

Playing by Heart

Thesis

Is the application of the Playing by Heart memorization model useful for learning and performing trumpet orchestral excerpts?

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Whatever you can do or dream you can do, begin it. Boldness has genius, power and magic in it. Goethe

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1. Introduction

1.1. Research question and relevance

Is the application of the Playing by Heart memorization model useful for learning and performing trumpet orchestral excerpts?

Performing orchestral excerpts reflects the way they were practiced and how well they are known by the performer. Memorization works hand in hand with effective practice. They grow together, work simultaneously and help each other develop. The main goal when performing is “music”. It is the interaction between the listeners - audience, judge committee, ensemble - and the performer. “Music” tells a story, brings up feelings and creates atmospheres through the way it sounds. It is an unexpected component of an audition, unlike accuracy which is already a presupposed factor.

This research aims for the development of performing skills, specifically on trumpet orchestral excerpts, through a personally created memorization tool. It describes memorization and effective practice, focusing on sound and storytelling (imagistic and creative).

Before this research, the concept of playing by memory literally meant “playing without a score”. Throughout it, my own perception about playing by memory was changed, which started to be a much deeper concept: “playing by heart”. “Playing by heart” reduces performance anxiety. It permits technical security and self-confidence under pressure situations and, most of all, gives music a concrete idea.

This is not so often common for orchestral instruments, particularly for brass. In an extended committee there is no way to please the whole panel. Many times, the members of the committee have different cultural backgrounds and different experiences, which affects the way each one perceives music. Although different excerpts should respect different styles, the way they should be played can also vary from place to place. Instead of focusing on the external aspect of playing music, one should accept there are only two aspects that will gain all the committee members attention, independently of their beliefs: having a very confident posture and a truly deep belief in one’s personal “story” being played in a very convincing way. There has been some work done on developing strategies for audition success, which use memorization methods – notably by Don Green¹, but further models such as the one I will describe in this paper could also be very beneficial.

1.2. Objectives

The main goal of this research is to create a memorization model that will allow an increased level of performance and to be able to play by heart, specifically trumpet orchestral. Acknowledging that measuring the positive or negative outcome of my memorization model is highly subjective, the results’ efficacy will mainly be based on my own reactions and perception. It means that, if by applying this memorization model I can achieve a more convincing performance in my personal perception, this experience will be classified as a positive result and an extremely helpful system to develop one’s skills. For the purposes of this research, I consider being convincing can be seen as showing confidence, being present (not thinking in the past or future), accurate, with character, in style and telling a story.

¹ 11 Strategies for Audition and Performance Success

1.3. Research structure

This research is divided in four parts. The first part presents theoretical background about memorization, nervous system and brain hemispheres. The second part describes the interactions between effective practice and memory, which relates the way of practicing with memorization and how memorizing a piece of music helps practicing it effectively. It also presents the role of effective practice and memorization in performance. The third part of this research is the intervention, which includes the PbH memorization model and its practical application to four trumpet orchestral excerpts: Symphony No. 5 – Mahler, Pictures at an exhibition – Mussorgsky/ Ravel, Petrushka – Stravinsky and Symphony No. 3 – Mahler. The fourth, and last part of this research presents the results and makes analysis, discussion and conclusions.

PART I - Theoretical background

The first part describes the theoretical background. It serves as a basic knowledge of concepts that will later take part in my memorization model.

1. Sympathetic nervous response to stress

Sensorial receptors are the starting point for many activities of the nervous system. They can be visual, auditory or tactile. This sensorial experience can cause an immediate brain reaction or it can be stored in the brain under the form of memory, determining future reactions of the organism.

The autonomic nervous system (ANS), also called the involuntary nervous system, acts as a control system that functions largely below the level of consciousness to control visceral functions. The major functions of the ANS are respiration, cardiac regulation, vasomotor activity and certain reflex actions, such as swallowing. The autonomic nervous system is divided in two branches, the parasympathetic nervous system (PSNS) and the sympathetic nervous system (SNS). The PSNS functions are very specific, contrasting with the SNS functions, which normally do a massive discharge. This results on a loss of the body capacity for having vigorous muscular activity. The PSNS conserves and restores the organism energy, relaxes the muscles, decreases heart rate and blood pressure and encourages processes, such as digestion and elimination. It is also known as the "rest and digest" or "feed and breath" system. The SNS reacts to an alarm, presents a sympathetic response to stress, governs total body movements through activation of the larger muscle groups and activates and heightens heartbeat, blood pressure and blood flow to muscles. The SNS is also known as the "fight or flight" system.

2. Stages of memory - encoding, storage and retrieval

Memory is the term given to the structures and processes involved in the storage and retrieval of information. It uses past experience to affect or influence current behavior. Information comes into the memory system by sensory input (sensory stimuli that occur in the nervous system and come all over from senses: sight, hearing, taste, smell and touch). They can either be ignored, or perceived. When the stimuli are ignored they disappear. Through the process of attention, which means focusing in one aspect of the environment, stimuli can be perceived. They must first be encoded in order to be stored

in the short-term memory. There are three ways, by which the information can be encoded: visual (picture), acoustic (sound) and semantic (meaning). Short-term memory (STM) in general refers to the short-term storage of information, and it does not entail the manipulation or organization of material held in memory - working memory. The working memory model² consists of a central executive, which controls and coordinates two specialized storage sub-systems: Visuo-Spatial Sketchpad (inner eye) and the Phonological loop (inner ear and inner voice), relating them to long-term memory (LTM). Chunking involves taking small units of information (chunks) and grouping them into larger units. It permits the expansion of short-term memory capacity. STM is stored and retrieved sequentially, while LTM is retrieved by association. When there is an inhibition of the synaptic paths for the presented information (habituation) short-term memory will decay in approximately 10 to 15 seconds. If the information is considered to be important there is a facilitation of the synaptic paths and the process is called sensitization of memory, which results on the passage of information to long-term memory. There needs to be a step of conscious effort to retain the information in order to achieve long-term memory. Giving a meaning to an information and then associate it with previously acquired knowledge and motivation are the needed factors for the information to pass to long-term memory.

Long-term memory stores unlimited amounts of information almost indefinitely. If the memory traces get more permanent, short term memory is transformed in long-term memory. This process is called consolidation and it also depends on association. Instead of being stored randomly, the new memory is compared to an already existent one of the same type. That existent memory is also used to help process a new incoming memory.

Memory recall or retrieval refers to re-accessing information from the past, which has previously been encoded and stored in the brain. Recall effectively returns a memory from long-term memory storage to short-term storage or working memory where it can be accessed in a kind of mirror image of the encoding process. It is then re-stored back in long-term memory, thus reconsolidating and strengthening it. Most of the remembered information can be recalled by direct retrieval, where information is directly linked to a cue; or by hierarchical interference, where information is associated to a class or subset of already known facts. There are three main types of recall: free recall (in which items are recalled randomly, without an order), cued recall (in which items are recalled through cues) and serial recall (in which items are recalled in a particular order).

Long-term memory can either be explicit (declarative) or implicit (non-declarative). Semantic and episodic memory³ together make up the category of declarative memory. Semantic memory refers to knowledge based on factual information (causes and results), whereas remembering is a feeling that is located in the past (episodic). Declarative memories represent the way our brain sees the world. In contrast with declarative memories, non-declarative memories are expressed through performances and procedures other than recollections, under the form of procedural memories (memory for the performance of particular types of action). Procedural memories are associated with relatively primitive portions of the nervous system, unconsciousness and sensibility. Encoding information into episodic memory activates the left-hemisphere more than the right one, while retrieval of information activates the right-hemisphere more than the left one.⁴ Forgetting information from long-term memory

² Baddeley, A. and Hitch, G. (1974)

³ Tulving, E. (1972)

⁴ HERA model of memorization (1993)

may be caused by the lack of appropriate retrieval cues, as opposed to decay of a memory trace over time or interference from other memories.⁵

Musical semantic memory is memory for pieces without memory for the temporal or spatial elements; and musical episodic memory is memory for pieces and the context in which they were learned.⁶ It was found that two distinct patterns of neural activations existed when comparing semantic and episodic components of musical memory. Controlling for processes of early auditory analysis, working memory and mental imagery, Patel found that retrieval of semantic musical memory involved activation in the right and left-hemispheres. Retrieval of episodic musical memory resulted also in bilateral hemispheric activation, with dominance in the right-hemisphere. This research suggests independence of episodic and semantic musical memory.

Episodic memory depends on the perception of particular and often unique events, and one's memories of such events, like one's original perception of them, are not only highly individual (colored by one's interests, concerns, and values), but prone to be revised or re-categorized every time they are recalled. This is in fundamental contrast to procedural memory, where it is all important that the remembering be literal, exact, and reproducible. A performer must rely both in explicit and implicit memory, regarding repetition and rehearsal, timing and sequence.⁷ "When a soloist such as Heifetz plays with a symphony orchestra accompanying him, by convention the concerto is played purely from memory. Such playing implies that this highly specific motor pattern is stored somewhere and subsequently released at the time the curtain goes up. Without intact explicit memory, Jascha Heifetz would not remember from day to day which piece he had chosen to work on previously, or that he had ever worked on that piece before. Nor would he recall what he had accomplished the day before or by analysis of past experience what particular problems in execution should be a focus of today's practice session. In fact, it would not occur to him to have a practice session at all; without close direction from someone else he would be effectively incapable of undertaking the process of learning any new piece, irrespective of his considerable technical skills."⁸

3. The brain hemispheres

Both hemispheres are involved in most mental processes and information is constantly being sent back and forth between them. During the day, the dominance of cerebral hemispheric activity alternates in a rhythmical fashion and favors one over another depending on the task and on the person. Whatever activity one is engaged in - reading, writing, music, arts or sports - requires both hemispheres to be engaged. The right and the left-hemispheres experience the world very differently. Both hemispheres contribute to most types of cognitive skills. It takes two hemispheres to be logical or creative, reasonable or imaginative, technical or inspired.⁹

Dividing up tasks, allowing hemispheres to work semi-independently, and take different approaches to an equal problem turns out to be a good strategy for the brain to function. The right-hemisphere lives in the present and experiences, individually, each vibrant and full of sensation moment. It sees the world as a whole and is more connected to rhythm and flow. It always looks for things that might be different from self

⁵ Encoding Specifity Principle, Tulving, E.

⁶ Platel, A. (2005)

⁷ Sacks, O. (2002)

⁸ Llinás, R. (2002)

⁹ Federmeier, K. D. (2013)

expectations and thus might indicate an unknown threat. It sees things in context, understanding implicit meaning, such as body language, connotative language and face emotional expression. It prefers uniqueness and is more involved with new experiences, events and ideas while they are still fresh and original. It is more skilled at recognizing relationships between things and allows people to see the big picture. Ultimately, it is interested in understanding and experiencing the world. The left-hemisphere takes all the vibrant moments and strings them together in a linear way, organizing them into past, present and future. The big picture perception is broken down into manageable and analyzable pieces of information that is then compared and evaluated. The left brain is more involved with things that are familiar and known, and it prefers to generalize, it understands individuals and not just categories. The left-hemisphere provides a simplified representation of reality, viewing the world as a map or a model and focusing on the details that have been previously identified as important. It yields clarity and power to manipulate things that are known, fixed, static, isolated, explicit and lifeless. It defines the concept of “self” and keeps track of who one is, where one lives, what one’s credentials are. That little voice that always compares oneself to others resides in the left-hemisphere. Ultimately, the left-hemisphere is interested in manipulating the world in self advantage.¹⁰

Right-hemisphere	Left-hemisphere
Sustained Broad Opened Vigilant Alert	Narrow Sharp Focused Attention to detail

Attention

Figure A: Hemispheric lateralization concerning attention

The right-hemisphere keeps a broadly vigilant kind of attention for whatever situation that might appear (seeks for new information), while the left-hemisphere uses a narrower focused kind of attention for a previously acquired situation.

There is a relation between the two hemispheres and the two branches of the autonomic nervous system. The parasympathetic nervous system gets triggered much more easily by a right-hemisphere function rather than by a left-hemisphere function. The left-hemisphere tends to trigger the sympathetic nervous system. There is also a tendency for the breathing to become shallower when verbal thinking processes are used.

Learning music requires both the analytical and sequential left-hemisphere and the creative imagistic right-hemisphere.

“The intuitive mind is a sacred gift and the rational mind is a faithful servant (...) we have created a society that honors the servant but has forgotten the gift.”¹¹ Society tends to rely more on the left hemisphere and to neglect the right hemisphere of the brain.

¹⁰ McGilchrist, I. (2012)

¹¹ Einstein, A.

4. Interactions between effective practice, memory retrieval and performance

Practice involves conscious application, constant monitoring of what is being done and should be based on one's intelligence, sensibility and values. Even what is painfully and unconsciously acquired, may sometimes become automatic, coded in motor patterns unconsciously. There is a relationship between action patterns and procedural memories.¹²

When the information is stored in the brain in chunks, retrieval cues are decided and rehearsed. There are three types of retrieval cues¹³:

- Basic: fingering, places of technical difficulty, motives, phrases, sections, their pattern and interrelationships;
- Interpretive: phrasing, dynamics, tempo;
- Expressive: mood, image, story or mental pictures.

Memorization retrieval is most effective when all types of cues are used in combination, instead of relying on just one of these pillars of memory. Different sections of different pieces might require different techniques of approaching. This provides a safety if the primary line of memorization fails during performance.

Memorization can be applied in a random and varied effective practice approach, and also improved by it. Episodic memory is remembering through personal associations, giving the information personal meaning. Musical episodic memory refers to the context in which the piece was learned. The information is encoded by the left-hemisphere, which is also analytic and presents segmented processing strategies. The left-hemisphere has also the capacity of detailed focusing. Musical episodic memory information is retrieved by the right-hemisphere, which is also rhythm and flow connected, experiences the present and does holistic processing strategies. It has the capacity of keeping a broad attention. The right-hemisphere of the brain is very skilled remembering concrete images and the unusual. That is why creating bizarre and out of the ordinary images, in visualization and association techniques, is so essential. "In every culture there is some form of music with a regular beat, a periodic pulse that affords temporal coordination between performers, and elicits synchronized motor response from listeners."¹⁴ This can be explained by the existing link between the auditory and motor systems. There is a human ability and tendency to keep time, to make motor responses to rhythm, anticipate and follow the beat, get rhythmic patterns as soon as they are heard, and establish internal models or templates of them. These internal templates are very precise and stable, meaning that humans have very accurate memories for tempo and rhythm.¹⁵ Rhythm, the integration of sound and movement, can play a great role in coordinating and invigorating basic locomotion movement.

Based on this information, practice and memory retrieval should use both hemispheric approaches. An early left-hemisphere approach will provide safe basic retrieval cues, which can and must be combined with interpretive and expressive cues, provided by a right hemispheric approach, which keeps the mind on the present, instead of thinking about past mistakes and future difficult technical passages. Although the individual strategies vary from musician to musician, auditory skills are crucial, some short analysis of the piece is essential and small sessions of practice should be taken. Mindless repetition and bad posture are both aspects that can easily start being a routine in the practice room.

¹² Sacks, O. (2008)

¹³ Chaffin, R., Imreh G., and Crawford, M. (2002)

¹⁴ Patel, A. (2006)

¹⁵ Levitin, D. and Cook, P. (1996)

Mental stimulation of movements activates some of the same central neural structures required for the performance of the actual movement. In so doing, mental practice alone seems to be sufficient to promote the modulation of neural circuits involved in the early stages of motor skill learning. This modulation not only results in marked improvement in performance, but also seems to place the subjects at an advantage for further skill learning with minimal physical practice. The combination of mental and physical practice leads to greater performance improvement than physical practice alone.¹⁶

During the "fight or flight" reaction of the sympathetic nervous system the body changes the way it operates physically in order to maximize its strength and energy. This reaction is a very important survival function, though it is not quite helpful when one faces situations that are not physical threats, such as performing. The fact that performing doesn't consume as much energy as a real life threat situation would, and that the body cannot absorb all the exceeding energy, results in stress. In a performance situation, the segregation of adrenalin causes symptoms such as shaking, excessive sweating and hyperventilation, interfering with the performer's intended accomplishments. An experiment discusses the identification and variations measurement of six specific autonomic nervous system (ANS) responses during motor skill and mental rehearsal sessions.¹⁷ The subjects were placed into an imagery group and a control group. The task measured in each group was based on their ability to pass an opponent's serve to a given teammate, playing volleyball. The ANS parameters tested included: skin potential and resistance, skin temperature and heat clearance, instantaneous heart rate, and respiratory frequency. The results of the test revealed a strong correlation between the response in the actual physical tasks and during the mental imagery sessions. The imagery group had a better skill at the specific task than the control group. This study showed that mental imagery induces a specific pattern of autonomic response. These include: decreased amplitude, shorter duration and negative skin potentials when compared to the control group. As a consequence of the ANS, the imagery group was associated with better performance. Roure suggested that mental imagery may help in the construction of schema which can be reproduced, almost automatically, in actual practice.

Giving music a meaning, by telling a story (based on images) through sound can bring about the conditions for a successful performance.

¹⁶ Pascual-Leone, A. (2003)

¹⁷ Roure, R., Collet, C., Deschaumes-Molinaro, C., Dittmar, A., Rada, H., Delhomme, G., & Vernet-Maury, E. (1998)

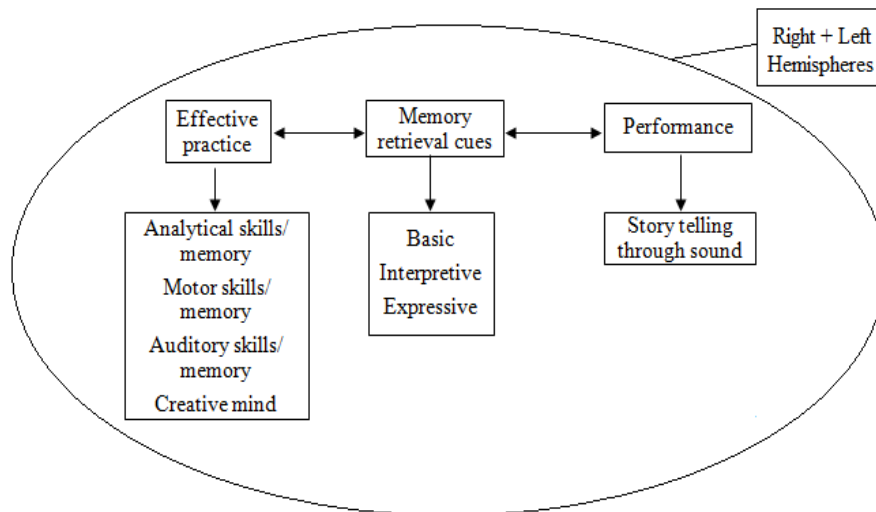


Diagram I: Relationship between effective practice, memory retrieval cues and performance.

5. Memorization Models

The following table describes the memorization models' stages from Wicinsky (1950), Miklaszewski (1989), Imreh and Chaffin (2002), Mishra (2004) and Greene (2012).

Wicinski and Miklaszewski present very similar memorization models, divided in three stages, although Miklaszewski goes a step further in the second stage where he relates stages 1 and 2. Chaffin and Imreh's model includes more detail, especially concerning the transitional stages and it is divided in four stages.

Mishra's model describes a previous stage of enculturation and experience and then is divided in three main stages: the preview stage, which includes notational overview, aural overview and performance overview; the practice stage, which includes notational- based practice and conscious memorization; and the over-learning stage, which includes re-learning, automatization and maintenance rehearsal. Greene's "The Game Plan: Memorizing Music" model presents a multi-faceted approach strategy divided in seven steps: analyze the piece, divide the music into distinct segments, assign each segment a location, assign each segment a person, perform each segment in each location as if you were the individual you assigned to it, perform the whole piece without looking at the score and tape yourself for this performance.

There are three main differences between standard memory tasks and in complex cognitive performance: individuals attain a particular level of performance in complex cognitive tasks only over extended periods of time, and much of the information is familiar and meaningful to their activity; storage of relevant information in long-term memory in skilled performance is a natural consequence of performing; and skilled performance requires that all relevant information be rapidly and reliably accessible.¹⁸

¹⁸ Ericsson, K.. and Kintsch, W. (1995)

Stage	Wicinski (1950)	Miklaszewski (1980)	Chaffin and Imreh (2002)	Mishra (2004) ¹⁹	Greene (2012)
1a	Preliminary ideas	Getting to know the music	Counting it out	Preview	Analyze the piece
1b	–	–	–	–	Divide the music into distinct segments
2a	Work on technical problems	Hard work on technical problems	Section by section	Practice	Assign each segment a location
2b	–	Fusion of stage 1 ideas and stage 2 technical skills	The gray stage	–	Assign each segment a person
2c	–	–	–	–	Perform each segment in each location as if you were the individual you assigned to it
3a	Trial rehearsals	Trial rehearsals and formation of a final interpretation version	Putting it together	Over-learning	Perform the whole piece without looking at the score
3b	–	–	Polishing	–	Tape yourself for this perform
4	–	–	Maintenance	–	–

Table A: Description of memorization stages according to Wicinski, Miklaszewski, Chaffin and Imreh, Mishra and Greene memorization models.

¹⁹ Previous stage of enculturation and experience

5.1. Processing strategies

Processing strategies in memorization training and practice should adapt to the difficulty and length of the music. A holistic process should be applied to short uncomplicated music. The segmented process would fit better long and technically difficult sections of music. Alternating between intensive sectional work (segmented processing strategy) and run through (holistic processing strategy) is very often chosen as a practice method.²⁰ Sequential processing was found to interact with phrase structures as memory was highest at the start of each phrase and declined towards the end. Segments may be used on the physical features of the printed page. Even experienced performers may organize practice segments based on page breaks rather than musical structure.²¹ Practicing at a slower tempo than the performance tempo, especially for difficult pieces or sections of pieces, may serve to focus cognitive attention and increase concentration.²² Linking segments in reverse order, or in fact any order other than starting at the first segment of the piece, forces the performer to create new beginning to the piece, negating serial effects.

Segmented	Holistic	Serial	Additive
1. Practice isolated portions of the piece.	1. Perform repeatedly the entire piece.	1. Perform repeatedly the entire piece.	1. Practice isolated portions of a piece.
2. Practice of discrete segments separately and then as a unit. (Segment size related to difficulty level)	2. Allow for minor regressions if errors or memory lapses occur.	2. When errors or memory lapses result in a repeated return to the beginning of the piece rather than a concerted push through the end.	2. Continuously adding material, lengthening a segment.
	3. May be modified to include rehearsal of complete sections of a larger work.		

Table B: Processing strategies in memorization training and practice.²³

5.2. Incidental memory

Lehman and Ericsson documented incidental memorization by masking notation. Between 30% and 80% of the missing notes could be recalled after four performances.²⁴ Miklaszewski deduced the amount of memorization by observing page turning behaviors.²⁵

Incidental memory is evidenced especially in pieces which are relatively short and simple. Pieces of music which are longer and more complex require focused analytical strategies beyond automatic memorization.²⁶

²⁰ Chaffin, R., Imreh, G., and Crawford, M. (2002); Hallam, S. (1997); Miklaszewski, K. (1989 and 1993)

²¹ Chaffin, R., Imreh, G. and Crawford, M. (2002)

²² Ericsson, A. C. and Lehman, K. A. (1998)

²³ Mishra, J. (2003)

²⁴ Ericsson, A. C. and Lehman, K. A. (1996)

²⁵ Miklaszewski, K. (1989 and 1995)

During notational-based stage, incidental memory may be developed. The main focus is to achieve an accurate performance of the music score. If incidental memory does not develop sufficiently during notational based practice, allowing a complete memorized performance, the performer's attentions must shift for technical considerations to conscious memorization.²⁷

PART II - Methodology

1. Playing By Heart Memorization Model (PbH)

The memorization model I designed is divided in three stages: prologue, story and epilogue. It concerns the interactions between effective practice, memorization and performance, using both hemispheres of the brain. It associates music with images, that work as retrieval cues and is based on creating a story to be told through sound. It is possible to go back and forward between the stages of this model. For instance if something cannot be fully understandable due to lack of analysis, when the player faces him/herself on the story stage, it is possible to go back to the prologue stage; or if a performance needs to be prepared, it is possible to go back to the prologue stage and prepare it mentally or forward to the epilogue to try just a phrase in the "performing mode".

1.1. Prologue

"Prologue is an opening to a story that establishes the setting and gives background details context."

As a prologue provides background details to better understand the story that is about to be read, this stage of my memorization model provides background information to understand the music, thus making learning and memorizing it easier. During this stage, analytical and auditory skills start being developed. This stage concerns uniquely mental practice. A conditioned response is a learned motor response to stimulus and becomes the instrument for a powerful stimulus for many conditioned responses. Once developed, a conditioned response becomes a reflex. Some reflexes are good, but other can be subconscious and bad. Since being aware of subconscious reflexes is almost impossible, developing new good habits should be done with the proper stimulus and motivation. Rather than break old bad habits, new good habits should be added. In the act of fighting bad habits, it only reinforces, strengthens and renews them. To avoid conflicts the trigger (instrument) should be removed, allowing mental practice to take place. When no instrument is involved, introducing new habits is a quicker process. Although there are no shortcuts in music, there are more efficient ways of learning. In order to alter conditioned responses, practicing exercises away from the instrument is a way to change the stimuli and not the response. New stimuli should be used together with recall and imagination. Sight is a powerful stimulus for functional improvement. Visual senses make results simple, easy to understand and to reproduce. Starting to practice and memorize a piece without having a previous idea of it, would be like making a puzzle without looking at its image before.

²⁶ Hallam, S. (1997)

²⁷ Mishra, J. (2004)

1.1.1. Analytical approach

Using a right-hemisphere approach would be to analyze in a spatial, relational style that seeks and constructs patterns. When approaching a piece analytically, examining patterns, such as intervals, melodies, rhythms; and the structures interrelationships is one of the most important steps to consolidate memory. The left-hemisphere has a linear way of analyzing. This means that it analyzes, individually, parts that make up a pattern, which can also be helpful. The encountered new patterns will be associated with similar and previously known familiar patterns, which will, during the story stage, supply basic and interpretive retrieval cues for the memorized music during performance. When playing orchestral excerpts it's of major importance, during the analytical overview to find the excerpt context. Having knowledge and assertiveness over notational aspects of the music before physically playing it on the instrument, avoids a very bad step: endless and mindless repetition on technical issues, which most of the times turn out to be useless the day after practicing. It has the advantage of saving time and embouchure, considering that the trumpet is very demanding instrument in terms of stamina and resistance. Encountering important patterns previously also helps phrasing, in the sense that the player is already familiarized with the music. Rhythm means measure, motion and stream. An articulation stream or a melody carries one along. The embedding of sequential patterns in melody and meter is extremely useful on the ability to recall large amounts of information.

To do an analytical approach to the music the following steps should be taken in consideration:

- Finding a context. This word can have several meanings. On the one hand, context can mean the composer's style, musical period and country in which the piece was written or even social and historical environment. On the other hand, it can mean the relationship with the music that accompanies one's part or the music that one's part accompanies, whether playing with piano, ensemble or orchestra. Integration and interaction between all the musical parts within a piece is only possible when all the musicians who are playing it are aware of what's happening around them;
- Starting by finding key changes, tempo changes, larger modulations and shapes of phrases;
- Instead of reading the notes individually, basic structures and patterns should be found, such as arpeggios, scales, interval relationships and repeated rhythms;
- Determining how a musical passage is built, such as by transposition of earlier passages, passages built with the same melody as earlier but with a different rhythm, passages presenting slight changes in melody or rhythm from earlier passages;
- Mapping the information of the piece structure on a diagram through images or symbols before playing it, which improves awareness of patterns and overall efficiency;
- Dividing it in sections according to musical phrases, regardless of how the music is printed out, for instance when a musical phrase is divided by a page gap.

1.1.2. Auditory approach

Doing an auditory approach is an essential aspect of the prologue stage. Once the analytical overview is done, it is time to develop an auditory based knowledge of the

piece. Auditory memory is the ability to process information presented orally, analyze it mentally, and store it to be recalled later.²⁸

Audiation is to sound in the same way that imagination is to images.²⁹ It is a cognitive process by which the brain gives meaning to musical sounds, involving mentally hearing and comprehending music, even when no physical sound is present. Audiation of music is analogous to thinking in a language. It is also more than just a musical form of auditory memory. Developed audiation includes the necessary understanding of music to enable the conscious prediction of patterns unfamiliar music and sound.

When listening to music, it should be given meaning to what has just been heard by recalling what has been heard in earlier occasions. At the same time, what is next to being heard is anticipated and predicted, based on personal musical achievement. Every action becomes an interaction (tonal and rhythmic conventions).

“What you are audiating depends on what you have already audiated. As audiation develops, the broader and deeper it becomes and thus the more it is able to reflect on itself. Members of an audience who are not audiating usually do not know when a piece of unfamiliar, or even familiar, music is nearing its end. They may applaud at any time, or not at all, unless they receive clues from others in the audience who are audiating. Through the process of audiation, we sing and move in our minds, without ever having to sing and move physically.”³⁰ The types of audiation are not hierarchical; however some of them serve as readiness for others.

Type of audiation	Activity	Familiarity level with music
1	Listening to	Familiar or unfamiliar
2	Reading	Familiar or unfamiliar
3	Writing	Familiar or unfamiliar from dictation
4	Recalling and performing	Familiar from memory
5	Recalling and writing	Familiar from memory
6	Creating and improvising	Unfamiliar
7	Creating and improvising	Unfamiliar while reading
8	Creating and improvising	Unfamiliar while writing

Table C: Interactions between types of audiation, musical activity and familiarity level with the music³¹

²⁸ V. Blackburn, 2014

²⁹ Gordon, E. (1975)

³⁰ Gordon, E. (1997)

³¹ Gordon, E. (1997)

The six stages of audiation are hierarchical – one stage serves as readiness for the next. In type 1 of audiation they happen in the following way:

Stage	Description
1	Momentary retention
2	Initiating and audiating tonal rhythmical patterns recognizing and identifying a tonal center and macrobeats
3	Establishing objective and subjective tonality meter
4	Consciously retaining in audiation tonal and rhythmical patterns that have been organized
5	Consciously recalling patterns organized and audiated in other pieces of music
6	Conscious prediction of patterns

Table D: Audiation stages description for type 1³²

The stages of audiation are the same for type 1 and 2, except for the fact that visual perceptions activate the first stage of audiation, when reading music (aural perceptions replaced by visual impressions in type 2 of audiation).

Type 1 stages are exactly the same as in type 3.

Type 1 stages and type 4, 5, 6, 7 and 8 stages differ on the aspect that unconscious audiation activates the first stage of audiation when music is recalled or created and improvised (unconscious audiation replaces aural impressions for types 4 and 5).

The ability to sing improves the memory span of the auditory working memory.³³

Singing engages memory of meaningful expression and helps a wind player to find the proper resonant oral cavity chamber for each note. It also helps intonation precision.

Overall, the voice is a much more fragile instrument than the trumpet. Stresses and strains, which may go noticeable on the trumpet by air speed and pressure misuse and embouchure problems, are highly noticeable in the voice. Hearing the music is associated with strong emotional feelings and it activates the entire limbic system, which is involved in processing of emotions, thus creating an episodic memory of it. Since episodic memory is encoded by the left-hemisphere, there should be an effort of focused attention on details, such as precision in intonation and rhythm.

In order to cover an auditory approach to a piece of music, the following steps should be regarded:

- Starting by audiating and singing scales and arpeggios in the piece's tonality, which will benefit intonation when playing and will provide physical awareness of the intervals;
- Audiating and singing difficult technical passages promotes a sense of line and smoothness;
- Audiating and singing long phrases will make their direction and dynamic clearer before playing it on the trumpet;
- Connecting sounds to images, is a way of creating retrieval cues for the memorization process that will be used later when practicing and performing. It

³² Gordon, E. (1997)

³³ Christiner, M. and Reiterer, S. (2013)

will also increase expressiveness, because it gives sound a concrete idea. instead of an abstract one;

- Audiating a specific sound or articulation according to what is wished for a particular piece of music is a way to achieve it more easily when later on playing for the first time.

1.1.3. Performance mental preparation

This stage has to do with preparing a performance mentally. It usually happens after assembling all the retrieval cues (Back to basics/Stay a beginner - Epilogue of PbH memorization model) and when the music is memorized. Nevertheless, it is somewhat of a mental approach to the piece of music, or in this case performance, being so the reason for including it on the prologue stage. It is extremely important that the actual real performance has already been done before hand, not only physically, but mostly mentally. Performance mental preparation helps avoiding excessive stress, being prepared for eventual mistakes and memory lapses. There needs to be an effort from the performer for this stage to be able to picture mentally and holistically concrete images as clearly as possible. In order to help this experience to be as vivid (right-hemisphere approach) and real as possible, while preserving a focused attention to details (left-hemisphere approach) the following steps should be taken in account when mentally running through the performance:

- Picturing the entrance on stage;
- Feeling the instrument under the fingers, in the hands, on the lips;
- Paying broad spatial attention to the room around and detailed attention in how the sound spreads around it;
- Picturing taking deep and slow breaths, avoiding shallow breathing.³⁴ This will lower blood pressure and slow pulse rate;
- Mapping all the changes in between pieces, their time signatures, desired atmospheres and characters;
- Picturing focusing before each piece, remembering all the important retrieval cues;
- Avoiding jumping over the resting bars. Keeping focus and enjoying the silent or music besides one's part is as important as playing one's music;
- When something goes wrong, such as missing a note, during the mental performance, one should keep going. In a real situation, one would never stop because of a mistake. It should not cause a chain reaction of missed notes. Instead of rehashing what went wrong, a positive attitude should be kept in order to improve the next notes;
- Having clear statements in mind instead of asking question;
- Being aware that in the end it is not a real life threat situation. One obviously survived and is now leaving the stage with a full heart and a smile on the face.

1.2. Story

"A story is an arrangement of words and images that re-create life-like characters and events. By how a storyteller describes and arranges a description of a story's events, issues and ideas, the storyteller gains the attention of an audience."

When reading a story, there is a need to know how it ends. If one jumps immediately to the end without reading the actual story, getting to know the characters, the plot, the

³⁴ Shallow breathing means that the percentage of vital capacity of air in use is too low.

unexpected situations that come out of it, one will never understand what it was really about, and the end turns out to be senseless and emotionless. Practicing is like reading a story. In order to achieve and understand the final result, in every note should be found a meaning, in each phrase a direction and in each sound an atmosphere. The ultimate goal for the performer is to be able to tell a story to the audience, a story through sound. After analyzing the piece and having a full idea of what it sounds like it is time to start physical practice. During this stage memory will continue to be encoded, developed and consolidated, and retrieval cues created. Musical imagery and visualization techniques will come into action. Various processing strategies can be taken during this stage, taking into account one's experience in the musical style of the piece in question, difficulty and length of it. Practicing the piece from top to bottom every time is not as effective as starting with different movements, other than the first one, different places in each movement, or even different notes in passages. In order to keep the brain active and fresh while practicing, one should keep it as varied as possible, by changing rhythms, transposing passages, playing around with characters. The right-hemisphere always looks for things that might be different from expectations and it deals with rhythm, while the left-hemisphere has a focus on detail and a linear kind of approach to any situation. During this stage hemispheric integration will assure the creation of all types of retrieval cues: basic, interpretive and expressive. Accuracy is very important in any performance, but it is particularly difficult to achieve in harmonic instruments, such as the trumpet. Certainty of technical issues, types of sound and styles of playing are the goal of the story stage. All of these chapters should be used together, instead of one at a time, ensuring that it is possible to go back and forward between them.

1.2.1. Chapter one - Not so fast!

The first chapter of the story stage describes practice from the technical accuracy perspective, where motor skills are developed. This stage will provide basic retrieval cues, such as fingerings, places of technical difficulty, motives, phrases, sections, their pattern and interrelationships.

Muscle memory, associated with motor learning, is a form of procedural memory and is consolidated by repetition. It guides the process for performing and most frequently resides below the level of conscious awareness. Since it is a declarative type of memory, it has two stages: a short-term memory encoding stage (fragile and susceptible to damage) and a long-term memory consolidation stage, which is considered to be more stable.³⁵ It is extremely important that the cognitive stage (memory encoding stage which is often referred to as motor learning) comes in the first place, in order to continue referring to it during the associative phase. When the cognitive process is rushed, a sloppy and prone to mistakes muscle memory will be developed. Repetition should never be mindless, so constant awareness is extremely important in muscle memory development. Muscle memory consolidation involves the continuous evolution of neural processes after stopping to practice a task. A fine motor memory skill is achieved by muscular memorization, when a note is seen and recalled, its auditory pair is learned and is matched by finger movements, breathing and buzz.³⁶ When producing a motor action, previous experience is necessary in order to memorize set actions. If there is no previous experience there will be no mental image of the motion, and therefore no actual movement. Professional musicians rely on a motor system that has increased efficiency resulting from many years of motor training and experience that helps forming a fine motor memory skill of musical performance. Long-term fine motor

³⁵ Atwell, P., Cooke, S. and Yeo, C. (2002)

³⁶ Smith, T. L. (1896)

training allows for complex actions to be performed at a lower level of movement control, monitoring, selection, attention, and timing.³⁷ Automaticity isn't necessarily pejorative. When muscle memory is developed the right way it allows the brain to be freer to think about musicality, dynamics expressivity and interaction with another musicians.

The following steps should be taken in consideration while practicing:

- Start by practicing the previously divided sections or segments, on the first stage of this model, according to a tempo, range and dynamics that permits the music to be executed perfectly. When it can be perfectly executed, the segment should be played as originally written (tempo, range and dynamics). One should keep focus on tone quality and ease of playing, not only prior to a note that is troublesome, but also during the hole passage;
- Keep instant and constant mistake correction, by looking for what is being done right, not what is being done wrong;
- Use mental imagery to organize all finger movement. The notes should be heard and felt before the fingers and lips move;
- Associate words to music. Brass playing involves more study of tone production than other instruments;
- Vary articulations, rhythms, dynamic pitch level and speed in order to keep the brain awake and conscious. Variety of approaches helps improving accuracy;
- Think of playing music to learn technique, instead of learning technique in order to play music;
- Focus on breath. They should never be shallow and should always be taken according to the phrase length and tempo that is about to be played;
- Write down difficult passages, is a way to make them clearer and consolidate them;
- Take small brakes when the passage/exercise is finished. An active brain is essential for the cognitive process to be assimilated.

1.2.2. Chapter two - The sound of music

Improvements achieved during practice should be later applied to music by remembering the sound and not the feel. The sense of feel is not reliable, and reinforces and refreshes old habits. "Feel is a sensory phenomenon; making music is a motor activity."³⁸ Instead of stabilizing the body, the sound should be stabilized. Stiffness reduces the ability to change airflow rates and directions suddenly. Using minimal motor movements instead of power helps achieving positive results. Muscle movements should be done resultant and not causative of playing.

Only one tone can be recalled at a time, completely filling one's consciousness, yet simultaneously relating to the whole. If only one note is given thought too consciously at a time the motor melody may be lost: "The hearing of a melody is a hearing with the melody (...) It is even a condition of hearing melody that the tone present at the moment should fill consciousness entirely, that nothing should be remembered, nothing except it or beside it be present in consciousness (...) Hearing a melody is hearing, having heard, and being about to hear, all at once. Every melody declares to us that the past can be there without being remembered, the future without being foreknown."³⁹

³⁷ Haslinger, B., Erhard, P., Altenmüller, E., Hennenlotter, A., Schwaiger, M., von Einsiedel, H. G., Rummeny, E., Conrad, B. and Ceballos-Baumann, A. O. (2004)

³⁸ B. Nelson, 2006

³⁹ V. ZuckerKandl, 1956

Sensory awareness is the ability to consciously receive and differentiate sensory stimuli⁴⁰. It can also be defined by bringing attention to the sensations of muscular tension and/or release.⁴¹ Posture is an important aspect of the practice routine. It affects sound directly, which is equivalent to saying that performers that can focus on the sound being produced are more likely able to become aware of their own postural issues. Here are some key aspects to keep in mind regarding this issue:

- [illegible]

For practicing this passage intervals can be brought closer by lowering E, F and last E by an octave and heightening G to an octave. As these intervals can be heard easily before playing, accuracy and intonation tend to be better when playing the intervals as written.

During chapters one and two, incidental memory may be developed, especially on short and simple pieces of music. In order to have a stable and safe performance regarding

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memorization, it should be shifted from incidental (unconscious) to conscious. In this memorization model this can be achieved by the use of visualization techniques and telling a story through sound. Images and sound awareness can be a very powerful tool when memorizing a piece, if used the right way. Visualization techniques can be used to help remembering technical passages or phrasings (basic retrieval cues). They can help in achieving the desired sound, as well as coordinate articulations with fingerings and breathing. Images can be associated with emotions and enhance musical expressivity (interpretive and expressive retrieval cues). They can improve accuracy, and give a specific meaning to musical phrases.

The brain is designed to encode and interpret complex stimuli such as images, colors, structures, sounds, smells, tastes, touch, positions, emotions and language. Imagery occurs in the areas of the brain that process stimuli, such as the visual cortex for visual imagery and the auditory cortex for auditory imagery.⁴³ The mental images are pictures in our minds which are associated with our own experiences.

Robert Zatorre developed a study based on brain-imaging techniques, which demonstrated that imagining music can activate the auditory cortex almost as strongly as actually listening to it. Imagining music also stimulates the motor cortex and imagining the action of playing stimulates the auditory cortex.

Most people remember images better than verbal or written based information. This happens due to the fact that images are concrete (right-hemisphere approach), while raw information is very often abstract. With the visualization and association technique, abstract information is converted into mental pictures. These images allow retrieving information from long-term memory. Another important aspect of this technique has to do with the importance of concentration and repetition in memorization. Creating images forces one to focus the mind, creating an original awareness of the material.⁴⁴ Repetition is done by reviewing the images and it also reinforces the memory of them. The clearer the image can be visualized, the better it will retrieve the information from memory. In addition, the larger, more incredible, sillier or more outrageous the images are created the better they work as memory triggers, also. The mind remembers the unusual far better than the ordinary.

“Method of loci” or “Memory palace” is a technique that dates back to the myth of Simonides of Ceos, a poet of ancient Greece: “That proud tradition began, at least according to legend, in the fifth century B.C. with the poet Simonides of Ceos standing in the rubble of the great banquet hall collapse in Thessaly. As the poet closed his eyes and reconstructed the crumbled building in his imagination, he had an extraordinary realization: He remembered where each of the guests at the ill-fated dinner had been sitting. Even though he had made no conscious effort to memorize the layout of the room, it had nevertheless left a durable impression on his memory. From that simple observation, Simonides reputedly invented a technique that would form the basis of what came to be known as the art of memory... Just about anything that could be imagined, he reckoned, could be imprinted upon one's memory, and kept in good order, simply by engaging one's spatial memory in the act of remembering.”⁴⁵ The idea is to visualize a mental walk through a well known place – like a room in one's house – which has specific known landmarks and can be filled with images that represent objects, people, symbols, words or whatever is trying to be memorized. Once the associations are made, remembering the items is just a matter of spatial visualization, in that the route provides the order for memorizing. “Memory palaces” don't have to be

⁴³ N. Thomas, 2001

⁴⁴ L. Lorraine and J. Lucas, 1978

⁴⁵ J. Foer, 2011

palatial – or even an actual building. They can be routes through a town, indoors or outdoors, big or small, real or imaginary, so long as they are intimately familiar.

The way to achieve this connection between images and telling a story through sound is hereby explained:

- Create a story to the piece of music that is trying to be memorized, by picturing atmospheres, situations or even colors. Regardless of being based on real life experiences or completely imaginary, the story that describes the piece should be as concrete and detailed as possible. This last observation will turn the story into a very vivid experience and thus activate the right-hemisphere of the brain. The story is based on images that should be associated with the segments that are being practiced. Images should respect the sound atmosphere, be connected to airflow and articulations, enhance the music's style and character;
- Have the style and character of the music firmly in mind. One must fit into a musical context or style. Expression is a main point in telling a musical story;
- It is of extreme importance to imagine with maximum detail (left-hemisphere) the place where images that make up the story are fitted in. This serves as a memory palace;
- Design a retrieval cues map or diagram together with the story. Retrieval cues are important, very familiar and strong spots in the piece which can retrieve memory during performance easily. To make them even stronger, they should be associated to very strong images of the created story, that also describe its main points.

In order to consolidate memory, repetition is a required important step, although it should never be unconscious. While practicing, many musicians tend to approach a piece of music from top to bottom. Technically difficult passages are often isolated and repeated careless of phrasing context, dynamics and articulations. The brain reacts on anything that is different from what it is used to, so the best way to keep it awake is to keep practice varied and random:

- Alternating between sectional work and run through;
- When taking a segmented processing strategy segments can be linked in reversed order other than starting at the first segment of the piece. The first segments of the pieces are always easier to memorize, so creating "new starts" for the piece can also be a way to improve memorization of the piece.
- It is important to keep practice random, meaning that the segments should be practiced with rhythmical variations, changing legatos for staccatos and vice-versa, or even melodic transpositions. This helps to keep the brain active, which is essential in the assimilation process. It is important to rely on the left-hemisphere of the brain during this step, using its sharp focus in details;
- Since each hemisphere has sensory and motor control of the opposite side of the body, moving both sides of the body at once in a rhythmical fashion will facilitate brain integration.
- An exercise that can be done in order to help with choosing different segments of the piece in a random way starts by choose different colored cardboards (one for each movement of the piece or excerpt, or even group difficult technical passages for a color, long phrases for another, etc) and glue the piece of music on it. Cut it in segments and put them in an opaque bag. Randomly take pieces of the music from the bag and practice. They should be rapidly associated to the retrieval cues in order to have a clear sight of where it stands in the complete piece.

1.3. Epilogue

"An epilogue is a piece of writing at the end of a work of literature, usually used to bring closure to the work. It is presented from a perspective within the story.

An epilogue is the final chapter at the end of a story that often serves to reveal the fates of the characters. It can also be used as a sequel."

The last stage of my memorization model is called epilogue. It works as an epilogue for a story. It covers all the practice that is done after a piece can already be performed by memory in a maintenance state. Memory recall or retrieval refers to re-accessing information from the past, which has previously been encoded and stored in the brain. Recall effectively returns a memory from long-term memory storage to short-term or working memory storage where it can be accessed in a kind of mirror image of the encoding process. It is then re-stored back in long-term memory, thus reconsolidating and strengthening it. Most of the remembered information can be recalled by retrieval cues. This stage of the model is crucial to keep memorized music present.

1.3.1. Back to basics/ Staying a beginner

This stage works on re-consolidation of memory, re-practicing and polishing details. During analytical overview as a first approach to a piece, everything is new. During this stage the musical information is already cognitively recognized, but it can still suffer changes that will strengthen it and make it even more solid. The following topics can be perfected during this stage:

- Change fingerings that might suit better for intonation or that can bring more ease in playing a passage;
- Further retrieval cues may be added or changed, ending up with only the absolutely necessary ones;
- Since muscular memory is developed before reaching this stage, it also allows the performer to explore full expressiveness and character of the piece. It also brings consciousness while performing;
- Improving familiar music and emphasizing the interpretative aspects will give way to physical skill. By relearning and refining familiar music, learning new music gets easier.
- Focus on having a story of sound to tell to the audience;

1.3.2. Keep positive, keep going

Performing the piece of music several times is a way to enhance the real performance and to keep the information active in memory for a longer period of time. This stage can be perceived as a physical approach to performance instead of a mental one, as in the performance overview. This is where all the retrieval cues and association of images are put into proof. If something doesn't work, one should go back to "Back to basics" and do the necessary alterations. This stage tests the recall of the memorized information. The following topics should be taken in account to accomplish this stage's goal:

All the points from the performance overview can physically be applied during this stage:

- Feeling present while playing. Keep yourself into the story and avoid digressing into other thoughts. This brings focus while performing.
- Staying positive. Trust in self preparation. If any slip occurs, the performance should go on, because a mistake is already in the past.
- Remembering that most of the people go to concerts to listen to music and enjoy it, and are not counting mistakes.

- When not feeling the best (whether nervous or fatigued), one should have the capacity to lie to the audience. One should communicate the musical story to the audience, not letting them know how one feels.
- Keeping focus until the end of each phrase. The listeners hear the overall phrase, but one should construct the music note-by-note as one is playing.

2. Practical application to orchestral excerpts

The Playing by Heart (PbH) memorization model was applied to four trumpet orchestral excerpts: symphony No. 5 – Mahler, Pictures at an exhibition – Mussorgsky/ Ravel, Petrushka – Stravinsky and Symphony no 3 – Mahler. The first three excerpts had already been practiced and unconsciously memorized. Since they are very commonly required for orchestra auditions a decision was made to apply the PbH memorization model to them. Mahler's symphony No. 3 was practiced and memorized from scratch within my memorization model, presenting a direct application of this research.

The following contextualization may include certain aspects described from a first person-like perspective. This interiorization and self-immersion is considered essential to fully understand the described memorization method.

2.1. Symphony No. 5 – Mahler



Figure C: Symphony No. 5 - Mahler

2.1.1. Prologue (Symphony No. 5 - Mahler)

Mahler wrote his fifth symphony during the summers of 1901 and 1902. In February 1901 Mahler had suffered sudden major hemorrhaging and his doctor later told him that he had come within an hour of bleeding to death. The composer spent a long time recovering. He moved into his own lakeside villa in the southern Austrian province of Carinthia in June 1901. He was Director of the Vienna Court Opera and the principal conductor of the Vienna Philharmonic. His own music was also starting to be successful. Later in 1901, he met Alma Schindler and, by the time he returned to his summer villa, in the summer of 1902, they were married and she was expecting their

first child. The trumpet excerpt, written for Bb trumpet but often played in C trumpet⁴⁶, marks the opening of the symphony - *Trauermarsch. In gemessenem Schritt. Streng. Wie ein Kondukt* (Funeral March. In the measured step. Strictly. As a funeral procession). This trumpet solo sets, in just a few notes, the atmosphere, the meter and the basic rhythm for the rest of the symphony.

Being a funeral march, the time signature is half note equals 62, written in 2/2 measures. This excerpt is divided in five phrases. Rhythmic patterns that are repeated many times during the excerpt were found, presenting, sometimes, slight variations⁴⁷. Phrases one and two present exactly the same rhythmic pattern. The melody is very similar too, but from the last bar of the first phrase, the resolving note of the triplet is E (minor third). On the last eighth note triplet of the second phrase the melody is a C# minor arpeggio. The third and fourth phrases present a descending scale pattern with a double dotted quarter note with sixteen note rhythmic pattern. The F# minor arpeggio on the third bar of the third phrase resolves to an A major chord on the fifth bar. This note presents the loudest dynamic of the excerpt (*ff*) and the orchestra first entrance. The melody goes chromatically to Eb starting on the upbeat sixteen to the third bar of this phrase. The descending fifth interval to Ab, gives the last tone of the excerpt, which on phrase five goes back to the initial rhythmic pattern, ending on a lower octave with a *pesante* character.

In an auditory overview, important rhythms are the eighth note triplets, and the double dotted quarter note and sixteen patterns. These patterns are crucial to the expression, giving the funeral march the proper character. Intervals that should always be kept in mind, heard before playing, are minor thirds, major descending scales and minor arpeggios. The dynamic progression assumes a very important role in this excerpt, creating suspense and giving the right atmosphere to the piece. So the first phrase should have p - mp - mf, the second phrase mp - mf (tension) - f. The dynamic f should be kept during the third phrase, but with a lighter color. The big explosion happens in the last bar of the third phrase. Although phrase forte is always fortissimo there should, the chromatic movement in the end requires tension and direction in sound until the last beat, respecting the written diminuendo. The first eighth note triplet of the last phrase goes back to forte and each time the triplet is repeated there should be direction in sound towards the last note, played fortissimo with diminuendo.

For the performance overview I followed the instructions presented on my memorization model, mainly picturing myself very calm, breathing low and maintaining a good posture throughout the excerpt, especially in the most difficult spots, such as the beginning, the last bar of the third phrase, start and end of the fourth phrase, and the octave interval in the end.

⁴⁶ All the tone references in all orchestral excerpts are already in concert pitch.

⁴⁷ Marked in the analytical map (Figure D) by the rectangular boxes.



Figure D: Symphony No. 5 - Mahler, analytical map

2.1.2. Story (Symphony No. 5 - Mahler)

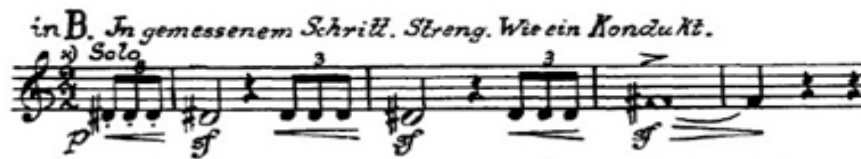


Figure E: Symphony No. 5 - Mahler, first phrase

Practicing the first phrase started by playing a comfortable *mf* C#, without forcing and without tonguing attack, gently feeling the air going through the instrument. Then I played it as soft and as loud as possible, because C# is a very repeated note throughout the excerpt, but the dynamics constantly change. Then I played a C# minor scale varying from legato to staccato and experimenting different kinds of articulations until the desired one for the excerpt was reached. It is crucial to check the intonation of the C# compared to the higher octave, being sure that it is low enough, since there is a tendency to play it sharp. I also made sure that the transition from C# to E was achieved with smoothness and that my fingers air and tongue move at the same time. During the practice sessions of this excerpt I guided and corrected my body posture through sound quality.

In order to memorize the excerpt I created a story for it, mainly based on visualization techniques by associating images to the music:

There seems to be a funeral coming down the street. I can't see sharp, notice what is really happening (C# is the beginning tone and by not being able to see sharp I remember to play the C# low enough, since it is a sharp tone on the C trumpet). I can hear the snare drum funeral beat and I picture the men steps carrying the coffin, not rushing, heavy and sad (marching triplets).

I listen to the first call of the trumpet, from very far away (first entrance is piano and with the direction to the *sf* just as the men steps landing the floor).

The second call sounds nearer - I think they are coming in my direction (same as the first entrance, but this time *mp* is the dynamic).

The third entrance sounds even nearer but I still can't see sharply, I'm wondering: is it really a funeral? (this time the call starts *mf* with *crescendo* to the *sf*, but a new tone is heard – E. This tone forms a minor third, which to me sounds as an interrogation, an uncertainty that vanishes in my thoughts - *diminuendo*).

I tried to picture all the images as clearly as possible, by placing them on a familiar street (method of loci).



Figure F: Symphony No. 5 - Mahler, second phrase

I practiced the second phrase in the same way as the first one, but altering the order of the exercises. The arpeggio took special care, since it is technically difficult especially for intonation. I started by singing it until I could do it in properly in tempo and in tune. I practice it legato and in a perfectly playable, free of mistake tempo. Then, when breath, tongue and fingers were synchronized, I increased tempo until reaching the marked one, always conscious of playing it the same way no matter the tempo. The final step was to add articulation in the same way of the previous triplets.

Then I continued my story:

The trumpet calls again asking the same question as an echo (fourth entrance goes back to the dynamic *mp*). When the trumpet calls for fifth time, it sounds from just around the corner and I can feel tension because I'm about to find out. They turn the corner and I can see sharp now: Yes, it is indeed a funeral! (The minor chord triplet sounds assertiveness in the melody, a confirmation that it really is a funeral – for me the *crescendo molto* means tension and direction to the C#, which brings the dynamic *f* for the first time.



Figure G: Symphony No. 5 - Mahler, third phrase

For practicing the third phrase of this excerpt I used the metronome marking sixteen notes to be sure that the rhythm was precise. I started by playing the melody in sixteen notes, which replaced the double dotted quarter notes. When the rhythm was precise and stable, I played the originally written phrase. I also switched the accents to the sixteen notes, instead of the double dotted quarter notes, when practicing. This exercise is extremely helpful in having the same sound on the faster notes, since they tend not to be heard as well as the slower notes. By thinking of the sixteen notes as an upbeat to the double dotted quarter notes I achieved the phrase direction, instead of playing it note by note, resulting in a stagnation of sound and no movement. During this passage I was aware that my trumpet's bell should not move up and down, but be as stable as possible, focusing always on continuous airflow (horizontal movement instead of vertical). To be precise in changing the notes on my fingers at the same time I articulated them, I played the passage legato, with and without emphasis on the shorter notes. The quarter note triplet has written in *triole flüchtig*, which means a rushed triplet. I only applied this

referenced style to the arpeggio when I could play all the notes perfectly centered and in tune. For the last two bars I kept attention on my body posture and tried not to raise my shoulders or the trumpet. Thinking of the sound going horizontally instead of vertically improved my intonation and sound quality. The horns enter on the trumpet's F# with the same note, together with the cymbals. The last note of this phrase marks the first entrance of the orchestra on an A major chord.

My story continued developing during this phrase:

Now that I have the confirmation I take a big relaxed breath (very important quarter note pause – the breath should be taken as part of the music very calm and relaxed). They keep walking and suddenly I feel happy and joyful, because I don't know the person in that coffin and never the less it is a celebration, a last opportunity to say goodbye (E major descending scale from B to E repeated for two bars).

I hear a familiar voice calling me in a rushed way from the other side of the street (*flüchtig* is a german word that can be translated in many different ways, such as volatile, fugitive, ephemeral or even cursory. For me, the *triole flüchtig* sounds as a call, an opportunity to get out of this funeral scene). I take a big breath and a last look at the funeral. The men are pushing the coffin from their shoulders and landing it (I hear the F# as a “going somewhere” tone and the A as definitive “landing point” tone. In the F# the horns join the trumpet and the A is the tonic of the A major chord together with the orchestra, which enters for the first time. The coffin, being pushed and landed by the men, is a concrete image of my air movement – pushing meaning blowing more air and landing meaning to support the air on the A until the end, as the coffin. The A has a tendency to get sharp so the image of the coffin going down also remembers me of that. I also think down when I go up in the register).



Figure H: Symphony No. 5 - Mahler, fourth phrase

I practiced the first part of the fourth phrase in the same way as the third phrase. The context changes. For the first two bars the horns play the same rhythmical pattern as the trumpet played in the opening and the stings play sixteenth notes. Rhythmical accuracy is extremely important, in order for the orchestra to sound as a whole. For the last three bars I kept the same horizontal way of playing. The air column should be constant, since *sempré ff* is written in. They should be played with the right energy and direction, instead of as loud as possible. This avoids a crackled sound. Although a diminuendo is written, the energy should not go low and the air should not stop. For practicing, I played the note without diminuendo and then with diminuendo, but with the same feeling as if I had to sustain it *ff* until the end. I also tried an exercise of introducing text in order to help memorizing the music. As images, text gives concrete emotional meaning to music. I did an effort for the text intention to match the rhythm and melodic line.

I walk calmly to my familiar voice, leaving the funeral behind, but I can still hear the music (repetition of the first measure in the third phrase, one octave higher and starting on the E instead of the B. The second bar continues the descending A major scale until the D, but starting on the F#, which is a major second higher than the last tone from the

previous measure). The familiar voice is my brother, who tells me: our (C#) father (D) is (E) dead (Ab)! (The first three words bring tension which culminates with emphasis on the word “dead”). Everything gets very dark around me (sound color change for the next phrase).



Figure I: Symphony No. 5 - Mahler, fifth phrase

I practiced the last phrase of this excerpt in the same way as the first phrase, since the rhythmic pattern is the same. I focused on sound to get a highly centered Ab tone. The octave interval from the third to the fourth bar of this phrase should be very precise in intonation and rhythm. To practice it, I sang and then played legato and staccato descending chromatically intervals until reaching the octave Ab. This exercise improved accuracy and brought a safe feeling while playing the octave interval. When audiating the last Ab, I kept singing internally the same note (without thinking about the octave interval). This improves intonation, avoiding a very low octave Ab.

Hereby the last piece of my story:

I picture my brother and I alone in the dark and I tell him in a state of confusion and denial: “This can’t be true!”, “This can’t be true!” (Ab flat eighth note triplet and half note repeated two times. The word “true” sustains the half note). He finally replies to me assuring my biggest fear: “Oh that’s the truth!” (As my sentence direction going to the last Ab half note, my brother’s sentence has the direction to the Ab whole tones for the last three bars. The sound *th* from the word “truth” symbolizes my air movement on the diminuendo. Although the dynamic goes down I can’t stop blowing. The unbearable truth is very *pesante*). I look at the funeral and the coffin is going under the ground (after playing the excerpt the stop shouldn’t be sudden, there is still an atmosphere going on and there is a need for time to digest what was heard. The story is over when the coffin is under the ground, which symbolizes lowering the trumpet very slowly after playing.

2.1.3. Epilogue (Symphony No. 5 - Mahler)

After the excerpt was memorized I summarized all the retrieval cues, the spots of my story that triggered relevant information about the excerpt. Each phrase had its own retrieval cue, which ensembles all aspects (basic, interpretive and expressive): 1. C#, 2. Arpeggio, 3. Phrasing, 4. Our father is dead! and 5. Oh that's the truth!

During performance, audiating the melody and thinking about sound colors, helped me to stay in my story.

2.2. Pictures at an exhibition – Mussorgsky/ Ravel

TROMBE I II
en Ut

Allegro guisto, nel modo russo; senza allegrezza, ma poco sostenuto.

The image shows a musical score for Trombe I II in Ut. It consists of three systems of music. The first system has a treble and bass staff with a forte (f) dynamic. The second system has a treble and bass staff with a circled '1' above the treble staff and a forte (f) dynamic. The third system has a treble and bass staff with a circled '2' above the treble staff and a forte (f) dynamic.

Figure J: Pictures at an exhibition - Mussorgski/ Ravel

2.2.1. Prologue (Pictures at an exhibition - Mussorgski/ Ravel)

Pictures at an exhibition is a ten movements suite (plus a varied Promenade) composed for piano by the Russian composer Modest Mussorgsky in 1874. It has become further known through various orchestrations and arrangements produced by other musicians and composers. Maurice Ravel's arrangement is the most recorded and performed. Mussorgsky met the artist and architect Viktor Hartmann, who died from an aneurism in 1873. The artist's sudden passing awaked Mussorgsky. During February and March of 1874, an exhibition of over 400 Hartmann's works was organized in the Academy of Fine Arts (Saint Petersburg, Russia). Thrilled by the experience, Mussorgsky composed Pictures at an Exhibition in six weeks. The piece describes an imaginary tour of an art collection. Mussorgsky music material is based on Hartmann's drawings and watercolors while he was travelling abroad. Mussorgsky links the suite's movements in a way that depicts the viewer's own progress through the exhibition. The beginning "Promenade" stands as a portal to the suite's main sections. Its irregular meter portraits the act of walking either leisurely and sadly due to the departed friend or briskly, when a picture captivates interest.

After acknowledging the context in which the piece was written, I started by approaching the piece analytically. I divided it in 4 phrases of two bars each (the first having a 5/4 meter and the second a 6/4 meter). There are only three rhythmic patterns presented in first bar, second bar and sixth bar (in the rectangular boxes), that are repeated throughout the excerpt. The second phrase is a repetition of the first one, but this time together with the brass, unlike the first phrase, which is solo. To help memorize the notes I created three groups of notes for the first bar: 1) G - F, 2) Bb - |C|,

3) |C| - F - D, where |C| is a common note of the last two groups. The second phrase presents first bar groups in a reversed order, where |C| is now transformed on a twice repeated note for the two groups since the meter alters from 5/4 to 6/4, generating one extra beat: 3) C - F - D, 2) Bb - C, 1) G - F. The third and fourth phrases are very similar; but from the last note of the first bar until the end, the fourth phrase is transposed a minor third higher from the third phrase. In both phrases it is extremely important to keep direction of the sound during the octave interval (second bar) and until the end of the bar.

Since it is very easy to be guided by intervals during this excerpt, keeping a focus on sound quality and intonation, and audiating constantly is crucial. Singing the excerpt until all the intervals are correctly in tune before playing, will help later to play all the notes centered and confidently. Phrase shaping will also be improved by having a clear idea of direction.

The main considerations in performing the piece mentally should be ease and sound colors.

TROMBE I II
en Ut

Allegro guisto, nel modo russo; senza allegrezza, ma poco sostenuto.

The musical score is for Trombe I II in Ut. It consists of four phrases, each spanning two staves (treble and bass clef). The tempo/mood is 'Allegro guisto, nel modo russo; senza allegrezza, ma poco sostenuto.' The key signature is one flat (Bb). The meter changes from 5/4 to 6/4. The score includes several analytical markings: circled notes, boxed groups of notes, and labels for 'Phrase 1', 'Phrase 2', 'Phrase 3', and 'Phrase 4'. A forte 'f' dynamic is indicated at the beginning of each phrase. Circled numbers 1 and 2 are placed above the first and second phrases respectively.

Figure K: Pictures at an exhibition - Mussorgski/ Ravel, analytical map

2.2.2. Story (Pictures at an exhibition - Mussorgski/ Ravel)



Figure L: Pictures at an exhibition - Mussorgski/ Ravel, first phrase

The main focus when practicing this excerpt was to sound, articulation, direction and intonation. Exercises for this phrase varied from playing the phrase legato and staccato. The final result to achieve was a good pronunciation of each note, while maintaining a slightly legato style. I played flexibility exercises, such as lip trills to assure a fine intonation and direct sound on the notes. *Vocalise* etudes helped me to build the shapes of the phrases and direction.

I am about to enter the Museum of Fine Arts in Saint Petersburg to see an exhibition and behind two big columns there are two doors already open, inviting people to come in. There is a straight corridor, with high elegant walls, before I get to the pictures hall. I see a window, and although it transepts light, I realize that the sun is covered by clouds. (The two columns and two doors symbolize phrases of two bars, and together I have four objects, which symbolize the four phrases of the excerpt. The doors being already opened remind me not to start playing with an accent, but gently let the air pass through my lips, creating a very gentle and elegant sound, as the big walls. The sun reminds me of the starting note, G. In Portuguese, sun is *sol*, which is also another name for G. The sun being covered by the clouds describes *senza allegrezza, ma poco sostenuto*, bringing a color to the corridor which is not shiny, but also not dark – something in the middle. (It's also the image for my first retrieval cue). As I begin to walk through the corridor, a man walks with me singing a melody and has written the word "groups" on his forehead. He constantly looks at my feet. (I keep in mind the man singing the melody of the first phrase, which I had previously separated in groups during the prologue stage of my memorization model. The fact that I'm walking along helps me keeping the melody's tempo stable. He looks at my feet and I remember to breathe very deep and low.)



Figure M: Pictures at an exhibition - Mussorgski/ Ravel, second phrase

The man sang the same phrase again while I kept walking. He kept looking at my feet. But there is something different this time. He sings it even clearer, assuring some kind of leadership. Other people are coming along with the man this time, singing as well and enhancing his melody. The sun shines for a little while, and colors in the corridor

get warmer (The people coming along with the man represent the entrance of the brass section. They also represent my second retrieval cue. The character of this phrase changes slightly to a more *marcato* style, just to lead the section while playing the melody. The sun is shining, while the man and people sing this phrase reminds me that in order to balance the slight change in articulation my sound needs to be warmer.



Figure N: Pictures at an exhibition - Mussorgski/ Ravel, third phrase

The difference between the third and fourth phrases reside mainly on the fact the melody goes to a slightly lower register on the first phrase and that there is an octave interval on the second phrase. I kept the same ideas and exercises as for the first and second phrases, with special attention to the airflow. By blowing more quantity of air the same sound can be achieved in the lower register, keeping the same good intonation and accuracy as in the other register. For practicing the second bar of this phrase I lowered the second F, D, C and Bb an octave, for sound reference reasons. Instead of having direction to the highest note (F) I conducted it to the next note (D). When sound, intonation and direction were as intended I played the originally written. This exercise improved accuracy greatly.

The sun stops shining and the man is singing alone again, a different melody. Before he sings the highest note of the melody people breathe in and start singing with him on the highest note. The sun shines again, stronger until the D of the melody that the man is singing. I can see everything, because I'm still walking beside him (the sun is again covered by clouds representing the first entrance color, since the trumpet is playing solo again. The image of the people breathing in gives me confidence and stability, reminding I'm not alone on the high F, the brass section is playing with me. The sun shining a bit stronger reminds me to keep my sound warm on the high F and to keep the direction until the D. In order to see the sun shining, the clouds must be blown by the wind. (That is the image for my airflow on the octave interval).



Figure O: Pictures at an exhibitions - Mussorgski/ Ravel, fourth phrase

The fourth phrase is a repetition of the third phrase, so I practiced it the same way. The sun is covered by a cloud again and the man sings alone the same previous melody, changing it to a minor third higher four notes before the people start singing with again. By that time, a strong wind blows the cloud away and the sun shines stronger than ever and the colors in the corridor had never been so bright and warm. (Basically everything goes exactly the same way as in the third phrase, but the minor third transposition turns

the high note into an Ab. That is a particularly difficult note on the trumpet which requires extra airflow in order to keep it in tune and with a good sound quality. There is also a tendency for this note to be low, so watching bright and warm colors reminds me to have a higher energy without changing the quality of sound, which should stay warm.

2.2.3. Epilogue

When I was able to play this excerpt by memory I summarized all the retrieval cues: 1: two columns + 2 doors + sun, 2: people singing, 3: color changes in the corridor, 4: strong wind blowing the clouds. The man walking is essential to keep the tempo, without rushing or getting slower, but at the same time having enough freedom for expressivity and phrase shapes.

The story I created for this excerpt gave me a clear picture of tempo, sound colors and phrasings, while performing it.

2.3. Petrushka – Stravinsky, ballerina's dance and waltz



Figure P: Petrushka - Stravinsky, ballerina's dance



Figure Q: Petrushka - Stravinsky, Waltz

2.3.1. Prologue (Petrushka - Stravinsky, Ballerina's dance)

Petrushka is a ballet burlesque in four scenes. It was composed in 1910–11 and revised in 1947. The music was composed by Igor Stravinsky and the libretto was written by Alexandre Benois, who was also the designer of the sets and costumes. Michel Fokine choreographed the ballet. It was first performed in Paris on June 13th of 1911, by Diaghilev's Ballets Russes. The first scene opens on a square filled with a rowdy crowd of peasants, aristocrats, soldiers, street performers, vendors, and various others, all seeking amusements and diversion. Their activities are interrupted by the appearance of a bearded showman, the Charlatan, who presents his three puppets – the doll-like Ballerina, the opulent Moor, and the sad Petrushka – performing a mechanical dance. Scene Two takes place in Petrushka's dark cell, dominated by a watchful portrait of the Charlatan, and reveals the puppet's awkward and despairing love for the self involved and uncomprehending Ballerina. Scene Three shifts to the Moor's colorful room. The Moor plays with a coconut and momentarily allows the admiring Ballerina to distract him (Ballerina's dance and waltz, trumpet orchestral excerpts). His rage at Petrushka's entrance results in a chase. In the final scene, back at the fair, Petrushka runs out of the Charlatan's booth, followed by the Moor, who kills him. The crowd is horrified, but the Charlatan picks up the limp puppet, convincing them that the corpse is just sawdust and rags. As the fair ends, the ghost of Petrushka appears above the rooftop, both threatening and triumphant. The bewildered Charlatan drops the doll and flees in terror. The excerpt was originally written for cornet, thus the composer searched for a mellow, sweet sound. The only accompaniment during this trumpet solo is a snare drum that starts three bars before and keeps playing during the whole excerpt marking the beats.

I started my analytical overview of the Ballerina's dance by dividing it in six phrases. Phrases one and two can be divided in two sub-phrases: the arpeggio pattern and the sixteen notes scale melody. Phrases five and six are a repetition of phrases one and two correspondently, thus each of them can also be divided in the same sub-phrases. The only difference between phrase two and phrase six are the two final bars added on the last one, which I interpret as a coda, a final statement closing the solo. The first sub-phrase of phrase one is divided in two ascendant and descendent F major arpeggios. Both start on the A and the second goes to a dominant seventh instead of tonic F. The second sub-phrase is based on F major scale and the important notes to memorize are: G (starting note), E (first top note), Bb (first bottom note), E (second top note) and C - F (the fifth interval that ends the melody). Phrase two is very similar to phrase one, in which only the second sub-phrase is slightly different, being the important notes/intervals: A (beginning note), E - C - G (C major arpeggio), E - C - G - F (C major arpeggio landing on the tonic, F). Phrase three, presents a new rhythmic pattern of sixteen notes grouped two-by-two, in an ascendant and descendant G dominant ninth cord. At the top of the chord a new rhythmic pattern (dotted eighth note with sixteen note, A - F) emerges, reinforcing the ninth and seventh of the chord. The fourth phrase is a mixture of patterns (of rhythm, melody and articulation) presented on phrases one and two. This phrase can also be divided in two sub-phrases: the first one until the eighth note on the second beat of bar rehearsal 137 and the second one until the end of phrase four. In the first sub-phrase, bar the rhythm comes from the beginning of phrase one, but the arpeggios are, this time, descendent: G minor, C major and G minor, with 4 sixteen notes before the last note (D, C, E, D). The second sub-phrase keeps also the same rhythmic pattern as the beginning but instead of an arpeggio melody, it presents diatonic movements: C - E - Bb, C - E - C - F (the same fourth interval as in the end of the second phrase). This excerpt shifts from articulated arpeggios to diatonic melodic legato lines very suddenly, since there is no crescendo or diminuendo written in

between the dynamic markings. Character and style bring this excerpt alive and the key for that resides in sound colors, clarity and precision.

Figure R: Petrushka - Stravinsky (Ballerina's dance), analytical map

2.3.2. Story (Petrushka - Stravinsky, Ballerina's dance)

Figure S: Petrushka - Stravinsky (Ballerina's dance), first phrase

There should be a contrast between the first sub-phrase and the second one. Not only the dynamic changes from *mf* to *p*, the first sub-phrase figures have accent marks for staccato and the second sub-phrase figures should be played in a smooth legato line. Although my main goal was for them to have different characters in the end, I practiced them the other way around, meaning that I practiced the first sub-phrase in a legato style (in order to avoid stiffness and losing phrase direction) and the second phrase very articulate (in order to have a defined legato pronunciation from note to note, instead of ascending and descending blurs). When I changed to the originally written phrase my intonation was better and I had a better sense of direction in sound and phrasing. Since this excerpt belongs to a ballet, which already has a story, I didn't create a new one. Based on the real story, I added specific images of objects that served as retrieval cues and sound (style, dynamics, accents) guiders.

As it happens in the ballet, this trumpet excerpt takes place in The Moors room, which is burlesque and exotic. I focus on the ballerina character: thoughtless, playful and lack of personality. Her mechanical puppet movements are inhuman and bare, unlike an human ballerina's movements. The Ballerina is in love with The Moor, which he doesn't realize right away. So, to seduce him, she dances. In her hands she holds a coconut that

drops water every beat. She dances in front of him arms by the side and alternately going up and down (the image of the water drops, dropping from the coconut, reminds me to keep the tempo steady, as the snare drum during the excerpt. This image also symbolizes the direction of my phrase - air movement as the water movement - and the kind of articulation I play. The words "puppet" and "Ballerina" together are a very good way to have a clear concrete image of the excerpt style. It should be mechanical as a puppet, in which every movement should be precise, but also as a ballerina dancing, flowing and in constant movement and balance). She spins on the tip of her toes, but because she is a puppet, she bends her knees two times (this is my image for the second sub-phrase. The picture of spinning in the tip of the toes in very tiny movements is contrast from the way she dances in the first sub-phrase. Both times the phrase arrives to the lower notes (C and last F) her knees bend I picture it as a puppet ballerina, that cannot stand for too long on the tip of her toes, but still doesn't stop going. Although there is no crescendo or diminuendo written in, the phrase should still have some shape, and this image also reminds me of the shape of the phrase).



Figure T: Petrushka - Stravinsky (Ballerina's dance), second phrase

For this phrase I paid special attention to the sixteenth notes arpeggio (E - C - G), in the second sub-phrase. Because they are harmonics, on the trumpet they are all played with no valves, involving a lot of flexibility skills. I kept the same method of practice. The story has no alterations apart from the fact that during the four last notes the ballerina designs the number four with her legs (this reminds me that in the end of this phrase I have to play the arpeggio until the F and that the four notes should equally be heard, instead of rushing through them).



Figure U: Petrushka - Stravinsky (Ballerina's dance), third phrase

The climax of the excerpt happens in the third phrase on the first high A. I started practicing this phrase of the excerpt by playing the arpeggio in long tones focusing on sound and intonation, both staccato and legato. Then I practiced it with the written rhythm and a very sharp articulation. In the end I practiced the written rhythm with a legato articulation, but keeping the same definition in the beginning of the notes. I kept the same energy going up and down the arpeggio. The sixteenth after the dotted eighth note (F) tends to be less heard than the remaining ones, so I put a particular emphasis on it, thinking of it as an upbeat for the descending arpeggio.

The ballerina throws the coconut to The Moor, but he started to be so interested in the Ballerina's dance that he didn't care about the coconut anymore, throwing it away (since the coconut represents the water, on this phrase I relate my airflow to the throwing of the coconut. My airflow should be the same going up and down motion as the arpeggio).



Figure V: Petrushka - Stravinsky (Ballerina's dance), fourth phrase

The Ballerina approaches The Moor, dancing very quietly on the tip of her toes, as delicately as she can possibly do it, because she is still a puppet. She approaches her lips to his cheek, as if she was going to kiss him, and then she recedes, provoking him. She repeats it, getting even closer, receding completely (this phrase contrasts with the previous one, in dynamic and character. The first part of this phrase should be played in a *piano* dynamic with an introvert character, as a response to the previous phrase's explosion. That is why I imagined the ballerina in the tip of her toes. The second part of this phrase as a very natural shape that accompanies the melody, as if it was going forward while going up and backwards while going down. Picturing the Ballerina's intention to kiss The Moor, going back and forth in an horizontal way, reminds me of my airflow, which shouldn't be vertical (up and down), and that it is not related to dynamics, but with the intention of phrase shaping.



Figure W: Petrushka - Stravinsky (Ballerina's dance), fifth phrase

The fifth phrase is a repetition of the first phrase, so I practiced the same exercises. The Ballerina steps away from The Moor and standing now in front of him. Holding the coconut on her hand, she dances putting her arms by the side and alternately going up and down (Having the same picture as in the beginning of the story reminds me repeat the opening phrase. With the same picture, I also play the fifth phrase in the same calm way as when I started).



Figure X: Petrushka - Stravinsky (Ballerina's dance), sixth phrase

Since this phrase is a repetition of the second phrase, I kept the same practicing strategies and exercises. I practiced the last two bars by varying rhythm and articulation styles, focusing on keeping a constant airflow. First I practiced it with only one half note and a eighth note in the end,. Then with two quarter notes and eighth note. After, I changed the quarter notes to five eighth notes. Finally I played the originally written rhythm. Keeping the airflow helped me keeping direction.

The ballerina dances in big steps getting closer to The Moo. When she is closer to him she starts spinning on the tip of toes very carefully. She finally kisses him on the cheek. (This phrase is a repetition of the second phrase except for the two bars added in the end.

2.3.3. Epilogue

After having this excerpt memorized, I assembled all the retrieval cues, picturing clearly the most important ones. The image of the water dropping from the coconut was kept throughout performing the excerpt, establishing tempo and phrasing direction: 1. Ballerina dancing contrasts, 2. arpeggio, 3. coconut throwing, 4. Ballerina seducing The Moor , 5. Ballerina dancing contrasts, 6. arpeggio + kiss.

2.3.4. Prologue (Petrushka - Stravinsky, Waltz)

For the second part of this excerpt, the Waltz, I started by dividing it in four phrases. There are three basic rhythmical patterns presented at the beginning of the first phrase, second bar of rehearsal number 141 and fifth bar of rehearsal number 141. The comma assures the waltz style, having a stronger emphasis on the first beat, weaker on the second and the weakest on the third beat. Audiating the melody played by the flute on the resting bars improves accuracy on the eight notes of the bars that follow it. Keeping a stable tempo can also be achieved by audiating the flutes sixteen notes during the cornet's melody. There should be special attention on the last bar of the excerpt, in which the last note should end suddenly, with a character that leaves expectation.

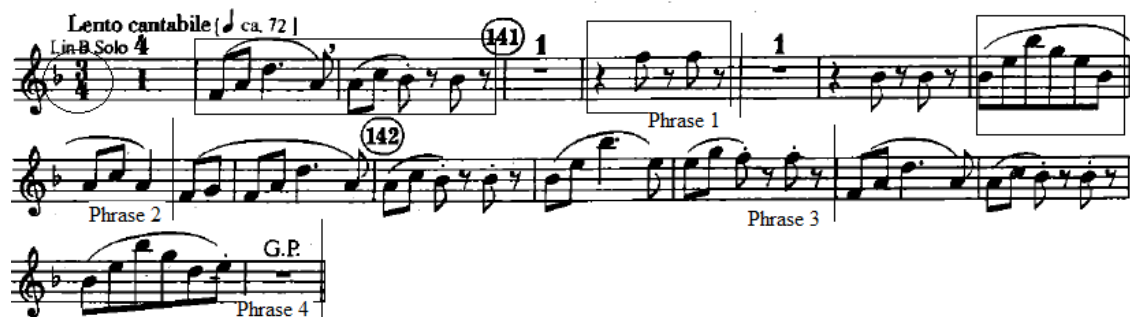


Figure Y: Petrushka - Stravinsky (Waltz), analytical map

2.3.5. Story (Petrushka - Stravinsky, Waltz)



Figure Z: Petrushka - Stravinsky (Waltz), first phrase

Practicing the first phrase of this excerpt I played the notes without rhythm, to be sure of intonation and phrase direction, which must go to G on the second bar. Then I focused on playing accurately the written rhythm, with the same character and direction. I paid particular attention not to breathe between the eight notes. Although there are eight note pauses they should be thought in a stylistic way, without stopping the air and losing sense of direction. In order to keep the waltz character and direction on the eight notes on bars two and four of this phrase I practiced them with a slight crescendo from one to another.

The Moor realizes his love for the Ballerina, and invites her to dance a waltz with him. She accepts it. The Moor has a flute on his hand and the Ballerina a cornet (On this phrase the first two bars sound to me like a question and the last two bars as an answer to it. The Moor's question and the Ballerina's answer remind me of that. For the whole excerpt I imagined the ballerina and The Moor dancing the waltz, representing the

cornet and the flute respectively, in which the assertive Moor as the flute, guides the sweet Ballerina as the cornet).



Figure AA: Petrushka - Stravinsky (Waltz), second phrase

I practiced the first two eight notes of this excerpt as in the previous phrase. On practicing the third bar melody, I started by singing and playing the melody, based on D minor arpeggio, an octave down, focusing on sound quality, smoothness, intonation and ease. Before transposing it to the written octave I practiced ascending Ab scales both legato and staccato very smoothly, focusing on sound. Then I slowly practiced the scale by intervals without forcing it and keeping a good intonation (Ab - Bb, Ab - C, Ab - Db, and so on). When I was sure of the written intervals I practiced it in the originally written way, keeping the waltz character.

The Moor's head turns into a heart with a question mark, meaning that he is asking the Ballerina if she loves him, to which she replies with positive assertiveness (the Moor's head having the image of a heart with a question mark serves as my second retrieval cue. Again, the first two bars sound to me as a question, explaining the question mark, and the last two as an answer. The ballerina's positive assertiveness reminds me to keep focused that way when playing the first bar of the answer, which melody can easily be missed).



Figure BB: Petrushka - Stravinsky (Waltz), third phrase

The third phrase starts with a two eight notes upbeat. In order to keep the waltz style I created a comma, separating them from the next bar, emphasizing the first beat. Since this phrase shows repeated patterns from previous phrases I used the same approach while practicing, always focusing on sound, style and easiness.

The Ballerina and The Moor dance, focusing on their steps, coordinating them as if they were one. The Moor guides the Ballerina, who seems to float in a puppet-like mechanical way. (During this phrase there should be a precise synchronization between the cornet and the flute. The flute plays sixteen notes guiding the tempo for the cornet's melody, which should keep the waltz phrasing style, without forgetting intonation and interval accuracy. The word floating gives a concrete idea to my air flow, which should stay smooth and without breaks).



Figure CC: Petrushka - Stravinsky (Waltz), fourth phrase

For practicing the fourth phrase ending I paid particular attention to sound. The solution I found for the note to be sudden was to play it slightly shorter, but thinking as if the airflow

kept going, and adding a slight decrescendo to it.

Petrushka enters The Moor's room, but the Ballerina and The Moor keep dancing in a very connected rhythmical fashion, not noticing him, until they suddenly do! (Picturing the Ballerina and The Moor focused on their dance, reminds me to stay focused on the present music I'm playing. The sudden surprise defines the character of the last note).

2.3.6. Epilogue

When I was able to play this excerpt by heart, I mentally pictured a retrieval cues map, regarding the main points of the story/ music: 1: Moor - flute, Ballerina - cornet, 2: heart?, 3: Puppets synchronized dance and 4: Petrushka surprise.

Audiating the melody while playing this excerpt improved accuracy, phrasing shapes and atmosphere.

2.4. Symphony No. 3 – Mahler



Figure DD: Symphony No. 3 - Mahler

2.4.1. Prologue (Symphony No. 3 - Mahler)

Gustav Mahler wrote symphony No. 3 between 1893 and 1896. In its final form, the work has six movements. As with each of his first four symphonies, Mahler originally explained the narrative of the piece. This excerpt is situated in the third movement of the symphony, to which Mahler named: "What the Animals in the Forest Tell Me". The third movement, a scherzo, with alternating sections in 2/4 and 6/8 metre, quotes extensively from Mahler's early song "Ablösung im Sommer" (Relief in Summer). In the trio section, the atmosphere changes from playful to contemplative and occurs with an off-stage post horn (or flugelhorn) solo. The reprise of the scherzo music is unusual, as it is interrupted several times by the post-horn melody.

"In his composing, Mahler usually tried to find new ways to express his feelings, new ways to obtain orchestral colorings, and new ways to organize his works. However, the

one predictable aspect of Mahler's composing was that each new symphony would contain something new. His new twist for the Third was to use as a solo instrument a posthorn, an open trumpet-like instrument, sometimes long and straight, sometimes curled. This horn was a common instrument to signal the arrival/departure of the carriages (postillion) carrying the mail, or sometimes simply as a signaling device in mountainous areas. In an early version of the score, Mahler calls for a *flügelhorn* but later editions call for a *trumpet played like a posthorn*. (...) The tune Mahler assigns to this instrument greatly resembles a tune in Franz Liszt's piece *Rhapsodie Espagnol* (circa 1863) and a similar tune to a piece called *Jota Aragonaise* by Michael Glinka, composed later. According to Morten Solvik, Ferruccio Busoni, composer and great pianist, orchestrated the Liszt piece and proposed to Mahler that it be performed in a concert. Mahler and Busoni were frequent collaborators in Europe and in New York. In brief, the orchestrated Liszt work was played by Busoni with Mahler at a concert on October 22 1894, in Hamburg, in the very period in which Mahler was composing his Symphony No. 3. (...) However, we now have some evidence that Mahler possibly heard this melody much earlier. My Dutch friend, Willem Smith, has just informed me of his research on tunes postillion drivers played in the former Bohemia and Moravia. The drivers played their own favorite tune to identify their coach. The Spanish tune that Liszt and Glinka used was one of their favorites! It was noted by some travelers (documented in letters) that Mahler took a postillion at one time, the driver of which often played this Spanish tune. So, the Liszt-Busoni piece might have reinforced in Mahler's memory that tune, which then found its way into the Third Symphony."⁴⁸

In a first analytical approach, I divided this excerpt in six phrases, based on the written commas. The first two phrases present *staccato* accents. Phrases three and four should respect a *portamento* style. The first part of phrase six (until four bars before rehearsal number 15) present *tenuto* accents and from then on the staccato accents, as in the beginning. There is a rhythmic pattern in the second bar (eighth note with sixteenth pause, sixteenth and eighth note) that is written differently in the first bar of the third phrase (dotted eighth note, sixteenth and eighth note), which supports the change of character. The excerpt is based on F major scales and arpeggios, so audiating and singing in this tonality before playing it on the instrument is crucial, special major thirds, perfect fourth and fifth and octave intervals. In the first phrase, the above text (*Sehr gemächlich*) defines the tempo as very slowly where the rhythmic figure of three eighth notes should be taken even slower as before. At the bottom the *ppp* means that the excerpt should sound as if it was played from far away; free speaking, as the example of a posthorn. In the end of phrase five, *zeit lassen* is written, which means allow time. Four bars before rehearsal number 15 Mahler writes *Zürück haltend*, hold back, and two bars after *verhallend*, echoing. These notations define phrase shapes, directions and sound colors.

This is a very difficult solo, which requires precision and smoothness. Since there are no resting bars, the management of maintaining an even sound quality can sometimes be hard. In order to achieve the right character, thinking of sound colors and airflow is essential. In the created story there should be elements that constantly remind me of ease and being relaxed while playing.

⁴⁸ Ruttenber, S. - What Nature and Man Tell Me



Figure EE: Symphony No. 3 - Mahler, analytical map

2.4.2. Story (Symphony No. 3 - Mahler)



Figure FF: Symphony No. 3 - Mahler, first phrase

The first exercise I practiced on this phrase involved bringing the intervals together, by lowering the first and final C an octave down. When the intonation and rhythm were precise I transposed back the octaves.

I am in 1893 travelling by post, being a passenger in a post delivery service. I'm sitting in fancy coach drawn by six horses, next to the coach man, who holds a tambourine. The postillion is driving the horses and mounted on the front left horse, holding a posthorn on his hand. The posthorn, played by the postillion, signals the arrival and departure of the mail coach, so that people could hear that it was going to pass, before it could even be seen. I'm enjoying the ride, surrounded by nature. I can see the postillion preparing to play the tune as we are approaching the village. He starts playing the posthorn, which has a very mellow sound. So that people could be able to recognize the tune, individual for each postillion, he plays the notes with a lot of definition, and space between (especially before the sixteenth notes), in order to assure that the tune can be recognized from far away (based on Mahler's inspiration for this posthorn solo, I started my story by picturing the atmosphere of nature around me, which relaxes me before starting to play. By seeing a fancy coach I remember the two notes of this phrase (F and C). The chain of six horses remembers me of the six phrases I have to play. During this excerpt, audiating the sound of a tambourine playing a quarter note with an eighth note rhythm remembers me to keep the air moving and the phrases direction alive and with

energy. The postillion is an image of myself playing, so I picture him getting prepared. He starts his tune by playing the notes very defined, so that they are fully perceptible from far away, making the tune recognizable).



Figure GG: Symphony No. 3 - Mahler, second phrase

I kept the same way of practicing, lowering the high F's an octave, making the intervals easier to audiate. Regarding articulation, I practiced the phrase legato and then staccato. Airflow assumes a very important role in phrase shaping. Although there is freedom in tempo, it should still sound logical and as a signal, so I took the quarter note on the fourth bar as a resting point for my phrasing. Although the notes should sound staccato, the airflow should never stop. In the last bar the sound color changes to a mellower character.

I look at my right and see the biggest tree I've ever seen, while the postillion keeps playing his tune, with every note very defined. The next image I see is a golden harp. I'm starting to see the village, and the carriage slows down (tree's translation into Portuguese is *árvore*, and by picturing this image I remember that the new note added on this phrase is A, first letter from *árvore*. The golden harp reminds me of two things: sound should still be round and warm as it usually gets when playing on a gold plated trumpet and the harp reminds that the next part of the phrase is based on F "harp"eggio. The last bar of this phrase anticipates a coma, a rest, so by thinking that the carriage slows I remember the phrase ending shape).



Figure HH: Symphony No. 3 - Mahler, third phrase

The two sixteenth notes play an extremely important role in this phrase, in terms of direction and shape. They have to be fully perceptible. I practiced the phrase legato, with an air accent on the sixteenth notes. In this excerpt the eighth note upbeats bring the movement to the phrases. When the upbeat is played too soft this movement is lost and is more difficult to give the phrase a shape. For this reason, another exercise I did, was to play the phrases all in eighth notes.

The carriage slows down as it approaches the village, and the postillion starts gradually changing the character of his tune, the notes don't have so much space in between. He now plays with much more expression and freedom. Nevertheless, he keeps driving the horses (the word *portamento* means carrying, so the notes should be more connected in a smooth legato style, and phrases have even more shape then they had in the beginning. The image of the horses, that keep drawing the carriage, reminds me that, although the phrasing expressivity increases, there should still be movement in sound).



Figure II: Symphony No. 3 - Mahler, fourth phrase

For this phrase I paid special attention to the octave interval at the beginning. I practiced it by gradually extending intervals diatonically, starting on F. Playing a diminuendo, but thinking of a crescendo when going to the high note, helps in accuracy and sound color. I also practiced the rhythm by having a very small gap between the high dotted eighth note F and the sixteenth octave lower F.

I take a look at the other side and I see the sea. The waves come and go, matching with the tune played by the postillion. The carriage slows down for a while, so that the passengers can observe that beautiful sight. (For the first two bars of this phrase, I connect the movement of the waves with my airflow, in order to achieve the big intervals easily. The slowing down of the carriage represents the end of this phrase. Picturing the sea and the waves is also relaxing.)



Figure JJ: Symphony No. 3 - Mahler, fifth phrase

In this phrase, there is the presence of unaccented notes, slurred notes and tenuto accented notes. So, the first bar should be played as the previous phrase, but in the second bar the articulation changes. In order to make a difference between *portamento* and this slurred/ tenuto bar, I increased tension in sound, achieved by direction and dynamics. By playing it with an even warmer sound, the character of this bar can change greatly. The *zeit lassen* bar, should work as a launching ramp for the next phrase, meaning that airflow should not stop, mentally.

The carriage keeps going as I watch the trees from the carriage's window and they gently balance with the wind blowing towards the direction of the village. (I perceive *zeit lassen*, written in on the last bar, as a huge *rubato*. Having the time to really appreciate the notes and giving the phrase time to rest. Watching the trees swaying in the wind.)



Figure KK: Symphony No. 3 - Mahler, sixth phrase

Practicing this phrase included a lot of air management. It is a very long phrase and it doesn't seem sensible to breathe in any spot. It starts with a long and piano A, creating space for the phrase to grow. In order to keep the tenuto character, asked from the composer for this phrase, controlling airflow is the basis for building and practicing this

phrase. I started by practicing it an octave lower, until the first note of the sixth bar. When transposing it to the written octave I constantly thought of playing it with the same easiness as I could previously achieve. I practiced it without crescendo and diminuendo, which brought consciousness to my sound, since the phrase had no shape anymore. When I put them back I thought of it as a color changing, keeping my airflow stable which improved intonation and accuracy. From the sixth bar the character changes, to the starting one, because staccato accents are written in. As the intervals get wider the difficulty increases. When practicing I played the arpeggios in eighth notes, making sure that intonation was precise. Then on the dotted quarter note I played the rhythm that follows it (dotted eighth note with sixteenth and eighth note). When playing in the originally written way, audiating the rhythm on the longer note, to play it after in the arpeggio increased precision and ease. The phrasing got more movement.

We arrive at the village. I am astonished at the view. The little houses seem to have come out of a fairy tale, the mountains that surround the village are of such deep green. Finally the carriage stops. I get out and listen to the postillion playing the departure signal once again on the posthorn. It is close to me and sounds very clear. The carriage continues down the road. I can still hear the posthorn, as if it was an echo, until the sound finally fades away (I associate the word fairy tale with something that is not completely real. And that is the way I perceive the beginning A of this phrase, starting without definition in articulation, just air; very soft. Imagining the deep green mountains helps me to give the phrase a very deep color in sound, very warm and legato. The image of the carriage departing is exactly the description of my sound, getting softer, then as an echo fading away).

2.4.3. Epilogue

After this excerpt was memorized, I assembled all the retrieval cues that reflected the important points that guide my story.: 1: FanCy carriage, 2: tree + golden harp, 3: Postillion expressiveness + horse driving, 4: waves, 5: wind blowing, 6: postillion leaving - echo + fade away. Audiating the posthorn sound while performing turned out to have extreme importance, regarding sound quality and easiness of playing.

3. Orchestral excerpts exam

To test my memorization model's efficacy, on January of my second year of the masters program, I played the orchestral excerpts exam, which consisted on the list presented in the appendix. Among all the excerpts, there were present the four I applied my memorization model to.

The exam situation avoided the bias effect. Since it was an exam, I did an effort to play my best in all the excerpts, independently of whether my model was applied to them or not. One week before the exam I had an influenza, which affected my preparation for the exam regarding stamina and sound quality. There was also a change of schedules, which result in an anticipation of forty minutes, meaning that I had five minutes to focus and prepare myself for the exam.

Previous practice and
incidental memorization

+

Memorization model

Memorization Model

Control Group

Pictures at an exhibition - Mussorgsky/ Ravel Petruschka - Stravinsky Symphony Nr. 5 - Mahler	Symphony Nr. 3 - Mahler	All the other trumpet orchestral excerpts.
--------------------------------------------------------------------------------------------------------	-------------------------	-----------------------------------------------

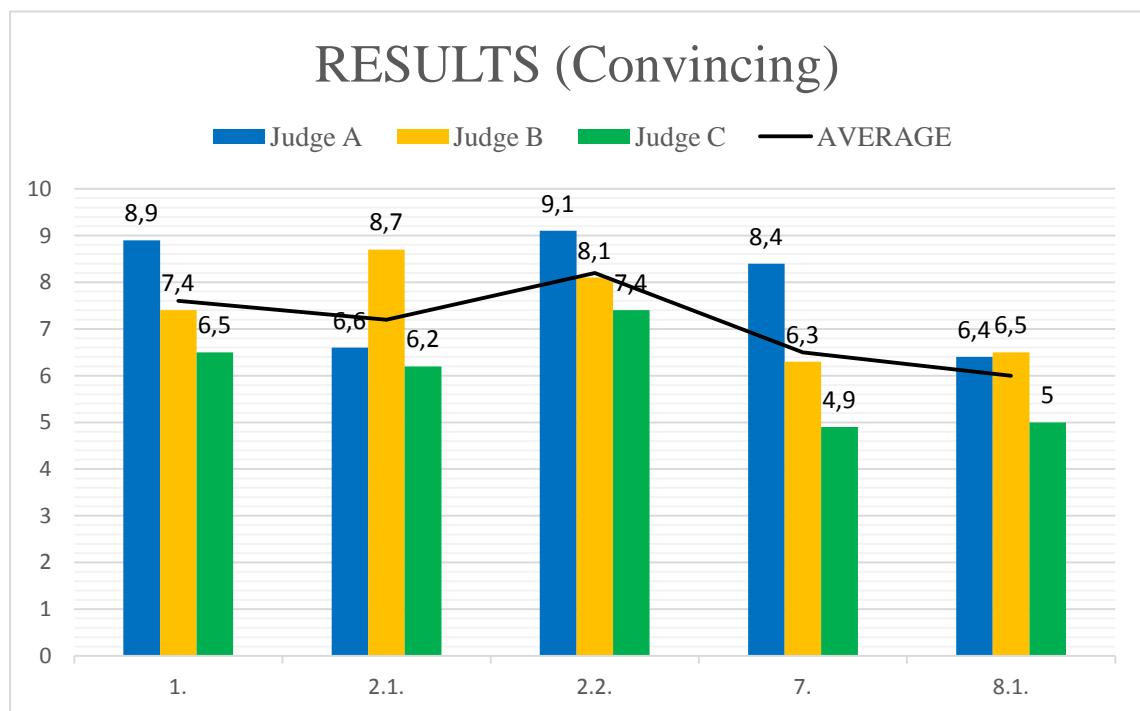
Table E: Previous practice and incidental memorization + memorization model, memorization model and control group of trumpet orchestral excerpts.

Part III - Results, analysis and discussion

1. Results

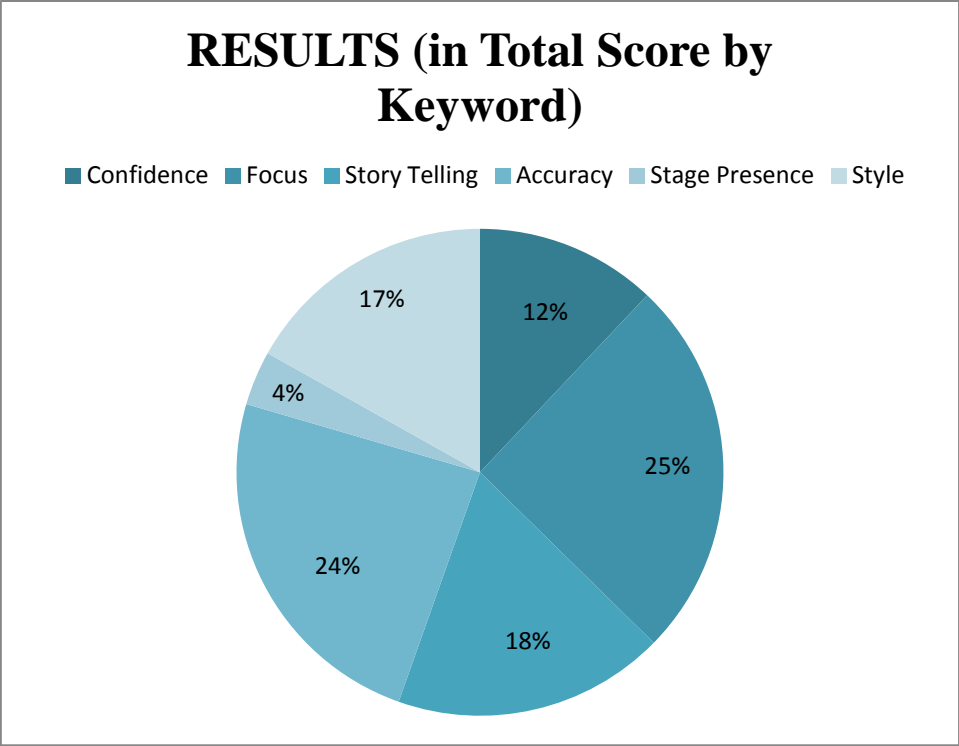
The following results are divided in two categories: the committee feedback results and my personally experienced results. Each of these categories is also divided in results regarding the convincing factor for each excerpt. This notion can be broken down in the following keywords: confidence, focus, storytelling, accuracy, stage presence and style. The particularly strong presence of these keywords, for each excerpt, was marked on both feedback groups (judges and personal experience). The presented graphs are based on the tables in the appendix.⁴⁹

1.1. Committee results

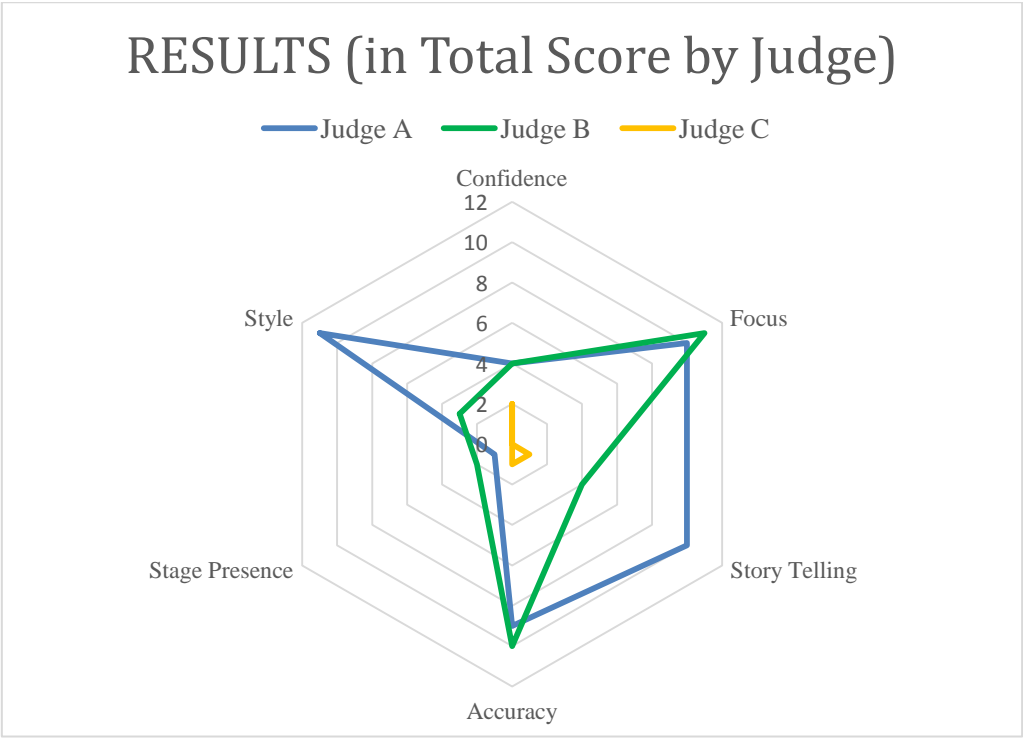


Graph A: Feedback (convincing mark) by judge and average of judges

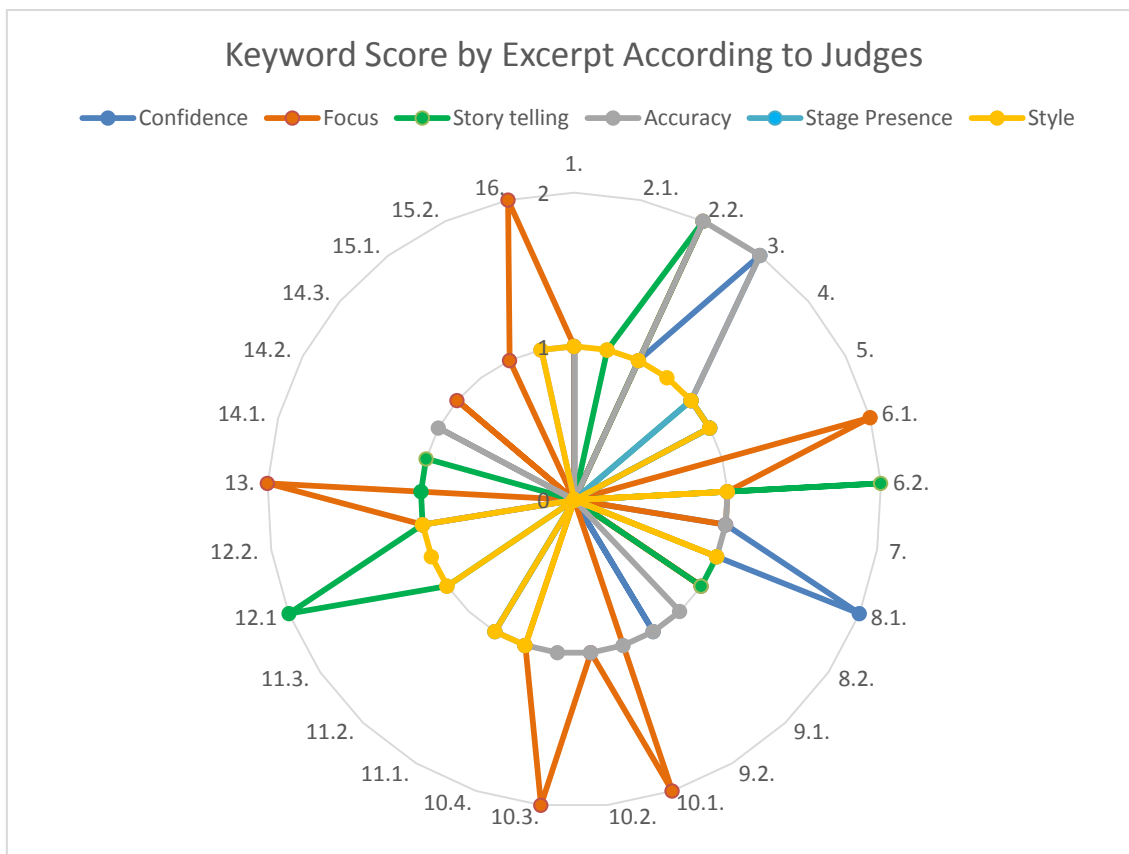
⁴⁹ Respectively: Graph A - Appendix VI; Graphs B, C and D - Appendix VII, Graphs E, F and G - Appendix VIII. Graph H - Appendix VI and appendix VIII.



Graph B: Total score percentage by keyword (confidence, focus, storytelling, accuracy, stage presence and style) for the whole list of excerpts

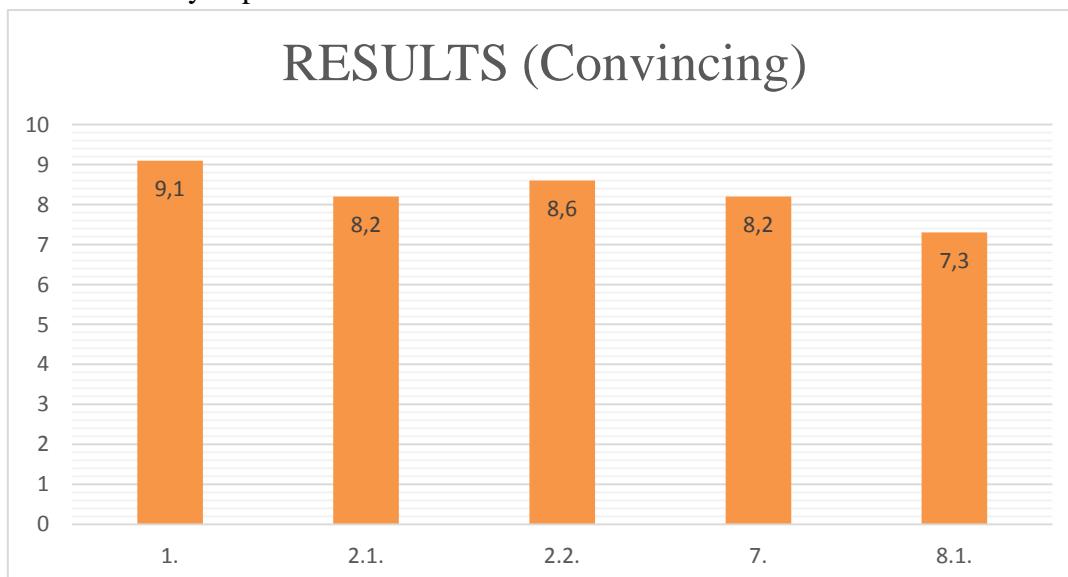


Graph C: Total score, concerning keywords, by judge for the whole excerpt list

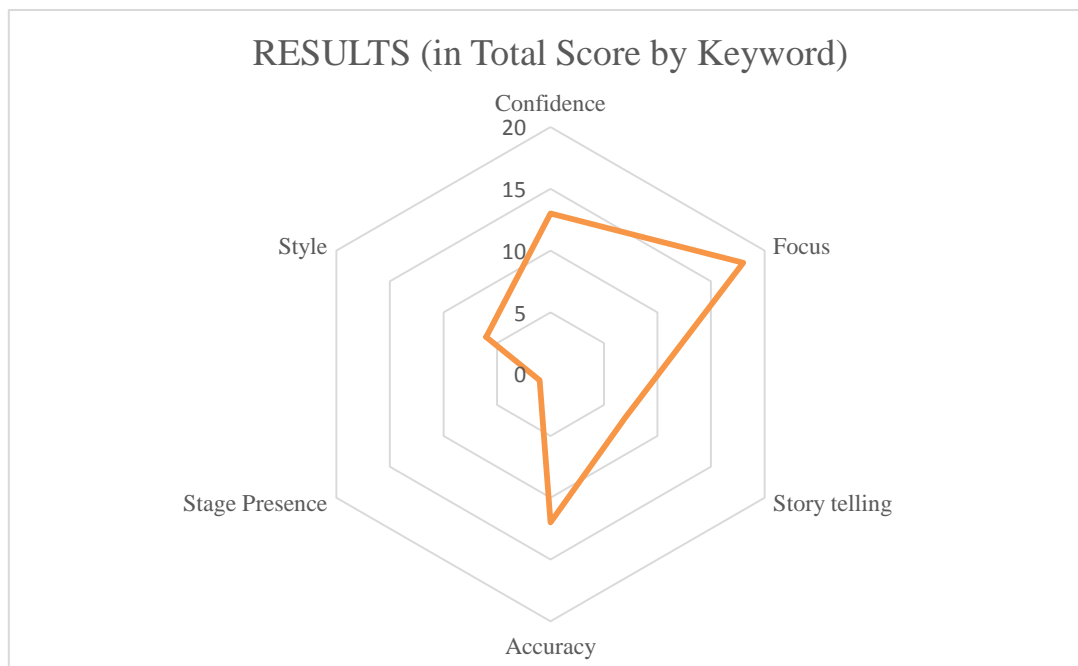


Graph D: keyword score by excerpt, by judge

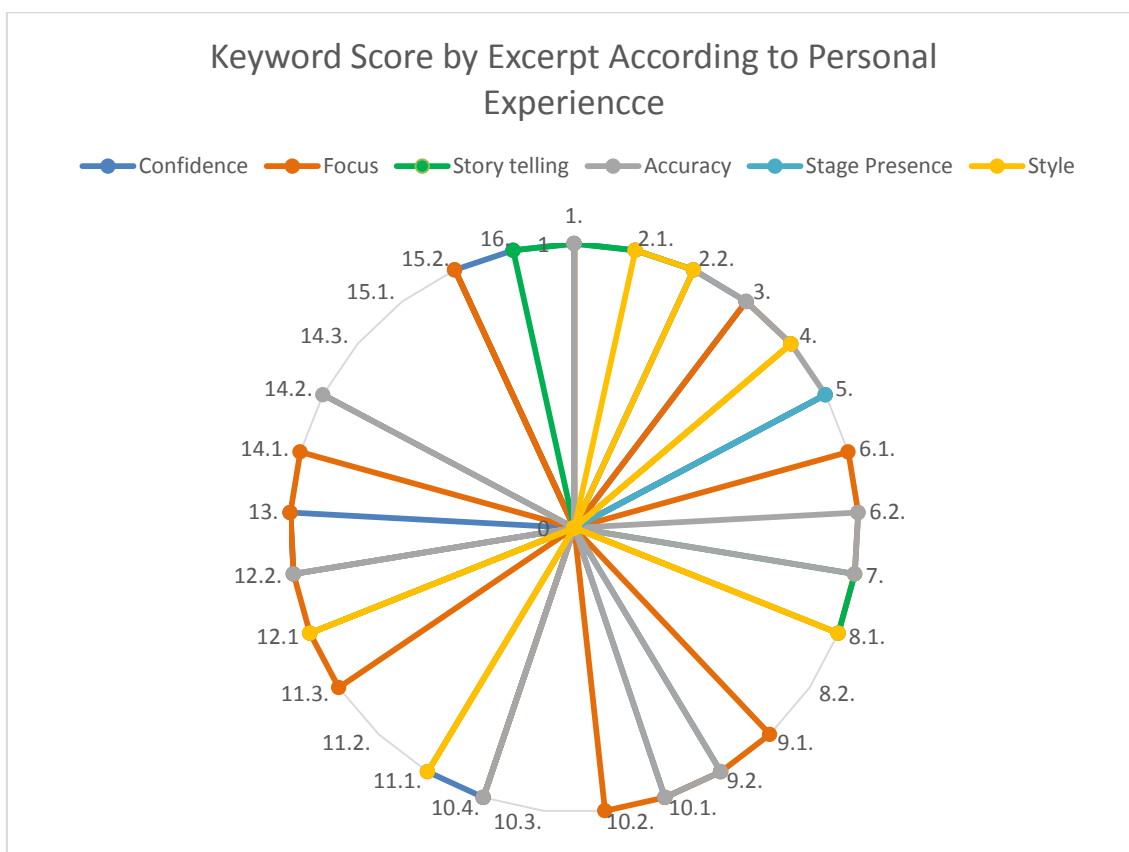
1.2. Personally experienced results



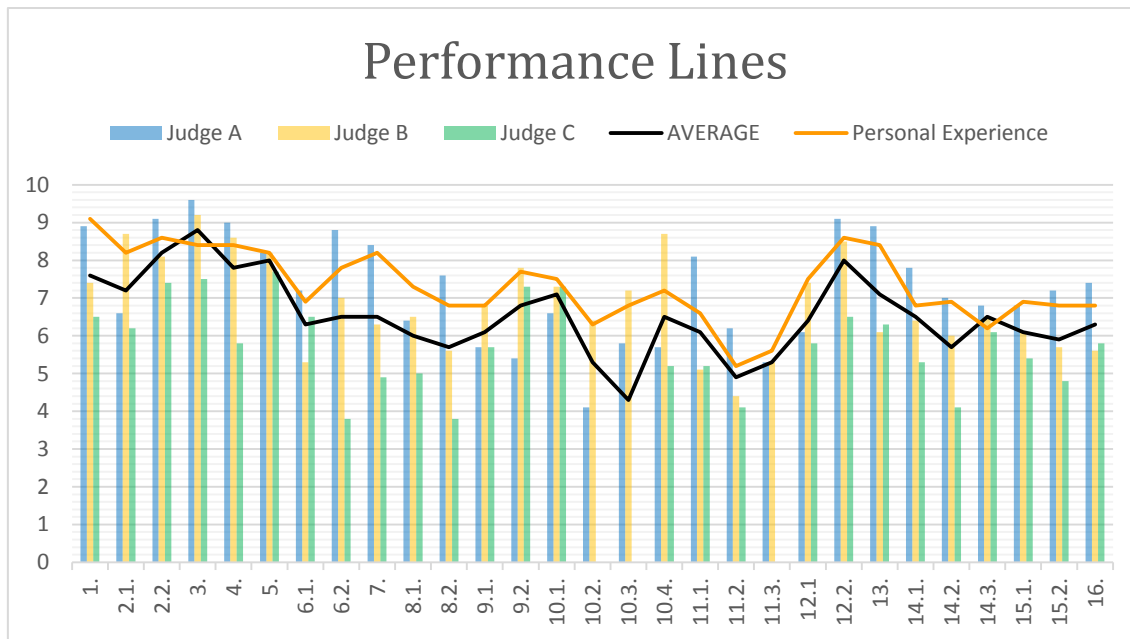
Graph E: Feedback (convincing mark) by personal experience



Graph F: Total score, concerning keywords, by personal experience, for the whole list of excerpts



Graph G: keyword score by excerpt according to personal experience



Graph H: performance baseline, based on the convincing mark average of the committee and performance baseline based on convincing mark of personal experience

2. Analysis and discussion

Graph A describes the convincing factor assigned by each judge to each orchestral excerpt, to which Playing by Heart Memorization Model was applied to. The average of the convincing marks is also presented by the black line. The most convincing excerpt (memorization model) by average was 2.2. Petrushka - Stravinsky (Waltz), and the least convincing was 8.1. Symphony No. 5 - Mahler. There is little deviation in the average results.

Graph B describes the overall breakdown regarding the incidence of keywords in each excerpt (memorization model + practice, memorization model and control group). The keyword with the most incidence was focus and the least incident was stage presence. Accuracy was also heavily mentioned. In the averagely mentioned parameters are included storytelling, style and confidence. One can explain the high percentage of focus being mentioned, by the control group being unconsciously affected by mental preparation of performance in addition to the other excerpts, consciously mentally prepared for performing. It is known that this memorization model is optimized for the stimulation of the focus capacity. Thusly, it is possible that the subject was too focused in the music and disregarded other aspects of performance, such as stage presence, which explains this keyword low percentage.

Graph C allows the understanding of each judge's personal view of keywords strong presence in each expert to which the memorization model was applied. This graph traces the most psychological and subjective aspects of performance. Due to the fact that the described memorization model focuses learning development through the positive aspects, instead of emphasizing the bad/wrong ones in order to improve, the questionnaire only focuses the positive aspects of performance, too. The revealed data would suggest that Judge C tends to focus on the negative aspects, finding almost no positive ones worth mentioning.

In graph D the information is sorted by orchestral excerpt instead of by judge view. This could be used as a study support tool, because is easy to visually identify the excerpts

that could use improvement, and which aspects (regarding the keywords) could be improved.

The following graphs are referring to the subject's personal experience about the performance. These results will be subjected to the same analysis and critical discussion as the aforementioned graphs

Graph E describes the subject's perception on the convincing factor, during the performance of the excerpts, to which the memorization model was applied. In the subject's opinion, excerpt 1. Pictures at an exhibition - Mussorgski/ Ravel was the most convincingly played and the excerpt 8.1 Symphony No. 5 -Mahler the less convincingly played one. It is important to mention that the discrepancies which can be witnessed between this graph and the one corresponding to the judges' point of view could be potentially minimized by increasing the number of people in the committee.

Graph F demonstrates the subject's view of keywords strong presence in each excerpt to which the memorization model was applied. As in graph C, graph F traces the most psychological and subjective aspects of performance. From the subject's point of view, the confidence factor was highly present in performing the referred excerpts, which is not consistent with the judges' opinion. Focus, accuracy, storytelling and stage presence are very consistent with the committee's opinion. An unnoticeable strong keyword in the subject's perception was style, considered highly present in the performance, by the judges. Although the information presented in this graph is valuable, it doesn't explain which excerpts originated which impressions.

Graph G can be seen as a complement of the information provided in Graph D, in the sense that the performer's self perception of her performance is highly valuable feedback when compared with the data collected from someone listening without any agenda. Furthermore, one can tell the procured data is somewhat rough in its assessment of qualities (being either 1 or 0), which is due to the individually small source of the values displayed.

Graph H describes the average of all judges regarding convincing. This average line traces the performance baseline, concerning the convincing factor. In an overall perspective, the starting marks are elevated, which would suggest the committee's expectations. It decreases throughout the first half, where it starts oscillating, having high and low points. After a relative peak in performance, near the end, the subject's performance levels stabilize at values lower than at the beginning of the audition. Furthermore, the presented graph includes the subject's own opinion of her performance which constitutes the orange line. The simultaneous representation of these two sets of data allow the viewer to confirm their similar behavior and tendency, which would indicate the performer is well aware of the progression of her performance.

Concerning error analysis, there are two major obstacles that are accountable for out of the expected results. These are the number of people that formed the committee (which was reduced given the goal of broad opinion, as previously stated) and the subject's own self-involved participation (being both the studier and the aspect being studied). Nevertheless, the collected data has facilitated a higher insight into the minds of the performer and the listener, the student and the teacher.

Part IV - Conclusions

It is inevitable to have a set opinion before undergoing any research. However, this process provides an opportunity for the researcher to learn more about facts instead of what her personal beliefs may dictate.

The main objective while undergoing this research was to put the PbH memorization model to test in a real life situation. However, this endeavor resulted in many secondary realizations.

Firstly, the very concept of “playing from memory” has evolved from being a process that pursues the interiorization of the rhythmic and melodic figures that compose what we call music (playing without any physical memory aid) to a much more emotional, even spiritual involvement of one’s consciousness with the message the particular music tries to convey, its content and not its form. This is to say that to know the very essence of what a musical excerpt stands for as well as its context is a much more powerful method than to simply learn it by memory: it’s playing it by heart.

As the graphs previously shown illustrate, although the PbH memorization model was designed to improve every single keyword regarding performance given, the obtained results revealed that while this method sharply boosts such traits as focus and accuracy (which make for better music), it may have damaged other aspects of performing that require an external awareness, like a performer’s presence on stage for example. The referred graphs also point to the fact that there is no relevant difference (whether in convincing or keyword scores) in applying this model to a previously studied and unconsciously memorized excerpt or to an excerpt which is completely new to the performer.

Nevertheless, some notions were empirically proved just as other ideas were disproved. For instance, the fact that all judges, while being equally musically well educated, perceive music differently was well established while analyzing the questionnaire results, therefore validating the notion that it is very unlikely to always be possible to please everyone every time.

Another interesting effect of this research was its lack of selectivity. This means that, although the performer tried to only apply the PbH memorization model to a select number of excerpts, the method’s nature (as well as the performer’s brain’s nature) made it impossible to avoid some of its principles to bleed into other excerpts which were not meant to be affected. This particular issue could have been resolved using different subjects: some that exclusively use the method and others that exclusively don’t.

The PbH memorization model was created using a vast array of data regarding the brain and the way it stores and learns information. It is therefore considered relevant to point out the importance of a deep scientific research prior to designing any memorization method.

The Playing by Heart memorization model is considered applicable and useful in learning and learning trumpet orchestral excerpts.

In a final note, the application of an improved version of this method in future solo pieces, practicing and performances is something considered worth pursuing. Hopefully, other trumpet/ brass players can benefit from this research.

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Appendix

I. Excerpts list

1. Pictures at an exhibition - Mussorgsky/ Ravel

Beginning to rehearsal number 2

2. Petrushka - Stravinsky

2.1. Ballerina dance

2.2. Waltz

3. Violinkonzert - Berg

4. Leonore Nr. 2 - Beethoven

First signal

5. Leonore Nr. 3 - Beethoven

First signal

6. Concerto for orchestra - Bartók

6.1. 1st movement, bar 356 to bar 396

6.2. 2nd movement, allegretto scherzando

7. Symphony Nr. 3 - Mahler

Posthorn part, from beginning to rehearsal number 15

8. Symphony Nr. 5 - Mahler

8.1. Trauermarsch, beginning

8.2. Bar 278 to bar 293

9. Piano concerto - Ravel

9.1. From rehearsal number 2 to rehearsal number 3

9.2. From rehearsal number 34 to the end

10. Scheherazade - Rimski-Korsakov

10.1. 2nd movement, from H to Tempo I

10.2. 4th movement, from C to D

10.3. 4th movement, from Q to R

10.4. 4th movement, from T to U

11. Ein Heldenleben - Strauss

11.1. From rehearsal number 42 to 5 bars after rehearsal number 44

11.2. From rehearsal number 58 to rehearsal number 62

11.3. From rehearsal number 80 to rehearsal number 90

12. Pulcinella - Stravinsky

12.1. Nr. 5 Toccata

12.2. Nr. 10 Finale, from rehearsal number 118

13. Symphony Nr. 4 - Tchaikovsky

14. Till Eulenspiegels lustige Streiche - Strauss

14.1. Rehearsal number 14

14.2. Rehearsal number 32

14.3. Rehearsal number 36

15. The firebird - Stravinsky

15.1. Infernal dance, two bars after rehearsal number 90 to rehearsal number 93

15.2. Infernal dance, from rehearsal number 100 to 4 bars after rehearsal number

105

16. Parsifal - Wagner

Vorspiel, Sehr langsam

II. Feedback questionnaire from Judge A

Feedback Questionnaire

Master Research

I would kindly like to ask you to fill in this form, in order for me to have relevant feedback for my master research. This questionnaire will be anonymous.

1. Mark the line from “*Not at all*” to “*Extremely*” according to how convincing each excerpt was.

Example:

Not at all _____ *Extremely*

2. Please mention which keyword(s) was/were particularly strong on each excerpt. If none of them is particularly strong, please leave in blank.

Example:

Confidence	<input type="checkbox"/>
Focus	<input checked="" type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input checked="" type="checkbox"/>

Thank you for the collaboration,

Inês Serrano Diogo

1. Pictures at an exhibition - Mussorgsky/ Ravel

Beginning to rehearsal number 2

Not at all

Extremely

Confidence	<input checked="" type="checkbox"/>
Focus	<input checked="" type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input checked="" type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input checked="" type="checkbox"/>

2. Petruschka - Stravinsky

2.1. Ballerina dance

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

2.2. Waltz

Not at all

Extremely

- Confidence ☒
Focus ☒
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☒

3. Violinkonzert - Berg

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☒

4. Leonore Nr. 2 - Beethoven

First signal

Not at all

Extremely

- Confidence ☒
Focus ☐
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☒

5. Leonore Nr. 3 - Beethoven

First signal
Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☒

6. Concerto for orchestra - Bartók

6.1. 1st movement, bar 356 to bar 396

Not at all

Extremely

Confidence ☐
Focus ☒
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

6.2. 2nd movement, allegretto scherzando

Not at all

Extremely

Confidence ☐
Focus ☒
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☒

7. Symphony Nr. 3 - Mahler

Posthorn part, from beginning to rehearsal number 15

Not at all

Extremely

Confidence ☐
Focus ☒
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☐

8. Symphony Nr. 5 - Mahler

8.1. Trauermarsch, beginning

Not at all

Extremely

Confidence ☒
Focus ☐
Story telling ☒
Accuracy ☐ -
Stage Presence ☐
Style ☒

8.2. Bar 278 to bar 293

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☐

9. Piano concerto - Ravel

9.1. From rehearsal number 2 to rehearsal number 3

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

9.2. From rehearsal number 34 to the end

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

10. Scheherazade - Rimski-Korsakov

10.1. 2nd movement, from H to Tempo I

Not at all

Extremely

Confidence ☐
 Focus ☒
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☐

10.2. 4th movement, from C to D

Not at all

Extremely

Confidence ☐
 Focus ☒
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☐

10.3. 4th movement, from Q to R

Not at all

Extremely

Confidence ☐
 Focus ☒
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☐

10.4. 4th movement, from T to U

Not at all

Extremely

Confidence ☐
 Focus ☒
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☐

11. Ein Heldenleben - Strauss

11.1. From rehearsal number 42 to 5 bars after rehearsal number 44

Not at all

Extremely

- Confidence ☐
 Focus ☐
 Story telling ☐
 Accuracy ☐
 Stage Presence ☒
 Style ☒

11.2. From rehearsal number 58 to rehearsal number 62

Not at all

Extremely

- Confidence ☐
 Focus ☐
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☐

11.3. From rehearsal number 80 to rehearsal number 90

Not at all

Extremely

- Confidence ☐
 Focus ☐
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☒

12. Pulcinella - Stravinsky

12.1. Nr. 5 Toccata

Not at all

Extremely

- Confidence ☐
 Focus ☐
 Story telling ☒
 Accuracy ☐
 Stage Presence ☐
 Style ☒

12.2. Nr. 10 Finale, from rehearsal number 118

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☒

13. Symphony Nr. 4 - Tchaikovsky

Not at all

Extremely

Confidence ☐
Focus ☒
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☐

14. Till Eulenspiegels lustige Streiche - Strauss

14.1. Rehearsal number 14

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☐

14.2. Rehearsal number 32

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

14.3. Rehearsal number 36

Not at all *Extremely*

Confidence ☐

Focus ☐

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

15. The firebird - Stravinsky

15.1. Infernal dance, two bars after rehearsal number 90 to rehearsal number 93

Not at all *Extremely*

Confidence ☐

Focus ☐

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

105 15.2. Infernal dance, from rehearsal number 100 to 4 bars after rehearsal number

Not at all *Extremely*

Confidence ☐

Focus ☐

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

16. Parsifal - Wagner

Vorspiel, Sehr langsam

Not at all *Extremely*

Confidence ☐

Focus ☒

Story telling ☐

Accuracy ☒

Stage Presence ☐

Style ☐

III. Feedback questionnaire from Judge B

Feedback Questionnaire

Master Research

I would kindly like to ask you to fill in this form, in order for me to have relevant feedback for my master research. This questionnaire will be anonymous.

1. Mark the line from "Not at all" to "Extremely" according to how convincing each excerpt was.

Example:

Not at all  Extremely

2. Please mention which keyword(s) was/were particularly strong on each excerpt. If none of them is particularly strong, please leave in blank.

Example:

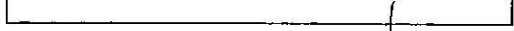
Confidence	<input type="checkbox"/>
Focus	<input checked="" type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input checked="" type="checkbox"/>

Thank you for the collaboration,

Inés Serrano Diogo

1. Pictures at an exhibition - Mussorgsky/ Ravel

Beginning to rehearsal number 2

Not at all  Extremely

Confidence	<input type="checkbox"/>
Focus	<input type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input type="checkbox"/>

2. Petruschka - Stravinsky

2.1. Ballerina dance

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☒

2.2. Waltz

Not at all

Extremely

Confidence ☒
Focus ☒
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☐

3. Violinkonzert - Berg

Not at all

Extremely

Confidence ☒
Focus ☐
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☐

4. Leonore Nr. 2 - Beethoven

First signal

Not at all

Extremely

Confidence ☒
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☒
Style ☐

5. Leonore Nr. 3 - Beethoven

First signal

Not at all

Extremely

- | | |
|----------------|-------------------------------------|
| Confidence | <input checked="" type="checkbox"/> |
| Focus | <input type="checkbox"/> |
| Story telling | <input type="checkbox"/> |
| Accuracy | <input checked="" type="checkbox"/> |
| Stage Presence | <input checked="" type="checkbox"/> |
| Style | <input type="checkbox"/> |

6. Concerto for orchestra - Bartók

6.1. 1st movement, bar 356 to bar 396

Not at all

Extremely

- | | |
|----------------|-------------------------------------|
| Confidence | <input type="checkbox"/> |
| Focus | <input checked="" type="checkbox"/> |
| Story telling | <input type="checkbox"/> |
| Accuracy | <input type="checkbox"/> |
| Stage Presence | <input type="checkbox"/> |
| Style | <input type="checkbox"/> |

6.2. 2nd movement, allegretto scherzando

Not at all

Extremely

- | | |
|----------------|-------------------------------------|
| Confidence | <input type="checkbox"/> |
| Focus | <input checked="" type="checkbox"/> |
| Story telling | <input type="checkbox"/> |
| Accuracy | <input type="checkbox"/> |
| Stage Presence | <input type="checkbox"/> |
| Style | <input type="checkbox"/> |

7. Symphony Nr. 3 - Mahler

Posthorn part, from beginning to rehearsal number 15

Not at all

Extremely

- | | |
|----------------|-------------------------------------|
| Confidence | <input checked="" type="checkbox"/> |
| Focus | <input checked="" type="checkbox"/> |
| Story telling | <input type="checkbox"/> |
| Accuracy | <input type="checkbox"/> |
| Stage Presence | <input type="checkbox"/> |
| Style | <input type="checkbox"/> |

8. Symphony Nr. 5 - Mahler

8.1. Trauermarsch, beginning

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☐

8.2. Bar 278 to bar 293

Not at all

Extremely

Confidence ☒
Focus ☒
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

9. Piano concerto - Ravel

9.1. From rehearsal number 2 to rehearsal number 3

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☐

9.2. From rehearsal number 34 to the end

Not at all

Extremely

Confidence ☒
Focus ☐
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☐

10. Scheherazade - Rimski-Korsakov

10.1. 2nd movement, from H to Tempo I

Not at all

Extremely

Confidence ☒
 Focus ☒
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☐

10.2. 4th movement, from C to D

Not at all

Extremely

Confidence ☐
 Focus ☐
 Story telling ☒
 Accuracy ☒
 Stage Presence ☐
 Style ☐

10.3. 4th movement, from Q to R

Not at all

Extremely

Confidence ☒
 Focus ☒
 Story telling ☒
 Accuracy ☒
 Stage Presence ☐
 Style ☐

10.4. 4th movement, from T to U

Not at all

Extremely

Confidence ☐
 Focus ☐
 Story telling ☒
 Accuracy ☒
 Stage Presence ☒
 Style ☒

11. Eln Heldenleben - Strauss

11.1. From rehearsal number 42 to 5 bars after rehearsal number 44

Not at all *Extremely*

Confidence ☐
Focus ☐
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☐

11.2. From rehearsal number 58 to rehearsal number 62

Not at all *Extremely*

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

11.3. From rehearsal number 80 to rehearsal number 90

Not at all *Extremely*

Confidence ☐
Focus ☒
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☐

12. Pulcinella - Stravinsky

12.1. Nr. 5 Toccata

Not at all *Extremely*

Confidence ☐
Focus ☒
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☐

12.2. Nr. 10 Finale, from rehearsal number 118

Not at all

Extremely

- Confidence ☒
- Focus ☒
- Story telling ☐
- Accuracy ☐
- Stage Presence ☐
- Style ☐

13. Symphony Nr. 4 - Tchaikovsky

Not at all

Extremely

- Confidence ☒
- Focus ☒
- Story telling ☐
- Accuracy ☐
- Stage Presence ☐
- Style ☐

14. Till Eulenspiegels lustige Streiche - Strauss

14.1. Rehearsal number 14

Not at all

Extremely

- Confidence ☐
- Focus ☐
- Story telling ☐
- Accuracy ☐
- Stage Presence ☐
- Style ☐

14.2. Rehearsal number 32

Not at all

Extremely

- Confidence ☐
- Focus ☐
- Story telling ☒
- Accuracy ☒
- Stage Presence ☐
- Style ☐

14.3. Rehearsal number 36
Not at all *Extremely*

Confidence ☒

Focus ☒

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

15. The firebird - Stravinsky

15.1. Infernal dance, two bars after rehearsal number 90 to rehearsal number 93
Not at all *Extremely*

Confidence ☐

Focus ☐

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

105 15.2. Infernal dance, from rehearsal number 100 to 4 bars after rehearsal number
Not at all *Extremely*

Confidence ☒

Focus ☒

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

16. Parsifal - Wagner

Vorspiel, Sehr langsam
Not at all *Extremely*

Confidence ☒

Focus ☒

Story telling ☐

Accuracy ☐

Stage Presence ☒

Style ☒

IV. Feedback questionnaire from Judge C

Feedback Questionnaire

Master Research

I would kindly like to ask you to fill in this form, in order for me to have relevant feedback for my master research. This questionnaire will be anonymous.

1. Mark the line from “*Not at all*” to “*Extremely*” according to how convincing each excerpt was.

Example:

Not at all

Extremely

2. Please mention which keyword(s) was/were particularly strong on each excerpt. If none of them is particularly strong, please leave in blank.

Example:

Confidence	<input type="checkbox"/>
Focus	<input checked="" type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input checked="" type="checkbox"/>

Thank you for the collaboration,

Inês Serrano Diogo

1. Pictures at an exhibition - Mussorgsky/ Ravel

Beginning to rehearsal number 2

Not at all

Extremely

Confidence	<input type="checkbox"/>
Focus	<input type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input type="checkbox"/>

2. Petruschka - Stravinsky

2.1. Ballerina dance

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

2.2. Waltz

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☐

3. Violinkonzert - Berg

Not at all

Extremely

- Confidence ☒
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

4. Leonore Nr. 2 - Beethoven

First signal

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

5. Leonore Nr. 3 - Beethoven

First signal

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

6. Concerto for orchestra - Bartók

6.1. 1st movement, bar 356 to bar 396

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

6.2. 2nd movement, allegretto scherzando

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

7. Symphony Nr. 3 - Mahler

Posthorn part, from beginning to rehearsal number 15

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

8. Symphony Nr. 5 - Mahler

8.1. Trauermarsch, beginning

Not at all

Extremely

Confidence ☒
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

8.2. Bar 278 to bar 293

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

9. Piano concerto - Ravel

9.1. From rehearsal number 2 to rehearsal number 3

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

9.2. From rehearsal number 34 to the end

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

10. Scheherazade - Rimski-Korsakov

10.1. 2nd movement, from H to Tempo I

Not at all *Extremely*

Confidence	<input type="checkbox"/>
Focus	<input type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input checked="" type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input type="checkbox"/>

10.2. 4th movement, from C to D

Not at all *Extremely*

Confidence	<input type="checkbox"/>
Focus	<input type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input type="checkbox"/>

10.3. 4th movement, from Q to R

Not at all *Extremely*

Confidence	<input type="checkbox"/>
Focus	<input type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input type="checkbox"/>

10.4. 4th movement, from T to U

Not at all *Extremely*

Confidence	<input type="checkbox"/>
Focus	<input type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input type="checkbox"/>

11. Ein Heldenleben - Strauss

11.1. From rehearsal number 42 to 5 bars after rehearsal number 44

Not at all *Extremely*

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

11.2. From rehearsal number 58 to rehearsal number 62

Not at all *Extremely*

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

11.3. From rehearsal number 80 to rehearsal number 90

Not at all *Extremely*

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

12. Pulcinella - Stravinsky

12.1. Nr. 5 Toccata

Not at all *Extremely*

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

12.2. Nr. 10 Finale, from rehearsal number 118

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

13. Symphony Nr. 4 - Tchaikovsky

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

14. Till Eulenspiegels lustige Streiche - Strauss

14.1. Rehearsal number 14

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

14.2. Rehearsal number 32

Not at all

Extremely

- Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

14.3. Rehearsal number 36

Not at all *Extremely*

Confidence ☐

Focus ☐

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

15. The firebird - Stravinsky

15.1. Infernal dance, two bars after rehearsal number 90 to rehearsal number 93

Not at all *Extremely*

Confidence ☐

Focus ☐

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

105 15.2. Infernal dance, from rehearsal number 100 to 4 bars after rehearsal number

Not at all *Extremely*

Confidence ☐

Focus ☐

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

16. Parsifal - Wagner

Vorspiel, Sehr langsam

Not at all *Extremely*

Confidence ☐

Focus ☐

Story telling ☐

Accuracy ☐

Stage Presence ☐

Style ☐

V. Feedback questionnaire from personal experience

Feedback Questionnaire

Master Research

I would kindly like to ask you to fill in this form, in order for me to have relevant feedback for my master research. This questionnaire will be anonymous.

1. Mark the line from “Not at all” to “Extremely” according to how convincing each excerpt was.

Example:

Not at all  Extremely

2. Please mention which keyword(s) was/were particularly strong on each excerpt. If none of them is particularly strong, please leave in blank.

Example:

Confidence	<input type="checkbox"/>
Focus	<input checked="" type="checkbox"/>
Story telling	<input type="checkbox"/>
Accuracy	<input type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input checked="" type="checkbox"/>

Thank you for the collaboration,

Inês Serrano Diogo

1. Pictures at an exhibition - Mussorgsky/ Ravel

Beginning to rehearsal number 2

Not at all

Extremely

Confidence	<input checked="" type="checkbox"/>
Focus	<input checked="" type="checkbox"/>
Story telling	<input checked="" type="checkbox"/>
Accuracy	<input checked="" type="checkbox"/>
Stage Presence	<input type="checkbox"/>
Style	<input type="checkbox"/>

2. Petruschka - Stravinsky

2.1. Ballerina dance

Not at all

Extremely

- Confidence ☒
Focus ☐
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☒

2.2. Waltz

Not at all

Extremely

- Confidence ☒
Focus ☐
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☒

3. Violinkonzert - Berg

Not at all

Extremely

- Confidence ☒
Focus ☒
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☐

4. Leonore Nr. 2 - Beethoven

First signal

Not at all

Extremely

- Confidence ☐
Focus ☒
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☒

5. Leonore Nr. 3 - Beethoven

First signal

Not at all

Extremely

- Confidence ☒
Focus ☐
Story telling ☐
Accuracy ☒
Stage Presence ☒
Style ☐

6. Concerto for orchestra - Bartók

6.1. 1st movement, bar 356 to bar 396

Not at all

Extremely

- Confidence ☐
Focus ☒
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

6.2. 2nd movement, allegretto scherzando

Not at all

Extremely

- Confidence ☐
Focus ☒
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☐

7. Symphony Nr. 3 - Mahler

Posthorn part, from beginning to rehearsal number 15

Not at all

Extremely

- Confidence ☐
Focus ☒
Story telling ☒
Accuracy ☒
Stage Presence ☐
Style ☐

8. Symphony Nr. 5 - Mahler

8.1. Trauermarsch, beginning

Not at all

Extremely

Confidence ☐
Focus ☒
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☒

8.2. Bar 278 to bar 293

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

9. Piano concerto - Ravel

9.1. From rehearsal number 2 to rehearsal number 3

Not at all

Extremely

Confidence ☐
Focus ☒
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

9.2. From rehearsal number 34 to the end

Not at all

Extremely

Confidence ☒
Focus ☒
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☐

10. Scheherazade - Rimski-Korsakov

10.1. 2nd movement, from II to Tempo I

Not at all

Extremely

Confidence ☒
Focus ☒
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☐

10.2. 4th movement, from C to D

Not at all

Extremely

Confidence ☐
Focus ☒
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

10.3. 4th movement, from Q to R

Not at all

Extremely

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

10.4. 4th movement, from T to U

Not at all

Extremely

Confidence ☒
Focus ☒
Story telling ☐
Accuracy ☒
Stage Presence ☐
Style ☐

11. Ein Heldenleben - Strauss

11.1. From rehearsal number 42 to 5 bars after rehearsal number 44

Not at all *Extremely*

Confidence ☒
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☒

11.2. From rehearsal number 58 to rehearsal number 62

Not at all *Extremely*

Confidence ☐
Focus ☐
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

11.3. From rehearsal number 80 to rehearsal number 90

Not at all *Extremely*

Confidence ☐
Focus ☒
Story telling ☐
Accuracy ☐
Stage Presence ☐
Style ☐

12. Pulcinella - Stravinsky

12.1. Nr. 5 Toccata

Not at all *Extremely*

Confidence ☐
Focus ☒
Story telling ☒
Accuracy ☐
Stage Presence ☐
Style ☒

12.2. Nr. 10 Finale, from rehearsal number 118

Not at all

Extremely

- | | |
|----------------|-------------------------------------|
| Confidence | <input checked="" type="checkbox"/> |
| Focus | <input checked="" type="checkbox"/> |
| Story telling | <input type="checkbox"/> |
| Accuracy | <input checked="" type="checkbox"/> |
| Stage Presence | <input type="checkbox"/> |
| Style | <input type="checkbox"/> |

13. Symphony Nr. 4 - Tchaikovsky

Not at all

Extremely

- | | |
|----------------|-------------------------------------|
| Confidence | <input checked="" type="checkbox"/> |
| Focus | <input checked="" type="checkbox"/> |
| Story telling | <input type="checkbox"/> |
| Accuracy | <input type="checkbox"/> |
| Stage Presence | <input type="checkbox"/> |
| Style | <input type="checkbox"/> |

14. Till Eulenspiegels lustige Streiche - Strauss

14.1. Rehearsal number 14

Not at all

Extremely

- | | |
|----------------|-------------------------------------|
| Confidence | <input type="checkbox"/> |
| Focus | <input checked="" type="checkbox"/> |
| Story telling | <input type="checkbox"/> |
| Accuracy | <input type="checkbox"/> |
| Stage Presence | <input type="checkbox"/> |
| Style | <input type="checkbox"/> |

14.2. Rehearsal number 32

Not at all

Extremely

- | | |
|----------------|-------------------------------------|
| Confidence | <input type="checkbox"/> |
| Focus | <input type="checkbox"/> |
| Story telling | <input type="checkbox"/> |
| Accuracy | <input checked="" type="checkbox"/> |
| Stage Presence | <input type="checkbox"/> |
| Style | <input type="checkbox"/> |

14.3. Rehearsal number 36

Not at all

Extremely

- Confidence ☐
 Focus ☐
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☐

15. The firebird - Stravinsky

15.1. Infernal dance, two bars after rehearsal number 90 to rehearsal number 93

Not at all

Extremely

- Confidence ☐
 Focus ☐
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☐

15.2. Infernal dance, from rehearsal number 100 to 4 bars after rehearsal number

105

Not at all

Extremely

- Confidence ☒
 Focus ☒
 Story telling ☐
 Accuracy ☐
 Stage Presence ☐
 Style ☐

16. Parsifal - Wagner

Vorspiel, Sehr langsam

Not at all

Extremely

- Confidence ☒
 Focus ☐
 Story telling ☒
 Accuracy ☐
 Stage Presence ☐
 Style ☐

VI. Table: Orchestral excerpts feedback of trumpet orchestral excerpts master exam, regarding convincing parameter.⁵⁰

<i>Orchestral Excerpt</i>	Judge A	Judge B	Judge C	Average
1.	8.9	7.4	6.5	7.6
2.1.	6.6	8.7	6.2	7.2
2.2.	9.1	8.1	7.4	8.2
3.	9.6	9.2	7.5	8.8
4.	9.0	8.6	5.8	7.8
5.	8.2	8.2	7.7	8.0
6.1.	7.2	5.3	6.5	6.3
6.2.	8.8	7.0	3.8	6.5
7.	8.4	6.3	4.9	6.5
8.1.	6.4	6.5	5.0	6.0
8.2.	7.6	5.6	3.8	5.7
9.1.	5.7	6.8	5.7	6.1
9.2.	5.4	7.8	7.3	6.8
10.1.	6.6	7.3	7.3	7.1
10.2.	4.1	6.4	–	5.3
10.3.	5.8	7.2	–	4.3
10.4.	5.7	8.7	5.2	6.5
11.1.	8.1	5.1	5.2	6.1
11.2.	6.2	4.4	4.1	4.9
11.3.	5.3	5.3	–	5.3
12.1	6.1	7.4	5.8	6.4
12.2.	9.1	8.5	6.5	8.0
13.	8.9	6.1	6.3	7.1
14.1.	7.8	6.4	5.3	6.5
14.2.	7.0	6.0	4.1	5.7
14.3.	6.8	6.5	6.1	6.5
15.1.	6.8	6.1	5.4	6.1
15.2.	7.2	5.7	4.8	5.9
16.	7.4	5.6	5.8	6.3
<i>Average</i>	7.2	6.8	5.2	6.5

⁵⁰ The correspondence for each orchestral excerpts number can be seen in appendix I. This information is valid for all tables presented in the appendix.

VII. Table: Orchestral excerpts feedback of trumpet orchestral excerpts master exam, regarding confidence, focus, storytelling, accuracy, stage presence and style parameters.

<i>Orchestral Excerpt</i>	Confidence			Focus			Story telling			Accuracy			Stage presence			Style		
<i>Judge</i>	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
<i>1.</i>	x			x						x						x		
<i>2.1.</i>								x									x	
<i>2.2.</i>	x			x	x		x		x	x	x					x		
<i>3.</i>		x	x							x	x					x		
<i>4.</i>		x					x			x				x		x		
<i>5.</i>		x					x			x				x		x		
<i>6.1.</i>				x	x													
<i>6.2.</i>				x			x	x		x						x		
<i>7.</i>	x				x					x								
<i>8.1.</i>	x		x				x				x					x		
<i>8.2.</i>					x		x											
<i>9.1.</i>											x							
<i>9.2.</i>		x									x							
<i>10.1.</i>				x	x							x						
<i>10.2.</i>				x							x							
<i>10.3.</i>				x	x						x							
<i>10.4.</i>				x							x						x	
<i>11.1.</i>											x		x			x		
<i>11.2.</i>																		
<i>11.3.</i>								x								x		
<i>12.1.</i>							x	x								x		
<i>12.2.</i>					x		x			x						x		
<i>13.</i>				x	x		x											
<i>14.1.</i>							x											
<i>14.2.</i>											x							
<i>14.3.</i>					x													
<i>15.1.</i>																		
<i>15.2.</i>					x													
<i>16.</i>				x	x					x							x	
<i>Total by judge</i>	4	4	2	10	11	0	10	4	1	9	10	1	1	2	0	11	3	0
<i>Total by parameter</i>	10			21			15			20			3			14		

VIII. Table: Personal experienced results, regarding convincing, confidence, focus, story telling, accuracy stage presence and style.

<i>Orchestral Excerpt</i>	Convincing	Confidence	Focus	Story telling	Accuracy	Stage presence	Style
1.	9.1	x	x	x	x		
2.1.	8.2	x		x			x
2.2.	8.6	x		x	x		x
3.	8.4	x	x		x		
4.	8.4		x		x		x
5.	8.2	x			x	x	
6.1.	6.9		x				
6.2.	7.8		x		x		
7.	8.2		x	x	x		
8.1.	7.3		x	x			x
8.2.	6.8						
9.1.	6.8		x				
9.2.	7.7	x	x		x		
10.1.	7.5	x	x		x		
10.2.	6.3		x				
10.3.	6.8						
10.4.	7.2	x	x		x		
11.1.	6.6	x					x
11.2.	5.2						
11.3.	5.6		x				
12.1	7.5		x	x			x
12.2.	8.6	x	x		x		
13.	8.4	x	x				
14.1.	6.8		x				
14.2.	6.9				x		
14.3.	6.2						
15.1.	6.9						
15.2.	6.8	x	x				
16.	6.8	x		x			
<i>Average/Total</i>	7.3	13	18	7	12	1	6