning a piece, I listen to it every time I practice it you know, ja because, for me, it happens a lot quicker if I know what I'm supposed to be doing. (Participant 10)

This link between aural ability and memorisation was also mentioned by Participant 2 who indicated that his aural ability is good. He stated that he believed that it was important to listen to your piece repeatedly in order to memorise it. Contrary to Participants 6, 8 and 10, Participant 2 indicated that his strength was sight-reading.

Participants 3 and 9 contradicted the others when speaking about aural ability. The first participant (3) discussed aural ability and perfect pitch stating adamantly that aural ability only helped with piano playing when the pianist had perfect pitch and that it could not be used as a memorisation tool otherwise. Although aural memory might be separated from aural abilities, it was interpreted in this context as being part of aural abilities, as the participant was asked if he employed aural techniques when learning new pieces. He replied with the following statement:

I think the only way you can rely on aural skills is if you've got perfect pitch ... I wouldn't say that it (aural memory) definitely is a tool ... I don't think you can just rely on aural memory. (Participant 3)

The second participant (9) to contradict the others stated that, in the process of learning a piece “I hear the music before I play it” but it’s not aural ability “it’s just to get a feel of it”. This was an interesting comment as the term “aural ability” implies hearing music or elements of music. This participant was contradicted by four other participants (6, 4, 8 and 10) who indicated that their aural abilities included hearing the piece in their head before playing and that this helped them to get through the music. Participant 4 said: “Sometimes you can just hear the tune before you play it”. (4)

Participant 9 also indicated that her general aural ability (at tertiary level) was not good: “well in first year I was terrible”. As a researcher, I previously stated that aural ability includes aural training received at tertiary level as well as hearing the piece before playing it and listening to it. However, this participant did not appear to share that view. From her answers, it could be said that she thought of aural ability as being solely based on what was done in aural training at the university and not based on what one heard while playing or learning pieces. Another participant, Participant 7, stated that his aural abilities were not up to standard by stating that: “I would give myself three out of ten for aural”. This participant further indicated that he was able to remember a melody but was unable to recreate it using either his voice, written notation or a piano. This was interesting as he participant indicated that memorisation was his strength, and part of memorisation is to remember a melody or piece of music and recreate it on the piano, an act that would be almost impossible if one was not able to remember and recreate a melody.

Other comments on aural ability included those of Participant 1 who indicated that singing through a piece helped him to learn and memorise it. He had previously mentioned that clarinet was his second instrument.

Similarly, Participant 2 made a valuable comment by saying the he believed that there was a definite relationship between your aural skills and one’s ability to memorise. He further reiterated that this was especially true for memorisation: “The better your aural skills the better or easier memorisation is”. This participant previously indicated that sight-reading was his strength, hence the possibility exists that he was more reliant on his aural ability because he was not entirely comfortable with memorisation.

Most participants were willing to openly assess their aural ability, with the exception of two participants (1 and 5) who made no mention of their aural ability. Overall it appeared that aural ability did affect performance on the piano by at least six of the participants (2, 4, 6, 7, 8 and 10) who indicated that they employed their aural abilities either by listening to the piece, singing through the piece or hearing the piece while playing it.

Subcategory 4: The influence of genre on memorisation and sight-reading

The participants were asked about the genre of music to determine whether they found that it was easier to memorise or sight-read one genre of music over another and how this might influence their abilities. Eight of the participants indicated that they found classical music easier to memorise and sight-read than other genres of music. One of these participants (2) indicated that classical music was easier to sight-read but romantic music was easier to memorise. Another participant (10) indicated that classical and romantic works were easier to memorise than twentieth century music:

I've never had a problem to memorise music. It also depends for me on the era. Uh, you know it's much easier for me to memorise something like a classical sonata or a romantic concerto or a romantic work compared to the modern works, you know, the impressionistic works, the Debussy the Ginastera and stuff like that. It becomes more tricky for me because I can't identify keys as quickly as I would with, you know, with the traditionally composed music. (Participant 10)

Reasons stated for a preference of classical music above other genres included the following: the clear structure of classical music, which was mentioned by three participants; the melody with accompaniment element, which was mentioned by four participants; and the functional harmony, which was mentioned by two participants. In contrast, Participant 6 mentioned that twentieth century music was easier to memorise because of the technique. He stated that:

Oh, no, I think that 20th century music is much easier. Just like ... uh ... ok ... classic I mean uh ... romantic music and all the other ones, they a bit more complex but the melody that plays in your head while you playing is easier. But the technique ... or the actual playing of this music is ... better to memorise. (Participant 6)

What I understood of this was that the participant felt that the technique for classical and romantic music was more difficult than for twentieth century music, despite the melodies being clearer for classical and romantic music. Another participant (9) indicated that her abilities to sight-read or memorise were not dependent on the genre of music, saying that they were all the same.

Other comments regarding the preference for classical music included its predictability and its stable characteristics. The genre of music was strongly related to the participants' descriptions of their memorisation and sight-reading processes. Classical music, with its clear structure and harmony is easier to divide into sections and repeat, something mentioned by numerous participants. The genre of music, although strongly related to participants' memorisation and sight-reading processes, does not have any apparent relationship with other categories.

Subcategory 5: Self-reported memorisation and sight-reading ability

Participants were asked to describe their abilities to memorise and sight-read respectively in order to gauge their self-perceived abilities of the two areas. Overall, sight-reading seemed to be a more problematic area for the participants than memorisation. Table 4.3 (under Subcategory 6 below) shows six participants (3, 6, 7, 8, 9 and 10) indicated that they struggled with sight-reading while they considered their memorisation abilities to be good:

It's poor. It's very poor. If I'm not put under pressure I read well enough to learn a piece, but also that's a thing of ... I just read enough until I memorise it. (Participant 7)

Participant 2 indicated that he had a particular problem with memorisation. As mentioned in the previous section, this category loosely correlated to the genre of music as the majority of participants indicated that classical music was easier to sight-read and memorise.

Furthermore, when specifically asked whether they considered themselves to be equally skilled in both areas, two participants (1 and 4) indicated that they had no difficulty with sight-reading or memorisation. Neither indicated that they deemed themselves to be equally proficient in both areas.

Uh, I think my sight-reading is a bit better than my memorisation. (Participant 1)

I don't know, it's difficult to compare because they are both very different. But I would say ... definitely my memorising, I learn very quickly, very naturally. (Participant 4)

The last participant's indecisiveness could be due to an unwillingness to appear arrogant during an interview or it could be that she was overly harsh during self-assessment exercises. The hesitation of the second participant when asked which she considers to be her strength shows that she might be hesitant to state that both were strengths. During the remainder of her interview she smilingly stated that she was uncomfortable talking about herself, which

gave the impression that she actually enjoyed talking about herself, but did not want to be seen as arrogant.

From the data, it appeared as if the majority of the participants were able to memorise reasonably well, as nine out of ten participants indicated that they did not find memorisation particularly difficult. Only seven (3, 4, 6, 7, 8, 9, 10) of these indicated that memorisation was their strength. This was an interesting finding as it indicated that only one out of the ten participants had particular difficulty with memorisation and that those who indicated that sight-reading was their strength, might be equally adept at both memorisation and sight-reading, despite only two (4 and 5) explicitly stating that their sight-reading ability was good while they had no problem with memorisation.

Subcategory 6: Participants’ descriptions of their memorisation processes

Participants were asked about their methods of memorising music in order to gain a deeper understanding of the methods they employ during the process. This was also done in an attempt to explore a possible relationship between memorisation and sight-reading ability. Table 4.3 illustrates methods that participants use to memorise music, the participants who indicated that memorisation was their strength and the participants who indicated that they suffered from memory lapses.

Table 4.3: Participants’ beliefs, self-assessment and methods regarding memorisation

Participants	Memorisation is their strength	Repetition	Divides the music into sections	Practices hands separately	Varies the tempo	Pattern identification	Muscle memory	Analysis of music	Harmony	Relies on aural ability	Suffers from memory lapses
1					X	X	X			X	
2		X			X		X	X	X		X
3	X	X				X		X	X		X
4	X	X	X		X						X
5			X			X		X			X
6	X			X						X	
7	X	X	X	X	X	X	X	X	X		X
8	X	X	X	X			X	X	X	X	
9	X	X	X				X	X			
10	X		X				X	X			X

The majority of the participants mentioned that repetition of music was an important factor in the memorisation process:

I go through the whole piece until I know it and then obviously the more you play it. Repeat, repeat, repeat then it sort of just came naturally to me.
(Participant 4)

Only four participants (1, 5, 6 and 10) did not mention this as an important aspect in memorisation. Muscle memory was mentioned by Participants 1, 2, 7, 8, 9, 10 as an important factor of their memorisation process. Participants 2 and 7 specifically stated that muscle memory helped them in their performance if they experienced memory lapses while performing:

I would just say the muscle memory of which we just spoke. I have previously felt that when I work with it, it helps naturally, if you have a slip-up, but I feel if you just focus on it then your thoughts tend to wander. (Participant 2)

Participants 2, 7, 8 and 9 who discussed muscle memory also indicated that they relied on repetition of the music, which is understandable, as muscle memory is often the result of continuous repetition.

Participants 4, 5, 7, 8, 9 and 10 indicated that they divided the music into sections before memorising it:

Uh, well I divide the music up into sections for myself and I memorise according to those sections ... Like, I me personally I rely on the digits. So, the contrasting sections, sorry I call it digits but it's contrasting sections.
(Participant 10)

The general method employed by the students for memorising sections appeared to be practicing the sections separately before putting them together in the correct order.

Another method mentioned by seven participants (2, 3, 5, 7, 8, 9, 10) was analysing the music before memorising it to gain an in-depth understanding of it and, in some cases, to aid them with delineating sections:

If I have more structured pieces like a sonata or a fugue or something like that I usually analyse the work and then do a little bit of a harmonic analysis.
(Participant 8)

The speed (tempo) of playing while memorising was mentioned by Participants 1, 2, 4 and 7. They discussed playing the music as slowly as possible before playing it at the recommended speed. One participant said that his lecturer encouraged this method for practice:

My lecturer always says if you can play a piece at the slowest of slowest tempo then you really do know what's going on. (Participant 1)

In terms of aural abilities, participants 1, 6 and 8 mentioned employing aural skills when memorising a piece of music, while three other participants (6, 7 and 8) discussed the importance of memorising the music hands separately and then putting it together without the sheet music:

Or I'll maybe take a page at a time, go through it separate hands and then, put it together slowly and then start increasing the speed. And then, once I got the speed up to a certain level, then I'll take it again separate hands. (Participant 7)

An unexpected finding was that Participants 2 and 6 indicated that internalising the music was an integral part of their memorisation processes:

What I have seen, like, is or experienced I don't know what the right word, but when you get a piece of music and you listen to it. The person that recorded that piece is playing it pretty well. So, then, if you listen to that you kind of, imprint how they play, in your head. (Participant 6)

This relates to aural ability, as part of internalising the music entails hearing the music in your head before or while you play.

Pattern identification was mentioned by Participants 1, 3, 5 and 7 when describing their memorisation techniques, two of which (3 and 7) indicated that they learn the patterns and play them in various keys to help them memorise the patterns:

So how many patterns, I mean, that's obviously something as well seriously, like runs and that will usually be, you know, repeats of the runs, so often, what also, what helps in memory, is, uh. Cos, I know usually a lot of pieces are in, like, sonata form or have the themes obviously recurring coming back in another key, so what I often do, is when I start a piece and I play the theme in a key I, you know, try and memorise and see what's going on in the harmony, see the patterns and then I try and do the same thing in another key. (Participant 3)

Despite this intensive approach to memorisation it does not seem to eliminate memory lapses as both participants indicated that they suffered from memory lapses when performing. The majority of the participants indicated that they suffered from memory lapses during performances. Interestingly, Participants 8 and 9 who indicated that they did not experience memory lapses, shared methods of repetition, dividing the music into sections, analysing the music and relying on muscle memory. However, a third participant (7) indicated that he employed these methods, yet he still suffered from memory lapses. There seems to be some

relationship between lack of memory lapses and good aural ability as three (1,6, and 8) of the four participants who indicated that they did not experience memory lapses also indicated that they relied on their aural abilities (listening to the piece) for memorisation.

The importance of harmony was mentioned by Participants 2, 3, 7 and 8 who described their process as identifying chord progressions or basing their sections on harmonies:

I memorise the chord structures and harmonic progressions, uh, as slowly as, uh, until I feel I can do them properly. (Participant 2)

Two participants (5 and 10) mentioned that they visualised the music when they performed from memory and that they identified key changes in the music when memorising:

Sometimes, uh, I try to literally see the sheet music in front of me even though I don't have the book in front of me to try and remember what's going on. (Participant 5)

Other aspects that were mentioned by one or two participants were: the impact of the length of the piece on the time it takes to memorise (Participant 10), returning to the sheet music only when struggling (Participant 8), and playing the piano as softly as possible to memorise (Participant 4). One participant also mentioned the effect of her emotional temperament on her performance:

If I'm in a good mood it would go better, if I'm calm it would go better, but if I've had a bad day, something bad has happened, it's sort of like a boulder running downhill. (Participant 10)

In terms of longevity of memory, Participants 1, 3, and 10 said that they would be able to remember the piece reasonably well if they had to play it after a month without having practiced it, while four participants (2, 4, 5 and 6) indicated that they struggled playing it after a month without practicing:

I'd still be able to remember it after a month. I would say after maybe ... a few months. (Participant 3)

Memory lapses and the relationship to age were discussed by Participants 2, 3 and 4 who mentioned that memory lapses became fewer as one becomes older and more experienced with playing from memory:

And then when you get older, when I got a bit older, then you become more aware when you performing and stuff. You know, I mean, sometimes say you're playing on stage and as soon as you realise that your hands are

actually doing a, the work and you don't truly know what's going on, you know that's when you have a memory lapse. (Participant 3)

One of the participants also commented on memory lapses being the result of not focusing:

It's usually when I just have a lapse in concentration or if I'm daydreaming while I'm playing or something that I suddenly, just when I suddenly focus on the music again, then I forget where I am. (Participant 7)

Overall Participants 1, 6, 8 and 9 indicated that they did not experience memory lapses during performances, three of which (6, 8 and 9) previously indicated that their self-perceived strength is memorisation. One participant mentioned that he felt that experiencing a memory lapse during a performance was detrimental to one's reputation:

You know, if I have a memory lapse, it becomes almost like, you know, I almost feel like my reputation is like at stake or whatever. Even though I have memory lapses, I'm not saying I don't but, you know, if you make a note mistake, you know everybody does that. (Participant 3)

It was interesting to note that only two participants mentioned that they named chords or attached certain emotions to chords in order to remember them. One participant said:

With one Liszt piece that I was playing it was, I didn't really know what the chord was so I just called it the weird chord and even today, like, I know what the notes are of that chord ... you don't necessarily just have to know exactly what's going on in the harmony or that, it's just somehow you need to try and get yourself to remember that chord even if it's just by saying weird chord or weird part or whatever. (Participant 3)

The other participant stated the following:

Like, for instance, If I struggle with chords I use certain vulgar words for them, like, I attach a strong emotion to it, like hate. And then when I'm playing I'm like, oh here comes that chord that I hate. (Participant 7)

Giving meaning to certain chords could also be considered as internalising the music, however, the two participants who mentioned naming chords for memorisation both struggle with memory lapses, while only one of the participants who indicated that they internalised the music indicated that he did not experience memory lapses. Hence, internalising the music did not seem to prevent memory lapses.

Other than this, three participants mentioned first reading the piece from sight until they started memorising it. There was no general length of time it took the participants to memorise pieces. The shortest time mentioned was two weeks, while the longest time was three months.

Another interesting finding was that two participants (4 and 3) mentioned what they considered to be the three aspects of memory. The first mentioned visual, aural and kinaesthetic memory, while the other mentioned visual, aural and cognitive memory. The first participant mentioned that she relied on these three types of memory when memorising stating that:

All three go hand-in-hand. I mean, if you memorise using all three those aspects, I think you will be safe on stage because, if one lets you down, the others might just help you. (Participant 4)

The second participant (3) only mentioned that there were three types of memory and that one could only rely on aural memory if one had perfect pitch. He did not discuss it in further detail. Both participants indicated that memorisation was their strength.

Participants 3, 4 and 5 stated that they learned the music automatically, one of which, had previously indicated that sight-reading was her strength.

I mean, if I calmly and quickly learn the concerto and, the more and more I play it, then it becomes automatic, which can also be dangerous. (Participant 4)

As can be seen from the table 4.3, participant 6 did not mention or employ the common methods employed by the other participants. However, he did discuss his process of listening to recordings of the music before memorising the pieces, as well as the importance of the melody in his memorisation process it. These aspects were also mentioned by Participants 10 and 1 respectively.

All the participants indicated at least one of the above-mentioned factors in their memorisation process. This points to a good relationship with perceived strengths as seven of the participants previously indicated that memorisation was their strengths. The outlier participant will be discussed further in the negative case analysis.

Subcategory 7: Participants' descriptions of their sight-reading processes

The participants were asked about the methods and techniques they employed when sight-reading in order to understand their processes, thereby gaining a deeper understanding of the phenomenon. Table 4.4 presents a summary of the main methods used by participants when sight-reading. The table also indicates which participants found sight-reading difficult and which of the participants sight-read often.

Table 4.4: Participants’ approaches, beliefs and self-assessment of sight-reading

Participants	Sight-reading is a problem	Rhythm is a problem in sight-reading	Belief that sight-reading improves with practice	Able to hear music before playing	Focus on accidentals	Analysis	Do not rely on counting	Sight-reading is their strength	Negatively affected by stress	Sight-reads often
1		X	X		X		X	X		X
2			X					X		X
3	X		X							
4		X	X	X						X
5					X			X		
6	X	X								X
7	X	X				X	X		X	
8	X	X	X						X	
9	X	X		X		X	X		X	
10	X	X	X		X				X	X

Six of the ten participants indicated that they experienced problems with rhythm when sight-reading:

Uh in sight-reading yes because you trying to get the notes right as well and rhythm is not really my strongest point. (Participant 1)

Of these six participants (1, 4, 6, 7, 8, 9 and 10) only Participant 1 had previously indicated that his strength was sight-reading, whereas the remainder indicated that memorisation was their strength. One participant mentioned the importance of rhythm in the success of one’s overall sight-reading experience:

I’ve noticed if your rhythm is right your notes, somehow, I don’t know how it works, just end up being right as well. (Participant 3)

Participants 1, 2, 3, 4, 8 and 10 also indicated that sight-reading ability was dependent on practice. They believed that: “the more you sight-read, the better you get”. Yet, despite this belief, only half of the participants (1, 2, 4, 6 and 10) indicated that they sight-read frequently, of which only Participant 1 indicated that he did it for leisure. Participants 1 and

2, of the participants who indicated that they sight-read frequently, previously mentioned that sight-reading was their strength.

Participants 4 and 9 indicated that they heard the music before they played, while Participants 1, 5 and 10 indicated that they focused more on key signatures and accidentals. Three participants (1, 7 and 9) indicated that they did not rely on counting when sight-reading, with Participants 7 and 9 that they did not like counting, while Participant 1 said that he just “plays through the music and doesn’t stop to count.” Of these, the latter (1) had previously indicated that sight-reading was his strength. Participants 1 and 9 also mentioned that they identified problem areas in the music before they proceeded to sight-read it.

one participant mentioned that he could only sight-read when under pressure:

It’s also something that I’ve noticed that I am able to do when my mind is in the, you know let’s say for instance when I’m forced to sight-read, let’s say I’ve got a rehearsal or and you know I didn’t practice the part. Cos I’ve noticed in the past when I’m there, there’s just something, I don’t know. You get into that zone and you don’t really have much of a choice you need to get through the music. You just somehow, do it. (Participant 3)

In contrast to this, Participants 7, 8, 9 and 10 noted that they struggled with sight-reading under pressure or stress situations:

I mean, there’s a very distinctive difference as well. I mean, so yeah, I can sight-read Oom pah Oom pah Oom pah but if you tell me to go sight-read a ballad in front of a crowd: No. (Participant 10)

Participants 1 and 3 mentioned that it was important for them to familiarise themselves with the time signatures. Other aspects that were mentioned by individuals included playing immediately to get the “feel under their fingers” (Participant 2), using pedal and dynamics immediately (Participant 4), reading key signatures with flats easier than key signatures with sharps (Participant 5), analysing the music quickly (Participant 9), struggling with the different voices of playing hands together (Participant 8) and establishing patterns (Participant 1).

Two participants (6 and 7) mentioned that sight-reading in general was an area of struggle for them. Participant 7 mentioned: “I just start and hope for the best”. Both had previously indicated that they regarded memorisation as their strength.

Another interesting statement was made by Participant 7 who said the he only sight-read until he could memorise the piece. Thus, the quicker he memorised the less he had to sight-read.

Another participant indicated that her sight-reading was also dependent on the piece. She said:

I mean it also depends on are you asking me to memorise an accompaniment for a vocal singer or are you asking me to sight-read uh Chopin ballad.
(Participant 10)

Overall sight-reading seemed to receive less technical attention by participants than memorisation. Participants were mostly in agreement that sight-reading was difficult and that it required constant practice for improvement. This was also related to their formative experiences with the phenomenon, and whether or not they were properly taught to sight-read.

Subcategory 8: The relationship between memorisation and sight-reading

The participants were asked if they believed that there was a relationship between the two skills in order to determine if they thought the two might be interlinked or connected. They were also asked to elaborate on their answers in order for the researcher to gain as much detail as possible. It was interesting to note that half of the participants (3, 5, 7, 8 and 9) indicated that there was a relationship between the two:

Uh I think there's a relationship with them because if I'm not able to sight-read then I'm not able to memorise. (Participant 8)

The other half indicated that there was no relationship between the two, stating specifically that they were “separate things”:

They do enhance, but they can also be seen as separate entities ... Memorising a piece, uh, because you are now practicing it is not something that is now, you getting a page and you have to sight-read it. (Participant 1)

Participant 4 and were adamant that, although sight-reading and memorisation supported each other, they were not the same thing. One stated as follows:

They help each other out, but it's two different things ...To sit and sight-read is one thing. To memorise is completely different. It is not like reading it is just memorisation, remember the notes. (Participant 4)

Another participant also stated that the two were separate entities:

I think, uh, sight-reading is more when you start learning the piece and I think memorisation only comes in when you know the piece well. (Participant 2)

This indicates that this participant views both skills as equally important despite being different things. This statement also points to a connection between the two as the piece is

sight-read at first and then memorised once the pieces is learnt and no longer needs to be sight-read.

Participants 4 and 9 stated that the two are completely separate:

They (memorisation and sight-reading) are ... dependent on each other, you have to be able to sight-read to memorise and ... maybe not memorise to sight-read, but ja, there is a relationship between them. (Participant 9)

The other participant (4) stated that “you can still memorise perfectly. But have a really bad sight-reading level.” This was contradicted by another participant who believes that if you are not able to sight-read then you are not able to memorise:

I think there is a relationship between them because, if I'm not able to sight-read, then I am not able to memorise and if I'm not able to memorise well that's just not gonna work. (Participant 8)

On the opposite end of the scale, Participants 7 and 8 indicated that they thought that if their memory was less good then their sight-reading would be better. One stated as follows:

I think if you memorise a lot quickly, you don't rely on sight-reading, so the sight-reading kinda stays behind. Whereas if you struggle to memorise, then sight-reading will definitely take the lead. (Participant 7)

This suggests that the participants believe that there is a connection between the two skills where a lack of ability in one is an advantage for the other.

The data presented are not substantial enough to draw conclusions. However, it is still valuable because it gives insight into the participants' beliefs about the skills and the relationship or lack thereof. Participants 3,4, 8 and 10 found this question difficult. These participants asked me to repeat and explain the question and halfway through their responses changed their answers the more they thought about it. Prior to the commencement of the study I was under the impression that most musicians thought of the possibility of a relationship between memorisation and sight-reading, however, the fact that participants hesitated to answer and found it difficult to verbalise their thoughts, led me to revisit my assumption.

4.2.2 Reflexive engagement with memorisation and sight-reading

Subcategory 1: Participants' past experiences with memorisation and sight-reading

Participants were asked about their past experiences in order to gain an understanding of how they acquired their memorisation and/or sight-reading skills, and to pinpoint specific events

or happenings that might have influenced their current abilities. From the data, it appears that past experiences have had some effect on the participants' abilities to sight-read and memorise. Participant 10, whose strength is memorisation, indicated that she was a "competition baby" and had to play six to seven competitions in a year where she received the pieces in December and they had to be memorised by January. She was not told to focus on sight-reading or how to do the pieces. The focus was on learning the pieces for performances. This has a direct correlation to her ability to memorise well, but not sight-read as well as she would wish to.

Participant 5, whose strength is sight-reading, noted that she has a fear of playing without a book. She said:

When I was younger, about seven or eight, I played at a music competition and it was the first time I played without a book, and I had a big slip up with one of my pieces and I think that made me scared to play without a book.
(Participant 5)

She further said that her long-term fear of playing from memory in a performance resulted in her strength being sight-reading, as she shied away from occasions where she had to play a performance from memory:

I think this year (2016) was probably only the second or third time that I have played without a book. (Participant 5)

Participant 1, whose strength is also sight-reading, said that he used to be uncomfortable with playing without a book:

I wasn't comfortable at all playing without a book because of, just slips and I wasn't too sure about, if what I'm doing, is correct. My teacher always used to write in the book, for interpretation purposes. (Participant 1)

Additionally, this participant also noted that, in his formative years, he used to listen to his teacher play music and then he would play it, relying on his ear and not on the sheet music. He also noted that he was forced to memorise when he went to university:

So, I'd always play from a book, then I go to Varsity and immediately you have to take the book away. (Participant 1)

Here again there is a correlation between past experiences and sight-reading ability as this participant indicated that, despite his strength being sight-reading, he had no problems with memorisation.

One participant mentioned that, from a young age, he was encouraged to memorise by his mother who was a music teacher:

My mom started me and I got this piece from those Jack's and Jill's beginners books and then she said: Ok now you gonna play from memory and she took the music away and I played it from memory of course, it was a thing of repetition, repetition, repetition. (Participant 7)

This also shows a relationship between past experiences and the participant's ability to memorise as he was expected to memorise from a young age, but not to sight-read.

Participants 7 and 9 mentioned their memorisation ability from their youth. They each explained how they were expected to "hear and play" as they could not yet sight-read. These two participants had previously indicated that they deemed memorisation being their strength. This also shows how formative experiences influenced the participants' experiences.

Another participant indicated that he did not think about memorisation when he was in high school, saying that he used to believe that memorisation was finger memory and that he was never able to explain to people who would ask him how he did it:

So, I used to think to myself, you know, I just do it. I just memorise ... There was a stage where I thought piano was memory. (Participant 3)

This further emphasises the importance of memory in the life of this participant as the two (memorisation and piano) were synonymous to him at one stage. In my earlier years as a piano student I shared this point of view. Participant 5 pointed out that the biggest difference between studying piano at university and in high school was the fact that the pieces in high school did not take as long to learn and memorise. Participant 8 mentioned that he only had to memorise for UNISA (University of South Africa) music examinations. This participant also repeated the fact that he only started piano in grade ten, giving the sense that he felt as though he was at a disadvantage because of it:

I think if you were taught at, like, an earlier age than, let's say grade ten, to sight-read and memorise, I think it's much easier to do both. (Participant 8)

In total seven participants (1, 3, 5, 7, 8, 9 and 10) mentioned and discussed past experiences with sight-reading and memorisation, evidencing the importance of music training and music experiences in the formative years of a piano student.

Subcategory 2: Participants' tuition in memorisation and sight-reading

In order to determine how the participants acquired their sight-reading and memorisation skills, they were asked whether they were ever taught to sight-read and/or memorise. The data shows that none of the participants were formally taught to sight-read. Three participants mentioned being taught the basics, such as the rhymes for the treble clef lines (Participant 7), checking the key signature and difficult parts in the piece (Participant 3), but, apart from that, none were taught proper techniques for sight-reading (such as saying the rhythm out loud or identifying patterns):

Well I mean, obviously, we had the normal ones, you know, you read ahead and, uh, never look at your hands look at the music, we were taught those basic things. But we were never taught, or I was never taught, a set method, like, this is how you sight-read. I think it was sort of something you did yourself. (Participant 10)

This has a strong relationship with the sight-reading abilities of the participants as the majority indicated that sight-reading was a big problem for them. One participant (5) mentioned that sight-reading was only a point of focus in her lessons during the two weeks prior to the UNISA exams, in which, as another participant (10) pointed out, sight-reading was formally assessed. Participant 2 mentioned that, due to his not being taught how to do either, he taught himself to do both using methods that worked best for him. Other than this, most of the participants indicated that they believed that sight-reading was something that should be practiced often (see Table 4.4):

And then it is just practicing. The more you practice new things the better you become. (Participant 4)

With regards to memorisation, only Participant 8 indicated that he was taught how to memorise music – and this only once he started music at university. Yet, despite this lack of training in memorisation experienced by the majority of participants, most indicated that memory was their strength:

I started with Dr Reed .and she taught me to memorise uh hands apart and then put it together without the sheet music. Uh that made the memory uh a lot better I think so I think I think it's a taught thing ... I don't think I was born with that. (Participant 8)

Other participants who were not taught stated as follows:

Uh, well the memorisation I never really learnt how to memorise, it always came naturally. (Participant 5)

Yeah well thing is in high school, you know that's why I said I wasn't really taught how to memorise. (Participant 3)

It is interesting to note that only one participant indicated that he received formal training in memorisation of music, however, none of the other participants received formal training for either memorisation or sight-reading. This points to a possible shortcoming in piano pedagogy as students are potentially denied the opportunity to properly engage with and learn about memorisation and sight-reading techniques.

Subcategory 3: Perception of memorisation and sight-reading as natural ability or taught skills

The participants were asked to judge their memorisation and sight-reading skills as natural ability or taught skills, in order to better understand the participants' construction of their reality as pianists. Participants 1, 4, 7 and 10 indicated that they believed that memory was an inborn talent, all of whom identified memorisation as their strengths, suggesting a possible connection between the two.

I think it's definitely an inborn talent ... I think ... it's a bit difficult to learn how to ... increase your memory. (Participant 7)

One participant indicated that she believed that memory was a bit of both, however, she then went on to say:

Everyone sort of has the ability to memorise, uh, but at the same time it needs to come naturally I think. (Participant 9)

This is a seemingly contradictory statement; however, it could mean that the participant believes that anyone can memorise music but that some people have more of an inclination for it than others.

The notion of memory being the result of both natural ability and taught skill was also mentioned by another participant:

I think it (memorisation) is also a talent but I think you can teach yourself to a certain extent. (Participant 2)

Furthermore, two participants (1 and 8) indicated that they believed that memorisation was a taught skill and not an inborn talent, both of which indicated that memorisation was their strengths:

Uh sjo, I think, I think a bit of both. No. it's a taught skill, I don't think it's an inborn thing. (Participant 8)

One of these participants (8) indicated that he was taught how to memorise. Participant 5 made no mention of memorisation and whether she thought of it as an inborn talent or taught skill.

Participants 2 and 5 who indicated that they were not taught how to sight-read but said that believed sight-reading it was an inborn talent. As these participants have not been taught to sight-reading, one can understand why they regard sight-reading as an inborn skill. Contrary to Participants 2 and 5, Participants 1, 3, 7, 8, 9 and 10 believe that sight-reading is a taught skill:

Sight-reading is more a taught thing. You can be taught how to read the notes, it's like reading a book or something. (Participant 7)

Of these participants, only Participant 1 had previously indicated that sight-reading was his strength, while none of these participants (1, 3, 7, 8, 9 and 10) were taught to sight-read other than the basics. One participant made no specific mention of his beliefs in this regard. He simply stated as follows:

I feel if you don't get the right, uh, stimulation with sight-reading, you won't be able to do it well. (Participant 8)

Subcategory 4: Participants' perceived belief about the worth of sight-reading or memorisation skills for performance

The participants were asked to judge sight-reading and memorisation skills in terms of a hierarchy to determine which they consider to be the most important for a performing musician. This was done in an attempt to determine if participants pay more attention to the skill that they believe is the most important aspect of a performing musician's career. Nine out of the ten participants commented on this question. Participants 1, 3, 5, 8 and 10 indicated that they felt that memorisation was the most important aspect for a performing musician, while Participants 2, 4, 6 and 9 indicated that they felt sight-reading was the most important skill performers should have.

I think if you're focusing on performance, then I would definitely think memory is you more important tool. (Participant 3)

Participant 10 commented that memory was most the important aspect for a performing musician: "because it's (performance) our life". Of the five participants who indicated that

memorisation was the most important, Participants 3 and 1 indicated that it depended on what a musician would like to do:

Only for solo work, I would maybe say memory is more important, uh, but accompanying, repetituring. I mean they rely on really good sight-reading ability, so I would say that. (3)

An interesting finding was that, of the participants (2, 4, 6 and 9) who indicated that sight-reading was the most important skill a performer should, only Participant 2 had previously indicated that it was his strength, while Participants 6 and 9 of the others had previously indicated that sight-reading was difficult for them:

I think, more important to sight-read. Cause, if you a performer and someone tells you, like ok, next week you have to play Beethoven sonata and then you can at least sight-read it and learn it instead of memorising it and taking long. (Participant 6)

There is a relationship between Participants 4, 6 who all had indicated that memorisation was one of their strengths. While Participants 2, 4 and 6 share a reliance on their aural abilities during piano playing endeavours.

Of the five participants (1, 3, 5, 8 and 10) who indicated that they believed that memorisation was the most important skill a performer should have, only four (3, 5, 8 and 10) had previously indicated that memorisation was their strength. Of those who indicated sight-reading was the most important (Participants 2, 4, 6 and 9), only Participant 2 had previously indicated that sight-reading was his strength. This indicates a weak correlation between strength and the perceived importance of either memorisation and/or sight-reading for performance.

Subcategory 5: The impact of stress or nerves on memorisation and sight-reading

It was interesting for me, as researcher, to note that nine of the participants interviewed mentioned stress and/or nerves without being explicitly asked about it. Although some participants indicated that they did not suffer from memory lapses, the majority indicated that they suffered from stress or nerves when performing and that this often influenced their playing. Of the ten participants, seven (2,5, 6, 7, 8, 9 and 10) indicated that stress negatively affected their performance. Of these, Participants 2, 5, 6, 7 and 10 also indicated that they suffered from memory lapses during a performance. Furthermore, Participants 2 and 5 indicated that, during a performance, they were confronted by the stress of remembering everything which added to the overall stress experienced during a performance:

I think it adds more stress because, uh, part of the stress of performing you have the stress of trying to remember your music. (Participant 2)

The physical manifestations of stress were mentioned by two participants (6 and 7) who indicated that their legs start shaking, making it difficult for them to pedal during the performance. One also mentioned that his hands start sweating when performing:

Ja, what sometimes happens is when I'm pedalling, then my foot shakes like, then it's a bit ... or my hands, my fingers start sweating. (Participant 6)

Furthermore, Participants 7, 8, and 10 mentioned that stress was a big factor to consider for sight-reading, as the more stressful the situation (such as “sight-reading in front of an audience”), the worse their sight-reading became. In contrast, one participant mentioned that he could only sight-read well when he was under stress, such as when he was in a rehearsal and he had not previously practiced the music.

Participants 9 and 10 discussed the stress of performance, referring specifically to the stress caused by the presence of an audience – usually consisting of peers and professionals. That is to say that their stress levels increased when they knew that their peers or an audience was listening:

It just adds to the stress I think, knowing that, for instance if you playing your exam, and you know that the person after you is listening and maybe they a better pianist. I guess it just adds to the stressful situation. (Participant 9)

In contrast to this, Participant 3 indicated that memorisation was easier to accomplish under pressure than sight-reading. Participant 10 mentioned that she delivered wonderful performances 80% of the time, while in about 20% of the performances everything went wrong. However, she attributed this to stress and not to memory lapses. Participant 4 is of the opinion that the more you perform the more comfortable you become as you remember that you like performing and then you sit and think about each note. What is interesting is that she generalised this statement to all musicians, assuming that they all enjoyed performing.

Participants 2, 6, 7, 8, 9 and 10 believed that playing from memory allowed them to express the music better and that sheet music could easily confuse one when playing on stage. In this regard, one of the participants made the most interesting comment:

You might, you went into an exam and you prepared with like your memory, but you still have a book in front of you let's say, but then you, something happens and you stumble and then you can't really get back to your place

even though you have a book in front of you. I think when you in that moment of, stress, I don't think either of them can help you. (Participant 9)

This shows that the participant believed that preparation beforehand either with or without a book was no match for stress. However, this statement also contradicts her previous statement in which she said that sight-reading was the most important skill to have as it provided a plan to fall back on should one experience a memory lapse:

What, uh, well just because with sight-reading there's much more flexibility in your performance as well. Whereas in memory when you memorise something, you sort of, uh, rely on just on your memory. And, uh, everything else falls away, cause as you were practicing you were relying on your memory so perhaps, if a memory lapse were to happen, during the performance then you have no other option. But, whereas, with sight-reading, it makes you more flexible so you, could have a plan b sort of ... to fall on. (Participant 9)

From the data, it is clear that for most pianists the most debilitating factor during a performance is stress, which not only has physical manifestations but often results in memory lapses.

Subcategory 6: Musical interpretation of a memorised performance

Although not all of the participants were explicitly questioned about this, many of them breached the subject when speaking about memorisation and relying on memory during performances. Six of the participants (2, 6, 7, 8, 9 and 10) mentioned that memorisation allowed them more “freedom of expression” in their performances as well as adding musicality to it. One participant said:

If I walk onto stage and I play from memory and it's all up to me, there's nothing telling me what I should do it's all up to me so I definitely think musicality is way more and the impact of the performance is way more. (Participant 10)

This statement was supported by the views of the five other participants who all agreed. These participants also mentioned the danger of being bound to sheet music during a performance:

Sometimes it (sheet music) can be a bit, it can throw you off, because you'll be playing from your memory and then you get lost and you look up and then you're completely lost. (Participant 6)

Another participant mentioned the following:

If I walk on stage with a book my performance is way more barred than if I walk onto stage and I play from memory. (Participant 10)

This is a view shared by Participants 2, 6, 7, 8, 9 and 10 all of whom agreed that sheet music could be a “distraction” when performing. Participants 7 and 10 also mentioned that memorisation allowed you to “put a little bit of yourself in the music”, which is not possible when reading music. In addition to this Participant 5 mentioned that memorisation allowed her to pay attention to the music and how it is communicated to the audience.

An interesting finding that arose was that Participants 2, 7 and 10 who had indicated that they suffered from stress and memory lapses also indicated that they believed that a memorised performance was better than a performance from sheet music.

4.2.3 Formative influences

Subcategory 1: The influence of teachers and lecturers

The participants were questioned about their teachers and lecturers to determine whether they had a significant influence on the participants and their abilities to memorise and sight-read music. Five of the participants (1, 3, 5, 8 and 10) indicated that they felt that their piano lecturer at university focused on memorisation. Participants 4 and 9 indicated that they felt that their lecturer focused on sight-reading, while Participants 6 and 7 indicated that their lecturers regarded sight-reading and memorisation as equally important. One participant said the following:

Considering the fact that you have to perform without your music, you have to know the piece by memory, I think its memory, But I think, maybe, they weigh up equally. (Participant 6)

One participant (5) mentioned that sight-reading was only ever done two weeks before an exam, while another participant (1) mentioned that he thought that practical teachers overlooked sight-reading as a skill. In line with this, Participant 3 commented as follows:

Ja, so it's (sight-reading) usually left to the end or it's left you know. So, that's why it makes sense that there are so many people that maybe can sight-read less well than they can memorise. (Participant 3)

An occurrence that was mentioned by Participants 1, 3 and 4 was that lecturers expected of students to take new pieces home, learn and study them and then to present these pieces to the best of their abilities the following week. The lecturer would then offer his or her help once the piece is presented again:

But I mean, you know, as soon as you sort of, ok standard, then its starts getting drilled into you, you know how to memorise and you must do this and that and next week I wanna hear it from memory and. So that's something that

we are more trained in because, especially because of the instrument we play. You know I mean its its its almost obligatory to to perform without music.
(Participant 3)

Three participants (5, 7, and 8) mentioned methods that were taught by lecturers or teachers. Participant 5 said that her lecturer focused on dividing the music into smaller sections and focusing on the key signatures, while Participants 7 and 8 mentioned their lecturers focused on learning a piece hands separately:

I started doing piano in grade 10, formally in, at school. And the teacher then would let me, uh, play without the sheet music. So yeah, I think so. And from there on I was taught to do it hands separately. (Participant 8)

Another participant made a very interesting comment regarding memorisation and being taught:

I suppose, when you're young, the teachers don't force you to memorise your pieces. But I mean, you know, as soon as you sort of ok standard then it starts getting drilled into you. (Participant 3)

One participant indicated that his lecturer taught him how to memorise properly and that made the process much easier for him.

But, since I started with Dr R. and she taught me to memorise, uh, hands apart and then put it together without the sheet music. Uh, that made the memory, uh, a lot better I think so I think I think it's a taught thing. (Participant 8)

It would appear that lecturers at university do not express their expectations outright, but rather expect piano students to be able to memorise and sight-read well. Considering that there is such a vast array of piano students from different walks of life with different levels of training, one would expect an approach that would enable those who do not yet have the skills to acquire them, and those who do have the skills to develop them further through instruction rather than self-study.

4.3 Negative case analysis

Creswell (2013:251) suggests negative case analysis to report any results that do not fit into a category of data, providing a realistic assessment of the studied phenomenon. This is done in an attempt to validate the qualitative research results in order to assess the accuracy of the data collected as described by the researcher and participants.

The majority of the participants interviewed provided answers that related to one another in some way, allowing for comparisons to be drawn. However, Participant 6, did not fit his

mould, as most of his answers and approaches varied greatly from those of the other participants. Despite the variance Participant 6 had some similarities with the other participants. This included memorisation being his strength, learning a piece hands separately, listening to the pieces for memorisation, internalising the music, focusing on the melody and acknowledging that memorisation has an aural aspect to it. This is summarised in table 4.5.

Table 4.5: Responses by Participant 6 compared to those of the other participants

	Memorisation has an aural aspect	Internalising the music	Listening to the pieces	Melody most important for memorisation	Playing hands separately	Identifying memorisation as the strength
1	X			X		
2		X				
3						X
4						X
5						
6	X	X	X	X	X	X
7					X	X
8					X	X
9						X
10			X			X

Participant 6 stated that he focused much more on the music than on the technical aspects:

I hear it, like, but what I realise is my, most of my pieces that I played, I never actually, uh, learnt it by: Ok this is a crotchet, semi-quaver you know, nananana. Like, it was, I listened to it and... I took it from there. (Participant 6)

He further said that he did not pay attention to small details in the music:

Like what I've also seen is, uh, for example, you had to ask me in this piece, what notes are at, bar 3, I wouldn't be able to tell you there's a E flat going to C to G you know, but my head knows.. what's going on. (Participant 6)

His method for memorising includes listening to the pieces, then relying on what he remembers as he works through the piece, instead of relying solely on the sheet music like his peers:

I find it better to like listen, to a, uh, piece of music and then memorise it.. Instead of playing playing playing it. (Participant 6)

This method explains why memorisation is his strength as he relies solely on aural abilities and memory. He further said that he only referred to the recordings if he struggled with the music and that he relied heavily on fixed points from which he could start after having made a mistake:

If I'm stuck, then I'll go back to, the music. Then I'll listen to and I'll replicate it. When I practice and I make a mistake and then I have to go back. I have a certain point. I can't just start anywhere. (Participant 6)

Throughout his interview, he emphasised how important it was to listen to the music to gain a holistic understanding of it that can be replicated by him:

So then on the other hand if you just start playing it without hearing it you following the rules, the rhythm everything. Then it won't be as ... Ok, if you listen to, let's say Chopin's Nocturne, five of them, then you get five different examples so you can work with that. But if you just play the piece and you start playing it and you learn it and that without any helping, ja then, I think, listening to them will make you play better. Like it's in a sense different. Ok for like bar 1. If You play it bar 1 one will be normal just as it says on the... sheet music. But when you had five bars 1's then it's a bit more, diverse. (Participant 6)

Another interesting view was his opinion that twentieth century music was easier to memorise than music from other genres:

Oh no I think that 20th century music is much easier. Just like, uh, ok classic I mean, uh, romantic music and all the other ones, they a bit more complex but the melody that plays in your head while you are playing is easier. But the technique, or the actual playing of this music is, better to memorise. (Participant 6)

As can be seen, this participant's approach to memorisation and piano music in general was not as technical as the approaches of his peers, and he was aware of this. However, he also seemed critical of overly technical approaches as he felt that the essence of the piece was lost as a result.

4.4 Conclusion

The findings of the interviews conducted with undergraduate piano students of varying ages are discussed in this chapter. The data were divided into three main categories with fifteen subcategories to portray the data as accurately as possible. Main category 1 had eight subcategories, main category 2 had six subcategories and main category 3 had one subcategory. In addition to this a negative case analysis was done to report data from a participant that differed from the others. This negative case analysis serves to report all data and not just those that fit specified categories. Throughout the interviews numerous participants mentioned that they found the questions difficult and a few had to think about the questions for a while before answering. In the following chapter the data is discussed in relation to existing literature.

Chapter 5

Discussion

5.1 Introduction

The tradition of performing from memory is a development brought on in the late nineteenth century with memorised performances given by Franz Liszt and Clara Schumann who, at the time, were regarded as arrogant and flamboyant (Mishra 2010:3). Despite its relatively recent inception, the tradition of performing from memory remains the accepted norm, which forces performing musicians to focus on memorising a piece and playing it flawlessly or else face humiliation and derision from their audience (Tomes 2007:2). This is especially true for soloists, such as pianists. Tomes (2007) mentions that she finds it unfair that this pressure is placed specifically on pianists and solo instrumentalists, but not on orchestras, conductors or chamber groups. The latter of which are not judged for playing or conducting with sheet music. She further states that most of the great music written by Chopin and Beethoven were not meant to be played from memory as the performer should not miss important score markings (Tomes 2007:2).

Sight-reading is still considered to be an invaluable skill a pianist should possess, despite the emphasis placed on memorised performances. According to the Marion Music Academy, sight-reading is one of the most important skills musicians should have as they are often placed in situations where they must perform music from sight in front of an audience or a student. This shows that sight-read performances are part of the everyday experiences of a musician, even though the practice of sight-read performances is no longer the norm. This points to the notion that pianists are at a disadvantage should they be inept at either sight-reading or memorising music.

The data from the analysis of the semi-structured interviews used in this are discussed in this chapter according to the main categories developed from the inductive data analysis process. This section serves to generate a theory by identifying common themes in the data gained from the respective participants. The data will also be used to draw comparisons between the categories and subcategories. Furthermore, where applicable, the data are related to relevant literature with the aim of placing this study in a broader research context. The discussion presented in this chapter aims to determine whether the data are sufficient to generate a

theory grounded in the data (grounded theory) as stated by Strauss and Corbin (1998) that researchers do not do not create data, but rather develop theories out of data.

5.2 Main category 1: Participant's self-appraisal of their abilities

The first main category to arise from the data is the participants' self-appraisal of their memorisation and sight-reading abilities with the subcategories being a) participants' self-perceived strengths, b) self-perceived ability for second instrument, c) self-reported aural abilities, d) the influence of genre on memorisation and sight-reading , e) self-reported memorisation and sight-reading abilities, f) participants' descriptions of their memorisation processes, g) participants' description of the sight-reading processes, and h) the relationship between memorisation and sight-reading. Pitts (2016:16) found that students valued their own musical ability in terms of reaching a higher level of musicianship rather than being confident in their existing abilities as musicians. The participants in this study generally seemed to have followed the same trend when assessing their own abilities.

It became apparent from the early stages of the study that the majority (7) of the participants indicated that their strength was memorisation. There are numerous factors that could have resulted in this response. One such factor includes the past experiences of the participants, which the data has shown significantly affects the participants. Two participants described their early experiences, which included listening to the teacher, remembering what was played and then playing it and being given pieces and told to memorise them within a month, which had significant effects on their abilities as pianists in later life. Consequently, these two participants indicated that they were adept at memorisation. A third participant, who indicated that she has experienced bad memory lapses when playing without a book, indicated that her strength was sight-reading because of that incident.

The predominance of memorisation as strength could also be due to the majority (9) of participants indicating that they did not receive training in memorisation in their formative or university years, despite the university requiring this of performance students. The reasoning behind this being that most students are self-taught because teachers do not actively teach methods of memorisation and the students must find ways in which to fulfil the university requirements of performance from memory, which is the norm for solo pianists (Tomes 2007:2). Furthermore, participants' self-perceived strength also seems to be connected to the majority of participants' beliefs that a memorised performance allows more freedom of musicality than a performance from a book. However, these issues will be discussed under

the second main category, which explored participants' past experiences, tuition received and musicality of a memorised performance.

In order to place their abilities for their first instrument into context, the participants were questioned about their abilities for their second instrument. They were also asked to determine whether or not they played a second instrument and whether this instrument was a keyboard instrument. Nine out of ten participants indicated that they played a second instrument, with seven of these still actively engaged in practicing their second instrument. Overall, it would appear as though participants were able to play their second instrument with ease and also found it easier than their first instrument because "there is only one line of music" (this statement was made by those participants who did not play a keyboard instrument as second instrument). The instruments played as second instruments included three keyboard instruments (one keyboard and two organs), two woodwinds, two strings, one voice and one brass instrument.

Furthermore, four participants indicated different strengths for their respective instruments. Two participants who had indicated that sight-reading was their strength for piano also indicated that memorisation was their strength for their second instruments, clarinet and cello respectively:

Actually, really good because it's one line It's not a lot of music that you have to memorise. So, I think comes easy to me. (Participant 1)

Two other participants indicated that memorisation was their strength for piano, but that sight-reading was their strength for their second instruments, saxophone and keyboard respectively:

With saxophone, my strongpoint there was the sight-reading. (Participant 6)

This is quite an unexpected finding as one would think that either memorisation or sight-reading would remain the participants' strength regardless of the instrument. At the time of this study no academic literature could be found on the topic of pianists who play other instruments alongside the piano. Some articles were found in popular psychology, most of which discussed the benefits and disadvantages of playing two instruments.

The data show that aural ability is a more important factor to be considered for first instrument than for second instrument. Six participants mentioned their reliance on aural skills in their first instrument as opposed to the three who mentioned it for their second

instrument. Three participants mentioned that they repeatedly listened to a piece before playing it in order to learn the piece and to know what to expect:

When I'm learning a piece, I listen to it every time I practice it you know, ja because, for me, it happens a lot quicker if I know what I'm supposed to be doing. (Participant 10)

This stands in agreement with the findings by Highben and Palmer (2004:6) who found that auditory practice, thus listening to a piece without playing it, improved a musician's performance of unfamiliar music. They also concluded from their data that aural abilities significantly affected and aided the memorisation of unfamiliar music (Highben & Palmer 2004:6). From the data in this study, similar trends are apparent as six of the ten participants mentioned employing aural skills when playing piano by either listening to recordings of the pieces beforehand, singing through the piece or hearing the piece while they play.

Bernardi, Schories, Jabusch, Colombo and Altenmüller (2009) studied mental practice and aural skills in pianists. They came to the conclusion that mental practice, which, in their study involved repeatedly listening to the piece, was directly proportional to a pianist's aural skills. In the current study, there was not enough data to substantiate this conclusion by Bernardi *et al.* (2009). However, the results of this study corroborate with other findings of Bernardi *et al.* (2009: 25) who conclude that mental practice/repeatedly listening to the piece is an invaluable tool for pianists. Three of the participants who indicated that they listened to the pieces before playing them, indicated that they did not suffer from memory lapses during performances, thereby showing the value of mental practice by listening to the pieces before playing.

From the data, it became clear that the participants considered the genre of music to be an important aspect when considering their memorisation and sight-reading abilities. They were required to judge which genre of music they found the easiest to memorise and sight-read in order to determine whether their memorisation skills were dependent on the genre of music. Overall, the data indicate that most participants found classical music easier to memorise and sight-read than other genres, with eight participants verifying this. Numerous reasons were given for this, such as the clear structure, homophony, functional harmony and Alberti bass. Moreover, one participant indicated that he found classical music easier to sight-read but romantic music easier to memorise. Another participant, who stood out from the rest, indicated that he found twentieth-century music easier to memorise than classical music because the technique employed in twentieth-century music was not as difficult as that of

classical or romantic music. However, this was not sufficient data to conclusively state that memorisation and sight-reading abilities were reliant on the genre of music.

At the time of this dissertation I could not find any studies specifically broaching the subject of memorisation and/or sight-reading and their respective relationships to the genre of music. However, in the literature no consistent genre of music or composer was mentioned in the exploration of sight-reading and memorisation. In the study by Bernardi *et al.* (2009:21) sonatas by Domenico Scarlatti, while in the study by Chaffin (2007:377) *Clair de Lune* by Claude Debussy were used in the analyses. In contrast to these studies, Gerling and Dos Santos (2015:4) employed music from the classical, romantic and twentieth-century music periods. This provides evidence that there might not be a link between memorisation and sight-reading ability and the genre of music. From the data in the current study there is evidence of a relationship between memorisation and sight-reading ability and the genre of music. However, the data relating to this is not substantive enough to support this claim as there was not enough detailed information gleaned on this subject.

Participants were requested to evaluate their sight-reading and memorisation abilities in order to gauge their self-perceived abilities with these constructs. This was also done to determine whether the participants found one aspect more challenging than the other. Overall it appears as though undergraduate music students find sight-reading a more challenging aspect than memorisation. Nine of the ten participants indicated that they did not experience any problems memorisation of a piece, while seven of these indicating that memorisation was their strength. In contrast to this only four participants indicated that they did not have any problems with sight-reading, three of which had previously indicated that sight-reading was their strength. Of all the participants, two indicated that they did not experience specific difficulties with either sight-reading or memorisation. When asked whether they deemed their sight-reading and memorisation abilities to be of equal standard, neither agreed. One stated that her strength was definitely sight-reading while the other seemed almost hesitant to answer before finally identifying memorisation as her strength.

Another finding was two participants, who not only indicated that memorisation is their strength but also expressed a desire to be better at sight-reading:

I wish that I was better prepared for sight-reading because it's sort of been my downfall. (10)

Both participants indicated that they did not suffer from memory lapses, pointing to a reliable memory in performance situations. It is interesting that they both felt so strongly about wishing to be better at sight-reading, especially when one considers that performances from memory are the accepted standard and that these two participants are easily able to fulfil this requirement with their memorisation capabilities.

Overall participants found it easier to describe their memorisation processes in detail than their sight-reading processes. Reasons for this could be the belief of the majority of the participants that memorisation was the most important skill a performer should have. Other reasons could include the indication that their lecturer(s) at university focused more on memorisation than they did on sight-reading or it could be attributed to the participants' view that playing from memory added to the musicality of a performance. Another reason for the detailed descriptions of their memorisation processes could also be due to the performance standards regarding memorisation. From the data, it was not possible to understand the students' reasons for not being able to describe their sight-reading abilities in as much detail as they did their memorisation abilities.

In order to further understand the memorisation abilities of the participants, they were asked to describe the methods they employ when memorising a piece. Majority of the participants (six) indicated that an important part of their memorisation process is repetition. According to Lehmann, Sloboda and Woody (2007: 118) this is an example of a term they coined "incidental memory" which occurs as a by-product of continually practicing or repeating the music. Klingenstein (2009:167) refers to this as remembering music, where students continually practice the music without being actively engaged with it. However, it should be noted that not all of the participants in this study simply repeated the music without actively engaging with it, many of them employed other techniques alongside the repetition of the music to help them memorise it (See Table 4.3 page 79). This combined or holistic approach to memorising was also discussed by Lehmann *et al.* (2017:117) who found that this approach better prepares a pianist for performance. Combining memorisation techniques also ensures that deliberate memory and not incidental memory is being used.

Five participants identified muscle memory as part of their memorisation technique, thus employing only one (tactile) of the four memories identified by Klingenstein (2009:168) as necessary to successfully memorise a piece. The data in this research study tie in with the findings by Mishra (2010:6) who concluded that, the authors that she analysed did not focus

on just one aspect of memorisation but rather advocated that pianists employ at least two or more memorisation techniques in order to memorise effectively.

Another aspect mentioned by six of the participants was dividing the music into sections before memorising it. This stands in agreement with the chunking techniques identified by Williamson (2014:174). Williamson states that pianists use their previous knowledge of scales, cadences, arpeggios and so on to chunk or split the music into meaningful sections, thus employing their schemata related to music. This was also found in the current study:

Ok, so it really depends on the music itself. Usually I'll maybe do it phrase for phrase, as a whole idea. (Participant 10)

Mishra (2010:11) identified analytic memory as one of the most important types of memory to employ when memorising a piece of music as it leads to a deeper understanding of the music through a thorough understanding of its parts and how they function as a whole. From the data in this study it is clear that analytic memory is an important aspect of participants' memorisation process. Seven of the participants, albeit it briefly in some cases, mentioned analysing the music before memorising it.

Three of the participants mentioned altering the tempo of the piece in order to memorise it. This is also mentioned by Wan (2008:75) who suggests using alternative methods to memorise pieces properly, which include altering the tempo and playing the piece as softly as possible. One participant in the current study mentioned playing the music as softly as possible in order to memorise it properly.

Furthermore, two participants identified three different aspects of memory. The first identified three of the four aspects of memory identified by Klingenstein (2009) and Mishra (2010), namely visual, aural and kinaesthetic memory. The second participant identified visual, aural and cognitive memory, which might be interpreted as analytic memory in Mishra (2010) and Klingenstein's (2009) model. However, only one of these participants mentioned that the three types of memory worked together in order memory to be effective; a conclusion also reached by Klingenstein (2009) and Mishra (2010).

Furthermore, three of the participants indicated that they memorised the music automatically. This implies that they go through the music without being actively engaged in it and are thus just remembering it, as Klingenstein (2009) puts it. Klingenstein (2009) further goes on to

state that the problem with remembering is that one forgets. This was also mentioned by one of the participants:

If I calmly learn the concerto and the more and more I play it, then it becomes automatic, which can also be dangerous. (Participant 10)

Overall the participants had a wide variety of methods for memorising music, most of which were mentioned previously in the literature. Aspects mentioned by the participants that were not found in the literature at the time include practicing hands separately, internalising the music, the length of the piece and naming certain chords in order to remember them. Lastly, there seemed to be no relationship between a participants' strengths and their methods of memorisation. All of the participants who indicated that they did not experience problems with memorisation used one or more of the methods discussed here. This indicates that a combination of methods or a holistic approach to memorisation is more beneficial to pianists (as recommended by Mishra (2010:8)) than simply relying on one method.

The participants were asked to describe their methods for sight-reading music in order to understand their methods and how these might be related to memorisation. Of the ten participants, six indicated that they struggled with rhythm when sight-reading. This is a problem also identified by Zhukov (2016), and Pike and Carter (2010), all of whom investigated interventions employed by researchers to improve the rhythmic element of sight-reading –thus pointing to evidence that rhythm is not only an important aspect of sight-reading, but an often neglected one. The results obtained by Zhukov (2016) indicate that rhythmic training should be combined with ensemble playing and style analysis. Whereas the results gleaned by Pike and Carter (2010) indicate that participants who received sight-reading training specifically focused on rhythmic training not only improved the rhythmic element of the participants' sight-reading, but also improved their continuity. The continuity and improved sight-reading aspect was also mentioned by a participant in this study:

You know, I suppose also getting the rhythm right is. I've noticed if your rhythm is right your notes somehow, I don't know how it works. Just end up being right as well. (Participant 3)

Another important aspect mentioned by the majority of participants was the element of regular practice to improve sight-reading. A similar finding was uncovered by Meinz and Hambrick (2010) who came to the conclusion that deliberate practice improves sight-reading abilities in pianists. However, their study also shows that working memory capacity is an

important factor to consider when dealing with sight-reading abilities, an aspect that did not feature in this study.

One participant mentioned that she was never formally taught to sight-read, but that she was told never to look at her hands and to read ahead, methods that Lehmann and McArthur (2002:139) claim expert sight-readers employ. In this light, this participant was told to employ methods that are used when one was already adept at sight-reading and not methods when one was still learning how to sight-read. This points to a shortcoming of teachers in South Africa, however, this will be discussed later in the chapter when looking at participants' tuition in memorisation and sight-reading.

In terms of chunking behaviour in sight-reading as discussed by Saxon (2009:23), none of the participants stated outright that they employed chunking techniques when sight-reading. However, some indicated that they analysed the music before reading it, while others mentioned their focus on accidentals and identifying difficult sections. This is similar to chunking techniques in which meaningful sections are created based on prior musical knowledge.

With regard to the relationship between memorisation and sight-reading, the data show that the participants are not convinced about the relationship between memorisation and sight-reading. Half of the participants believed the two elements were related, while the other half believed that they were separate entities. The article by Eric Street (1987:1) stands in favour of the participants who believe that the two skills are related. He states as follows: "The problems of the fluent reader who fears memorizing and the secure memorizer who sight reads badly are closely related". Lehmann and McArthur (2002: 24) also stand in agreement with this as they categorised memory as part of the "subskills needed for sight-reading". Although not stating it outright, they point to a relationship between the two skills as they go on to explain that repeatedly reading a piece improves its performance as fingering and repeated musical material is remembered (and memory for music essentially entails remembering musical material and the associated fingering).

Two participants indicated that they believed that the concepts "help(ed) each other out", but that they were not related. Despite their statements about the constructs being separate entities, their initial reactions showed that they believed there was a relationship between the two, however small. It was interesting to note that these two participants did not share a strength, however, both indicated that they did not find memorisation or sight-reading

particularly difficult. This could be as a result of their belief that the skills are separate entities as they would have spent an equal amount of time developing their memorisation and sight-reading skills to ensure a proficiency in both. In light of this it could be interpreted that seven participants believed that there was a relationship between the two, supporting Street's (1987:1) hypothesis and Lehmann and McArthur's (2002:24) suggestion that memorisation and sight-reading are related.

Further intriguing findings included the two participants who indicated that memorisation and sight-reading were so separate that memorisation was entirely possible without the ability to sight-read. It is intriguing because it implies that the participants do not regard sight-reading as necessary for memorisation. One of these participants had previously indicated that he relied heavily on his aural abilities for memorisation. This could explain why he believed that sight-reading was not necessary for memorising music; by listening to the music he got to know the music before learning it and thus does not need to read it to familiarise himself with it.

5.3 Main category 2: Reflexive engagement with memorisation and sight-reading

The second main category identified is the participants' reflexive engagement with memorisation and sight-reading. The subcategories are a) participants' past experiences with memorisation and sight-reading, b) participants' tuition in memorisation and sight-reading, c) perception of memorisation and sight-reading as natural ability or taught skills, d) participants' perceived belief about the worth of sight-reading or memorisation skills for performance, e) the impact of stress or nerves on memorisation and sight-reading, and f) the musical interpretation of a memorised piece. The data point to a relationship between the past experiences of participants and their current engagement with music in terms of sight-reading and/or memorisation. Overall, seven participants discussed their past experiences with sight-reading and/or memorisation, mentioning that they believed that it has had long term effects on their abilities. Those who were insecure about playing without a book turned out to be good sight-readers, while those who were forced to memorise or memorised as a child, are now adept at memorisation.

The data indicate that there is a connection between early experiences and ability as participants often recalled events regarding memorisation or sight-reading from their formative years. Experiences in high school were mentioned by four participants, two of whom only started playing piano in high school and two who explained their memorisation

expectation in high school and how it differed from those at university. Three participants mentioned their memorisation experiences from their younger years (ages five to seven). Ferro (1973:33), in describing key elements of the Suzuki method, emphasises the importance of the early experiences and development of children on their musical careers by stating that their formative influences and stimulation affect their engagement with music in later stages of their lives. Suzuki (1973:10) mentions the importance of early experiences and stimulation, referring specifically to parents who are the children's first teachers. In the current research, only one participant mentioned the influence of his mother on his musical career, explaining that she was his first music teacher. He goes on to explain that she forced him to memorise music, with the result being that his strength today is memorisation.

It would be easy to conclude that the lack of tuition in sight-reading or memorisation would be to the detriment of both, yet the results indicate the opposite. From the data, it is apparent that none of the participants were formally taught to sight-read music. Three participants mentioned being taught about the basics of sight-reading, such as the rhymes for the treble clef lines, checking the key signatures and difficult parts in the piece, but, apart from that, none were taught proper techniques for sight-reading such as identifying patterns using chunking techniques as identified by Pike and Carter (2010:231). Similar findings were uncovered by McPherson (1994:229). The results from his study show that very few of the high school students investigated received training in sight-reading or were aware that sight-reading could be improved by using certain simple strategies. In terms of memorisation in the current study, only one participant indicated that he was taught specific methods to memorise music. This participant also indicated that his strength was memorisation, hence the connection between his memorisation ability and his belief about it being taught, is strong. It is surprising to find that one out of ten participants was taught to memorise, while none of the ten were taught to sight-read. This points to a flaw in the teaching methods of South African music teachers. In his article, Saxon (2009:23) elaborates on detailed and concise methods and techniques that teachers and lecturers can employ to improve the sight-reading abilities of their students. He states that it is the teacher's responsibility to, not only teach these methods to students using understandable language, but also to ensure that they continuously practice the methods until they have mastered each one. This opinion is also shared by Klingenstein (2009:167) with regard to memorisation. She states that students have to be given specific instructions when taking on a task such as memorisation, otherwise they engage in ineffective, passive strategies that can often result in memory lapses. Yet, despite

this information, only one of the participants was taught to memorise by his lecturer, while none were taught to sight-read.

According to Saxon (2009:25) sight-reading can be incorporated into lessons even at a later stage of a musician's development. He states that: "First of all, sight-reading techniques can easily be incorporated into the curriculum of the college piano major, as well as the private piano student. All that is needed is a workable plan, a small sliver of lesson time and a consistent approach. Contrary to this, many of the participants in this study commented that sight-reading and memorisation was something that "you did yourself". Thus, their abilities in either sight-reading and or memorisation were the results of their own devotion to developing these two skills and not due to the efforts of their teachers or lecturers. This indicates that, despite the majority of students not being taught integral skills needed for becoming adequate pianists, they are still able to sight-read and/or memorise on a level that allows them to continue their studies with piano as first instrument.

The data indicate that there is a relationship between participants' lack of tuition in sight-reading and their views that sight-reading is a taught skill rather than an inborn talent as six participants indicated that they believed that sight-reading was a taught skill. Of the six participants, none were taught to sight-read. Two participants who had indicated that sight-reading was their strength and that they were not taught to sight-read, indicated that they believed that it was an inborn talent. This is understandable as these participants would have no other explanation for their sight-reading abilities as they were not taught to sight-read. In terms of memorisation, four participants indicated that they believed that memory was an inborn talent, all of whom identified memorisation as their strengths. Two participants indicated that they believed that memorisation was a taught skill, one of whom had indicated that he had been taught to memorise. This was also found by Mishra (2010:6) in her analysis of articles focusing on memorisation. The authors researched in her study came to the general conclusion that memorisation was considered to be a learned skill that could be acquired by all musicians. This view is shared by Suzuki (1973:11): "Musical ability is not an inborn talent but an ability which can be developed. Any child who is properly trained can develop musical ability, just as all children develop the ability to speak their mother tongue. The potential of every child is unlimited."

Two other participants indicated that they believed that memorisation was both a taught skill and a natural ability. This is somewhat contradictory; however, it could mean that the

participants believed that memorisation could be taught, but that the level of memorisation reached depended on the individual's natural propensity for it. One of the participants made no mention of this did not discuss her belief of memorisation and sight-reading being a natural ability or a taught skill. However, this participant did state that she felt that her abilities came naturally because she was never taught to do either.

According to Saxon (2009:25) sight-reading is the most important skill a performing musician should have as it not only improves techniques and memorisation ability, but it is the most useful tool for likely future careers such as teaching, ensemble playing and accompanying. The data do not indicate a strong correlation between the participants' perceived strengths and their views on the most important skill a performing pianist should have. Three of the participants who indicated that they felt that sight-reading was the most important skill also indicated previously that they believed that sight-reading was a taught skill and not an inborn talent. However, three is not a sufficient number of participants to credit this claim. Out of the nine participants that were questioned, five indicated that they felt that memorisation was the most important aspect for a performing musician, four of whom had indicated that memorisation was their strength. The other four participants indicated that they felt that sight-reading was the most important skill performers should have, three of whom had previously indicated that memorisation was their strength. There seems to some relationship between strength and the most important perceived skill needed for a performance, however, it was unexpected to find that three participants who indicated that memorisation was their strength also indicated that they believed that sight-reading was the most important for performance.

Like the five participants who favoured memorisation above sight-reading for a performance, Williamon and Egner (2004:36) are of the opinion that memorisation and performing from memory are indicative of musical expertise. Williamon and Egner (2004) further state that listening to a performance from memory is not only "astounding" but a "much cherished cultural experience". Their use of sensationalist language shows their belief that memorisation is a superior skill. This dichotomy found among the ten participants is also found in the literature on the subjects of memorisation and sight-reading. However, in contrast to the participants, the literature does not state outright that one skill is of greater importance than the other. It simply states that either sight-reading or memorisation is important for a performing musician.

Overall, it would appear that stress plays an important role in the sight-reading and memorisation abilities of the majority of the participants who raised the subject without being questioned about it directly. Although some participants indicated that they did not suffer from memory lapses, the majority indicated that they suffered from stress or nerves when performing, and that this often influenced their playing, resulting in memory lapses. Similar findings were uncovered by Hallam (1997:93) regarding anxiety experienced by participants performing from memory. The participants in Hallam's (1997) study often referred to cognitive strategies when struggling with memorisation as these provided more security as opposed to the kinaesthetic strategies. This was also mentioned by a participant in this research who indicated that he believed that relying solely on muscle memory caused one's thoughts to wander from the music.

Mishra (2010:8) mentions that factors causing memory lapses include an over reliance on kinaesthetic memory, becoming distracted during a performance, and stress or anxiety. This was also mentioned by participants who stated that one could not solely rely on muscle memory for performance. Another participant also mentioned that his memory lapses during performances were not due to him forgetting the music, but rather due to him "daydreaming".

Mishra (2010) further states that stress or anxiety might be due to the change of venue – from a practice space to a performance or concert hall – indicating that the physical appearance of the space also contains memory cues. One of the participants also made a comment regarding performance and practice spaces:

When you perform it sort of, you have to have the same sort of atmosphere, about you when you're practicing. (Participant 9)

When speaking about memorisation and relying on memory during performances, numerous participants mentioned musical interpretation. Six of the participants mentioned that memorisation allowed them more "freedom of expression" in their performances as well as increasing the musicality of the performances. Klingenstein (2009:166) shares the opinion that musicality is enhanced when music is memorised, further explaining that a memorised piece allows the performer to become more closely involved in the music. Many of the participants also indicated that sheet music could be a distraction during a performance and that it inhibited the extent to which the performer could personalise the music. This is again supported by Klingenstein (2009:166): "Many teachers feel that once students detach

themselves from the written notes, they are more able to play the music in an expressive manner.”

An interesting finding is that all of the participants who indicated that they suffered from stress and memory lapses also indicated that they believed that a memorised performance was better than a performance from sheet music. This belief is possibly strengthened by the standing tradition of performing from memory.

5.4 Main category 3: Formative influences

The third and final category identified from the data is the formative influences on the participants. The subcategory identified is the influence of lecturers and teachers on the participants. Participants were asked on which skill they felt that their lecturers at university focused on in order to gain more insight into the relationship between the participants' abilities and their lecturers' methods. Five of the participants indicated that they felt that their piano lecturers at university focused on memorisation. Two participants indicated that they felt that their lecturers focused on sight-reading, while two others indicated that they felt that both were of equal importance to their lecturers. Klingenstein (2009:166) provides evidence that many teachers favour memorisation for their students as it allows them to connect with the music on a deeper level. She further explains that teachers often expect of their students to take their pieces home and memorise them without giving them proper instruction on how to do this. This was also mentioned by many of the participants in this study. They stated that lecturers expected of students to take new pieces home, learn and study them and then to present these pieces to the best of their abilities in the following week.

Literature pertaining to teacher-pupil relationships indicates that it is very important when considering instrumental tuition. Hallam (2006:167) states that music tuition is centred around the teacher rather than the student. The teacher chooses the piece and tells the student how to play and interpret it. The teacher speaks for most of the lesson while the student's input is limited to playing the instrument. This practice of teacher-centred teaching was mentioned by most of the participants who received this kind of tuition at university and, for some, in high school. Hallam (2006: 176) further states that pupil-teacher relationships are integral in establishing the level of musical expertise a pupil is able to achieve. Considering this, it would be expected that teachers value student-teacher relationships more and would be more willing to try alternative teaching methods.

5.5 Negative case analysis

The majority (9) of the participants interviewed provided answers that related to one another in some way, allowing for comparisons to be drawn. However, the responses from Participant 6 were completely different. His focused mainly on listening to the music he is to perform and then to recreate it on the piano. He indicated that he did not rely on sheet music and did not suffer from memory lapses. It is understandable that he indicated that memorisation was his strength and that his aural skills were of a good standard. It is interesting to note that Klingenstein (2009:169) advocates aural skills for memory. She states that aural memory provides a solid tool for preventing memory slips. If a student is able to hear what should come next, s/he can easily recover from a memory slip and keep moving forward.

This method of listening to the piece before playing it is one of the key points of the Suzuki method (Suzuki 1973). He argues that the child's ear for music, and the piece in particular, will develop in direct proportion to the number of times the piece was heard. Suzuki further states that audible music is absorbed by human beings and become part of their abilities (Suzuki 1973:13). Participant 6 was also convinced that the best way to learn music was to listen to it over and over again, before, during and after practicing.

It could be concluded that the methods employed by Participant 6, although different from all those employed by the other participants, were most closely associated with the methods employed in the Suzuki method. Despite not following the Suzuki methods precisely, there are numerous overlapping techniques between the Suzuki methods and those employed by Participant 6.

5.6 Conclusion

It would appear that there is no direct connection between age group or year of undergraduate studies and memorisation and sight-reading abilities. The majority (7) of the participants were able to memorise without great difficulty, however, sight-reading seemed to be more of a problem with only four participants claiming that sight-reading was "good" or "not a problem" for them. The data also indicate that there is some relationship between memorisation and aural abilities as four of the six participants who indicated that aural abilities were important for playing, indicated memorisation as their strength, while only three participants indicated that sight-reading was their strength. However, more data are needed to substantiate this. Participants were able to describe their memorisation processes in more detail than their sight-reading processes, which could be attributed to the requirements

of performers to perform faultlessly from memory. Past experiences with memorisation and sight-reading, which include experiences of student-teacher relationships, which is often neglected by teachers and lecturers alike, have long term effects on these skills in the participants.

Furthermore, participants' abilities are negatively affected by stress or anxiety. However, their lack of tuition in methods to master memorisation and sight-reading abilities have not prohibited them from studying piano at university level, thus the absence of educational methods for sight-reading or memorisation does not determine participants' skill in these. In order to compensate for their lack of tuition in memorisation and sight-reading methods, participants employ a range of methods. For memorisation these include repetition, analysis, varying the tempo, pattern identification and dividing the music into sections. For sight-reading music participants employ methods such as analysis, focusing on accidentals and sight-reading often. Overall it would appear that the majority (7) of the participants believed that there was a relationship between the two skills. Some indicated that, although they could be viewed as separate entities, they still influenced each other.

Chapter 6

Conclusions, theory and recommendations

6.1 Introduction

The aim of this study was to explore the self-reported abilities of undergraduate music students to understand their processes and beliefs about the constructs of memorisation and sight-reading. This was done in an attempt to determine whether a relationship exists between memorisation and sight-reading ability in undergraduate music students. This study focused on how the students acquired these two skills, their processes when memorising and sight-reading, their perceptions of the skills and other influences that could affect their abilities and beliefs.

In the previous chapters I discuss the existing literature, the methodology employed in this study, the results obtained and a discussion about how the results are linked to the literature. At the time of this study, it was found that there was a gap in the literature regarding the relationship between memorisation and sight-reading in undergraduate students, the impact of playing a second instrument on these skills, and the self-perceived strengths of pianists. The bulk of the literature focuses on the two skills as separate entities, discussing methods of teaching sight-reading and memorisation, and the value of these skills to performing musicians, especially pianists. There is a paucity of literature available on a relationship or the possibility of a relationship between the two skills. Two sources that mention a relationship between the two skills are those by Street (1987), and Lehmann and McArthur (2002). The article by Street (1987:1) explains the relationship between the two constructs, stating that memorisation and sight-reading ability in pianists are related, while the study by Lehmann and McArthur (2002:24) points to a relationship between the two, although they do not state this outright. Instead, they classify memorisation as an important “subskill” of sight-reading. This implies that sight-reading cannot be achieved successfully without memorisation, hence the two are related. Interestingly, neither Lehmann and McArthur (2002), nor other authors mention sight-reading as a “subskill” of memorisation. The value of the current study is that it is the first to qualitatively explore the possibility of a relationship between memorisation and sight-reading.

This chapter serves to conclude this research by answering the research questions, generating a preliminary theory based on the data, stating the limitations of the study and providing recommendations for future studies.

6.2 Research questions

Before answering the main research question: “What is the self-reported ability and relationship between memorisation and sight-reading in undergraduate music students?”, I will first address the secondary research questions. These questions are related to the constructs of memorisation and sight-reading and serve to help me understand how undergraduate students acquired and develop these skills and if they believed there is a relationship between them.

6.2.1 Secondary research questions

How are memorisation and sight-reading skills acquired?

The categories related to this question are: participants’ past experiences with memorisation and sight-reading, participant’s tuition in memorisation and sight-reading, musical interpretation of a memorised performance, perception of memorisation and sight-reading as natural ability or taught skills, and participants’ perceived beliefs about the worth of sight-reading or memorisation skills for performance.

The data shows that very few participants were specifically taught to memorise and sight-read music. Some of the participants mentioned being taught the basics of music such as the rhymes for the lines and spaces, checking the accidentals and identifying difficult parts in the music, none of which were specifically used for the improvement of sight-reading skills. With regard to memorisation, only one participant indicated that he had been taught to memorise music. The others indicated that they learnt it without thinking about it in statements such as “It came naturally” or “I never really thought about it, it just happened”. This implies that most of the participants’ knowledge and abilities in sight-reading and memorisation were self-taught. Participant indicated that they believed that both memorisation (five participants) and sight-reading (four participants) is the most important skill a musician should have. Considering this and the results that show that they were not taught to do either, it comes as no surprise that the participants had to take it upon themselves to become proficient in these areas to the extent where they can function successfully in a department of music at a tertiary institution.

Overall six participants indicated that a memorised performance allowed them more freedom of expression. This also explains the participants' need to become adept at memorisation without having been taught as the alternative would result in a restricted performance based on the sheet music in front of the performer.

Judging from the participants' early experiences, their skills or lack thereof can partly be attributed to their past experiences. These experiences include the participants' first teachers and performances. Enjoyable, self-discovery, competitive experiences led to the participants being adept at a skill while those that induced fear, were deemed tedious or were omitted by the teachers, resulting in participants experiencing difficulties with that skill. This is especially true for sight-reading, which was often omitted by teachers and lecturers alike.

To answer the research sub-question, the participants acquired their skills mostly through self-study, augmented by past experiences and possibly motivated by performance practice standards of today (performing from memory).

In what way are memorisation and sight-reading skills related?

The categories related to this question are: self-perceived strengths, the relationship between memorisation and sight-reading, participants' tuition in memorisation and sight-reading, and the influence of genre on memorisation and sight-reading

At first glance, it appeared that half of the participants believed that the skills were related in some way while the others stated that they believed that the skills were two entirely different entities. However, two participants who indicated that they believed that the two skills were different entities also pointed out that they were related and could enhance each other. Seven of the participants believed that the two constructs were related in some way, albeit it weakly. This is confirmed by the data as none of the participants indicated that they had an equal propensity for both, as the all clearly identified either one or the other as their strength. Two of the participants indicated that they were not entirely comfortable with speaking about themselves, thus a hesitation to describe themselves might have inhibited them from stating an outright efficacy in both. Regardless of this, eight participants indicated, without hesitation, one or the other as their strength.

According to the participants it seemed that the two skills were related in terms of music genre. Most (eight) of the participants indicated that classical music was easier to sight-read and memorise due to its homophonic texture, clear melodies and predictable harmonies.

An unexpected relationship between the two constructs was the participants' lack of tuition in effective memorisation and sight-reading techniques. Of the ten participants, only one had indicated that he was taught to memorise. Thus, despite the two skills being deemed invaluable for pianists, not only in the literature but also by the participants and their lecturers, neither skill was specifically taught.

To answer the research question, five of the participants felt that the two skills were related in some way. From the data, it is clear that the skills are further related in terms of music genre and the participants' lack of tuition in effective techniques for either skill.

How do music students develop memorisation and sight-reading skills?

The categories related to this question are: participants' descriptions of their memorisation processes, participants' descriptions of their sight-reading processes, the influence of teachers and lecturers and participants' perceived belief about the worth of sight-reading or memorisation skills for performance.

The data show that students, although not being taught specific techniques, develop the skills as best they are able. This is more applicable to memorisation than to sight-reading. Although six of the ten participants indicated that sight-reading improved with practice, only four indicated that they sight-read often. With regard to memorisation, the main methods mentioned for practicing memorisation skills were repetition, analysis of the music, relying on muscle memory and aural skills. The main methods mentioned for practicing sight-reading were analysis and identifying accidentals. The main problem regarding sight-reading identified by participants was the rhythm, which concurs with findings by Zhukov (2016) and Pike and Carter (2010). The majority (6) of the participants believed that sight-reading improved with the frequency at which it is done, despite which, very few of the participants indicated that they actively practiced sight-reading.

Overall, the development of the participants' sight-reading and memorisation skills are reliant on their own efforts with minimal input from lecturers. Participants mentioned one lecturer who put in more effort than the others, but ultimately the responsibility of developing sight-reading and memorisation skills was mostly left to the participants' own initiative. This could also explain why many indicated memorisation and not sight-reading as their strength, as memorisation is expected for most performances and exams in departments of music, whereas sight-reading is not.

In what way does sight-reading ability affect memorisation ability and vice versa?

The data indicate that seven participants believed that the two skills impacted each other in some way or another. One participant said that memorisation was not possible without sight-reading, while another said that memorisation was entirely possible without being able to sight-read.

From the data it we see that, of the participants who stated that sight-reading was their strength, only one struggled with memorisation while the other two experienced no problems in this regard. Hence, two of the three participants who indicated sight-reading as their strength were able to memorise sufficiently. Of the seven participants who indicated that memorisation was their strength, six indicated that they struggled with sight-reading. This points to the possibility that well-developed memorisation skills might be to the detriment of sight-reading skills, but that well-developed sight-reading skills benefit memorisation ability. This could be due to the fact that performers were forced to develop memorisation skills for solo performances. The results of this study further show that sight-reading was and is neglected not only by students but also by teachers and lecturers.

6.2.1 Primary research question

The primary research question of this study is: “What is the self-reported ability and relationship between memorisation and sight-reading in undergraduate music students?” The research shows that most of the participants possessed reasonably well-developed ability to memorise, as nine of the ten participants indicated that they had adequate memorisation skills. In terms of sight-reading, the minority of the participants indicated that they had well-developed sight-reading skills, with only four of the participants who indicated that they did not experience problems with regard to sight-reading. Seven participants indicated that they believed that the two skills were related. The participants believed that the two skills were related to each other in terms of genre, as eight participants indicated that the classical genre was easier to sight-read and memorise than other genres.

Lastly, the two skills are related to the extent that participants never received tuition in either skill. The participants felt that their skills were not adequately developed as they were not taught efficient techniques specifically related to successful memorisation and/or sight-reading of music.

6.3 The theory relating to the study

The following preliminary theory can be suggested from the data regarding the participants' strengths, self-assessment of their abilities, and past experiences: *Music students who have well-developed skills in sight-reading are less likely to struggle with memorisation tasks, while those who have well-developed memorisation abilities struggle with sight-reading tasks.* Strauss and Corbin (1990:423) state that grounded theory invites a theory that is uncovered, developed, conditionally proven through data collection and analysis of data related to the phenomena in question. This preliminary theory is based on the data which show that most participants are able to memorise without great difficulty, but find sight-reading difficult. Further evidence to support this theory is that seven of the ten participants indicated that memorisation was their strength, the participants' detailed descriptions of their memorisation processes and the majority indicating that the two skills were related.

6.4 Limitations of the study

This study aimed to explore the possibility of a relationship between memorisation and sight-reading skills in undergraduate music students through interviews with participants. During the research process, numerous challenges were encountered.

Due to the small sample the results might not be generalised to a larger population or even to undergraduate music students in Departments of Music at other tertiary institutions in South Africa or internationally.

As the interviews were conducted in English, this was another limitation to the study. Not all of the participants were confident in speaking English. Three interviews were done in Afrikaans at the participants' requests while the others were completed in English. Of those that were conducted in English, two participants were native Afrikaans speakers and struggled to express themselves adequately in English. Despite being given the option to express themselves in Afrikaans they preferred speaking in English as far as possible.

Further limitations include the distribution of the participants across the year groups. Ideally an equal number of participants from each year group would have been preferred. However, the participants who were able to participate in the interviews were three first year students, four second year students, one third year student and two fourth year students.

Another limitation of the study is that many of the participants experienced the interview questions as quite difficult and that they were unsure whether or not they were able to fully answer the questions.

6.5 Recommendations for future research

Future research could include a larger sample, including undergraduate and postgraduate students and lecturers, in order to gain insight into the topic from numerous different angles. I would also recommend that a pilot study should be conducted or that questions are provided to the participants before the commencement of the interviews to allow them time to prepare.

Another interesting avenue that could be pursued is to investigate how the playing of a second instrument could affect pianists' abilities and experiences as musicians. Lastly, when speaking of musical abilities, emotions often become part of the discussion. It could be interesting to investigate whether and to what extent musician's abilities are influenced by their emotional states.

6.5 Conclusion

The theory identified from this research: *Music students who have well-developed skills in sight-reading are less likely to struggle with memorisation tasks, while those who have well-developed memorisation abilities struggle with sight-reading tasks*, shows that undergraduate music students employ a wide range of techniques when memorising and sight-reading music. Despite none of the participants being taught to sight-read and memorise, most of them are able to function effectively within a Department of Music at a tertiary institution. The data and literature were approached within a conceptual framework based on constructivism and schemata. From the data, it can be seen that participants' previous experiences and schemata for music, such as scales, keys and historical knowledge, allowed them to memorise and sight-read by analysing the music, dividing it into sections and identify patterns. From a constructivist perspective, it is interesting to see that no two participants employed exactly the same methods when memorising or sight-reading. Each had their own formula for memorising and sight-reading music.

Further interesting results from the study include: the relationship between participants' reliance on aural abilities for memorisation and their lack of memory lapses during performances; the impact of stress on sight-reading and memorisation; participants' strengths and their experiences of second instrument practices; and the finding that none of the

participants believed they had an equal propensity for both sight-reading and memorisation. From the interviews it became evident that many participants struggled with the questions and found it difficult to express themselves clearly. This was evident from the participants' hesitations and stuttering, alongside comments on how difficult the questions are. It is clear that these are issues that undergraduate students do not focus on or think about routinely.

Importantly, the data show that the participants were not taught to sight-read or memorise music (except for one who was taught to memorise). This result leads one to question teachers' knowledge of sight-reading and memorisation and the value they place on the development of these skills in music lessons. Further studies are needed to explore teachers' perception of the skills and the effect of early music lessons on the abilities of musicians in their later years.

In conclusion, this study formulated a preliminary theory which could be tested in other similar situations with larger samples. This study has provided valuable information regarding the beliefs, practices and experiences of undergraduate music students with regard to memorisation and sight-reading.

Sources

Aiello, R. & Williamon, A. 2002. Memory. In *The science and psychology of music performance*, edited by R. Parncutt & G. E. McPherson. Oxford: Oxford University Press: 167–182.

Alternmüller, E., Fahle, M. & Rosemann, S. 2016. The art of sight-reading: influence of practice, playing tempo, complexity and cognitive skills on the eye-hand span in pianists. *Psychology of Music*, 44(4):658–673.

Backlin, W. & Mishra, J. 2007. The effects of altering environmental and instrumental context on the performance of memorized music. *Psychology of Music*, 35(3):453–472.

Beals, D. E. 1998. Reappropriating schema: conceptions of development from Bartlett and Bathkin. *Mind, Culture and Activity*, 5(1):3–24.

Bernardi, N. F., Schories, A., Jabusch, H.C., Colombo, B. & Alternmüller, E. 2009. Mental practice in music memorization: an ecological-empirical study. *Proceedings of the 7th Triennial Conference of European Society for the Cognitive Sciences of Music (ESCOM)*. Jyväskylä, s.n.:20–27.

Böhm, A. 2004. Theoretical coding: text analysis in grounded theory. In *A companion to qualitative research*, edited by U. Flick, E. Kardoff & I. Steinke. London: SAGE publications:270–275.

Brandfonbrener, A. G. 2001. Memorialization: a learned skill or an inborn talent? *Medical Problems of Performing Artists*, 16(3):83–84.

Brochard, R., Dufour, A. & Despres, O. 2003. Effect of musical expertise on visuospatial abilities: evidence from reaction times and mental imagery. *Brain and Cognition*, 54(2):103–109.

Chaffin, R. 2007. *Learning Clair de Lune: retrieval practice and expert memorization*. Mansfield, CT: University of Connecticut.

Chaffin, R., Logan, T. & Begosh, K. 2009. Performing from memory. In *The Oxford handbook of music psychology*, edited by S. Hallam, I. Cross & M. Thaut. New York, NY: Oxford University Press:352–363.

- Charmaz, K. 2006. *Constructing grounded theory: a practical guide through qualitative analysis*. London: Sage.
- Charmaz, K. 2012. Reconstructing grounded theory. In *SAGE handbook of social research methods*, edited by P. Alasuutari, L. Bickman & J. Brannen. London: SAGE Publications:461–478.
- Cook, N. 2000. *Music: a very short introduction*. New York, NY: Oxford University Press.
- Creswell, J. W. 2013. *Qualitative inquiry and research design: choosing among five principles*. Los Angeles, CA: SAGE Publications.
- De Vos, A. 2011. *Research at grass roots: for the social sciences and human services profession*. 4th edition. Pretoria: Van Schaik.
- Denscombe, M. 2010. *Ground rules for social research*. Berkshire: McGraw-Hill Open University Press.
- Durrheim, K. 2006. Research design. In *Research in practice*, edited by M. Terre Blanche, K. Durrheim & D. Painter. Cape Town: University of Cape Town Press:33–59.
- Eaves, Y. D. 2001. A synthesis technique for grounded theory data analysis. *Journal of Advanced Nursing*, 35(5):654–663.
- Ericsson, A. E. & Lehmann, A. C. 1993. Sight-reading ability of expert pianists in the context of piano accompanying. *Psychomusicology*, 12(2):182–195.
- Ferro, M. 1973. The psychology of early learning. In *The Suzuki concept: an introduction to successful method for early music education*, edited by E. Mills, T.C. Murphy and M. Honda. Berkeley, CA: Diablo:33–42.
- Flohr, J. W. & Trollinger, V. L. 2010. *Music in elementary education*. Boston, MA: Prentice Hall.
- Gerling, C. C. & Dos Santos, R. A. T. 2015. How do undergraduate piano students memorize their repertoire?. *International Journal of Music Education*, 35(1):1–19.
- Gilbert, A. 2011. Thinking. In *Psychology: an introduction*, edited by L. Swartz, C. de la Rey, N. Duncan & L. Townsend. Cape Town: Oxford University Press:245–258.

- Green, B. 2010. Understand schema, understand difference. *Journal of Instructional Psychology*, 37(2):133–145.
- Hallam, S. 2006. *Music psychology in education*. London: Bedford Way Papers.
- Hallberg, L, R-M. 2009. The core category of grounded theory: making constant comparisons. *International Journal of Qualitative Studies on Health and Well-Being*. 1(3):141-148.
- Hartley, J. 1994. Case studies in organizational research. In *Qualitative methods in organizational research: a practical guide*, edited by C. Cassell & G. Symon. London: Sage Publications:208–229.
- Highben, Z. & Palmer, C. 2004. Effects of auditory and motor mental practice in memorised piano performance. *Bulletin of the Council for Research in Music Education*, 159:1–8.
- Hodges, D. & Sebald, D. 2011. *Music in the human experience: an introduction to music psychology*. New York, NY: Routledge.
- Holmes, J. n.d. *Your guide to ABRSM music exams*. Available at: <http://za.abrsm.org/resources/theseMusicExams0607.pdf> (accessed on 14 November 2016).
- Hopf, C. 2004. Research ethics and qualitative research. In *A companion to qualitative research*, edited by U. Flick, E. von Kardorff & I. Steinke. London: Sage Publications:334–339.
- Imreh, G., Chaffin, R. & Crawford, M. 2002. *Practicing perfection: memory and piano performance*. London: Lawrence Erlbaum Associates.
- Kemp, S. 2015–2017. *Trinity College London piano syllabus*. London: Trinity College.
- Klingenstein, B. G. 2009. *The independent piano teacher's studio handbook*. Milwaukee, WI: Hal Leonard.
- Kopiez, R. & In Lee, J. 2006. Towards a dynamic model of skills involved in sight-reading music. *Music Education Research*, 8(1):97–120.
- Kumar, R. 2014. *Research methodology: a step by step guide for beginners*. 4th edition. Thousand Oaks, CA: Sage Publications.

- Lawrence, J. & Tar, U. 2013. The use of grounded theory technique as a practical tool for qualitative data collection and analysis. *The Electronic Journal of Business Research Methods*, 11(1):29–40.
- Lehmann, A. C. & McArthur, V. 2002. Sight-reading. In *The Science and Psychology of Music Performance*, edited by R. Parncutt & G. E. McPherson. Oxford: Oxford University Press:135–150.
- Lehmann, A. C., Sloboda, J. A. & Woody, R. H. 2007. *Psychology for musicians*. New York, NY: Oxford University Press.
- Levitin, D. 2007. *This is your brain on music: understand a human obsession*. London: Atlantic.
- Lo, S. Y. 1993. *A reading course for Suzuki piano students*. Texas: Texas Tech University.
- Maree, K. & Van der Westhuizen, C. 2007. Planning a research proposal. In *First steps in research* edited by K. Maree. Pretoria: Van Schaik:24–46.
- Mays, N. & Pope, C. 1995. Rigour and qualitative research. *BMI*, 311(6997):109–12.
- McBride, S. M. & Arkatov, S. R. 2016. The teaching legacy of Rosina Lhevinne part II. *Clavier Companion*, 8(1):69–71.
- McPherson, G. 1994. Factors and abilities influencing sightreading skill in music. *Journal of Research in Music Education*, 42(3):217–231.
- McVee, M. B., Dunsmore, K. & Gavelek, J. R. 2005. Schema theory revisited. *Review of Educational Research*, 75(4):531–566.
- Meinz, E. J. & Hambrick, D. Z. 2010. Deliberate practice is necessary but not sufficient to explain individual differences in piano sight-reading skill: the role of working memory capacity. *Psychological Science*, 21(7):914–919.
- Merkens, H. 2004. Selection procedures, sampling, case construction. In *A Companion to Qualitative Research*, edited by U. Flick, E. van Kardorff & I. Steinke. London: Sage Publications:165–171.

- Mills, H. & Mills, E. 1973. Practical suggestions for teachers on reading. In *The Suzuki concepts: an introduction to a successful method for early music education*, edited by E. Mills, T. C. Murphy and M. Honda. Berkeley, CA: Diablo: 158–203.
- Mishra, J. 2010. A century of memorization pedagogy. *Journal of Historical Research in Music Education*, 32(1):3–18.
- Mishra, J. 2013. Factors relating to sight-reading ability: a meta-analysis. *Journal of Research in Music Education*, 61(4):452–465.
- Mishra, J. 2016. Rhythmic and melodic sight-reading interventions: two meta-analyses. *Psychology of Music*, 44(5):1082–1094.
- Nieuwenhuis, J. 2007(a). Introducing qualitative research. In *First Steps in Research*, edited by K. Maree. Pretoria: Van Schaik:47–69.
- Nieuwenhuis, J. 2007(b). Qualitative research designs and data gathering techniques. In *First Steps in Research*, edited by K. Maree. Pretoria: Van Schaik:70–98.
- Noice, H., Jeffrey, J., Noice, T. & Chaffin, R. 2008. Memorisation by a jazz musician: a case study. *Psychology of Music*, 36(1):63–79.
- Passer, M., Smith, R., Holt, N., Bremner, A., Sutherland, E., & Vlieg, M. L. W. 2009. *Psychology: the Science of Mind and Behaviour*. Berkshire: McGraw-Hill.
- Phelps, R. P., Sadoff, R. H., Warburton, E. C. & Ferrara, L. 2005. *A guide to research in music education*. 5th edition. Lanham: Scarecrow.
- Pike, P. 2012. Sight-reading strategies for the beginning and intermediate piano student: a fresh look at a familiar topic. *American Music Teacher*, 61(4):23–28.
- Pike, P. D. & Carter, R. 2010. Employing cognitive chunking techniques to enhance sight-reading performance of undergraduate group of piano students. *International Journal of Music Education*, 28(3):231–246.
- Pitts, S. 2016. *Valuing musical participation*. London: Routledge.
- Roberts, C. M. 2010. *The dissertation journey*. Thousand Oaks, CA: Corwin.

- Robson, C. 1999. *Real world research: a resource for social scientists and practitioner-researchers*. Oxford: Blackwell.
- Saldana, J. 2016. *The coding manual for qualitative researchers*. London: SAGE.
- Saxon, K. 2009. The science of sight-reading. *American Music Teacher*, 58(6):22–25.
- Schmidt, C. 2004. The analysis of semi-structured interviews. In *A companion to qualitative research*, edited by U. Flick, E. von Kardorff & I. Steinke. London: Sage Publications:253–258.
- Shenton, A. K. 2004. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22(2):63–75.
- Shoemaker, K. & Pike, P. D. 2013. The effect of distance learning on acquisition of piano sight-reading skills. *Journal of Music, Technology and Education*, 6(2):147–162.
- Shore, B. 1998. *Culture in mind: cognition, culture and the problem of meaning*. New York, NY: Oxford University Press.
- Snyder, B. 2009. Memory for music. In *The Oxford handbook of music psychology*, edited by S. Hallam, I. Cross & M. Thaut. New York, NY: Oxford University Press:107–116.
- Spangenberg, E. R., Grohmann, B. & Sprott, D. E. 2005. It's beginning to smell (and sound) a lot like Christmas:the interactive effects of ambient scent and music in a retail setting. *Journal of Business Research*, 58(11):1583–1589.
- Strauss, A. L. & Glaser, B. G. 1967. *The discovery of grounded theory: strategies for qualitative research*. Chicago, IL: Aldine.
- Strauss, A. & Corbin, J. 1990. Grounded theory research: procedures, canons and evaluative criteria. *Zeitschrift für Soziologie*, 19(6):418–427.
- Street, E. 1987. Bridging the gap between sight-reading and memorizing. *Music Teachers National Association*, 37(2):32–33.
- Suzuki, S. 1973. Children can develop their ability to the highest standard. In *The Suzuki concept: an introduction to a successful method for early music education*, edited by E. Mills & T. C. Murphy. Berkeley, CA: Diablo:9–16.

- Tan, S.-L., Pfordresher, P. & Harre, R. 2010. *Psychology of music: from sound to significance*. New York, NY: Psychology.
- Tomes, S. 2007. All in the mind. *The guardian*, 20 April. Available at: <https://www.theguardian.com/music/2007/apr/20/classicalmusicandopera1> (accessed on 15 January 2017).
- Trinity College London piano syllabus 2015-2017*. London: Trinity College.
- Van Ommen, C. 2011. Memory. In *Psychology: an introduction*, edited by L. Swartz, C. de la Rey, N. Duncan & L. Townsend. Cape Town: Oxford University Press:271–281.
- Wan, H. Y. A. 2008. *Physical and mental issues in piano performance*. Saarbrücken: Verlag Dr Muler Aktiengesellschaft.
- Wiggins, J. & Espeland, M. 2010. Creating in music learning contexts. In *The Oxford handbook of music education*, edited by G. E. McPherson & G. F. Welch. New York, NY: Oxford University Press: 341–360.
- Williamon, A. & Egner, T. 2004. Memory structures for encoding and retrieving a piece of music: an ERP investigation. *Cognitive Brain Research*, 22(1):36–44.
- Williamson, V. 2014. *You are the music: how music reveals what it means to be human*. London: Icon.
- Yamada, R. & Itsukushima, Y. 2013. The schema provokes a disparity of false recollection between actions and objects in an everyday scene. *Scandinavian Journal of Psychology*, 54(4):276–282.
- Zhukov, K. 2014. Exploring advanced piano students' approach to sight-reading. *International Journal of Music Education*, 32(4):487–498.
- Zhukov, K., Viney, L., Riddle, G., Tenniswood-Harvey, A., & Fujimura, K. 2016. Improving sight-reading skills in advanced pianists: a hybrid approach. *Psychology of Music*, 44(2):155–167.

Appendix A: Semi-structured interview schedule

1. How long have you been formally studying piano?
2. How would you describe your ability to memorise music?
 - How would you describe your performance in terms of memory lapses?
3. Were you taught how to memorise music?
 - If yes, what methods were you taught?
 - If you still employ these methods please explain how you employ them?
4. How would you describe your ability to sight-read music?
 - How would you describe your fluency and accuracy during a sight-reading exercise?
5. Were you taught how to sight-read?
 - What methods were you taught?
 - If you still employ these methods please explain how you employ them?
6. How would you describe the relationship between your ability to memorise and sight-read music?
7. Which one would you deem your strength and why?
8. Why do you think your ability to sight-read/memorise well affects your ability to memorise/sight-read?
9. Would you describe your ability to sight-read/memorise is an inborn talent or taught skill and why?

Appendix B: Letter of information



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Faculty of Humanities

Dear Music student

I, Sondra-Marie Grobbelaar, would like you to take part in a research project. This project is for a Master's degree in Musicology at the University of Pretoria. The study is entitled *The relationship between memorizing and sight-reading music in undergraduate music students*. The aim of the study is to find out if musicians who memorise well are able to sight-read well and vice-versa. The study further aims to find out what the relationship between music memorisation and sight-reading is and how the two abilities influence each other.

The study involves a semi-structured interview to determine your views of your own sight-reading and memorisation abilities as well as how you came to sight-read and memorise. This should not take more than 30-45 minutes of your time. The interview will be audio recorded.

Your participation in the study is voluntary and you are free to withdraw at any stage. Your anonymity is ensured. Data collected will be used for academic research purposes only and the information will be safely stored at the University of Pretoria Department of Music for a period of 15 years, in compliance with the ethical guidelines of the university. No financial benefits will be involved.

Your participation in this research will be greatly appreciated and will contribute to a deeper understanding of the relationship between memorising and sight-reading music. Should you agree to take part in the study, please complete the informed consent form attached.

Many thanks

Sondra-Marie Grobbelaar

Appendix C: Informed consent forms



UNIVERSITEIT VAN PRETORIA
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YUNIBESITHI YA PRETORIA

Department of Music

March 2016

INFORMED CONSENT FORM

I hereby agree to participate in the MMus study by Sondra-Marie Grobbelaar, consisting of a semi-structured interview. I also give my consent to have the interviews recorded and the data be used for later research that I may undertake. I understand that I am free to withdraw should I so choose and understand that there is no reward or other incentive to participate in the study. I have also been informed that my anonymity will be ensured.

_____ Signature of participant

_____ Signature of researcher

_____ Date