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Master in performance

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Piano and memory

Strategies to memorize piano music

Written reflection within independent project
The documentation also includes the following recordings:
Concert exam_Olga Albasini
Video examples day 1 (4 files)
Video examples day 4 (3 files)
Video examples final test (3 files)

Abstract

This study was carried out in order to discover new strategies to memorize piano music. There are six different types of memory involved in performing: auditory, kinesthetic, visual, analytical, nominal and emotional. There are two main ways of practicing: playing practice and non-playing practice. I tried to find out if the order in which we use these two kinds of practice affects the quality of the memorization. During one week I practiced three different pieces following three different methods: 1 Using only playing practice; 2 using first playing practice and then non-playing practice; 3 using first non-playing practice and then playing practice. The second method had a much better result than the other two. The whole process was registered with a video camera and a logbook.

Contents

1. Introduction

1.1 Why do we play by memory?

Solo piano recitals are to be played by memory. This is the biggest curse that pianists have had to endure since the beginning of XIX century. Back then, when classical music was like pop music nowadays, pianists started to leave the score backstage as a way of using one more skill to leave the audience in awe. In 1837, 17 year-old Clara Wieck played Beethoven's piano sonata Op. 57 No. 23 from memory. Others had done it before in smaller occasions but this is the first big concert where it happened. At that time, playing without the score was viewed as arrogant, but the musical taste was starting to change as the Romantic era started to develop. Apart from Clara, other big piano soloists like Franz Liszt started to play from memory, and at the end of the century the exception was to play with the score.

During my whole piano studies, memorizing has been my biggest challenge. Out of the music field, my memory seems to have no problem at all, I was actually very good at school when I had to memorize all the kings Spain has had since 1492 or all the elements in the periodic table. But playing the simplest, shortest little piece for piano in front of an audience was my worst nightmare. Stage fright has something to do with it, of course, but it is not especially big in my case, some other people get more nervous than I do and have no problem with the notes. So if it is not my brain's memorizing ability, nor my stage fright, then what is it?

Two years ago, when I started my master's degree in Stockholm I began to notice something in my fellow pianists that was very different from those in my previous schools (Salamanca, Spain and Dresden, Germany). We had one group lesson every Friday where everybody had to play something and, as time went by, I noticed that almost all of the piano students brought at least one new piece every week and played it from memory with no mistakes. Although the level of students was quite good, it was very similar to that of my previous colleagues in other institutions and they didn't seem to have much less stage fright, so these were not the reasons. They were also all very different from each other. After thinking about it I realized that the only factor missing in the equation was simply the way they memorized the music, I decided that I needed to improve my memorizing techniques and that this master's project was a great way to do it.

1.2 Previous research about the matter

Quite many books and articles about piano playing have addressed the issue of memorization. However, these texts are mainly short and not very scientific, based on the personal experience of each pianist without much

research or experimental evidence. Scientists have expressed their concern about the lack of research on musical performance.[1]

During the first half of the XX century there were not many changes in the research about memorization and piano. The study by Edwin Hughes "Musical Memory in Piano Playing and Piano Study"[2] already stated many of the ideas that research of the following years has tried to prove. It talks basically about the same types of memory addressed in this work although differently organized, it gives importance to sleep, and to focus and awareness during practice. Later on, research has proved that what we memorize is stored in our minds during sleep, what has been called "consolidation"[3]. And the concept of flow, discovered in 1975 by Hungarian psychologist Mihaly Csikszentmihaly[4] has proved that awareness during practice is one of the most important aspects for memorizing.

Terms have not been very consistent throughout the history of research about piano and memory. Gieseking delved into the practice of visualization, which he called mental practice.[5] But classifying the types of practice into mental and muscular practice doesn't allow us to include exercises like listening to the piece, analyzing the score, singing melodies and other types of practicing away from the instrument. The book "Musicians in the Making: Pathways to Creative Performance"[6] explains in a very interesting and exhaustive way the most important research works on musical performance in general and playing by memory in particular. Some of the most interesting and serious works were those of Gary E. McPherson, who carried out a series of experiments on music students, like that of 1995[7], where he measured the relationship among their skills of playing from memory, playing by ear, improvising, sight reading and performing rehearsed music. Results showed that these skills were strongly related, suggesting that the improvement of playing by ear, improvising and sight reading skills leads to the improvement of memorization. Another interesting work cited in "Musicians in the Making" is that of Jørgensen[8], who in 2002 defined the concepts of "playing" and "non-playing" practice,

1 Gary E. McPherson, "The assessment of musical performance: development and validation of five new measures,", *Psychology of Music* 23, no. 2 (1995).
2 Edwin Hughes, "Musical Memory in Piano Playing and Piano Study," *The Musical Quarterly* 1, no. 4 (1915): 592-603.
3 Björn Rasch and Jan Born, "About sleep's role in memory," *Physiological reviews* vol. 93, no. 2 (2013): 681-766.
4 Mihaly Csikszentmihalyi, *Beyond Boredom and Anxiety*. *The Jossey-Bass Behavioral Science Series* (San Francisco, CA: Jossey-Bass, 1975).
5 Gieseking, Walter and Karl Leimer. The Shortest Way to Pianistic Perfection. New York: Dover Publication, Inc., 1972.
6 John Rink, Helena Gaunt and Aaron Williamon, "Musicians in the making: Pathways to Creative Performance" (Oxford, England, 2017)
7 Gary E. McPherson, "The assessment of musical performance: development and validation of five new measures,", *Psychology of Music* 23, no. 2 (1995).
8 Harald Jørgensen, "Instrumental Performance Expertise and Amount of Practice among Instrumental Students in a Conservatoire," *Music Education Research* (2002).

which allow us to include in ”non-playing” practice all the different kinds of practices that can be done away from the instrument. This is the classification used for this master project.

As we can see, the end of XX century and beginning of XXI century have experienced an increase in the number and quality of studies about musical performance, nonetheless there are still many things we don’t know and should be researched. The present work, although limited in study subjects (myself), aims to build up on a consistent bibliography to explain the ways memory works for musicians and to offer useful strategies based on new research findings.

1.3 How does memory work?

One of the main functions of our brain is to store information. The capacity of our memory is large but not unlimited; if we stored every bit of information that gets to our brain, we would be overwhelmed and this is why our brain is very selective about what it remembers and what it doesn’t. We often forget very simple things right after we have heard them, like the name of a new acquaintance. However, our brain retains easily other material that it considers could be useful in the future. These two different aspects, forgetfulness and retentiveness, suggest that there are two types of memory: short-term and long-term memory. [9]

Short-term memory

Short-term memory is the one that helps us retain information in the moment we receive it. It refers to the amount of items that we can retain at one time. Research has shown that most people can remember seven items plus or minus two.[10] If we try to store more than this number, the amount is overwhelming and the information is not stored properly. We will probably be able to recall only the first or last few items, or not even a single one of them.

However, there is a way of expanding the limited capacity of our short-term memory called “chunking”. This process consists in grouping bits of information to create chunks which can be stored as one single item.

In the book “Your Memory: How it Works and How to Improve it”, Kenneth L. Higbee explains short-term memory and chunking with the following words: “Short-term memory can be compared to a purse that can hold seven coins. If the coins are pennies, then the capacity of the purse is only 7 cents. But if the coins are nickles (each representing a “chunk” of 5

[9] Lloyd R. Peterson, "Short-term verbal memory and learning," *Psychological Review* 73, no. 3 (1966).

[10] George A. Miller, ”The magical number seven, plus or minus two: Some limits on our capacity for processing information,” *Psychological Review* 63 (1956): 81-97.

pennies), then the capacity is 35 cents. If they are dimes, the capacity is increased to 70 cents." [11]

For example, we might need to remember a number of 16 digits to use it in a short period of time. If we try to remember 4837294756283952, we will probably not succeed because our brain detects 16 items, which is too much for the capacity of our short-term memory. However, if we divide this large number into smaller chunks: 4837-2947-5628-3952, this information will be stored as only 4 items, allowing our mind to retain it for immediate use.

But the items stored in our short-term memory will be there for a very short period of time, because short-term memory is precisely that, short-term. This means that the information will be there and ready to use only for a few seconds.

Long-term memory

All the information that is stored in our brain for larger periods of time is there thanks to long-term memory. This is what most people are referring to when they talk about memory in general. Long-term memory is more or less permanent, its capacity is unlimited. In order to transfer the information from short-term to long-term memory, we use repetition. If we repeat the bits of information stored in our short-term memory a sufficient number of times, they will be automatically transferred to long-term memory and we will be able to surpass the 30 seconds time limit and remember them after a longer period of time. Importantly, the information must first be stored in short-term memory; if the bits of information we repeat are too large for short-term memory, they won't be stored in long-term memory either, no matter how many repetitions we make. The solution would be to divide the information into smaller chunks as explained in the previous section of this introduction.

Active recall

When most people talk about remembering, they are actually referring to active recall. This is the process through which we actively bring back the information stored in our long-term memory in order to make use of it.[12] Active recall is the opposite of passive recall, which we use when we are simply repeating information (íbid).

A person who is not able to recall might succeed if we give her some cues. For example, if she is trying to recall a long word, hearing the first few letters might help her bring back from long-term memory the whole word. This is called *aided recall*.

[11] Kenneth L. Higbee, *Your Memory: How it Works and How to Improve it* (Oxford, England: Prentice - Hall, 1977).
[12] Kenneth L. Higbee, *Your Memory: How it Works and How to Improve it* (Oxford, England: Prentice - Hall, 1977).

Sleep

Research has shown that sleep is a great tool when it comes to transferring information from short-term to long-term memory. This process is called consolidation[13]. The information newly transferred to long-term memory becomes more solid through sleep. After repeating several times the information we want to memorize, it is most effective to move to a different section and wait for the next day to add more repetitions if needed. Surprisingly, the items recently added to long-term memory will be much better stored the next day. Recent research has shown that napping can also be a really good tool to consolidate memory. Short periods of sleep during the day have proved to benefit the formation of long-term memory.[14]

Moreover, a recent study carried out mainly by Harvard researchers has shown that sleep improves the acquisition and consolidation of not only memory but also motor skills; more specifically typing skills, which are very similar to piano playing.[15]

1.4 Types of memory involved in music

Auditory

Auditory memory is one of the most strongly related to memorizing. Most of the pianists who possess and "ideal" auditory memory don't need to rely on any of the other types of memory. A higher power of a sense means a higher power of the memory owned by that sense.[16] This means that the more refined the audition of one person is, the stronger his auditory memory will be. But being able to remember the music and all its nuances is not enough, ultimately we need to be capable of translating the sounds to the keyboard. Recent research has shown that the ability to play from memory is related to the skills of playing by ear and sight reading.[17] When we use these skills, we imagine a sound and then reproduce it on the instrument; this is the same process we use for playing by memory. When we play by ear we develop this relationship of sound-movement, and thus our playing by memory improves. However, being able to rely only upon auditory memory is not a very common situation, and it is not by far the only way of playing without the score. The rest of us can get that result by combining other types of memory.

[13] Björn Rasch and Jan Born, "About sleep's role in memory," *Physiological reviews* vol. 93, no. 2 (2013): 681-766.
[14] Elizabeth A. McDevitt et al., "The impact of frequent napping and nap practice on sleep-dependent memory in humans," *Scientific Reports* 8, no. 1 (2018).
[15] Matthew A. Tucker, et al., "The Relative Impact of Sleep and Circadian Drive on Motor Skill Acquisition and Memory Consolidation," *Sleep* 40, no. 4 (2017).
[16] Shinn, Frederick G., "The Memorizing of Piano Music for Performance," *Proceedings of the Musical Association* 25 (1898): 1–25.
[17] Gary E. McPherson, "The assessment of musical performance: development and validation of five new measures,", *Psychology of Music* 23, no. 2 (1995).

Kinesthetic

Also called muscle or physical memory, this is the form most pianists rely upon. But the moment we start thinking while performing or our nerves make us doubt about what the next movement should be, muscular memory is no longer enough. It needs to be combined with other types of memory. Depending on the passage: passages based on repetitions of the same figure in the same or different octaves, which are "regular", are easier to memorize for the muscular memory, while those not based on any patterns, the "irregular" ones, are much more difficult for this type of memory and should be combined with other forms.

Visual

There are two types of visual memory that can be useful for pianists: the image of the score and the image of our movements on the keyboard. Visual memory has a similar relationship to difficulty as muscular memory. The more "regular" a passage is, the easiest it will be to memorize.

The use of visual memory through score study has proved to be beneficial for memorizing. In a study carried out on 42 pianists, results showed that the group using visual memory had better results than the group that didn't. Visual memorization consisted in looking at the section that should be memorized, capturing the image, and trying to reproduce it with their eyes closed. If the impression was not clear, they were supposed to repeat the exercise until the image was secured in their minds.[18]

Analytical

This type of memory is the one based on the theoretical aspect of music. Just like the types of memory related to the senses, the power of this one will depend on how strong our sense is, or in this case how much theoretical or intellectual knowledge we possess. We can make two sub-divisions: based on the form of the piece (main structure, sections, phrases, motives) or based on its harmonic basis (tonalities, chords). The form can give us some important landmarks from which we can further develop the details of the piece.

Nominal

This type of memory applies mainly to those pianists who have learned music through fixed do solfège as we do in Spain, Italy or France. For us each note has a fixed name, C is Do, D is Re, E is Mi, etc. For this kind of musicians nominal memory can be really useful since we associate a word in our heads to a key on the keyboard, although not exactly which octave. However, other musicians may be able to make use of letter notation (A, B, C) in the same way, associate always the sound to its letter and use it for memorizing.

[18] Lawrence N-L., Lo., "The effect of visual memory training on the ability to memorize music within class piano instruction," (PhD diss., Indiana University, 1976). http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.915.6025&rep=rep1&type=pdf

Emotional

Memory is connected to emotions. Most of the life events stored in our long-term memory are connected to some emotion which gave them meaning and importance. [19] This also applies to music; pieces or sections strongly related to some emotion are easier to remember. This is the scientific explanation to why often piano teachers recommend to create a "story" related to the piece we are memorizing and to assign different "characters" to sections of a piece. It will not only reinforce the musical expression but also help our brain store the information in our long-term memory.

1.5 Types of practicing music

After understanding the way in which memory works and the different kinds of memory involved in music, we can approach better how to memorize piano music. Jørgensen has defined two different kinds of practice: "playing practice" and "non-playing practice".[20] Through playing practice we develop kinesthetic memory, while with "non-playing practice" we are developing all the other types of memory. In previous research about this matter, practice away from the instrument has been called "mental practice". It was defined as "cognitive or imaginary rehearsal of a physical skill without overt muscular movement" this is, visualizing the physical movements to rehearse aspects of technique and execution. However, nowadays many researchers believe that practice away from the instrument includes many different types of imagery including visual imagery (visualization of the score and the performance), auditory imagery, emotional imagery (expressive aspects) and kinesthetic imagery.

In this study we will use the concepts of "playing practice" and "non-playing practice". Moreover, in the work in which he defines these concepts, Jørgensen also recommends that both of them should be balanced "in a single session or over a period of time". Now a new question arises: In which way should we combine them in order to obtain the best result?

Psychological approach to practice

Practicing an instrument is a task that requires a high self-discipline just like the acquisition of any skill. Musicians are very similar to some kinds of sportspersons like athletes, but the difference is that athletes are usually accompanied by a trainer who tells them what to do, whereas musicians practice on their own. We also have a trainer, who is our instrument teacher, but we spend at the most one or two hours per week with him, whereas the rest of the training hours are spent in the loneliness of the practice room. All

[19] Johns Hopkins Medical Institutions, "Why Emotionally Charged Events Are So Memorable, " ScienceDaily, Accessed October 30, 2018. www.sciencedaily.com/releases/2007/10/071004121045.html

[20] Harald Jørgensen, "Strategies for Individual Practice," In *Musical Excellence; Strategies and Techniques to Enhance Performance,* ed. Aaron Williamon (Oxford: Oxford University Press, 2004), 85-103.

the decision-making, goal-setting and monitoring of the process of learning our skill must be done by ourselves. Little research has been made about the matter of how to improve practice, it is also not so often taught by instrument teachers, so those musicians who succeed are usually the ones who find their own ways and don't lose hope in the process. Others are just discouraged by frustration and end up either having a bitter relationship to music making or giving up on it. But every day practice doesn't need to be a source of suffering, in fact, we tend to do what we like doing, the more we like it, the more we will want to do it; and this is where the concept of flow comes in.

The concept of flow

Flow was first defined by the Hungarian psychologist Mihaly Csikszentmihalyi in 1975 after interviewing different professionals including rock climbers, basketballers, composers, dancers and chess-players.[21] He described it as "the holistic sensation that people feel when they act with total involvement". All the participants interviewed described the sensation of wanting to practice their activity only because of the enjoyment of it, a high focus and basically forgetting everything else, even losing track of time; what is sometimes referred to as "being in the zone". Csikszentmihalyi later discovered that artists and athletes were more likely to experience flow, especially during their work.[22] In the framework of positive psychology, research has shown that music and flow are strictly related and that musical activities are more likely to produce flow experiences than other types of activities.[23]

[21] Mihaly Csikszentmihalyi, *Beyond Boredom and Anxiety*. *The Jossey-Bass Behavioral Science Series* (San Francisco, CA: Jossey-Bass, 1975).
[22] Mihaly Csikszentmihalyi, *Flow: The Psychology of Optimal Experience* (New York, NY: Harper & Row, 1990).
[23] Martin E. Seligman and Mihaly Csikszentmihalyi, "Positive psychology: an introduction," *American Psychologist* 55, no. 1 (2000): 5-14.

Practicing music is a musical activity; therefore, meeting the required conditions, it should be possible to obtain flow during practice sessions. The basic condition of flow is that the skills and challenges of the activity should be balanced. Too little skill combined with too much challenge produces anxiety, whereas too much skill and too little challenge causes boredom as can be seen in Figure 1[24].

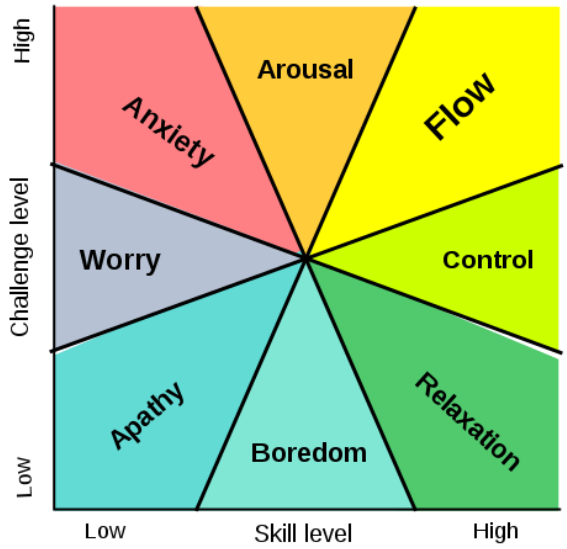

Figure 1. Mental state depending on the combination of chalenge and skills levels while performing a task according to Mihaly Csikszentmihalyi.

In the book "The Positive Pianist"[25], Thomas J. Parente states that there are three steps to achieve flow in self-regulated learning. He calls them the three Power Steps for Learning:

1. Knowing how to choose learning goals
2. Reflecting on learning strategies
3. Being conscious of how to sustain motivation

It is important to choose goals that are not too difficult or too easy. Goals can be set for several years, months, weeks or one single practice session and they should be reviewed in order to adjust them to new or unexpected situations.

In order to reduce distractions it is also recommended to use a timer or an alarm to know when to finish and take a rest.[26] These conditions can foster flow during practice; however, it is important to know that it is a phenomenon which cannot be forced through will.

[24] Mihaly Csikszentmihalyi, *Finding Flow*, 1997.
[25] Thomas J. Parente, *The Positive Pianist: How Flow Can Bring Passion to Practice and Performance*, (Oxford: Oxford University Press, 2015).
[26] Eve Newsome "The Flow Music Method. Optimal experience tips and strategies for musicians and music teachers." Queensland Conservatorium Griffith University, Australia (2016).

2 Special case study

2.1 Methods

In order to find out whether the order in which we combine "playing practice" and "non-playing practice" when memorizing a piece affects the quality of the memorization, a one week experiment was carried out. During this week, I practiced every day three different pieces in three different ways and on the last day I made a test, which consisted in trying to play the pieces through and evaluating how much I could play of each and how many mistakes I had. I registered the whole process with a video camera and I kept a logbook so that I could analyze this material afterwards and evaluate which method was more efficient.

The **playing practice** consisted in developing exclusively kinesthetic memory by repetitions. I tried to emulate the way in which I practiced when I had very little or no understanding of how memory works, what kinds of memory are involved in music and what are the best ways of practicing in order to memorize. This included a quite unfocused, mindless way of practicing where the only important aspect was to rehearse physically with very little mental awareness.

The **non-playing practice** involved all the different ways of practice I could include considering my current knowledge about the subject and what I felt comfortable with. Each person has a different background and abilities and it is important that each musician finds which ways of reinforcing visual, auditory, analytical, nominal and emotional memory work for them. The higher variety of tools the better. In my case, analytical memory is one of the strongest because I have a quite good theory background; therefore, analyzing is important for me. I am not very good with auditory memory but I am always trying to develop it as it is the most linked to playing from memory, so listening to the piece and singing is also an important part of my non-playing practice. The nominal memory is very special because it mainly applies to musicians with experience in fixed do solfège, as explained previously. I have this type of training so I try to learn melodies with their note names. My training with emotional memory is not very high but I have tried it a few times and it worked very well, so I include it in my practice. As far as training visual memory is concerned, I included visual imagery, that is, imagining the score in my head, especially while listening to the recording, but not kinesthetic imagery (called previously by researchers "mental practice"), which means imagining the movements of my hands on the keyboard, recreating the act of playing. I didn't include this last one due to my twenty minute time limit; I chose to leave specifically this type of practice out because it is the one I have the least experience in, and about which most research has been done.

More specifically, in order to develop auditory memory I started by listening to recordings of the piece several times. I also looked at the score

while listening, so this exercise also included reinforcing visual memory. Another way in which I reinforced auditory memory was by singing different melodic or bass lines. When singing the melody I always used fixed do solfège, therefore developing not only auditory but also nominal memory.

Furthermore, analytical memory was reinforced by analyzing the piece. Starting with the most general aspects as the main tonality and main structure, and then taking a closer look into the first few measures. Since the goal of this analysis is memorizing, the analysis should be detailed. Looking for motives and trying to understand and memorize how they work always with very small sections, remembering the concepts of short-term memory and chunking explained in the introduction of this study. For example noticing that the first motive consists of: "four ascending notes in the scale of E minor starting from the third note of the scale (G). Then it goes down a 3rd, up a 2nd and down a 3rd again, where the first motive reappears but in opposite direction." as I wrote about the first non-practice session of the experiment in my logbook.[27] Another aspect of analysis very useful for memorizing was harmony. When the underlying harmony was not clear due to poliphony, I tried to differenciate the additional notes from the basic harmonic ones so that I could define the chord.

Finally, in order to facilitate achieving flow during practice sessions, specific goals were set. The goals I had set before starting the experiment were reviewed and adjusted after some days. In the beginning I expected to learn 30 measures during the 7-day experiment, but as I moved forward I realized that the amount of measures was too big, so I changed the goal to 16 measures. Another way in which flow was fostered was setting a timer of 20 minutes to avoid distractions. I also reflected on my learning strategies as I planned them beforehand and wrote down on the logbook my experiences after each session.

2.1.1 Research structure

Main question:
The goal underlying this whole master project was to find better ways to practice which will improve memorization of piano pieces. After understanding the concepts of playing and non-playing practice, I found a more specific question that allowed me to design a practical research in order to get some specific answers. The question was:
During the process of memorizing a piece, does the order in which we use the two main kinds of practice affect the result?

Methods:

1) Playing practice
2) Playing practice followed by non-playing practice

[27] Appendix 1.

3) Non-playing practice followed by playing practice

Practice sessions:
20 minutes per session. Three sessions a day during one week. Each day the first session started at 10.00 and it was followed immediately by the other two sessions.

Pieces:
1) Prelude No. 2 in C minor BWV 871, The Well Tempered Clavier Book II - Bach
2) Prelude No. 10 in E minor BWV 879, The Well Tempered Clavier Book II - Bach
3) Prelude No. 15 in G major BWV 884, The Well Tempered Clavier Book II - Bach

Procedure:
1) Method 1 - Playing practice. During one week I will try to memorize the first page of Prelude No. 2 in practice sessions of 20 minutes. I will use only playing practice.
2) Method 2 - Playing practice followed by non-playing practice. During 3 practice sessions (3 days) I will use only playing practice to memorize Prelude No. 10. In the rest of the practice sessions I will use both playing and non-playing practice.
3) Method 3 - Non-playing practice followed by playing practice. During 3 practice sessions (3 days) I will use only non-playing practice to memorize prelude No. 15. In the rest of the sessions I will use both playing and non-playing practice.

Day 1:
M1: Only repetition
M2: Only repetition
M3: 5 mins - Listen to the piece
15 mins - Analyze the piece

Day 2:
M1: Only repetition
M2: Only repetition
M3: 5 mins - Listen to the piece
15 mins - Learn the harmonies

Day 3:
M1: Only repetition
M2: Only repetition
M3: 5 mins - Listen to the piece

15 mins - Sing melodies

Day 4:
M1: Only repetition
M2: 10 mins - Listen to the piece and analyze structures and harmonies
10 mins - Play while singing melodies
M3: Play and decide fingerings

Day: 5
M1: Only repetition
M2: 10 mins - Listen to the piece and find cues
10 mins - Play while analyzing and play while singing melodies
M3: Play and find cues

Day 6
M1: Only repetition
M2: Listen to the section twice, assign characters, play melodic structure
M3: Play keeping in mind characters and cues

Day 7
M1: Only repetition
M2: Play keeping in mind characters and cues, play melodic structure
M3: Play repeating sections, play keeping in mind characters and cues

2.1.2 Registration of the process

Logbook

After each practice section I wrote down on a logbook a summary of it and I answered to the following questions: What did I learn? How did I learn it? How did it feel?

Video observation

I recorded every practice session and additionally one mid-term test and one final test. This is the sounding part of my project together with the documentation of my final concert which I memorized following the results found in this work. I couldn't include the Bach preludes in my final concert, I only used a small section of each prelude for the research. However, I memorized the pieces I played in my final concert following the strategies I learned with this project.

2.2 Results

After analyzing the final test and the whole progress of the study, the best method proved to be number 2, in which I started with playing practice and then added non-playing practice. This result is not what I had expected, I

thought that the best method would be number 3, starting with non-playing practice and then adding playing practice. I was quite shocked also by how big the difference among the three methods was, I thought that method 1 would be slightly worse than the other two but I didn't expect it to be so much worse.

If we analyze the logbook from a psychological point of view, the method which obtained better results (Method 2) was also the one with most number of positive answers to the question: How did it feel? More specifically, I answered 9 times to this question for each of the methods. Method 1 received 1 positive and 8 negative answers; Method 2 received the opposite, 8 positive and 1 negative answer; and Method 3 received 3 positive and 6 negative answers (Figure 2).

	METHOD 1	**METHOD 2**	**METHOD 3**
DAY 1	Bored	Unfocused	Focused
DAY 2	Very focused	Made progress	Focused
DAY 3	Focused but no progress	Made progress	Big progress
DAY 4	Not much progress	Very good. Very focused. Big progress	Felt anxious
MID-TERM TEST	Much worse than expected	Satisfied	Frustrated
DAY 5	Anxious	Very focused. Had fun. Big progress.	Start focused but lost it. Task too big.
DAY 6	Bored	Very good. Had fun. Know the piece.	Weak memory
DAY 7	Bored	Very focused. Confident	Anxious, unprepared
FINAL TEST	Bad. Stopped, couldn't continue	Very well. Almost no mistakes. Could keep going.	Ok. Kinesthetic memory not safe. Thinking too much. Skipped notes.

SUMMARY	1 Positive answer 8 Negative answers	8 Positive answers 1 Negative answer	3 Positive answers 6 Negative answers

Figure 2. Summary of comments answering to the question: How did I feel? after each practice session or test.

In order to understand the progress of each method, answers were classified in a range of 1 to 5, 1 being the lowest level of satisfaction and 5 the highest. The words used to describe how I felt after each practice session or test were analyzed and rated as follows: 1 – anxious / bad; 2 – unfocused /bored; 3 – focused / made progress; 4 – very good / big progress; 5 – very good / had fun / confident. This rating was designed trying to take into account Figure 1 and the mental states related to the combination of skill and challenge, which in its balance can originate flow. The sessions rated with number 5 were those in which skills and challenge were balanced, thus suggesting that flow was reached. Consequently, if we consider that during those practice sessions rated with 5 points the mental state was flow, this would mean that the most successful method was the one which had a bigger amount of flow experiences.

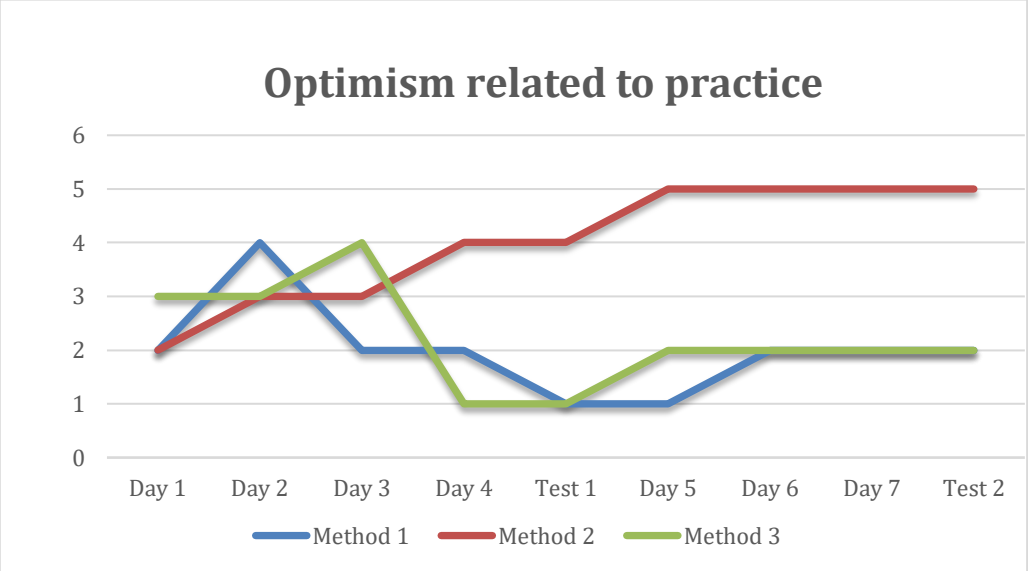

Figure 3. Level of optimism after each session of practice or testing. Answers to How did I feel? were rated 1 to 5. 1 – anxious / bad; 2 – unfocused /bored; 3 – focused / made progress; 4 – very good / big progress; 5 – very good / had fun / confident.

3. Discussion

A good practice is the best path towards a good performance by memory. Simple playing practice has proved to be inefficient while non-playing practice on its own has even worse results. The combination of both is the best solution.

The results obtained in this study suggest that neither playing practice nor non-playing practice alone is an effective way to memorize and that the best approach is to combine both of them. The method with the best results was number 2, which started with 3 days of playing practice followed by 4 days of non-playing practice combined with playing practice. Method number 1 with only playing practice was a total failure, while method number 3 was better but not as good as number 2. These results prove that playing practice on its own is not useful, as suspected. However, when we combine both types of practice (methods 2 and 3), playing practice seems to be important, since method 3 which had more days of non-playing practice didn't have a good result. Therefore, the best way to combine the types of practice according to these results would be to start learning the piece with playing practice and add non-playing practice as soon as possible. In method 2 I had the feeling that 3 days of playing practice were a bit too much, 1 or 2 days would have been enough for the section I was memorizing.

After this whole process of learning, researching and experimenting with memory and piano playing, I have summarized the obtained knowledge for anyone who is interested in improving their memorizing skills:

1. Look for flow. The results of our study related to flow showed that a higher amount of flow moments was associated with better memorization results. Therefore, in order to improve our memorization skills, it is important that we first increase our awareness during practice sessions, aiming to notice if we have optimal conditions for flow to appear. If we don't, we should admit it and reorganize our goals, make a bigger effort or simply take a break. Focused practice can also be rehearsed, we can slowly have longer focused practice sessions.

2. Set a timer. Being aware is much easier if we know there is a limited time for it. One is not allowed to get distracted, check the phone or take a rest during these minutes. The amount of time can vary a lot depending on how we feel, if we are not motivated to start practicing we can try to focus for 10 minutes at the beginning and then raise sessions up to 20 or 30 minutes. 1 hour is the longest I have been practicing with a timer, but it depends on the person. It can be much time as we want as long as we are aware that we are totally focused.

3. Improve your goal-setting skills. It is very common among musicians, especially pianists, to set too many or too big goals. It is understandable, if we think of the vast quantity of great piano repertoire that exists; we wouldn't be able to practice all of it in a lifetime. As previously stated, flow can appear when the relationship between challenge and skill is balanced.

We choose challenge by setting goals according to our skills and hope they are as balanced as possible. Goal-setting applies to all levels of the learning process, from how many pieces we will play in a year to how many notes we will memorize in 20 seconds. Here is where short-term memory and "chunking" come into play. When memorizing, even a group of two notes can be enough, because as soon as we take too much, our short-term memory can't handle it and the information is not stored or not correctly, which will be detrimental further in the process of memorizing.

4. Begin early in the learning process. There is a general memory law called "desirable difficulty" according to which a certain degree of difficulty in the learning process helps our brain retain information in a better way and for a longer time.[28] Starting to memorize early has been another one of the most useful things I have discovered by working on this project. I used to learn the piece, play it for a few months with the score and then start memorizing it. Now I have learned that with that method I was actually learning the piece twice. If the piece we begin to learn is meant to be played by memory at the end of the process, memorizing should start from the first sessions. Some teachers don't recommend this method because they are afraid students will forget some of the details in the score. We should always come back to the score and learn it well, pay attention to the details for the sake of interpretation; but memorizing early should not conflict with being precise, and it is very important if our ambition is to play from memory.

5. Spaced repetitions. Research has shown that spaced repetitions during learning are beneficial.[29] This means that the information is stored better and for a longer time in our memory when we repeat it leaving some time among repetitions. Many people have experienced studying for an exam the night before, remembering the day after and then forgetting the information and not knowing anything about the topic two days later. The same applies to practicing music. If we memorize a piece, perform it, and then leave it for six months, the information will probably not be there anymore. But if we perform it again two weeks after, then one month later and so on, the information will slowly get more safely stored in our minds.

6. Sleep. While sleeping our brain solidifies everything we tried to memorize that day. Scientists call this consolidation.[30] Some of the information that we memorize will become more stable the next day, and some will become less stable just because of the passing of time. If we do the same process of repetition the following few days, each night of sleep will continue to consolidate our memories, and eventually what we are memorizing will be firmly stable in our long-term memory. Also napping is

[28] Bjork, Robert A., "Institutional Impediments to Effective Training," In *Learning, remembering, believing: Enhancing huinan performance*, ed. D. Druckman and R. A. Bjork, (Washington, DC: National Academy Press, 1994), 295-306.
[29] Sean H. K. Kang, "Spaced Repetition Promotes Efficient and Effective Learning: Policy Implications for Instruction," *Policy Insights from the Behavioral and Brain Sciences* 3, no. 1 (2016).
[30] Björn Rasch and Jan Born, "About sleep's role in memory," *Physiological reviews* vol. 93, no. 2 (2013): 681-766.

highly recommended especially when memorizing a piece, as it has recently shown to improve memory consolidation just like night-sleep[31] as well as motor skill acquisition and consolidation[32]. A short 20 or 30 minute nap can be almost as effective as a whole night sleep and help us memorize a much bigger section of the piece of music in one day.

7. Address all types of practice and all types of memory. As previously explained, we can divide the types of practice into "playing practice" and "non-playing practice". Results of our study have shown that the higher amount of time that we spend combining them, the better results we will have. With regard to types of memory, we have defined the following: auditory, kinesthetic, visual, analytical, nominal, emotional. Pianist Graham Fitch has said "These [memory] techniques are like buying security features for the home: the more you have, the safer you feel." [33]

Auditory. Listen to the pieces actively, that is, paying attention to what you hear. You can also look at the score while you listen (that way you are simultaneously using visual memory). Sing the melody alone. Sing the melody while you play the bass. If there are more voices sing alternatively each of them while playing the rest. Always remember advice number 3 of this list and don't take too much. One single voice in one bar can be enough for a start.

Kinesthetic. Don't forget that one very big part of memorizing is still a physical process. The way of taking our movements from our short-term to our long-term memory is by repetition. But the most important is to be aware while you repeat so that it doesn't become something automatic. Again remember not to take too much and choose smaller chunks that you can store in your short-term memory, and then repeat them a number of times. Decide fingerings from the beginning, otherwise, the repetitions will be different each time and therefore not so effective. Assign cues, find places where you could start in case of a memory slip and practice starting there directly. It can be at the beginning of new sections, new grand staves or every few bars. Another useful practice is to change rhythms and tempo, play extremely slow, a bit slower than normal tempo or very fast, each tempo will reinforce different aspects of our playing.

Visual. Take short sections like one measure, look at it for a while and then try to visualize the image in your head without looking at the score. If you don't manage reduce the section into smaller chunks or take only one melody at a time. You can also study the score by looking at it, and imagining the music in your head and the movements of your hands on the

[31] Elizabeth A. McDevitt et al., "The impact of frequent napping and nap practice on sleep-dependent memory in humans," *Scientific Reports* 8, no. 1 (2018).
[32] Matthew A. Tucker et al., "The Relative Impact of Sleep and Circadian Drive on Motor Skill Acquisition and Memory Consolidation," *Sleep* 40, no. 4 (2017).
[33] Graham Fitch, "Tools for Memorisation," Practising the Piano, Accessed June 30, 2015, http://www.practisingthepiano.com/tools-for -memorisation/

piano. This is what some people call visualization and it is part of the non-playing practice as it is performed away from the instrument.[34]

Analytical. Analyze the piece the best you can. But don't worry about names of specific chords or details, start by knowing which main tonalities there are and how many sections, that will already be very helpful. Of course the higher your analytical skills are the better, apart from tonalities, you can analyze harmonies and after main structure you can go further to phrases and motives. Look at the first motive, which can be 4 or 5 notes in the melody, and try to define it using all the theory you know. For example, it starts with the 3rd note of the tonic, goes up the scale two more notes and down to the note where it started. After defining it try to remember and play it several times. It is also important to make as many associations as possible, trying to find patterns and connecting them. This is related to short-term memory the amount of items it can retain, as we explained above. For example, when we learn arpeggios or scales, all those notes become one single item, which can be stored much easier in short-term memory than the 6 or 8 items we would have to store if we counted each note separate.

Nominal. If you learned the notes with fixed solfège, read or sing them always with their corresponding name (do, re, mi…). Otherwise you can also try with letter notation (A, B, C) and say these names each time you sing or read a note. If well trained it can be very useful.

Emotional. As previously stated, memory is related to emotions.[35] Try to link your emotions to the pieces you are trying to memorize by assigning characters to the whole piece or smaller sections. You can also create a whole story which arouses different emotions according to the actions of the story related to each section. Apart from being useful for memorizing, this practice can help with stage fright, since the goal is for the performer to be so caught up in her own story and emotions that she will forget about the audience, focus on the expressive part of music and not miss one note.

8. Practice performing. If there is an upcoming performing situation, play everything through before preferably in front of someone and in the best case at the same time as the future performance. This way your body won't be shocked when the moment comes because you have been through that situation already.

9. Keep learning. Improving our general music skills can help us memorize better, so be curious about music, listen to it, decide what skills need to be improved and work on them. It can be your audition, your analytical

[34] Walter Gieseing and Karl Leimer, Piano Technique, (New York: Dover Books on Music, 1972).

[35] Johns Hopkins Medical Institutions, "Why Emotionally Charged Events Are So Memorable," ScienceDaily, Accessed October 30, 2018. www.sciencedaily.com/releases/2007/10/071004121045.html

knowledge or your sight-reading skills. Improving any of these will help you get better at memorizing.

10. Be creative. Play with all the strategies you can. Sing the melodies for 5 minutes, then analyze the piece another 5, listen to the piece twice, repeat the first two bars very slowly and with different rhythms, assign a character to the first section, take a break. This is only one example, this kind of practice is effortful but it can get easier with time and it is very effective. The main goal is to keep our motivation and awareness and have fun while practicing, since positive feelings during practice have shown to be associated with good memorization results. Practicing and memorizing don't have to be sources of suffering, it depends only on us to do it well so that we obtain good practicing and performing experiences. The better and more fun we do it, the more time we will want to spend doing it, and the more we will improve our skills and life as performing musicians.

These strategies were the ones I used to prepare the pieces for my master exam concert. After the one-week research carried out in January, I started to memorize the pieces for May, basing my practice on the knowledge I had acquired thanks to this project. The pieces I had to prepare were: Prokofiev sonata No. 4 and "Nights in the Gardens of Spain" for piano and orchestra by Manuel de Falla.

The more atonal a piece is, the more difficult it is for me to memorize it, this is why I had never played anything by Prokofiev before. So the Sonata no. 4 by this composer was a big challenge for me. Thanks to my newly acquired knowledge about memory and the use of new memorization strategies I managed to play it without any memorization mistakes, which is a landmark in the development of my piano skills. Not only did I play it on my master exam concert and other concerts but I also played it live on Spanish Radio on April 9th 2019. For this radio session I played as well Mozart Sonata KV. 281, also by memory and I managed to play both of these Sonatas without any memory mistakes. The Mozart Sonata was also memorized following the new strategies. Before beginning this project I could have never imagined that it might be possible for me to play without any memory mistakes in a concert or a live recording situation.

I tried to use all the strategies I could, all pieces were memorized from the beginning, in parallel to the learning of the piece. I started to use always a timer for my practice sessions, which had a duration of 20 to 40 minutes depending on the section I was working on and the goals I had decided to strive for. I worked with small sections and analyzed everything harmonically and structurally trying to remember as much as I could from these analyses. I listened to different recordings of the works, especially "Nights in the Gardens of Spain", since I had to listen to the orchestra part. I assigned characters to each section and created a whole story of each piece. I tried to practice always remembering these characters and the story of the piece. This strategy was much more helpful than I had expected, during the performances I followed the story in my head which was related to different

characters. The story helped me to recall thanks to emotional memory but also kept my mind occupied with the piece and away from distractions.

Thanks to this project, my memorization skills have improved significantly. And as a side effect, my whole piano playing has also improved, it has gained a higher quality, more controlled and more musical. This doesn't mean that I will never have a memory slip, but it does mean that now I know how to address the problem and how to work on it. Most importantly, now I know that I am able to play piano pieces from memory without mistakes and with joy if I practice following the newly acquired practice techniques. I hope that my work can help many other pianists –and other musicians– to improve their memorization skills and become better and happier performers.

4. Reference list

- Bernardi, Nicolò Francesco, Alexander Schories, Hans-Christian Jabusch, Barbara Colombo, and Eckart Altenmüller. "Mental Practice in Music Memorization: An Ecological-Empirical Study." *Music Perception: An Interdisciplinary Journal* 30, no. 3 (2013): 275-90.
- Bjork, Robert A. "Institutional Impediments to Effective Training." In *Learning, remembering, believing: Enhancing huinan performance*, edited by D. Druckman and R. A. Bjork, 295-306. Washington, DC: National Academy Press, 1994.
- Bye, Antony. "Playthings of Memory." *The Musical Times* 138, no. 1848 (1997): 4-10.
- Chaffin, Roger, and Gabriela Imreh. "Practicing Perfection: Piano Performance as Expert Memory." *Psychological Science* 13, no. 4 (2002): 342-49. http://www.jstor.org/stable/40063766.
- Chua, Weng L. "Memory and the Pianist: Practical Strategies for Improving Memorization and Performance Recall." PhD diss., University of Texas, 2015. Memory and the Pianist - TTU DSpace Homehttps://ttu-ir.tdl.org/.../CHUA-PROJECTPAPER--DMA-2015.pdf?...
- Croom-Hatch, Sarah. "Continuous Audiation For Piano Performance." *American Music Teacher* 42, no. 1 (1992): 14-73. http://www.jstor.org/stable/43547352.
- Csikszentmihalyi, Mihaly. *Finding Flow*. 1997.
- Csikszentmihalyi, Mihaly. *Beyond Boredom and Anxiety*. The Jossey-Bass Behavioral Science Series. San Francisco, CA: Jossey-Bass, 1975.
- Csikszentmihalyi, Mihaly. *Flow: The Psychology of Optimal Experience.* New York, NY: Harper & Row, 1990.
- Cuartero, Marta and Payri, Blas. "Memory types, attitudes and strategies in piano students' memorizing process." *Revista Electrónica de LEEME (Lista Europea Electrónica de Música en la Educación)* no. 26 (2010). http://musica.rediris.es/leeme/revista/cuarteropayri10.pdf
- Dickinson, Stefanie. "A Multi-Level Approach to More Secure Memorization." *College Music Symposium* 49/50 (2009): 271-83. http://www.jstor.org/stable/41225253.
- Duckworth, Guy. "Piano Education." *Music Educators Journal* 51, no. 3 (1965): 40-44. http://www.jstor.org/stable/3390341.

- Duke, Robert A., and Carla M. Davis. “Procedural Memory Consolidation in the Performance of Brief Keyboard Sequences.” *Journal of Research in Music Education* 54, no. 2 (2006): 111-24. http://www.jstor.org/stable/4101434.
- Gieseking, Walter and Karl Leimer. *Piano Technique.* New York: Dover Books on Music, 1972.
- Gieseking, Walter and Karl Leimer. *The Shortest Way to Pianistic Perfection*. New York: Dover Publication, Inc., 1972.
- Higbee, Kenneth L. *Your Memory: How it Works and How to Improve it*. Oxford, England: Prentice - Hall, 1977.
- Highben, Zebulon, and Caroline Palmer. “Effects of Auditory and Motor Mental Practice in Memorized Piano Performance.” *Bulletin of the Council for Research in Music Education*, no. 159 (2004): 58-65. http://www.jstor.org/stable/40319208.
- Hughes, Edwin. “Musical Memory in Piano Playing and Piano Study.” *The Musical Quarterly* 1, no. 4 (1915): 592-603. https://www.jstor.org/stable/10.2307/738068?Search=yes&resultItemClick=true&searchText=memory&searchText=piano&searchUri=%2Faction%2FdoBasicSearch%3Ffilter%3D%26amp%3BQuery%3Dmemory%2Bpiano
- Imreh, Gabriela, and Roger Chaffin. “Understanding and Developing Musical Memory: The Views of a Concert Pianist and a Cognitive Psychologist.” *American Music Teacher* 46, no. 3 (1996): 20-67. http://www.jstor.org/stable/43547414.
- Jacobson, Jeanine M. “Memorize And Remember.” *American Music Teacher* 41, no. 4 (1992): 16-68. http://www.jstor.org/stable/43546139.
- Jenkins, Bryan. Your Music Lessons Blog “How to Memorize Music 5 Times Faster.” Accessed October 29, 2018. https://yourmusiclessons.com/blog/how-to-memorize-music-5-times-faster/
- Johns Hopkins Medical Institutions. “Why Emotionally Charged Events Are So Memorable.” ScienceDaily. Accessed October 30, 2018. www.sciencedaily.com/releases/2007/10/071004121045.html
- Jørgensen, H. “Instrumental Performance Expertise and Amount of Practice among Instrumental Students in a Conservatoire,” *Music Education Research* (2002).
- Kang, Sean H. K. “Spaced Repetition Promotes Efficient and Effective Learning: Policy Implications for Instruction.” *Policy Insights from the Behavioral and Brain Sciences* 3, no. 1 (2016).

- Kursell, Julia. “Visualizing Piano Playing, 1890-1930.” *Grey Room*, no. 43 (2011): 66-87. http://www.jstor.org/stable/41237034.
- Landahl, Tove . “Blackout : En observationsstudie om memorering av harmonik inom klassiskt pianospel och hur memorering kan komma att påverka konsertnerverna hos pianister.” BA diss., University of Karlstad, 2017. http://urn.kb.se/resolve?urn=urn:nbn:se:kau:diva-48530
- Lo, Lawrence N-L. “The Effect of Visual Memory Training on the Ability to Memorize Music within Class Piano Instruction.” PhD diss., Indiana University, 1976. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.915.6025&rep=rep1&type=pdf
- Magrath, Jane. “Nerves, Memory, and Pianos.” *American Music Teacher* 33, no. 1 (1983): 14-18. http://www.jstor.org/stable/43541670.
- McDevitt, Elizabeth A., Negin Sattari, Katherine A. Duggan, Nicola Cellini, Lauren N. Whitehurst, Chalani Perera, Nicholas Reihanabad, et al. "The Impact of Frequent Napping and Nap Practice on Sleep-Dependent Memory in Humans." *Scientific Reports* 8, no. 15053 (2018).
- McPherson, Gary E. “The assessment of musical performance: development and validation of five new measures.” *Psychology of Music* 23, no. 2 (1995).
- Miller, George A. “The magical number seven, plus or minus two: Some limits on our capacity for processing information.” *Psychological Review* 63 (1956): 81-97.
- Mishra, Jennifer. “A Century of Memorization Pedagogy.” *Journal of Historical Research in Music Education* 32, no. 1 (2010): 3-18. http://www.jstor.org/stable/20789876
- Newsome, Eve. “The Flow Music Method. Optimal experience tips and strategies for musicians and music teachers.” Queensland Conservatorium Griffith University, Australia (2016).
- Olsson, Per. “To memorize, or not to memorize, that is the question? : A self-observation study in memorizing music.” BA diss., University of Karlstad, 2016. http://urn.kb.se/resolve?urn=urn:nbn:se:kau:diva-46460
- Palmer, Caroline. “Sequence Memory in Music Performance.” *Current Directions in Psychological Science* 14, no. 5 (2005): 247-50. http://www.jstor.org/stable/20183037.
- Parente, Thomas J. *The Positive Pianist: How Flow Can Bring Passion to Practice and Performance*. Oxford: Oxford University Press, 2015.

- Paszkowski, Steven. “How to Memorize Music?” Accessed October 29, 2018. https://www.libertyparkmusic.com/how-to-memorize-music/
- Peterson, Lloyd R. “Short-Term Verbal Memory and Learning.” *Psychological Review* 73, no. 3 (1966): 193-207.
- Rasch, Björn and Jan Born. “About sleep's role in memory.” *Physiological reviews* 93, no. 2 (2013): 681-766.
- Schmied, Al. “The Importance of Developing Kinesthetic (Finger) Memory in Piano Performance.” *American Music Teacher* 23, no. 5 (1974): 11-12. http://www.jstor.org/stable/43534317.
- Seligman, Martin E. and Mihaly Csikszentmihalyi. “Positive psychology: an introduction.” *American Psychologist* 55, no. 1 (2000): 5-14.
- Shinn, Frederick G. “The Memorizing of Piano Music for Performance.” *Proceedings of the Musical Association* 25 (1898): 1–25. www.jstor.org/stable/765150.
- Terrien-Queen, Alys. “Practicing to Play by Memory.” *American Music Teacher* 44, no. 1 (1994): 20-75. http://www.jstor.org/stable/43542723.
- Tucker, Matthew A. et al. “The Relative Impact of Sleep and Circadian Drive on Motor Skill Acquisition and Memory Consolidation.” *Sleep* 40, no. 4 (2017).
- Yang Halvardsson, Chenfei. “How do you remember everything? : -A self-observation study in classical piano memorization.” BA diss., University of Karlstad, 2018. http://urn.kb.se/resolve?urn=urn:nbn:se:kau:diva-67257
- Yu, Benjamin B. M. “Mental Study in Piano Teaching.” *American Music Teacher* 33, no. 6 (1984): 12-14. http://www.jstor.org/stable/43544011.

5. Appendix 1

Logbook

What did I learn?
How did I learn it?
How did it feel?

Method 1 (M1) – Prélude 6 D minor BWV 875
Method 2 (M2) – Prélude 15 G Major BWV 884
Method 3 (M3) – Prélude 10 E minor BWV 879

Day 1 8.1.19

M1 – I tried to learn the first half of the first page. I tried to practice the way I practiced before, when I didn't use any practicing techniques. I tried to play a tempo and with both hands, I did write some fingerings. I was not very focused. It was easier to learn than I had expected, but I was bored while practicing and didn't feel like I made much progress.
M2 – I tried to learn until the double bar. I played through the first page, I played a tempo and with both hands. I wrote some fingerings. I didn't feel very focused.
M3 – First I listened to the whole piece twice so that I could get an idea of it, that took me around 7 minutes, then I spent the rest analyzing it: What is the main tonality? E minor; How is the texture? Poliphonic; How long is the first phrase? six measures. I analyzed some general aspects and then I moved on quite quickly to details, since this analysis aims to learning the piece by memory, the details are very important. The main motive consists of four ascending notes in the scale of E minor starting from the third note in the scale (G). Then it goes down a 3rd, up a 2nd and down a 3rd again, where the first motive reappears but in opposite direction. The first phrase has 6 measures where the main motive appears 3 times alternating right and left hand (Right / left / right).

Day 2 9.1.19

M1 – Today I can already play the whole first page (thirty measures). It works very well, I think it is much easier than the other two preludes. I play both hands and not too slow. I don't always start from the beginning, I take the passages that don't work and write fingerings. I practice better than I'd like to, I can't help also recognizing some rythmic or melodic patterns. I do

it automatically and this helps me learn the piece. I try not to look at my hands. I feel very focused.
M2 – This prelude is not as easy as the previous one. I try to read until measure thirty but the measures after the double bar, which I play today for the first time, don't work yet, I have many mistakes. So I focus on the first half, it takes some time but at the end of the session I can play it. I write some fingerings and try not to play wrong notes like the C sharp I always play in the first measure and shouldn't. This prelude has more voices (three) than the other two. At the end I feel like I made some progress.
M3 – First I listened to the first half of the piece twice. I realized that it is more difficult than the other two because it has quick harmonic and melodic changes. The listening takes around 3 minutes and the rest of the session I analyze the harmonies using the piano to find them. The last five minutes of the first session I also use the piano to help me analyze the sections (structure) but usually very short sections, one hand at a time and without thinking about fingering, so I don't count this as kinesthetic practice. I tried to analyze until measure thirty. After this session I feel like I understand much better how the piece works, I was focused so I feel satisfied.

Day 3 10.1.19

M1 – I can already play the first thirty measures (first page) but I don't try to memorize, I just play it through and play again the passages that work worse. I feel focused but I don't notice the amount of progress I noticed yesterday.
M2 – Today I manage to play without any mistakes until the double bar. I repeat this first part several times because I want to be sure that I can play it before moving on. At the end I learn one more system. Everything with both hands and without looking at them. I make progress.
M3 – I listen to the piece once, only the first thirty measures, and I assign a character to it. Then I play and sing the melodies of one hand while I play chords of the harmony with the other. I also pay attention to the structure and melodies that I had already analyzed and try to learn them. I do this first, and basically with the first eight measures and then I practice another two or four more. I am very focused and it feels very good because I start to understand how this first part of the prelude works. I learn the basic tonalities of these measures (E minor, G Major and B minor). I made a lot of progress, even though I haven't started to actually play with both hands and haven't decided fingerings, so the physical memory is not being used yet.

Day 4 11.1.19

M1 – I can play the whole page with the score. I repeat it several times. I play and practice some passages that have some problems but they are few. I repeat each system (five measures) at least two times. When I repeat passages it is always more than one bar, at least two, and not slower, always

a tempo. I don't look at my hands. It feels ok but I didn't make much progress.
M2 – First day of mental practice with this prelude. I listen to the first half once and I assign a character ("tenderness") to it. I analyze the main structure of the first sixteen measures, up to the double bar. I decide how many parts it has and how many measures contains each phrase. Three bars 1st phrase, three bars 2nd phrase, two bars transition, four bars progressions and four bars conclusion. Then I analyze the main harmonies and chords. Finally I try to memorize the first three bars by playing them slowly and looking at my hands. I play and sing first the melody in right hand and then the melody in left hand, also while playing. It feels very good because I am very focused and I am understanding how the piece works. I have made a lot of progress.
M3 – I start to play the piece for the first time. It takes me some time to find the right fingerings and it makes me feel like I am never going to learn it. I get stressed and feel like just playing it through but then I remember what I have learned about practice and memory so I try to control myself. After I have decided most of the fingerings I need, I start trying to memorize the first four bars. I play them very slowly looking at my hands. Then I move on to the following eight bars, trying to sing the melody and remembering the harmonies that I practiced yesterday. It feels like it is going to take long until I can play it by heart.

Mid-term test

M1 – I can play only the first three bars. It is much worse than I expected. I try two other times and I can't even go on with one hand or move to another section. It is the first time that I look at my hands while playing this prelude. The physical memory is clearly not enough.
M2 – The first time I try I can only play the first three bars. But I try two more times and each one is better. The last time I try, I can basically play up to the double bar although I skip some places and sometimes play only with one hand. I feel satisfied.
M3 – The first time I can play the first four bars although with some mistakes. The second time it is a bit better (less mistakes) and the third time I can play until bar nine or ten skipping some voices. It feels ok because I control the first bars but also frustrating because it is too little.

Day 5 12.1.19

M1 – Repetitions not looking at my hands. I try not to look at the score either in order to practice memory because the test I did yesterday was a disaster and I feel I won't be able to play it at all on the final test. I get bored practicing. I decide to play through several times the first sixteen measures, it doesn't make sense to keep repeating the whole page.
M2 – I practice up to the double bar. Well, first I listen to the first thirty measures twice. I remember about the character and try to keep it in mind. I look for cues, I decide to have one in bar four, another one in bar seven and

also in nine, ten, eleven and thirteen. This feels very helpful. I play slowly several times the beginning of those "cue bars". I find relations between motives; I realize that the eight-note motive starts with the 3rd of G Major (the tonic) and then with the 3rd of D Major (the dominant). The other motive, which sounds simultaneously, starts with the first note of each of those two chords. I practice taking out unimportant notes, like the sixteenths which repeat themselves. I sing some passages while I play them, paying attention to what the left hand does. I am very focused and I have fun, I feel like I made big progress.
M3 – It is difficult because the physical aspect doesn't work so it is complicated to try to find cues since some things don't work yet. Some fingerings are not clear either. I play slowly and looking at my hands. I try to find cues: bars five, seven, nine and eleven. I try to remember the harmonies. I play almost all the time until bar twelve although I read once until measure twenty-four. I don't want to go on without being able to play the first few bars. I try to keep the character in mind. It is frustrating but not as much as yesterday and it feels very difficult to manage for Monday. I start quite focused but I lose focus because the task is too big.

Day 6 13.1.19

M1 – I practice up to bar sixteen. It is a bit boring because I don't know what else to do, I play with both hands without looking at them. Sometimes I also try not to look at the score. I repeat from the beginning to the end several times and especially bars nine to twelve, which I find to be the most difficult ones.
M2 – I practice until bar sixteen. I listen twice to these sixteen bars. I keep in mind the main character. I also assign different characters to different smaller sections. This feels helpful for the musical aspect but also for the memory. I practice the cues I defined yesterday. I transpose the whole section to C Major. This doesn't feel as difficult as I expected and it helps me understand the piece from a different point of view. I take out some notes and play only with the important ones, usually the melodies. It feels very good, I have fun and feel like I am getting to know the piece more and more.
M3 – I practice up to bar sixteen. I keep in mind the character and assign "sub-characters" to some shorter sections. I repeat some parts because my physical memory feels too weak so it is not working yet. I practice the cues I defined yesterday. I still decide some fingerings. It feels difficult and a bit boring. I find some new things about the motives (analytical memory), like the fact that the first motive repeats itself twice with the same notes and later starting from D it repeats itself three times with some notes and alternating hands (right – left – right).

Day 7 14.1.19

M1 – I practice up to bar sixteen. I repeat several times the whole section. I repeat several times each five bars. I try to play without looking at my hands or the score. It is quite boring.
M2 – I practice the first sixteen bars. I keep in mind the main character and the sub-characters I assigned yesterday to smaller sections. I practice the cues. I pay attention to phrases. I am very focused and feel confident for today's test. I look at my hands most of the time. I practice taking some notes out. I practice mainly characters and cues.
M3 – The physical memory is not enough yet. I practice playing and repeating smaller sections. I keep in mind the character. It feels better than yesterday but the memory is not safe enough for the final test. However this method is not as boring as method 1.

Final test

I made three tries of the final test.
M1

1 It didn't work well. I had to skip some parts and I didn't make it to the end.
2 This try went the same way
3 Same as the previous.

When I lost track of what I was playing, I couldn't keep playing and I had to either stop completely or skip some part.
M2
This went very well. I could almost play it without any mistakes. The times when I played some wrong note, I could anyway keep going and I didn't have to skip anything. I could sing the names of some notes in my head and I thought about characters and phrases. Thinking about this helped me forget that I was playing by heart and helped me make fewer mistakes and be more focused.
M3
This went ok. Better than Method 1 but worse than Method 2. It was not memorized well enough in the physical sense. I had to think too much. I had to skip some notes but I could make it to the end.